AN EMPIRICAL INVESTIGATION OF UIP AND PPP IN INFLATION TARGETING COUNTRIES

by

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Declaration

I certify that the thesis I have presented for examination for the degree of Doctor of Philosophy at London South Bank University is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

A version of Chapter 3 of this thesis was issued as a working paper through CESifo, Working Paper No. 8961.

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I declare that my thesis consists of approximately 42,000 words, excluding tables and appendices.

Statement of conjoint work

I confirm that Chapters 3, 5 and 7 were jointly co-authored with Professor Guglielmo Caporale and I contributed at least 60% of this work.

Abstract

This thesis consists of three empirical chapters, which study the role of central bank credibility in influencing the exchange rate parities in inflation targeting countries. Central bank credibility is considered to be of upmost importance to the success of the inflation targeting regime. The increasing popularity of inflation targeting as a monetary policy framework requires an evaluation of its wider implications on the economy compared to alternative monetary regimes. This thesis provides insight into the relation between central bank credibility and the exchange rate parities in a comparative study of inflation targeting countries and countries that operate alternative monetary regimes.

The first empirical chapter investigates the extent to which deviations from the Taylor rule influence the exchange rate parities. The use of a nonlinear framework provides evidence for the strong persistence of deviations from the parities when Taylor rule deviations are large. The findings of the comparative study show that central bank credibility is more important in inflation targeting countries than in non-targeting countries.

The second empirical chapter considers the role of interest rate expectations as an often overlooked measure of central bank credibility when investigating the UIP relation. Using a nonlinear framework, the findings are able to confirm the validity of UIP when the public expects the central bank to adopt a tight monetary stance with closer adherence to the inflation target.

The final empirical chapter analyses the role of macroeconomic shocks including inflation expectations shocks in a nonlinear model of the real exchange rate. It is shown that the adjustment to PPP is partially influenced by central bank credibility shocks, in particular those arising from survey expectations.

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1 Introduction

"What information should it [the central bank] use to keep inflation within the desired range? – The answer to this question is 'any information that is relevant to the forecasting of inflation.'"

- Bernanke, Laubach, Mishkin and Posen (2018, p. 32)

1.1 Research Motivation and Background

This thesis aims to conduct an empirical investigation of Uncovered Interest Rate Parity and Purchasing Power Parity in inflation targeting countries. There are three empirical chapters which analyse the topic, each from a different angle, but which are connected by an underlying theme; namely to determine how the adjustment to the exchange rate parities is influenced by factors, which indicate the degree of credibility of the inflation targeting central bank. Before the detailed focus of the research is discussed, the below sections provide a brief background to highlight why such an investigation is important and how it is placed within the existing literature.

1.1.1 The Exchange Rate Parities

Few variables in international finance have received as much attention in the economic literature as the exchange rate. There are numerous theories that aim to explain the behaviour of the exchange rate, amongst which the Uncovered Interest Rate Parity and Purchasing Power Parity are the most well-documented exchange rate theories in this context. The Purchasing Power Parity (PPP) hypothesis, which establishes a direct relationship between the exchange rate and inflation rates between two countries, represents the exchange rate equilibrium in the goods market. The Uncovered Interest Rate Parity (UIP), which links expected changes in the exchange rate to changes in the interest rate differential between two countries, represents the exchange rate equilibrium in the asset market. The two theories are important non-arbitrage conditions and, apart from being standalone theories of exchange rate determination, serve as fundamental building blocks in a number of more far-reaching theoretical models of the exchange rate. The empirical evaluation of UIP and PPP has generated great controversy, and the parities are, more often than not, found to be invalid. The frequent empirical rejection of the parities has crystalized itself as a recurring conundrum and has been labelled the UIP and PPP puzzles (see, for instance, Taylor et al., 2001; Sarno et al., 2005).

The vast evidence which confirms the empirical failure of UIP and PPP is by no means surprising. The assumptions that underlie the theoretical definition of the parities, such as the existence of perfectly competitive markets, or the absence of transactions costs, risk premia and speculative bubbles, represent strict constraints in which the parities are assumed to hold, but which are far from resembling economic reality. The empirical evidence lends only little support to the strict theoretical definition of the parities. A less stringent definition of the parities, which is commonly used as the basis for empirical estimations, is that of the existence of a long run relation between the exchange rate and the parity fundamentals, which are the interest rate differentials and inflation rate differentials for UIP and PPP, respectively. In this context, if one were to briefly summarise the findings in the empirical literature, it would be that even when PPP and UIP are valid in the long run, the adjustment speed to equilibrium tends to be slow (Sarno, 2005).

1.1.2 The Inflation Targeting Regime

Inflation targeting central banks have set as their primary monetary policy objective the stabilisation of price levels and have made an explicit commitment to keeping inflation at a low and stable target rate. The central bank generally uses a monetary policy rule, according to which it sets the interest rate to reduce any deviations of the inflation rate from its target. Credibility is of paramount importance for the success of the regime, since the loss of central bank credibility can severely impact the fulfilment of the inflation target. The degree of central bank credibility and inflation expectations held by the general public crucially affect macroeconomic outcomes, such as price-setting decisions made by firms and the consumption behaviour of households. A loss in credibility can amplify the impact of economic shocks and lead to higher levels of inflation. Strengthening the degree of central bank credibility and reducing variations in public expectations to better align them with the monetary policy objective, have become important aspects of monetary stabilisation in inflation targeting countries (Blinder et al., 2008).

In order to effectively achieve the inflation targeting goal, the monetary authority should limit undesired side effects of its policies and communications on any macroeconomic variables, the central bank is not directly responsible for. In order to fulfil this requirement, the monetary authority needs to consider all information that is important for achieving the inflation target. This forms part of the understanding of the wider monetary policy transmission mechanism. Monetary policy can be transmitted to the inflation rate and other economic aggregates through various channels. Apart from the aggregate demand channel and the expectations channel, inflation targeting monetary policy can be transmitted to economic fundamentals in the goods market through an additional exchange rate channel (Svensson, 2000a). In the inflation targeting regime, the interest rate and the inflation rate are connected through the monetary policy rule, with which the central bank raises or lowers the interest rate to align the inflation rate with the target. The interest rate and inflation rate are, however, also connected through the exchange rate and the UIP and PPP relations. The existence of this additional connection raises the question of whether inflation targeting central banks should pay attention to how their policies affect the exchange rate equilibria in the goods and asset markets. An understanding of whether central bank credibility can positively or negatively influence the adjustment of deviations from the parities could aid with achieving greater economic stabilisation beyond price level stabilisation.

1.2 Aims and Objectives

1.2.1 Research Problem and Aim

This brings us to the specific topic this thesis aims to address. The aim of this thesis is to investigate whether central bank credibility influences the adjustment to UIP and PPP in inflation targeting countries. The exchange rate parities are important indicators of the economic performance of a country vis-à-vis other countries. Within the vast existing literature that has investigated the parities from various angles and put forward numerous suggested reasons to explain deviations from the parities, there is at present no comprehensive investigation of the exchange rate parities in inflation targeting countries. There are two important motives for conducting such an analysis. Firstly, assessing how central bank credibility influences UIP and PPP in inflation targeting countries compared to non-targeting countries is of relevance for the general economic understanding of the parity puzzles. Secondly, understanding whether credibility affects the adjustment to the UIP- and PPP-implied equilibrium values can provide important insight into the overall macroeconomic stability in the inflation targeting regime. The analysis might be useful for central banks to assess the implications of changes in central bank credibility on the goods and asset markets; and can be indicative of the wider success of the inflation targeting regime. This awareness in turn can be useful for estimating the impact of monetary policy under different levels of central bank credibility. While policymakers go to great lengths of assessing the impact of their policies and of exogenous shocks on achieving the target inflation rate, a detailed investigation of the validity of the parities and, in particular, their adjustment to equilibrium can be relevant for achieving the ultimate goal of price stability.

The two conditions of the exchange rate goods and asset market equilibrium can influence other variables, especially interest rates and inflation rates, as both are direct components of the parity relations. The parities are by no means independent from each other and this is mainly due to the exchange rate which features in both conditions, but also through other interactions between goods and asset markets, meaning that a disequilibrium in one market can have repercussions on the other (Cumby and Obstfeld, 1984). The exchange rate represents a direct connection between the parities and can act as an additional transmission channel of interest rate changes or exogenous shocks, which affect the exchange rate, to inflation. Therefore, the validity of UIP and PPP might be a desirable property to support the achievement of the main inflation targeting goal of low and stable inflation.

1.2.2 Research Questions and Objectives

The aim of this thesis is to uncover the ways in which key indicators of central bank credibility in the inflation targeting regime influence the exchange rate parities. In order to achieve this aim, one needs to define the ways in which central bank credibility can be measured. There are several ways in which this can be done, and this thesis is going to focus on three distinct methods. The first is deviations from the monetary policy rule; the second is changes in interest rate expectations of market participants; and the third is shocks to inflation expectations. Over the course of this thesis, it will be assessed how the adjustment to UIP and PPP is influenced by these measures of central bank credibility. With respect to this, this thesis addresses the following specific research questions.

1) To what extent does the existence and size of Taylor rule deviations influence the adjustment to UIP and PPP?

2) How do changes in interest rate expectations influence the adjustment to the UIP-implied equilibrium?

3) How do shocks to inflation expectations affect PPP and the adjustment of the real exchange rate?

As we shall see, particular interest in placed on uncovering nonlinear and asymmetric adjustment to the UIP- and PPP-implied equilibria by using three different applications of nonlinear estimations.[1] This is investigated for five countries that pioneered the adoption of inflation targeting, namely the United Kingdom, Canada, Australia, New Zealand and Sweden. Some background to the monetary policy in these countries is discussed in Section 2.4.5. In order to be able to identify the relation between central bank credibility and the exchange rate parities in inflation targeting countries, the analysis is also conducted for a small control group of economies, which do not identify themselves as inflation-targeters, but have instead chosen alternative monetary regimes. These are the United States, the Euro-Area and Switzerland.

In order to answer the research questions, the following distinct research objectives have been set, which will represent the focus of the three empirical chapters in this thesis. The first objective is to assess how the size of Taylor rule deviations affects the speed of adjustment of deviations from UIP and PPP. To achieve this objective, one first needs to establish whether the exchange rate parities are valid in the selected inflation targeting countries, as well as in the non-targeting economies. One then wants to assess whether the adjustment of any deviations are influenced by the existence and size of Taylor rule deviations. For this purpose, one needs to construct an empirical measure of Taylor rule deviations for each country. Finally, a suitable model needs to be identified which allows one to assess the influence of Taylor rule deviations on the adjustment to UIP and PPP. The second objective is to analyse how changes in interest rate expectations affect the speed of adjustment to UIP. Meeting this objective requires to first assess the validity of UIP. One then needs to construct a measure of interest rate expectations that can measure any changes in the expected interest rate that are not aligned with the actual interest rate set or announced by the central bank. This requires the selection of a model which allows to separate the effect of announcements of the interest rate from that of expectations of the interest rate. The third objective is to estimate the impact of shocks to inflation expectations on deviations

[1] A pictorial representation of the different classes of nonlinear time-series models can be found in Appendix A.

from PPP and the adjustment to the PPP-implied equilibrium. In order to achieve this objective, one needs to identify suitable measures of inflation expectations by weighing the merits of several different measures. There is then the need to identify a model which allows to estimate the effect of shocks to inflation expectations on PPP. The model needs to be suitable to separate inflation expectations shocks from other macroeconomic shocks. The details about how the three research objectives are going to be addressed in this thesis is outlined in the following section.

1.3 Contribution and Thesis Outline

This thesis makes contributions in several areas. Firstly, it is the first comprehensive investigation of the validity of UIP and PPP in inflation targeting countries. Secondly, it considers variables as potential determinants of the adjustment to the long run parity equilibria, which can be indicative of the degree of central bank credibility and are important for the successful operation of the inflation targeting regime. Under the overarching theme of central bank credibility, we account for Taylor rule deviations, changes in the expected interest rate, as well as different types of inflation expectations shocks as potential variables which influence the parities in inflation targeting countries. Finally, this thesis uses three types of nonlinear models, which have not been used in this context to this extent, and allow us to assess nonlinearities and asymmetries in the adjustment process to UIP and PPP. The thesis, as such, aims to provide a comprehensive assessment of nonlinearities and asymmetries in the adjustment process of deviations from the parities determined by different indicators of central bank credibility.

This thesis is structured in the following way. Chapter 2 presents the theoretical background and empirical literature underlying the research in this thesis. This includes the theoretical formulation and explanation of past empirical investigations of the exchange rate parity relations, an overview of the role of monetary policy in inflation targeting countries and an insight into empirical Taylor rule exchange rate models. Chapters 3, 5 and 7 constitute the main parts of this thesis in which we investigate how different measures of central bank credibility affect the adjustment to UIP and PPP.

The first empirical chapter, Chapter 3, is named *The Exchange Rate Parities and Taylor Rule Deviations* and commences with providing an investigation of the adjustment to UIP and PPP under Taylor rule deviations. A deviation of the level of the interest rate set by the central bank from the level determined by the Taylor rule constitutes a loss in central bank credibility. We first estimate empirical Taylor rules, which best describe the interest rate setting mechanism in each country and from there construct a Taylor rule deviations variable. Then a test for the long run cointegration relationship between the exchange rate and the parity fundamentals is employed, followed by a test for threshold-type nonlinearities in the adjustment process, which are determined by Taylor rule deviations. We proceed to estimate a multivariate Threshold Vector Error Correction model to assess the adjustment to the exchange rate parities under regimes of both small and large Taylor rule deviations. This allows us to evaluate nonlinearities in the adjustment speed of deviations from UIP and PPP to the long run equilibrium between states of small and large deviations from the monetary policy rule. The nonlinear model is assessed against a benchmark linear Vector Error Correction model of UIP and PPP. The findings show that the adjustment of deviations from the parities is faster when Taylor rule deviations are small and further show that credibility seems to be more important for the validity of UIP and PPP in inflation targeting countries than in non-targeting economies.

This first empirical chapter is followed by a linking chapter that summarises the findings of the preceding chapter and presents avenues for subsequent research. The chapter discusses the concepts of transparency and central bank credibility in more detail and thematises the need to consider the role of communications and expectations in analyses of the exchange rate parities. As such, Chapter 4 provides the conceptual link between the first and the second empirical chapters. In the subsequent two empirical chapters UIP and PPP are investigated separately.

Chapter 5 is the second empirical chapter and is named *Testing for UIP: Nonlinearities, Monetary Announcements and Interest Rate Expectations*. This estimates the equilibrium UIP relation and how the adjustment to this equilibrium is affected by changes in interest rate expectations. The aim is to explore asymmetric effects of policy announcements on the UIP fundamentals directly; as well as the nonlinear adjustment of UIP deviations under different regimes of positive and negative changes in the expected interest rate. This is done by using a Smooth Transition Cointegrated Vector Autoregressive framework which allows us to assess differences in the adjustment speed to UIP depending on the size of changes in interest rate expectations. The model controls for the effect of positive and negative central bank announcements of changes in the interest rate and is assessed against a benchmark linear Cointegrated Vector Autoregressive Model. The adjustment of deviations from UIP is found to be faster when the market expects the interest rate to increase in the near future, which indicates that UIP holds better when the market expects the central bank to adhere closer to the target of low inflation.

The second empirical chapter is once again followed by a linking chapter, which presents some background to the final measure of central bank credibility that is used in the last empirical chapter in this thesis. The chapter highlights the importance of inflation expectations for the inflation targeting regime and as a measure of central bank credibility. The chapter concludes with introducing the final empirical chapter, which incorporates inflation expectations in the analysis of the PPP relation.

The final empirical chapter, Chapter 7, is named *Asymmetric Adjustment to PPP in Response to Real, Nominal and Inflation Expectations Shocks*. The chapter addresses the third research question by focusing on the role of shocks to inflation expectations in influencing deviations from and adjustment to PPP in inflation targeting countries. We want to separate the impact of shocks to inflation expectations on PPP from the impact of other macroeconomic shocks, which originate from both real and nominal fundamentals. For this purpose, a Nonlinear Autoregressive Distributed Lag model is employed to assess the asymmetric dynamic short and long run relationships between the real exchange rate and these fundamentals. We allow for the inclusion of two different measures of inflation expectations; one is based on a market measure derived from the yield curve and the other is a survey measure. The findings suggest that shocks to real and nominal fundamentals and inflation expectations have a strong asymmetric effect on the real exchange rate, which indicates that the occurrence of central bank credibility shocks seems to be an important explanation of PPP in inflation targeting countries.

Chapter 8 provides the overall conclusion of this thesis. The chapter discusses the implication of the findings for policymakers in inflation targeting countries and makes suggestions about how central banks can use this information to support the impact of their policies. The chapter emphasises the relevance of the findings for the general understanding of the exchange rate parities and highlights areas for further research. In the next chapter, a focused review of the existing literature provides the background to set the scene for this study.

2 Theoretical Background and Empirical Literature

This chapter provides a detailed exploration of the theoretical and empirical literature underpinning the focus of the research in this thesis. The chapter begins with a formal discussion of the Uncovered Interest Rate and Purchasing Power parities in Sections 2.1 and 2.2, which is followed by an explanation of rational expectations in relation to the exchange rate in Section 2.3. The second large topic area in this chapter introduces the inflation targeting regime and its monetary policy tools in Section 2.4.

2.1 The Uncovered Interest Rate Parity Puzzle

2.1.1 The Theoretical Formulation of UIP

Uncovered interest rate parity is an asset-market based theory of the exchange rate. In short, UIP proposes that the exchange rate will change according to the relative difference between the interest rates of two countries. The theory implies that investors can take advantage of cross-country differences in nominal interest rates through the reallocation of funds from lower-yielding to higher-yielding countries. This usually results in an equalisation of returns on comparable assets through an adjustment of the exchange rate. The above propositions only apply under forward market efficiency and risk neutrality, which suggests that any profit or arbitrage opportunities are eradicated by efficient markets in the absence of large risk premia. Theoretically, this is expressed in the UIP condition in its simplest form:

$$E_t(s_{t+1}) - s_t = i_t - i_t^* \tag{2.1}$$

where $E_t(s_{t+1}) - s_t$ is the difference between the expected future spot rate for time $t+1$ at time t and the current spot exchange rate s_t at time t, and $i_t - i_t^*$ is the interest rate differential where i_t is the domestic interest rate and i_t^* is the foreign interest rate. The exchange rate s_t is defined as units of domestic currency per unit of foreign currency. In reality, it is difficult to accurately measure the expected future spot rate; hence, in the empirical literature it is often approximated by using the forward rate instead (Lothian, 2016). In order for UIP to hold, exchange rate movements need to directly offset changes in the interest rate differential. A deviation from UIP can then be defined as:

$$E_t(\Delta UIP_{t+1}) \ = i_t - i_t^* - E_t(s_{t+1}) + s_t \tag{2.2}$$

where $E_t(\Delta UIP_{t+1})$ represents the expected deviation from UIP one-period ahead and all other variables are the same as above. Expression $E_t(s_{t+1})$, which is the expected future spot rate, cannot be observed at time t, whereas all other right-hand side variables are known with certainty at time t. UIP requires expression ΔUIP_{t+1} to be equal to zero in order for the change in the exchange rate to offset the interest rate differential (Bekaert et al., 2007). In such a case, all arbitrage opportunities are exploited, and the domestic and foreign interest rates are identical when converted to the same currency. Equation (2.2) only holds when forward markets are efficient, which is why the forward exchange rate can be included into equation (2.2):

$$E_t\ (\Delta UIP_{t+1}) \ = \ (i_t - i_t^* - f_t^{t+1} + s_t) + [f_t^{t+1} - \ E_t(s_{t+1})] \tag{2.3}$$

where f_t^{t+1} is the one-period ahead forward exchange rate at time t and all other variables are defined as before. The expected deviation from UIP can be decomposed into two components. The first one is denoted by expression $(i_t - i_t^* - f_t^{t+1} + s_t)$ in equation (2.3) and represents a deviation from Covered Interest Rate Parity (CIP). The second is denoted by expression $f_t^{t+1} - \ E_t(s_{t+1})$ and represents the difference between the one-period ahead forward rate at time t and the expected future spot rate at time t, otherwise known as the forward rate bias (Pippenger, 2018).

Covered Interest Rate Parity postulates that the interest differential between two countries should be equal to the difference between the future exchange rate and the spot exchange rate. A deviation from CIP occurs when $(i_t - i_t^* - f_t^{t+1} + s_t)$ in equation (2.3) is larger than zero. Covered interest rate parity is a non-arbitrage relationship which is assumed to hold at all times, since, if expression $(i_t - i_t^* - f_t^{t+1} + s_t)$ is larger than zero, investors are able to exploit the difference in returns by investing in the high-yielding country and simultaneously taking out a forward contract to hedge against any adverse exchange rate movements (Ames et al., 2017). This approach is essentially risk-free since the forward rate is known at time t. Provided international capital markets are efficient, all relative differences between the two countries' interest rates should therefore be equalised. This would suggest that CIP always holds, since arbitrage opportunities should be exploited and eliminated almost instantaneously. Overall, CIP is found to hold when capital flows are unrestricted and country-specific investment risks are non-existent (Meredith and Chinn, 1998). Since inflation targeting is generally not compatible with capital flow restrictions, CIP can be assumed to be valid for the investigation of inflation targeting countries.

Apart from a violation of CIP, UIP deviations can stem from bias in the forward exchange rate. Forward rate bias is measured as the difference between the current forward rate and the expected future spot rate. Due to the difficulties with measuring the expected future spot rate, an accurate observation of forward bias cannot be obtained. This problem is circumvented by performing an *ex post* assessment of the realisation of the future spot rate at time t with respect to its expected value at time $t - 1$. Because deviations from UIP can be caused by the occurrence of deviations of the forward rate from the expected future spot rate, the UIP puzzle is sometimes also called the forward rate bias or the forward rate anomaly (Sarno et al., 2006).

Empirically, a large number of investigations of UIP have used a regression similar to the following:

$$s_{t+1} - s_t = \alpha + \beta\,(f_t^{t+1} - s_t) + \varepsilon_{t+1} \qquad (2.4)$$

Equation (2.4) is the Fama equation (Fama, 1984). Since we have established that deviations from CIP are likely to be small or non-existent in inflation targeting countries, the forward rate premium $f_t^{t+1} - s_t$ in equation (2.4) can be replaced by the interest rate differential:

$$s_{t+1} - s_t = \alpha + \beta\,(i_t - i_t^*) + \varepsilon_{t+1} \qquad (2.5)$$

Transforming equation (2.5) into its *ex post* formulation, UIP can be represented as follows:

$$s_t - s_{t-1} = \alpha + \beta\,(i_{t-1} - i_{t-1}^*) + \varepsilon_t \qquad (2.6)$$

The specification of UIP in equation (2.6), namely as the depreciation of the exchange rate in response to a higher interest rate differential, is commonly used to investigate UIP in the empirical literature. In order for UIP to hold in its strictest form, coefficient α should be zero and coefficient β should be equal to positive unity. If this is the case, then exchange rate movements tend to offset interest rate differentials and therefore equalise the returns on domestic and foreign deposits.

2.1.2 Empirical Investigations of UIP

The literature concerned with the UIP puzzle is extensive. Early research during the 1980s (Bilson, 1981; Longworth, 1981; or see the seminal paper by Fama, 1984), which investigated the forward bias puzzle by using simple Ordinary Least Squares (OLS) regressions, found that high interest rate currencies tend to appreciate rather than depreciate. This finding suggests that the forward market is so inefficient, that future exchange rate movements are predicted in the wrong direction. Investigations in the 1990s, such as those by McCallum (1994) or Hollifield and Uppal (1997), continued to report negative slope estimates in the UIP regression and failed to provide support for the validity of UIP. Subsequent studies have since departed from the use of OLS to estimate UIP, mainly due to its failure to capture the existence of a time-varying risk premium (Barnhart et al., 1999). However, empirical investigations of the risk premium as an explanation of the forward bias puzzle produce mixed results (Frankel and Engel, 1984; Cumby, 1988; Engel, 1996). Within the vast UIP literature, only few studies have tested for a long run relation between the exchange rate and the interest rate differentials by the means of cointegration methods. Clarida and Taylor (1997), for instance, used a Vector Error Correction (VEC) model and showed that the US dollar exchange rate can be forecasted by using information obtained from the term structure. They report that the VEC has superior out-of-sample performance in forecasting the exchange rate than a random walk model or simple spot-forward regressions.

At the same time, several studies attempted to investigate possible causes for the occurrence of the UIP puzzle. Taylor (1987) highlighted that the risk premium alone does not sufficiently explain the forward bias or deviations from UIP, but that, instead, biased exchange rate expectations, which can result in incorrect predictions of future spot rates, should be considered as alternative causes of UIP deviations. Flood and Rose (1996) found evidence that the frequent empirical rejection of UIP can be related to small sample bias in the UIP regressions which is related to the peso problem. McCallum (1994) suggested that the existence of a monetary policy reaction function can explain the negative slope coefficient in the UIP regression. His analysis accounted for a reaction function which sets the interest rate differential to reduce large exchange rate movements and provides supportive evidence for the validity of UIP. This suggestion was extended by Chinn and Meredith (2004), who incorporated a monetary policy reaction function into a model of UIP, in which the interest rate responds to innovations in output and inflation. They found supportive evidence for the validity of UIP at longer horizons.

Due to the inconclusive attempts to explain the forward bias with models of risk premia and the mixed results generated by linear estimations, several authors have recently suggested the possibility that the UIP relation might exhibit nonlinearities. There are a variety of reasons for such a claim, including the existence of transaction costs (Hollifield and Uppal, 1997; Sercu and Wu, 2000) or the role of central bank interventions (Mark and Moh, 2002). Sarno et al. (2005) suggested, that the forward bias commonly observed in the empirical literature might be a less suitable explanation of forward market inefficiencies than previously assumed. They applied a Smooth Transition Regression (STR) model to the case and found evidence for significant nonlinearities in the UIP relation. Asymmetric deviations from UIP were found to be small, but more persistent, the closer they were to the UIP equilibrium. Baillie and Kilic (2006) employed a Logistic Smooth Transition Regression (LSTR) model with different transition variables and found that nonlinearity is an important characteristic of the forward premium anomaly. They reported additional sources and types of nonlinear behaviour of UIP which the model was unable to capture appropriately. Using the same methodology, Li et al. (2013) investigated the relationship between the exchange rate and the interest rate differential in developed and emerging countries for potential asymmetries. When using the interest rate differential as the transition variable in the model, they failed to find supportive evidence for the UIP hypothesis, but when using exchange rate volatility as the transition variable, they were able to confirm the existence of nonlinearities as an explanation of the failure of UIP. The strong supportive evidence for the validity of UIP suggested in these studies highlights the importance of accounting for nonlinearities and partially motivates the use of nonlinear models in this thesis.

2.2 The Purchasing Power Parity Puzzle

2.2.1 Absolute and Relative PPP

The Purchasing Power Parity theory is one of the most fundamental models of exchange rate determination. According to PPP, the prices of the same good should be identical across countries when expressed in the same currency. The parity is a non-arbitrage condition of the exchange rate and the differences in price levels or inflation rates between two countries. The absolute version of PPP states that the nominal exchange rate should be equal to the ratio of domestic to foreign price levels:

$$S_t = \frac{P_t}{P_t^*} \tag{2.7}$$

where S_t is the nominal spot exchange rate defined as domestic currency units per unit of foreign currency, P_t is the domestic price level and P_t^* is the foreign price level. The assumption of complete price level equalisation was found to be unrealistic due to the existence of transport costs and product differentiation which impedes perfect substitutability of traded goods (Froot and Rogoff, 1995). Relative PPP satisfies slightly weaker conditions and states that changes in the exchange rate should equalise changes in relative price levels between the two countries:

$$\Delta s_t = \Delta p_t - \Delta p_t^* \tag{2.8}$$

where Δ indicates a change in the variable from one period to the next and all variables are now expressed in their natural logarithm. Equation (2.8) can be expressed differently by stating that the change in the nominal exchange rate is supposed to be equal to the relative difference in inflation rates between two countries:

$$\Delta s_t = \pi_t - \pi_t^* \tag{2.9}$$

where Δs_t is the change in the nominal exchange rate and $\pi_t - \pi_t^*$ is the inflation rate differential, where π_t is the domestic inflation rate and π_t^* is the foreign inflation rate. According to relative PPP, the exchange rate is expected to depreciate in response to an increase in the inflation rate differential. As such, the relative version of PPP implies, that changes in relative inflation rates between two countries will ultimately lead to an adjustment of the nominal exchange rate to equalise any difference between them.

The empirical evidence regarding the validity of PPP is mixed. Early studies in the 1970s and 1980s used traditional econometric methods, such as OLS and instrumental variables regressions, to assess the relation between the nominal exchange rate and price levels. Frenkel (1978), for instance found that PPP held well for high-inflation countries, while in his later paper, Frenkel (1981) found less supportive evidence for the validity of PPP in low-inflation countries. Most studies that investigated the behaviour of the exchange rate at the time, rested on the assumption that the causality in the PPP relation was such, that prices predicted the exchange rate, rather than vice versa. This conjecture originates from the monetary model, in which PPP is assumed to hold continuously. This assumption, however, was largely invalidated in the 1980s, when an increasing number of studies failed to confirm PPP in the short run and suggested that the parity is, at best, valid only in the long run (see, for instance, Edison, 1987; Enders 1988).

This notion of the long-run validity of PPP is included in some wider models of exchange rate determination. In his sticky-price model, for instance, Dornbusch (1976) rests the model dynamics on the assumption that short run price rigidity paired with flexible asset-price behaviour of the nominal exchange rate allows PPP to hold only in the long run. Studies that investigated PPP in the late 1980s and 1990s continued to focus on the long run validity of PPP by testing for cointegration between the nominal exchange rate and prices. These studies could not confirm the existence of cointegration and were mostly unable to generate sufficient evidence for the long-run validity of PPP (see Taylor, 1988; Corbae and Ouliaris, 1988), apart from Pippenger (1993), who confirmed the validity of long-run PPP for the case of Switzerland. Extensions to panel cointegration in the 2000s continued to present mixed evidence for the long run relationship between the nominal exchange rate and relative price levels (see, for instance, Azali et al., 2001; Nagayasu, 2002; Chen et al., 2007; Narayan, 2010).

2.2.2 PPP and the Real Exchange Rate

Amongst studies that use integration methods to approach the PPP puzzle, several focus on the behaviour of the real exchange rate. This is the case since the concept of PPP is directly incorporated into the real exchange rate, which can be expressed as follows:

$$q_t = s_t + p_t^* - p_t \tag{2.10}$$

where q_t is the real exchange rate and all other variables are defined as before. The definition of absolute PPP presented earlier implies that when PPP is satisfied, the real exchange rate is equal to unity, which means equation (2.10) can be rewritten as:

$$q_t = s_t + p_t^* - p_t = 1 \tag{2.11}$$

Equation (2.11) postulates that the purchasing power is the same in both countries, when the real exchange rate is equal to unity. If the real exchange rate is greater than unity, it indicates that the domestic currency in undervalued and should appreciate in order to equalise relative changes in goods market prices, whereas when the real exchange rate is less than unity, the domestic currency is overvalued and needs to depreciate to reinstate PPP. This further implies that the change in the real exchange rate can be represented by the relative difference in inflation rates between countries through a change in the nominal exchange rate:

$$\Delta q_t = \Delta s_t - \pi_t + \pi_t^* \tag{2.12}$$

where all variables are defined as above. This relative version of PPP and the real exchange rate relaxes some of the strict assumptions of absolute PPP, such as the absence of transportation costs and trade barriers or the non-tradability of goods. Given this, the validity of absolute PPP also implies the validity of relative PPP. According to equation (2.12), a deviation from PPP can be defined as any case for which the change in the real exchange rate is not equal to zero, which means that movements in the real exchange rate are the direct result of deviations from PPP. If the change in the real exchange rate is not equal to zero, it is out of equilibrium and requires adjustment of either an appreciation of the domestic currency if $\Delta q_t > 0$ or a depreciation of the domestic currency if $\Delta q_t < 0$.

More recent empirical investigations of PPP tend to investigate whether the real exchange rate, which is the product of the nominal exchange rate and the ratio of domestic to foreign price levels, is equal to unity. Early studies investigated the random walk behaviour of the real exchange rate by testing for the existence of a unit root and these studies found supportive evidence for the random walk behaviour of the real exchange rate (Kim, 1987; Phylaktis and Kassimatis, 1994). The real exchange rate was found to exhibit mean-reverting behaviour during the gold standard (Diebold et al., 1991) and the inter-war period (Taylor and McMahon, 1988), but less so during the recent floating period (Mark, 1990). In his review of the literature on PPP, Rogoff (1996) contended that short run deviations from PPP are large and volatile and that the real exchange rate will revert to PPP in the long run at a slow speed of convergence of between 3 to 5 years. This was contradicted by later studies which used panel unit root tests to test for PPP deviations. Kim (2004), for instance, reported shorter and less persistent half-lives of only 1.1 to 2.4 years when considering only tradable goods prices. Likewise in a later study, Chortareas and Kapetanios (2009) reported shorter half-lives of only 1 to 1.5 years and pointed out that the inclusion of non-stationary real exchange rates into the half-life estimation is unsuitable to assess PPP, which they criticize as a limitation of earlier studies. Some authors even found that the half-life model of PPP outperforms the random walk model of PPP as a superior predictor of the real exchange rate (Ca'Zorzi et al., 2016). While most of these studies suggest that PPP is valid in the long run, the evidence regarding the speed of mean reversion is mixed.

This inconclusive evidence in the PPP literature has prompted the consideration of alternative estimation methods resulting in a considerable amount of studies that investigate the nonlinear behaviour of the real exchange rate. Michael et al. (1997), for instance, used an Exponential Smooth Transition Autoregressive (ESTAR) model of the real exchange rate including transaction costs. The nonlinear model was found to perform better than the linear model in explaining asymmetric mean-reversion of deviations from long-run PPP. Using the same methodology, Baum et al. (2001) provided further evidence that large deviations from PPP exhibit dynamic mean reverting behaviour and that the speed of adjustment is related to the size of the deviation. Chortareas et al. (2002) considered the combination of nonlinearity with non-stationarity when investigating the behaviour of the real exchange rate. To this end, they used a nonlinear unit root test and found that the real exchange rate exhibits substantial asymmetries in its mean reversion. Similar results were reported by Bahmani-Oskooee et al. (2008). Heimonen (2006) used a threshold cointegration model and reports the existence of real exchange rate asymmetries which are dependent on the sign of the disequilibrium and the current exchange rate regime. The adjustment was found to be stronger during flexible exchange rate regimes and when the sign of the deviation was positive. Norman (2010) developed a method to estimate the distribution of real exchange rate half-lives and confirmed that nonlinear mean reversion provides a solution to the PPP puzzle. The supportive evidence for PPP generated from the use of these various nonlinear models partially motivates the use of nonlinear methods to investigate PPP in this thesis.

2.3 The Exchange Rate and Rational Expectations

Besides UIP and PPP, the literature in international finance has recognised a vast amount of other models of the exchange rate, most of which emphasize the importance of monetary policy in determining exchange rate movements. One way in which the exchange rate has been linked to monetary policy theoretically and empirically is through the inclusion of monetary fundamentals in exchange rate determination models. In this context, the money supply, in particular, serves as the key monetary variable which is supposed to explain movements in the exchange rate. Inflation targeting central banks, however, use the interest rate as their primary monetary policy tool which is endogenously determined according to a set of fundamentals. Therefore, any analysis of the exchange rate in relation to inflation targeting monetary policy cannot be conducted without considering the role of expectations and the concept of rationality which is explored in this section.

The key idea of rationality is that agents inside an economic model are fully aware of the model and its parameters and assumptions. If this is true, then expectations of future economic fundamentals in the model should be identical to those of the policymakers, who use the model to inform their policymaking, plus the information available to agents. If a model is built under the assumption of full rationality then agent expectations are assumed to be unbiased on average. Furthermore, it means that expectations about future fundamentals should not differ from market equilibria. The only deviations of expectations from the market equilibrium should be due to an unforeseen information shock (Frenkel and Johnson, 2013).

The distinction between rational expectations and adaptive expectations is that the latter assumes expectations about the future value of fundamentals is entirely based on past values. The theory of rational expectations, however, suggests that agents take into account all information available to them in their expectations formation process. For exchange rates, this means that the future value of the exchange rate is expected to be influenced by the value of current fundamentals, expectations about future fundamentals and by actions of policymakers (Frankel and Rose, 1995). Since future fundamentals cannot be observed in the present, the exchange rate is determined by expectations about the future values of these fundamentals (Wilde, 2012). For our investigation of UIP and PPP, this means that the parities might be equally influenced by expectations about future fundamentals, primarily since the nominal exchange rate serves as a key component in both the UIP and PPP relations (Berk and Knot, 2001).

Expectations about a future variable are said to be rational, if they are equal to the expected value of the variable conditional on the set of all available information. This implies that individual market participants will make forecasts about the future value of the exchange rate based on all information they hold currently (Frankel, 1980). For any application of models of exchange rate determination, this means that under full rationality, market expectations will be identical to the outcome obtained from an optimal exchange rate model built with all available information. If we assume that rational expectations hold, then unanticipated movements in the exchange rate must be a direct effect of unexpected changes in economic fundamentals. This idea was developed further in the news model, which postulates that if agent expectations are formed rationally then changes in expectations should occur only in response to the arrival of new information, i.e. news (Buiter, 1982).

The idea that short run movements in the exchange rate are influenced by expectations has been confirmed by empirical evidence which shows that the exchange rate is determined by expectations of future fundamentals rather than values of current fundamentals (Engel and West, 2005). If expectations are an important driver of exchange rate movements, then it is crucial to accurately estimate and model the effects of expectations as well as monetary policy. This suggestion rests on the idea that changes in monetary policy impact exchange rates indirectly through the impact on expectations about future monetary fundamentals. Changes to current fundamentals might have a stronger effect on the exchange rate through the expectations channel of monetary policy transmission. In this context, neglecting the endogeneity of monetary policy in empirical exchange rate models does not account for the interest rate as a policy-determined variable and potentially omits the role of expectations as drivers of the exchange rate (Engel et al., 2007). If this applies to the nominal exchange rate, which is a key component of the exchange rate parities, then it will be of interest to investigate the role of expectations in the context of monetary policy endogeneity and credibility. So far expectations in relation to the exchange rate have not particularly strongly featured expectations which directly represent the credibility of the inflation targeting central bank. Considering such expectations might constitute an interesting addition to the exchange rate literature and might be able to dissect the relation of the exchange rate with the UIP and PPP fundamentals. This notion becomes particularly relevant in the empirical chapters which take a closer look at the role of credibility and expectations in influencing adjustment to the exchange rate parity conditions. The following section discusses the endogeneity of monetary policy in inflation targeting countries in more detail.

2.4 Monetary Policy in the Inflation Targeting Regime

2.4.1 The Inflation Targeting Regime

Monetary policy is conducted by a country's central bank in order to support greater macroeconomic objectives. The focus of monetary policy can vary depending on the main objective policymakers aim to pursue. The most common central bank objectives include sustaining steady real growth, creating exchange rate stability by maintaining a fixed exchange rate or ensuring price stability by operating an inflation targeting regime (Cecchetti, 2000).

Amongst the various macroeconomic goals policymakers could pursue, inflation targeting countries have made a conscious decision to prioritise price stabilisation as their main monetary policy goal. There are several reasons why inflation targeting is preferred as a monetary policy focus to achieving other objectives, such as low unemployment, high economic growth rates or a reduction in the trade deficit. Firstly, central banks have had to accept the reality that monetary policy has only limited power over most macroeconomic variables in the short run and that inflation is the only variable which can successfully be affected in the long run (Bernanke et al., 2018). While expansionary monetary policies might in the short run increase employment and inflation, only the latter will prevail into the long run. Likewise, contractionary monetary policy will reduce inflation, but at the expense of higher unemployment. If wages are fixed due to the existence of employment contracts, for instance, firms will expect greater profit margins if they expect inflation to increase in the near future. This incentivises firms to increase their current production. Once workers expect inflation to rise in the future, they are more likely to demand wage increases in line with their expectations of future price rises. Once wages are increased at a level which matches the increase in prices, firms will once again experience lower profit margins and reduce their production to the previous level (Arestis and Sawyer, 2008). This example illustrates that the trade-off between inflation and unemployment does not exist in the long run. The result of this is that monetary policy generates greater costs in the form of permanently higher inflation than benefits in the form of lower unemployment, which is only a temporary positive outcome. Therefore, the inflation rate is the only variable which can be affected permanently. Secondly, a low and stable inflation rate is important for economic efficiency and supports economic growth. As such, policymakers can indirectly support the realisation of other macroeconomic goals by ensuring a consistently moderate inflation rate. Finally, the objective of price stability provides a reference point against which long term consequences of short term policies must be weighed (Roger, 2010). More simply put, targeting inflation rates acts as a nominal anchor for monetary policy, which conveys that policymakers are going to show a certain degree of discipline in their policies.

The importance of central bank credibility for the success of monetary policy practices is well-known (McCallum, 1984). Monetary policy has historically been regarded as imprecise due to its effects being susceptible to large and volatile lags. This element of unpredictability makes the full control of economic variables difficult for the monetary authority to achieve (Friedman, 1961). One of the reasons for this unpredictability is the role of expectations. The general public aims to understand current monetary policy actions and, at the same time, anticipate the future policy direction of the central bank. These expectations have great power to influence the future outcome of monetary policy through the actions of market participants. Therefore, the monetary authority needs to consider the role of expectations when conducting its policies and when estimating the effect of its policy actions. If the central bank raises inflation above the level which is expected by the general public, it can temporarily increase output and employment. However, in order to be able to do so it needs to know what the general public expects the future rate of inflation to be in the first place. The central bank needs to be cautious about maintaining its credibility with the general public in order to not raise inflation expectations permanently in the process (Friedman, 2002). These concepts of credibility and expectations are going to be of particular relevance to the focus of this thesis. They shall be revisited in more detail in Chapters 4 and 6.

The modern role of the inflation targeting central bank is more flexible and allows for discrete policy actions if necessary, despite its monetary policy objective of setting and maintaining a target inflation rate. This concept is also known as *constrained discretion*; a term coined by Ben Bernanke in his famous speech at the Annual Washington Policy Conference of the National Association of Business Economists in Washington DC in March 2003 (Bernanke, 2003). Central banks have a choice between a rules-based approach to monetary policy and a discretionary approach. In reality, inflation targeting central banks tend to adopt a combination of a monetary policy rule with allowance for some moderate discretion. This is why inflation targeting is often regarded as a framework rather than a rule. An important distinction between the two is that a rule conveys central bank discipline while discretion allows for monetary policy flexibility. Whilst rules are seen as an inflexible tool which is used to respond to specified macroeconomic factors without the requirement for adaptive analysis or judgement, full discretion does not require the central bank to make a commitment to fulfilling any one policy objective (Taylor, 2012). The main benefit of the latter is that it allows a great deal of flexibility for the central bank to react to unforeseen economic circumstances, but it might create the appearance that the central bank is not disciplined in its policies. The adherence to a strict rule, on the other hand, is often seen as generating high levels of central bank credibility since strict monetary rules do not leave any leeway for discretionary policies. This, however, also means that the abilities of policymakers to navigate sudden economic fluctuations and unusual developments are virtually non-existent. The security of central bank credibility as a result of a strict adherence to a rules-based policy comes at the cost of being able to apply a moderate level of discretion if necessary (Bernanke, 2003). How the central bank can strike an appropriate balance within this dichotomy will be explored further in Chapters 4 and 6.

Inflation targeting as a monetary policy objective has gained increasing popularity in recent decades. Countries that have adopted a formal inflation targeting regime have benefitted from experiencing lower inflation rates alongside lower inflation expectations as well as a reduced pass-through of economic shocks to the inflation rate. Most of them have even gained the ability to keep nominal interest rates lower due to low and stable inflation expectations. In the next section we are going to take a closer look at the monetary policy tools central banks use to target the inflation rate.

2.4.2 Taylor Rules: A Novel Perspective on Monetary Policy

When pursuing an inflation targeting policy, central banks are concerned not only with the achievement of low inflation rates in order to support sustainable economic growth, but further with ensuring the stability of the inflation rate through a reduction of inflation volatility. After the central bank announces its inflation target it is responsible for ensuring this target inflation rate is maintained and there are distinct policies that can be used for this purpose. Usually, central banks will conduct their monetary policy by setting the interest rate according to a monetary policy reaction function. This reaction function, which was first postulated by Taylor (1993), is referred to as the Taylor rule and can be expressed as follows:

$$i_t = r_t + \phi_\pi (\pi_t - \bar{\pi}_t) + \phi_y (y_t - y_t^n) \tag{2.13}$$

where i_t is the nominal interest rate, r_t is the equilibrium interest rate, π_t is the contemporaneous inflation rate, $\bar{\pi}_t$ is the inflation rate target, y_t is the contemporaneous level of output and y_t^n is the potential output. Under this Taylor rule, the central bank sets its interest rate according to the inflation gap, the output gap and the equilibrium interest rate. According to the rule, the central bank should increase the interest rate when inflation and output are above target and should decrease the interest rate when inflation and output are below target. The values of the current inflation rate π_t and the output gap, $y_t - y_t^n$, influence short run policy adjustments whereas the equilibrium interest rate r_t and the target inflation rate $\bar{\pi}_t$ constitute long run policy aims. The policy rule suggested by Taylor (1993) provides a semi-flexible guide for inflation targeting monetary policy, which allows central banks to target inflation under consideration of other macroeconomic variables. Inflation targeting central banks are assumed to be forward-looking and to consider expected future rather than current values of inflation and output in their policymaking. Therefore, the Taylor rule in equation (2.13) is often adjusted to the following in empirical estimations:

$$i_t = r_t + \phi_\pi (\pi_{t+d} - \bar{\pi}_t) + \phi_y (y_{t+d} - y_{t+d}^n) \qquad (2.14)$$

where π_{t+d} is the d-period ahead inflation rate central bank forecast and y_{t+d} is the d-period ahead central bank output rate forecast.

Empirically, it was found that the monetary policy behaviour of major economies is better explained by the Taylor rule than by monetary policies which focus on fixing the money supply or the exchange rate (Taylor, 1993). Although the Taylor rule is a policy mechanism commonly used by inflation targeting central banks, Taylor (2001) suggests that the rule should not be followed rigidly without considering additional unforeseen factors and circumstances. Central banks operating under a strict Taylor rule are therefore advised to display some level of discretion and regard other macroeconomic fundamentals in their policymaking to adjust the rule accordingly if necessary. The above Taylor rule in equations (2.13) and (2.14) have been tested by numerous authors in a closed economy setting (see, for instance, Taylor, 1999; Orphanides, 2003). Since most economies are open economies, however, it has been suggested to consider the role of the exchange rate when assessing the performance of the Taylor rule. The exchange rate can act as a transmitter of domestic and foreign economic shocks to consumer and import prices and thereby can influence the rate of inflation through the PPP relation. Therefore, the exchange rate is often considered as an additional variable in monetary policy reaction functions. For the open economy, an extended Taylor rule has been developed which includes the real exchange rate in the interest rate reaction function:

$$i_t = r_t + \phi_\pi (\pi_t - \bar{\pi}_t) + \phi_y (y_t - y_t^n) + \phi_q q_t \tag{2.15}$$

where q_t is the real exchange rate and all other variables are defined as before. The inclusion of the real exchange rate means that in this representation of the Taylor rule, PPP is considered as an important exchange rate equilibrium condition. Empirically, this monetary policy reaction function was found to be a good descriptor of monetary policy in a number of developed economies in the 1990s (Clarida et al., 1998). Like the classical Taylor rule, the extended Taylor rule is often estimated as a forward-looking rule with the three-period ahead inflation and output forecasts:

$$i_t = r_t + \phi_\pi (\pi_{t+d} - \bar{\pi}_t) + \phi_y (y_{t+d} - y_t^n) + \phi_q q_t \tag{2.16}$$

where all variables are defined as before. A third type of Taylor rule commonly used by inflation targeting central banks is the Taylor rule with interest rate smoothing, either with current or forecasted values of inflation and output:

$$i_t = r_t + \rho i_{t-1} + (1-\rho) \left[\phi_\pi (\pi_t - \bar{\pi}_t) + \phi_y (y_t - y_t^n) \right] \tag{2.17}$$

$$i_t = r_t + \rho i_{t-1} + (1-\rho) \left[\phi_\pi (\pi_{t+d} - \bar{\pi}_t) + \phi_y (y_{t+d} - y_t^n) \right] \tag{2.18}$$

where ρ is the smoothing parameter. According to this type of Taylor rule, the central bank adjusts the interest rate by fraction ρ over several periods to induce gradual movements in the inflation rate.

Some empirical estimations of the performance of the monetary policy reaction function have extended the classical Taylor rule to exhibit potentially nonlinearities (see, for instance, Taylor and Davradakis, 2006; Castro, 2011). The nonlinear Taylor rule allows for different weights to positive and negative inflation and output gaps assigned by the central bank. Empirically, this has been accounted for by using nonlinear Regime Switching or Smooth Transition Regression models. The findings are generally supportive of the nonlinear estimation of the Taylor rule and report that these are good descriptors of asymmetric interest rate adjustments (see, for instance, Taylor and Davradakis, 2006; Castro, 2011; and Caporale et al., 2018). Regardless of which type of Taylor rule inflation targeting central banks use, an important aspect for the success of inflation targeting policies is central bank credibility, which will be discussed in the following section.

2.4.3 A Preliminary Discussion of Central Bank Credibility

Central bank credibility requires an explicit commitment of the monetary authority to transparently fulfil its monetary policy objectives. Credibility can broadly be defined as the difference between the objectives of the central bank and the public opinion about these objectives in absolute terms (Cukierman, 1986). Or, if one wanted to rephrase the above in a simpler way, credibility is when the general public believes that policymakers will follow their announcements with actions.

While it is difficult to accurately measure or quantify central bank credibility, a number of approximations have been suggested (Bordo and Siklos, 2015). One measure of central bank credibility can be obtained by assessing inflation performance, i.e. whether the actual inflation rate is stable and close to the target rate for prolonged periods. Apart from measuring credibility as how well central banks have fulfilled their policy targets, it can also be defined as how closely inflation expectations are aligned with policy actions. Amongst measures of this latter type of credibility suggested in the literature, Svensson (1993) estimated the beliefs of market participants in the fulfilment of the inflation target from the yield curve; and also measured credibility as the difference between expected inflation by the general public and the target inflation rate (Svensson, 2000a). A loss of credibility is then realised when expected inflation deviates from the target inflation rate. The public perception of central bank credibility affects public inflation expectations, which in turn directly determine the achievement of the monetary policy objective. Credibility can in some way be influenced by the central bank’s reaction to economic shocks, which might either support or harm the fulfilment of the policy target.

Given the definitions of credibility mentioned above, a loss or change in credibility can be observed through any of the following. The first one is an apparent departure from the fulfilment of the inflation target, represented by a deviation of the interest rate set by the central bank from the interest rate determined by the monetary policy rule. Since the interest rate is the monetary policy tool which is used to move the inflation rate to the target, a loss in credibility occurs when the interest rate set by the central bank deviates from level it should be according to the Taylor rule (Wilde, 2012). A central bank that is perceived as credible in the sense that it commits to the long term inflation target will have greater flexibility in temporarily deviating from the inflation target and the Taylor rule without generating large changes in inflation expectations or a loss in credibility. Apart from obvious deviations from the inflation rate and the Taylor rule, credibility can further be influenced by how expectations are formed in the regime. A central bank which possesses a high degree of credibility will be able to firmly anchor inflation expectations in the regime. If expectations change, it can be indicative of the central bank losing some of its credibility in the eye of the general public. One type of expectations, which is often overlooked as a measure of credibility is the change in the expected interest rate. Whenever the expectations of market participants about the future interest rate differ from the interest rate set or announced by the central bank, it indicates that the general public does not believe the central bank interest rate to be credible (Cukierman and Meltzer, 1986). Interest rate expectations, therefore constitute the second indicator of credibility referred to in this thesis. The third indicator is a shock to inflation expectations. If inflation expectations change or are highly volatile, it further indicates that the central bank is not believed to fully commit to achieving the target rate (Issler and Soares, 2019). Given the central role of expectations and central bank credibility for the long term success of the regime, an assessment of whether any changes to either influence the exchange rate equilibrium conditions in the goods and asset markets provides an interesting avenue for research and will be the focus of the three empirical chapter in this thesis. The concept of credibility will be discussed further in Chapters 4 and 6.

2.4.4 The Taylor Rule and the Exchange Rate

As mentioned briefly in Section 2.3 above, one shortcoming of important theoretical exchange rate models, which is particularly relevant for empirical applications, is the omission of the endogeneity of monetary policy. Recently, the literature has made great advances in relating the exchange rate to the very fundamentals, which central banks consider in their policymaking. One motivation for this stems from the limitations imposed by using the money supply as the primary monetary policy variable in most theoretical exchange rate determination models. In reality, central banks have departed from focusing on the money supply as the main monetary policy tool and instead moved to a system in which they aim to set other monetary variables in order to achieve their policy objectives. Nowadays, most central banks use the interest rate rather than the money supply as their preferred monetary policy instrument. Since the money supply is no longer the primary monetary policy tool of interest, exchange rate models based on the money supply might no longer represent a suitable and comprehensive method to model exchange rates (Wang et al., 2019).

Some of the empirical research recognises the endogeneity of monetary policy, which means that policymakers respond directly to changes in economic fundamentals. Although such changes in economic fundamentals can have a direct effect on the exchange rate, they can also affect the exchange rate indirectly by causing changes in expectations of future monetary policy. In the literature, this has been accounted for by using Taylor rule models to model exchange rate behaviour, since inflation targeting central banks set their nominal interest rates according to a Taylor rule type reaction function. This reaction function, together with other fundamentals, is included into models of exchange rate determination. The literature on Taylor rule based exchange rate models is young, but is already generating interesting results. Most of the studies in this field begin by computing a Taylor rule based on the interest rate differential similar to the following:

$$i_t - i_t^* = \phi_\pi \hat{\pi}_t + \phi_y \hat{y}_t + \phi_i \hat{\imath}_{t-1} + \phi_q q_t \qquad (2.18)$$

where $\hat{\pi}_t$ is the inflation differential, $\hat{y}_t$ is the output differential, $\hat{\imath}_{t-1}$ is the lagged interest rate differential and q_t is the real exchange rate. An application of the Taylor rule exchange rate model was developed by Molodtsova and Papell (2009), who expressed the real exchange rate as a function of the above differentials model of the Taylor rule:

$$\Delta s_{t+1} = \phi_\pi \hat{\pi}_t + \phi_y \hat{y}_t + \phi_i \hat{\imath}_{t-1} + \phi_q q_t \qquad (2.19)$$

where $\Delta s_{t+1} = i_t - i_t^*$ as per the UIP condition. They used the above to analyse the short-term predictability of Taylor rule fundamentals in exchange rate models. The Taylor rule model was found to be more suitable at predicting out-of-sample exchange rates than the monetary model or the UIP and PPP models themselves. Molodtsova and Papell (2012) further tested the above model during the 2008 Financial Crisis and again confirmed its suitability for out-of-sample exchange rate predictability compared to other models during the crisis period.

An extension to the model was presented by Ince et al. (2016), who compared the out-of-sample exchange rate predictability of the Taylor rule differentials model in equation (2.18) with a Taylor rule fundamentals model. They found that the Taylor rule differentials model demonstrates superior performance in terms of exchange rate predictability than the Taylor rule fundamentals model. Interestingly, they further highlighted that the Taylor rule exchange rate models outperform the UIP and PPP models of exchange rate determination. Another extension was provided by Beckmann and Wilde (2013) and by Wang et al. (2019), who expressed the real exchange rate as a function of Taylor rule fundamentals in a nonlinear Smooth Transition Regression model, which was found to provide an accurate description of real exchange rate behaviour. Both studies noted the importance of accounting for potential nonlinearities if this provides a closer approximation to the true data generating process. This idea shall receive particular attention in this thesis and will be revisited in the empirical chapters.

The literature has also found evidence that Taylor rule exchange rate models provide a possible solution to explaining the PPP puzzle (Benigno, 2004). While in the PPP model, a higher inflation rate causes a depreciation of the exchange rate, the model does not take into account the policy action of the inflation targeting central bank of reducing the inflation rate back to target. If the central bank is believed to be credible in following its monetary policy objective, then an increase in the inflation rate should be counteracted by a monetary tightening. In reality, it has been found that an increase in the inflation rate in inflation targeting countries instead leads to an appreciation of the domestic currency due to expectations formed by the general public which expects a future monetary contraction to return the inflation rate back to its target (Clarida and Waldmann, 2008). This empirical finding illustrates the importance of accounting for the endogeneity of monetary policy in assessing the exchange rate models, especially in inflation targeting countries. The focus of this thesis is partially motivated by the literature in this context, but places particular emphasis on central bank credibility as an important determinant of the success of monetary policy. In the following section, the countries of interest in this thesis are presented.

2.4.5 Inflation Targeting Countries and Non-Targeting Countries

In the empirical analysis in this thesis we consider five countries that pioneered the adoption of inflation targeting policies. All of these countries adopted inflation targeting at early stages, but follow different targeting procedures. Some brief detail and information about the history of monetary policy and the operation of the inflation targeting regime in these countries is presented below.

The United Kingdom

The UK officially adopted the inflation targeting regime after its exit from the Exchange Rate Mechanism in 1992. The target rate was set to 2% and strict measures are undertaken whenever actual inflation shows large deviations from the target rate. At a deviation of more than 1% either side, the Governor of the Bank of England is required to inform the Chancellor of the Exchequer in written form of the reasons for this deviation and any planned policy actions to rectify the divergence. Globally, the Bank of England is perceived as a leader in terms of central bank transparency and effective release of communications to the public.

Canada

Canada was the second country to officially adopt inflation targeting in 1991. The Canadian Central Bank finally decided on a target midpoint of 2% inflation with a variation tolerance band of up to 1% in either direction. The Canadian Central Bank uses the Consumer Price Index as the inflation metric for its target. The central bank rests its estimation of inflation and the adaption of its monetary policy on a computed monetary conditions index, which shows the time path which is required to achieve an inflation rate close to the 2% target. The index accounts for changes in the interest rate and the exchange rate which are reflected in changes in the index itself.

Australia

The Reserve Bank of Australia officially adopted inflation targeting in 1993. The target inflation rate was agreed to range between 2% and 3%. The Reserve Bank allows for some flexibility around deviations of inflation from the target range and is concerned with the inflation rate meeting the targeted range on average over time only. In order to support the inflation targeting regime, the Reserve Bank of Australia has significantly increased its communications with the general public.

New Zealand

New Zealand was the first country to officially adopt inflation targeting in 1990. In 1989, the Reserve Bank of New Zealand Act was released, which states that the stability of the general price level should be the first and foremost monetary policy objective. Under the act, the Governor of the Reserve Bank of New Zealand has to decide on Policy Target Agreements with the Minister of Finance to define the target inflation rate and any acceptable variation going forward. The Reserve Bank of New Zealand operates a much stricter regime than other countries and only allows an inflation target range between 0% and 2%. If inflation exceeds the target, the Governor might be released from the position before the end of the governance term.

Sweden

In 1993, the Riksbank announced the official adoption of inflation targeting as the main monetary policy objective. The target was set at 2% with a 1% band either side. Although the inflation target would not formally apply until 1995, the Riksbank put measures into place to maintain the inflation rate at the target rate since 1993. The official announcement in 1993 achieved an initial alignment of the inflation rate with the target value by influencing inflation expectations.

In a sample of 100 central banks, the Bank of England, the Bank of Canada, the Reserve Bank of New Zealand and the Swedish Riksbank were identified amongst the most transparent central banks (Dincer and Eichengreen, 2007). The set of five inflation targeting countries considered in this thesis is compared to a set of three economies that have chosen alternative monetary policy regimes. The choice of non-targeters is based on existing comparative studies of inflation-targeters and non-targeters (Neumann and Von Hagen, 2002) and the background to their monetary policy is discussed below.

The United States

Although the US adopted a fixed inflation target of 2% between 2012 and 2020, the Federal Reserve does not consider itself to be an explicit inflation targeting central bank. This is important for our investigation of central bank credibility and is in particular relevant for the formation of public expectations.

The Euro Area

The European Central Bank does not officially consider itself to be an inflation-targeter, but after the inception of the Euro in 1999, it aimed to maintain price stability over the medium term to support the establishment of the monetary union. The European Central Bank has since then temporarily aimed for a maximum 2% inflation rate during challenging economic periods.

Switzerland

Switzerland is classified as a non-targeting country, since it largely pursued other monetary policy objectives during the 1990s and early 2000s. While Switzerland has never announced an official inflation target, it has recently aimed to ensure price stability over the medium term in order to support economic growth and prosperity.

Given the three different degrees of price level stabilisation that the three non-targeting economies have displayed over time, they provide an ideal choice for our comparison group in the empirical estimations. The following chapter constitutes the first empirical investigation of UIP and PPP, which assesses the role of Taylor rule deviations in influencing the adjustment to both exchange rate parities.

3 The Exchange Rate Parities and Taylor Rule Deviations

3.1 Introduction

The UIP (Uncovered Interest Rate Parity) and PPP (Purchasing Power Parity) puzzles constitute the frequent empirical rejection of a relation of the nominal exchange rate with cross-country interest rate differentials (UIP) and inflation rate differentials (PPP). The literature concerned with UIP and PPP has suggested numerous possible solutions for the puzzles. Amongst the most noteworthy suggestions are the existence of a risk premium (Li et al., 2012; Biswas et al., 2020), the occurrence of rational bubbles (Obstfeld, 1987; Canterbery, 2000), or deviations from rationality of market participants (Gregory, 1987; Chinn and Quayyum, 2012) in the case of UIP; the unsuitability of simple unit root tests (Murray and Papell, 2005) or the existence of real frictions (Ford and Horioka, 2017) in the case of PPP; the existence of nonlinearities in the case of both (Kisswani and Nusair, 2014); or the failure to account for the interaction between goods and asset markets (Johansen and Juselius, 1992). The joint empirical analysis of the parities is well documented in the literature. Popular methods include multivariate cointegration models pioneered by Johansen and Juselius (1992) and Juselius (1995), which establish the validity of UIP and PPP through the interaction between goods and asset markets. Other studies adopt different methods of cointegration to assess the long run relation between the exchange rate and the parity fundamentals. Their findings lend additional support towards the joint long run validity of the parities (see Hunter, 1992; Camarero and Tamarit, 1996; Pesaran and Shin, 1996). An interesting consideration for the investigation of the parities is the possible role of the monetary policy regime and the credibility of the central bank. While the individual validity of UIP and PPP has been investigated for countries which operate different monetary regimes (Lacerda et al., 2010), few papers have assessed the exchange rate parities jointly in inflation targeting countries. These papers investigate UIP and PPP as a single long run relation either in the form of a PPP-UIP-CIP consistent measure of inflation expectations (Gerlach-Kristen et al., 2017) or in the form of assessments of the RIP (Real Interest Rate Parity) relation, for which exact inference regarding the individual validity of UIP and PPP remains inconclusive (Ding and Kim, 2017). While these existing studies generally find supportive evidence for the validity of UIP and PPP, they fail to provide a comparative analysis of inflation targeters against non-targeters.

This chapter aims to conduct such an analysis by estimating a nonlinear model of UIP and PPP jointly, which allows the adjustment speed to differ between regimes of small and large Taylor rule deviations. Under inflation targeting the credibility of the central bank is particularly important for the successful implementation of monetary policy. Deviations from the Taylor rule can be an indicator of changes to central bank credibility, which could affect the adjustment to the UIP and PPP equilibrium (Wilde, 2012). A few studies have analysed the impact of Taylor rules on PPP (Kim et al., 2014) or UIP (Backus et al., 2010) separately. By contrast, in this chapter we aim to assess jointly the empirical validity of PPP and UIP under different monetary policy setups. We consider five inflation targeting countries, namely the UK, Canada, Australia, New Zealand and Sweden over the period from January 1993 to December 2020; and additionally three non-targeting economies, namely the US, the Euro-Area and Switzerland, for comparison (see Neumann and Von Hagen, 2002, for a similar selection of countries). Given the suggestion of previous studies to investigate the parities jointly (Juselius, 1995), in the first instance we test for a joint long run equilibrium UIP and PPP relation in a benchmark linear Vector Error Correction (VEC) model.

Since nonlinear estimation methods have recently found considerable successful application in the context of investigating the exchange rate parities (Kapetanios et al., 2003; Sarno et al., 2006), we want to further estimate a nonlinear Threshold Vector Error Correction (TVEC) model, where Taylor rule deviations serve as the threshold variable. As part of our estimation, we investigate which Taylor rule reaction function best describes the interest rate in each country by taking into account three different types of forward-looking Taylor rules. Once the most suitable Taylor rule is identified, we construct a Taylor rule deviations variable for the inflation targeting countries and an implied Taylor rule deviations variable for each non-targeting economy. Using the Taylor rule deviations variable as the threshold variable in the nonlinear TVEC differentiates between a regime of large Taylor rule deviations and a regime of small Taylor rule deviations. This allows us to assess whether the adjustment parameter of the Error Correction model differs according to the size of the Taylor rule deviation. The nonlinear model is assessed against the benchmark linear VEC of UIP and PPP.

Our findings suggest that the nonlinear model is more suitable to capture the adjustment to the joint long run UIP- and PPP-implied equilibrium, since we find substantially stronger evidence for equilibrium correction in the nonlinear model than in the linear model. The adjustment speed is twice as fast when Taylor rule deviations are small than when they are large, which suggests that small deviations from the monetary policy rule are regarded as temporary discretionary policies, whilst large deviations are seen as indicative of a permanent shift in monetary policy (Neuenkirch and Tillmann, 2010). We observe that the adjustment in inflation targeting regimes is twice as fast as in non-targeting regimes. Our findings suggest that credibility plays a more important role in inflation targeting countries than in non-targeting economies; and that the inflation targeting countries considered in this study were generally successful at establishing credibility and reducing the impact of deviations from the monetary policy rule.

The remainder of this chapter is organised as follows. Section 3.2 discusses the related literature; Section 3.3 outlines the econometric models used for our estimation; Section 3.4 presents the data and discusses the empirical results; Section 3.5 concludes.

3.2 Literature

3.2.1 Joint Investigations of UIP and PPP

Most of the literature concerned with the UIP and PPP puzzles assesses them separately and studies in this context provide mixed support for the validity of PPP. Unit root tests of the real exchange rate have generated contrasting results, with some authors confirming stationarity (Cumby and Obstfeld, 1981; Diebold et al., 1991), while others report the existence of a unit root (Hakkio, 1984; MacDonald, 1985). Cointegration tests of the PPP relation have been equally inconclusive, despite using different types of cointegration tests (Taylor, 1988; McNown and Wallace, 1990; Kim, 1990; Taylor, 1992). Likewise, analyses of UIP have found overwhelming evidence for the rejection of the interest rate differential as an optimal predictor of exchange rate depreciations (Cumby and Obstfeld, 1981; Taylor, 1987; Mylonidis and Semertzidou, 2010; Londono and Zhou, 2017).

Based on this inconclusive evidence, some authors have advocated for investigations of the simultaneous validity of UIP and PPP in wide-reaching equilibrium models (Johansen and Juselius, 1992), which takes account of linkages between the goods and the asset markets. Johansen and Juselius (1992) pioneered the literature in this context by estimating a five-dimensional multivariate cointegration model for the UK based on the framework developed by Johansen (1991). They found evidence for the nonstationarity of the PPP relation, which was rejected after they combined the PPP relation with the UIP relation. The results suggest that this linkage between goods and capital markets plays a central role in the analysis of the exchange rate parities.

Since then, several other studies have used the Johansen (1991) methodology to assess the joint validity of UIP and PPP. Hunter (1992) extended the Johansen and Juselius (1992) method by abandoning the weak exogeneity assumption of oil prices and found two cointegration vectors representing the long run relations for UIP and PPP for the British pound. Camarero and Tamarit (1993) conducted the analysis for Spain during its integration to the European Community and provide support for the validity of UIP and PPP. They established the interest rate differential as an important determinant of the adjustment to PPP. Using the framework for the case of Denmark, Juselius (1995) reported that goods and capital market linkages, evident in the joint UIP and PPP relation, are important to accurately model movements in exchange rates, interest rates and prices. Similar results were found by Caporale et al. (2001) for the German mark and the Japanese yen.

Juselius and MacDonald (2004), who employed a multivariate cointegration model for the US and Japan, found that UIP and PPP do not hold as stationary conditions. They attributed this to the nonstationarity of the exchange rate which is related to the nonstationarity of interest rate movements. Özmen and Gökcan (2004) applied the Johansen cointegration model to the case of Turkey and rejected the UIP and PPP relations when modelling them independently. A joint analysis of the parities in the same context, however, showed that PPP deviations can be explained by interest rate differentials and UIP deviations can be explained by inflation rate differentials. Jaramillo Franco and Serván Lozano (2012) applied the Johansen cointegration approach to analyse UIP and PPP for the Peruvian sol for the period 1997-2011. Using trade-weighted data, they found two stationary vectors in the model; one which represented the joint UIP and PPP equilibrium, while the other was an interest rate equation with a risk premium. Their findings support the idea that UIP and PPP hold better when modelled jointly rather than separately.

Another way of capturing the linkages between goods and asset markets is via the construction of a single UIP- and PPP-consistent equilibrium condition. Stephens (2004) used the parities to estimate such a time-varying equilibrium exchange rate that is conditional on interest rate and price level differentials. The results showed that the exchange rate cycle in the 1990s closely represented the conditional equilibrium exchange rate, whereas the cycle in the early 2000s showed large deviations from the conditional equilibrium. This indicates a change in the relationship between the exchange rate and the parity fundamentals over time, but the investigation of the variables responsible for this was left for future research.

3.2.2 Nonlinear Estimations of UIP and PPP

Recently, some authors have argued that the frequent empirical rejection of the parity relations can be attributed to the failure of empirical studies to account for possible nonlinearities. Nonlinear model, which assess the UIP and PPP hypotheses separately, have yielded interesting supportive results for the nonlinear adjustment process of deviations from the parities (Kapetanios et al., 2003; Sarno et al., 2006; Taylor et al., 2001; Chortareas et al., 2002). To date, nonlinear estimations which assess the parities jointly have only been conducted by analysing the Real Interest Rate Parity (RIP) relation, which combines both UIP and PPP into a single equilibrium relation of the real interest rate. Holmes and Maghrebi (2004), for instance, estimated a Logistic Smooth Transition Autoregressive (LSTAR) model of RIP for selected South-East Asian economies against Japan and the US. They confirmed the presence of nonlinearities in the adjustment process, which supports the validity of both UIP and PPP. Kisswani and Nusair (2014), used the same methodology to test for the validity of RIP for selected Asian economies and confirmed the existence of a strong asymmetrical adjustment. They suggested that UIP and PPP hold due to the strong integration of goods and asset markets. A drawback of the RIP approach to investigating the exchange rate parities jointly is that if RIP is rejected, it remains inconclusive as to whether the rejection originates from a rejection of UIP or PPP or both.

As can be seen from the findings in the existing literature, the evidence for the existence of a linkage between goods and asset markets is strong, which partially motivates the approach of investigating the parities jointly in this chapter.

3.2.3 Taylor Rule Deviations

While there is substantial existing literature, which investigates whether the exchange rate itself can be explained with Taylor rule fundamentals in inflation targeting countries (Molodtsova and Papell, 2009; Kempa and Wilde, 2011; Galimberti and Moura, 2013; Ince et al., 2016), there is to date only limited research investigating the exchange rate parities in inflation targeting regimes. Apart from Ding and Kim (2012) and Kim (2014) who found favourable evidence for the validity of PPP in inflation targeting countries, and Coulibaly and Kempf (2019), who found that inflation targeting supports the occurrence of the forward bias puzzle, the literature concerned with the topic is scarce at present.

In this context, assessing the role played by deviations from the Taylor rule provides an interesting addition to the analysis of UIP and PPP. The size and persistence of Taylor rule deviations can determine the public perception of central bank credibility. Small or temporary deviations might be indicative of an appropriate discretionary policy response of the monetary authority to temporary unforeseen economic circumstances. Larger and more persistent deviations, on the other hand, might indicate a permanent shift in monetary policy and lead to a loss in central bank credibility (Kahn, 2010). Deviations of the interest rate from the monetary policy rule can lead to market participants revising their expectations regarding the future monetary policy stance of the central bank. More importantly, Taylor rule deviations can influence public expectations about future values of the interest rate and the inflation rate (Wilde, 2012). Since these variables form the main components of the UIP and PPP relations and the exchange rate equilibria in the goods and asset markets, the occurrence of Taylor rule deviations might provide a novel explanation of the UIP and PPP puzzles.

The effect of deviations from the Taylor rule on macroeconomic variables has only been tested by a few authors. Taylor rule deviations, which are generally measured as the difference between the actual interest rate and the target interest rate (determined by Taylor rule fundamentals), have been found to influence the path of the real exchange rate Wilde (2012). Nikolsko-Rzhevskyy et al. (2014) used a similar measure to estimate Taylor rule deviations from different types of Taylor rules, including an original Taylor rule, an estimated Taylor rule and a modified Taylor rule with a larger coefficient on the output gap. They calculated several central bank loss functions to estimate the effect of deviating from each of the three Taylor rules and found that the costs of deviations from the Taylor rule, while being large for all rules, are highest for the original Taylor rule. A rules-based inflation targeting regime should experience small or no deviations from the policy rule. Frequent deviations from the Taylor rule can be indicative of a permanent shift in monetary policy, potentially leading to a loss of central bank credibility and also affecting monetary policy transmission to the inflation rate. As such, deviations from the Taylor rule provide an interesting addition to the analysis of the exchange rate parities.

A different approach to deviations from the inflation target was adopted by Neuenkirch and Tillmann (2014), who investigated a loss in central bank credibility as the result of past deviations from the inflation target and the effect on the formation of inflation expectations in subsequent time periods. They found that credibility declined in a non-linear fashion if there was a deviation from the target in the past and when inflation was close to the target rate in the past, credibility was found to be only minimally, but negatively, affected. For their estimations, they used the same five inflation targeting countries which are considered in this thesis and conclude that central banks in these countries suffer from a loss of credibility as a result of aggregate inflation deviations. This idea can be extended to regard not only inflation deviations from the target rate as a measure of central bank credibility but also Taylor rule deviations more broadly.

Table 1 below summarises the extensive literature regarding UIP and PPP and their main findings. What becomes evident from the existing literature is that the interaction between goods and asset markets plays an important role when assessing the validity of UIP and PPP. These linkages have mostly been assessed in multivariate models of the exchange rate and the UIP and PPP fundamentals. Whilst these analyses generate important results, an extension can be made by assessing these linkages in a nonlinear multivariate model and by considering Taylor rule deviations in inflation targeting countries. The specification of the linear model and the nonlinear model with Taylor rule deviations is discussed in the following section.

Table 1 Literature Review Summary UIP and PPP				
Authors	**Estimation Sample**	**Exchange Rates**	**Methodology**	**Findings**
Joint Estimations of UIP and PPP				
Cumby and Obstfeld (1983)	January 1976 to September 1981	US against the UK, Germany, Switzerland, Canada	Unit Root Test with additional tests for conditional heteroscedasticity	UIP and PPP are strongly rejected
Diebold et al. (1991)	More than a century of the classic gold standard period	16 real exchange rates	Long-memory unit root tests	PPP holds in the long run
Hakkio (1984)	Quarter 3 1973 to Quarter 4 1982 and Quarter 1 1921 to Quarter 2 1925	UK pound, French franc, Canadian dollar and Japanese yen	Time series-cross sectional unit root tests	PPP holds in several currencies simultaneously
Taylor (1988)	June 1973 to December 1985	Five major exchange rates against the US dollar	Granger cointegration regressions	Long run PPP is not valid, even with an allowance made for measurement error and transportation costs
Kim (1990)	January 1973 to December 1987	Major economies against the US dollar	Cointegration test	The exchange rate is cointegrated strongly with the wholesale price index ratio and somewhat weakly with the consumer price index ratio
Taylor (1992)	100 years of data	Twenty countries	Univariate and Multivariate integration tests and cointegration tests	PPP valid
Taylor (1987)	July 1979 to December 1986	Six major currencies against the UK and USDDEM	VAR chain rule of forecasting including Wald, LM and LR restrictions of UIP	Reject UIP under rational expectations
Mylonidis and Semertzidou (2010)	January 1980 to August 2008	Four major currencies vis-à-vis the US dollar	Generalized Method of Moments	Absence of any relationship between the interest rate differential and the expected change in the exchange rate
Londono and Zhou (2017)	January 2000 to December 2011	22 currencies with respect to the US dollar	Panel data regressions	World currency andUS stock variance risk premiums have significant predictive power for exchange rate appreciation
Johansen and Juselius (1992)	Quarter 1 1972 to Quarter 4 1991	UK	Multivariate VECM with Gaussian errors	PPP and UIP valid when accounting for the interaction of goods and asset markets
Hunter (1992)	Quarter 1 1980 to Quarter 4 1990	UK	Johansen VECM with exogeneity considerations	UIP and PPP valid when modelled jointly
Camarero and Tamarit (1993)	Quarter 1 1980 to Quarter 2 1989	Spain against the EC	Johansen VECM	Interest rate differential explains SR adjustment to PPP
Juselius (1995)	Quarter 1 1972 to Quarter 4 1991	Denmark and West Germany	I(2) CVAR Model	UIP and PPP valid when modelled jointly
Caporale et al. (2001)	Quarter 3 1980 to Quarter 4 1993	DEM and JPY exchange rates against the USD	FIML model	PPP holds for all effective exchange rates and UIP for all bilateral exchange rates
Juselius and MacDonald (2004)	July 1975 to January 1998	USD and JPY	Johansen VECM	PPP and UIP do not hold due to nonstationarity of the real exchange rate and nonstationary movements in interest rates
Özmen and Gökcan (2004)	Quarter 1 1986 to Quarter 4 1999	Turkey against the US	Johansen VECM	UIP and PPP valid when modelled jointly
Jaramillo Franco and Serván Lozano (2012)	1997 to 2011	Peru	Johansen VECM	UIP and PPP valid when modelled jointly
Stephens (2004)	1992 to 2003	NZDUSD	Estimate a Behavioural Equilibrium Exchange Rate that is conditional on interest rates and price levels	PPP valid but UIP rejected; the relationship has changed during the estimation period

Nonlinear Estimations of UIP and PPP				
Kapetanios et al. (2003)	Quarter 1 1957 to Quarter 4 1998	11 OECD countries against the USD	Derive limiting nonstandard distribution for tests of nonstationarity against globally stationary ESTAR with the use of Monte Carlo simulations	The test has better power than the DF test in explaining PPP
Sarno et al. (2006)	4th January 1985 to 31st December 2002	US dollar exchange rates against the Japanese yen, the UK sterling, the German mark, the euro, and the Swiss franc	STR model of the Fama regression with expected excess return as the transition variable	UIP holds in the upper regime only
Taylor et al. (2001)	January 1973 to December 1996	UK sterling, German mark, French franc, and Japanese yen against the US dollar	STAR model of the RER with Monte Carlo simulations of the multivariate ADF statistic	Faster adjustment of the real exchange rate than found in previous studies
Chortareas et al. (2002)	Quarter 1 1960 to Quarter 4 2000	Bilateral DM and US dollar real exchange rates for the G7 countries	Modified the unit root test in STAR models by Kapetanios, Shin and Snell (2001) by using a detrending method by Schmidt and Phillips (1992)	Confirm real exchange rate mean reversion where standard DF tests do not
Holmes and Maghrebi (2004)	January 1991 to March 2000	Four South East Asian economies against Japan and the US	LSTAR and ESTAR models	Results differ by country but large shocks to RIP are more likely to lead to the reestablishment of the parity at a faster rate than small shocks
Kisswani and Nusair (2014)	Quarter 2 1973 to Quarter 3 2011	Seven Asian countries against US and Japan	LSTAR and ESTAR models	Nonlinear convergence in inflation rates and interest rates
Taylor Rule Deviations				
Molodtsova and Papell (2009)	Post-Bretton Woods float	12 currencies against the USD	Out-of-sample exchange rate predictability models with TR fundamentals	Find short-term predictability of TR models for 11 currencies which is stronger than that of UIP and PPP models
Kempa and Wilde, (2011)	Quarter 1 1980 to Quarter 4 2007	Canada, the Euro area, Japan and the UK, all relative to the US	Structural VAR in which long-run restrictions are embedded in the triangular structure of the model	Suggest to consider Taylor-rule fundamentals which are distinct from the set of traditional fundamentals of exchange rate determination
Galimberti and Moura (2013)	January 1995 to March 2011	15 emerging economies that adopted inflation targeting from the mid-1990s	Panel data regressions with out-of-sample statistics incorporating bootstrapped and asymptotic distributions for the Diebold-Mariano statistic, the Clark and West statistic and Theil's U ratio	Strong exchange rate predictability
Ince et al. (2016)	1973 to 2014	Eight exchange rates against the USD	Out-of-sample exchange rate predictability models with TR fundamentals and differentials	TR fundamentals model has stronger exchange rate predictability than PPP or UIP models
Ding and Kim (2012)	Quarter 1 1974 to Quarter 4 2009	19 OECD countries including nine inflation targeting countries	Panel unit root tests with cross-sectional dependence	IT plays an important role in providing favourable evidence for long-run PPP
Kim (2014)	Quarter 1 1974 to Quarter 4 2013	Canada, France, Japan, Italy, Sweden, the United Kingdom and the United States	Bias correction method in a system with cross-sectional dependence	IT plays an important role in providing favourable evidence for LR PPP since it lowers the variability of the real exchange rate
Coulibaly and Kempf (2019)	Quarter 1 1990 to Quarter 3 2014	31 emerging countries, 16 of which are IT	Panel data approach of the Fama regression	UIP valid in IT countries

Abbreviations: RER = real exchange rate; IT = inflation targeting; TR = Taylor rule; LR = long run; SR = short run

3.3 Empirical Framework

We estimate a nonlinear Threshold Vector Error Correction model to investigate whether the exchange rate parity relations exhibit threshold type nonlinearity with the Taylor rule deviations variable as the threshold variable. This nonlinear model is compared against a benchmark linear Vector Error Correction model of the exchange rate parities (Lacerda et al., 2010).

3.3.1 The Linear Vector Error Correction Model

We want to establish whether there exists a long run UIP and PPP equilibrium relation, which can be assessed by estimating the following linear Vector Error Correction model:

$$\Delta Y_t = \mu + \theta z_{t-1} + \sum_{i=1}^{p} \Phi_i \Delta Y_{t-1} + u_t \tag{3.1}$$

where Y_t represents a vector containing the nominal exchange rate s_t (defined as domestic currency units per unit of foreign currency), the interest rate differential $\tilde{\imath}_t = i_t - i_t^*$, which is the difference between the domestic and foreign interest rates, and the inflation differential $\tilde{\pi}_t = \pi_t - \pi_t^*$, which is the difference between the domestic and foreign inflation rates; z_{t-1} is the error correction term representing the long-run equilibrium and Δ is the difference operator which indicates the change in a variable from one period to the next. The Φ_i is a parameter matrix corresponding to the short run dynamics, θ is the speed of adjustment parameter which measures the speed with which the system returns to equilibrium after any deviations from it, and u_t stands for the innovations. The model allows us to establish whether there exists a long run relationship between the exchange rate and the parity fundamentals while also identifying the short run dynamics between the variables.

The model requires all endogenous variables to be integrated of order $I(1)$ and to also be cointegrated with each other. We use the Dickey Fuller Generalised Least Squares (DF-GLS) and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test to test for the order of integration of the interest rate differentials, the inflation rate differentials and the exchange rate. The DF-GLS test transforms the series via a generalised least squares regression with 1 to k lags of the first differenced GLS-detrended time series and tests the null hypothesis that the series contains a unit root against the alternative that it is stationary. There are several cases to specify the alternative hypothesis for the test. We use *Case I – Constant Only*, which includes a constant to identify the nonzero mean under the alternative hypothesis.[2] The KPSS test on the other hand breaks down the time series into a deterministic trend and a random walk component as well as an error term and tests the null hypothesis that the series is stationary versus the alternative that it is not. The failure to reject the null hypothesis is indicative of the absence of a unit root and suggests that the series is trend-stationary. Should we find that all series are integrated of order $I(1)$, we continue to test for the existence of a long run relation between the exchange rate with inflation differentials and interest rate differentials. We use both the Johansen (1991) trace and eigenvalue tests to test whether a cointegration relationship exists between the exchange rate and the parity fundamentals.

Once we have specified the model, we want to test whether the linear model is data congruent. Data congruency is a strict assumption about the true population data generating process. The assumption of full congruency is difficult to test. However, we can test for partial data congruency, which requires the following conditions to hold. For one, the errors should not suffer from heteroscedasticity and serial correlation. Secondly, the contemporaneous variables must be weakly exogenous. Finally, the model parameters must be constant. All the above can easily be assessed with the use of model misspecification tests. We use the White test for heteroscedasticity and the Breusch-Godfrey Lagrange multiplier (LM) test for serial correlation. The weak exogeneity assumption can be tested with a simple Wald test of the null hypothesis of no endogeneity against weak endogeneity. Finally, we use the Gregory-Hansen test for cointegration with regime shifts. The latter tests the null hypothesis of no cointegration against the alternative of cointegration with a regime shift at an unknown break point in time.

3.3.2 The Threshold Vector Error Correction Model

A natural extension of the linear model is the nonlinear Threshold Vector Error Correction model, in which the model is divided into two regimes determined by a threshold variable (Tsay, 1989)[3]. A typical Threshold Vector Error Correction model takes the following form:

[2] The use of *Case I – Constant Only* is particularly applicable for macroeconomic and financial time series, which do not exhibit trending behaviour, such as the interest rate or the exchange rate. The lag length p for the test is determined by using the following criterion suggested by Schwert (2002):

$$p_{max} = \left[12 \cdot \left(\frac{T}{100} \right)^{1/4} \right]$$

In our case, this provides us with a maximum lag length of 16 lags.

[3] A pictorial representation of the model selection process can be found in Appendix B.

$$\Delta Y_t = \left(\mu_1 + \theta_1 z_{t-1} + \sum_{i=1}^{p-1} \Phi_{1,i} \Delta Y_{t-i} \right) \cdot I(d_t \leq \gamma) +$$
$$+ \left(\mu_2 + \theta_2 z_{t-1} + \sum_{i=1}^{p-1} \Phi_{2,i} \Delta Y_{t-i} \right) \cdot I(d_t > \gamma) + u_t \qquad (3.2)$$

where z_{t-1} is the error correction term and $\tilde{Y}_t$ are the exchange rate and the parity fundamentals, i.e. the interest rate differential and the inflation differential, $I(\cdot)$ is the indicator function, d_t is the threshold variable and γ is the threshold value. The above is a two-regime model, which divides the vector error correction system into a regime below an estimated threshold and a regime for which the threshold variable exceeds the same threshold. The threshold value is estimated empirically as the value which minimises the residual sum of squares. We are particularly interested in estimating the threshold model with Taylor rule deviations as the threshold variable.

3.3.3 Measuring Taylor Rule Deviations

Before we can estimate the threshold model, we first need to define the Taylor rule deviations variable. For this purpose, we want to estimate the Taylor rule which best describes the interest rate in each country. We use the Generalised Methods of Moments (GMM) method for this. Generalised Methods of Moments is a method for constructing estimators which is analogous to Maximum Likelihood estimation. The approach is very appealing since its estimators are consistent and asymptotically normal (Hansen, 1982). Using this method, we model the interest rate for three different types of Taylor rules: the classical Taylor rule, the extended Taylor rule and a Taylor rule with interest rate smoothing. The classical Taylor rule can be defined as follows:

$$i_t = \alpha + \beta(E_{t-1}\pi_{t+3} - \bar{\pi}) + \gamma(E_{t-1}y_{t+3}) + u_t \qquad (3.3)$$

where i_t is the nominal interest rate set by the central bank, $E_{t-1}\pi_{t+3}$ is the 3-month ahead central bank expectation of the inflation rate, $\bar{\pi}$ is the target inflation rate, $E_{t-1}y_{t+3}$ is the 3-month ahead central bank expectation of the output gap and u_t is a disturbance term. The inflation gap is defined as the difference between the central bank expectation of inflation one quarter ahead and the communicated inflation target. The output gap is defined as the deviation of the central bank expectations of output one quarter ahead from its trend. We use the Hodrick-Prescott Filter to calculate the output gap, which is standard procedure in the empirical literature (Álvarez and Gómez-Loscos, 2018).[4] Forward-looking policymakers are assumed to make their policy decisions based on their one-quarter ahead forecast for the Taylor rule fundamentals. Since expected inflation and output cannot be observed directly, we use the 3-month ahead average as in most of the existing literature on Taylor rules (see Clarida et al., 1998, 2000).

The classical Taylor rule can be enlarged to the extended Taylor rule, which includes the real exchange rate as an additional regressor:

$$i_t = \alpha + \beta(E_{t-1}\pi_{t+3} - \bar{\pi}) + \gamma(E_{t-1}y_{t+3}) + \delta q_t + u_t \quad (3.4)$$

where q_t is the real effective exchange rate and all other variables are defined as before. The last Taylor rule we consider is the Taylor rule with interest rate smoothing:

$$i_t = \alpha + \rho i_{t-1} + (1-\rho)\big(\beta(E_{t-1}\pi_{t+3} - \bar{\pi}) + \gamma(E_{t-1}y_{t+3})\big) + u_t \quad (3.5)$$

where i_{t-1} is the one-period lagged interest rate, ρ is the partial adjustment parameter which measures the fraction of the target rate by which the central bank moves the current interest rate in each period, and all other variables are defined as before. Under interest rate smoothing the central bank does not change the interest rate immediately but gradually to offset the change in inflation over a prolonged period, i.e. i_t is moved in the direction of $\bar{\imath}_t$ over time.

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[4] The filter allows us to remove the cyclical component from a time series. The remaining part of the series then represents the trend which is more responsive to long term economic variations than short term economic variations. The Hodrick-Prescott Filter is defined as follows:

$$\min_{\tau}\left(\sum_{t=1}^{T}(y_t - \tau_t)^2 + \lambda\sum_{t=2}^{T-1}[(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t+1})^2]\right)$$

where y_t is the output series and τ_t is the trend component at time t. The first term of the equation is the sum of the squared deviations which penalises the cyclical component and the second term is the sum of squares of the second differences of the trend component multiplied by λ. The multiplier λ allows to adjust the sensitivity of the trend component to short-term variations (Hodrick and Prescott, 1997). It is common to set the value of the multiplier λ to a fixed number which is appropriate for the frequency of the data. For monthly frequency, which is the frequency of the data used in this chapter, the multiplier should be set to $\lambda = 129{,}600$.

The GMM approach requires the identification of suitable instruments, which are correlated with the variables on the right-hand side of the Taylor rule equation and uncorrelated with the innovations. For our purpose we use the first lag of the inflation rate and the output gap as instruments in all Taylor rules; in the extended Taylor rule, we also add the first lag of the real exchange rate; and in the Taylor rule with interest rate smoothing, we include the second lag of the interest rate as an additional instrument. The GMM method requires all variables to be stationary, therefore we perform the DF-GLS and KPSS test on the individual series to establish their order of integration.

To select the optimal Taylor rule, we compare the models by using the J-statistic of overidentifying restrictions which tests instrument suitability and can be used to assess the omission or redundancy of variables and instruments in the model. The test tests the null of variable insignificance against the alternative that the included variable is significant. A relatively large J-statistic indicates that it is questionable whether the model fulfils the GMM moment conditions (Andrews and Lu, 2001). Once the optimal Taylor rule has been identified for each country, we construct the Taylor rule deviations variable as the difference between the policy rate and the target interest rate which is determined by the Taylor rule fundamentals (Wilde, 2012; Nikolsko-Rzhevskyy et al., 2014).

3.3.4 Tests for Threshold Nonlinearity

Prior to estimating the threshold model a test for threshold-type nonlinearity has to be carried out. A common problem with tests for threshold-type nonlinearity is that the number and value of thresholds are only identified under the alternative hypothesis. In order to account for this, we use two methods which have found considerable practical applications in the literature, namely the sup-Wald test and the Bai-Perron test (Balke and Fomby, 1997). The sup-Wald test was proposed by Seo (2008) and has the following test statistic:

$$Wald = I_n(\hat{\rho})(\hat{\rho} - \rho_0)^2 \tag{3.6}$$

where $\hat{\rho}$ is the maximum likelihood estimator and $I_n(\hat{\rho})$ is the Fisher information. The test statistic is the normalised reduction in the sum of squares. The supremum of the test is then taken to evaluate and obtain the break points:

$$W_n = sup_{r\epsilon\Gamma} n \left\{ \frac{\hat{\sigma}^2}{\hat{\sigma}^2(T)} - 1 \right\} \quad (3.7)$$

where T is the number of time periods, $\hat{\sigma}^2$ is the residual variance of the linear model under the null, $\hat{\sigma}^2(T)$ is the residual variance of the model under the alternative hypothesis, n is the number of observations and $sup_{r\epsilon\Gamma}$ is the supremum. The test searches for a single threshold value over the entire range $[-\gamma, \gamma]$ of the threshold variable, where $\gamma = max|z_{t-d}|$ is the threshold value and z_{t-d} is the threshold variable. The threshold search is usually restricted to exclude the bottom and top 15% of observations in the range. The test is constructed in such a way that the break point corresponds to the minimum sum of squares and the highest Wald statistic. In order to deal with the problem that the threshold value is unidentified under the linear null, Seo (2008) proposes the use of bootstrap simulations which can approximate the empirical distribution of the above test statistic. As such, we use the block bootstrap suggested by Seo with 1000 replications. The idea of the sup-Wald test is to detect the existence of a nonlinear adjustment process towards the long run equilibrium. This means that even under the assumption of nonlinearity there exists still one single linear cointegrating vector in the system.

The Bai-Perron test is instead based on a sequential selection method, which tests for the existence and number of thresholds by minimising the sum of squared residuals at the m-partition $(T_1, \ldots, T_m)$ of m thresholds, resulting in $m + 1$ regimes. The test is an F-Test of the null hypothesis of zero thresholds versus the alternative of one threshold. If the null is rejected, the test can be extended to sequentially test for higher numbers of thresholds. The method allows for identification of the exact number of thresholds with an external threshold variable (Bai and Perron, 2003). We use both the sup-Wald test by Seo (2008) and the selection method by Bai and Perron (2003) to determine the number and value of the thresholds in our models.

Finally, we also carry out diagnostic tests; specifically the Breusch-Godfrey LM test for serial correlation, the Breusch-Pagan LM test for heteroscedasticity and the Cumulative Sum of Squares (CUSUM) test for parameter constancy to check model adequacy in each case.

3.4 Data and Empirical Results

3.4.1 Data Description

We investigate five inflation targeting countries, namely the UK, Canada, Australia, New Zealand and Sweden; and three non-targeting economies, which have found common application in the literature, namely the US, the Euro-Area and Switzerland (see Cecchetti and Ehrmann, 1999; Mishkin and Schmidt-Hebel, 2001; Neumann and Von Hagen, 2002). The data used for the estimations are monthly and span the time period from January 1993 to December 2020[5]. Inflation data for Australia is obtained from the Reserve Bank of Australia Measures of Consumer Price Inflation series, while inflation data for New Zealand is obtained from the Reserve Bank of New Zealand Statistics for Inflation series. The remaining data for the inflation rate series as well as all interest rate series are obtained from the OECD (Organisation for Economic Co-operation and Development). The inflation rate series is the Annual Percentage Change in CPI series, while the interest rate series are the nominal short term rates, which are the monthly averages of daily three-month money market rates. All nominal exchange rate series are obtained from the Pacific Exchange Rate Service database. The data obtained for the real GDP series are volume estimates of real GDP in national currency and are retrieved from the Federal Reserve Bank of St Louis Economic Database. The real exchange rates series are effective CPI-based measures and are obtained from the BIS (Bank for International Settlements) Statistics Warehouse. All variables are transformed to their natural logarithm.

3.4.2 Unit Root and Cointegration Tests

We first perform the DF-GLS and KPSS unit root tests on the nominal exchange rate, the interest rate differential and the inflation differential series, and report the results in Table 2 and Table 3. We can confirm that all series are integrated of order $I(1)$.

[5] The official dates when inflation targeting was adopted in each country are as follows: UK – October 1992; Canada – February 1991; Australia – January 1993; New Zealand – December 1989; Sweden – January 1993. The time period 1993-2020 therefore captures the entire time range of the inflation targeting regime up until recently in these countries.

Table 2 Unit Root Test Results for Interest Rate Differentials and Inflation Differentials				
	Level series		Differenced series	
	DF-GLS	KPSS	DF-GLS	KPSS
	Interest Rate Differentials			
UK-Canada	-2.432	3.57***	-4.480***	0.0663
UK-Australia	-1.935	3.07***	-4.249***	0.104
UK-New Zealand	-1.446	2.56***	-9.103***	0.0955
UK-Sweden	-2.586	1.94***	-4.021***	0.0948
Canada-Australia	-1.492	4.68***	-6.940***	0.0709
Canada-New Zealand	-2.118	3.75***	-8.238***	0.0467
Canada-Sweden	-2.041	2.35***	-8.851***	0.0966
Australia-New Zealand	-2.627	1.75***	-6.884***	0.0717
Australia-Sweden	-2.455	1.37***	-7.455***	0.0987
New Zealand Sweden	-2.665	0.954***	-9.155***	0.0992
US- Euro Area	-1.882	3.91***	-6.364***	0.0949
US-Switzerland	-1.945	3.96***	-4.652***	0.0712
Euro Area-Switzerland	-2.795	1.11***	-4.935***	0.0162
	Inflation Differentials			
UK-Canada	-2.364	1.21***	-4.101***	0.0102
UK-Australia	-2.031	1.42***	-4.349***	0.0326
UK-New Zealand	-2.392	1.39***	-7.074***	0.0263
UK-Sweden	-2.523	1.04***	-6.496***	0.016
Canada-Australia	-2.364	0.743***	-4.724***	0.0105
Canada-New Zealand	-2.674	0.815***	-4.407***	0.0116
Canada-Sweden	-1.778	1.24***	-4.610***	0.0074
Australia-New Zealand	-2.625	0.604***	-6.133***	0.0211
Australia-Sweden	-1.397	1.53***	-6.498***	0.019
New Zealand Sweden	-1.728	1.33***	-7.407***	0.0181
US- Euro Area	-2.220	1.14***	-3.582***	0.0286
US-Switzerland	-2.555	0.508***	-6.244***	0.0228
Euro Area-Switzerland	-2.151	0.422***	-4.809***	0.0156

* significant at 10% level; ** significant at 5% level; *** significant at 1% level
Critical values:
DF-GLS: 1%: -3.452; 5%: -2.876; 10%: -2.570 — KPSS: 1%: 0.216; 5%: 0.146; 10%: 0.119
H_0: variable contains a unit root — H_0: variable is stationary
H_1: variable is stationary — H_1: variable is not stationary

Table 3 Unit Root Test Results for the Exchange Rate				
	Level series		Differenced series	
	DF-GLS	KPSS	DF-GLS	KPSS
	Nominal Exchange Rates			
GBPCAD	-1.535	2.95***	-4.546***	0.0982
GBPAUD	-1.913	3.59***	-4.121***	0.0912
GBPNZD	-2.166	4.01***	-4.302***	0.083
GBPSEK	-1.996	3.5***	-3.966***	0.0752
CADAUD	-2.547	2.26***	-9.382***	0.0554
CADNZD	-2.115	2.39***	-9.050***	0.0986
CADSEK	-2.093	0.948***	-6.271***	0.0349
AUDNZD	-2.020	2.24***	-3.649***	0.0576
AUDSEK	-2.840	1.81***	-4.931***	0.0273
NZDSEK	-2.146	2.26***	-5.684***	0.0428
USDEUR	-2.084	3.05***	-9.568***	0.101
USDCHF	-2.244	2.89***	-9.643***	0.0725
EURCHF	-1.788	4.62***	-5.670***	0.0995

* significant at 10% level; ** significant at 5% level; *** significant at 1% level
Critical values:
DF-GLS: 1%: -3.452; 5%: -2.876; 10%: -2.570 — KPSS: 1%: 0.216; 5%: 0.146; 10%: 0.119
H_0: variable contains a unit root — H_0: variable is stationary
H_1: variable is stationary — H_1: variable is not stationary

Since all variables are integrated of the same order $I(1)$, we proceed to test for cointegration of the series. The results of the Johansen cointegration trace and eigenvalue tests are reported in Table 4 and show that exactly one cointegration relation exists between the three variables for each exchange rate model. The existence of exactly one long run equilibrium relationship between the exchange rate and the parity fundamentals suggests that the equilibrium is consistent with both UIP and PPP simultaneously.

Table 4 Johansen Trace and Eigenvalue Test for Cointegration

	Trace Test			**Eigenvalue Test**		
	Test 1	**Test 2**	**Test 3**	**Test 1**	**Test 2**	**Test 3**
UK-Canada	0.0189**	0.3049	0.2905	0.0231**	0.5082	0.2905
UK-Australia	0.0240**	0.0808	0.9260	0.0015***	0.1681	0.1565
UK-New Zealand	0.0380**	0.6693	0.2834	0.0360**	0.5519	0.2834
UK-Sweden	0.0373**	0.3066	0.3054	0.0486**	0.7100	0.3540
Canada-Australia	0.0047***	0.3884	0.8716	0.0025***	0.2333	0.8716
Canada-New Zealand	0.0118**	0.1329	0.1000	0.0333**	0.2232	0.1000
Canada-Sweden	0.0135**	0.1800	0.3150	0.0047***	0.3751	0.8910
Australia-New Zealand	0.0245**	0.2624	0.6578	0.0399**	0.2080	0.6578
Australia-Sweden	0.0220**	0.2546	0.6729	0.0079***	0.2152	0.4430
New Zealand-Sweden	0.0388**	0.2482	0.6560	0.0201**	0.4559	0.6448
US-Euro Area	0.0465**	0.5256	0.0999	0.0237**	0.6005	0.9109
US-Switzerland	0.0152**	0.4826	0.2577	0.0088***	0.5425	0.2577
Euro Area-Switzerland	0.0065***	0.4059	0.8809	0.0006***	0.0921	0.6530

* significant at 10% level; ** significant at 5% level; *** significant at 1% level

Trace Test:
Test 1: $H_0: r = 0$; $H_1: r = 1$; 95% Critical value: 42.92
Test 2: $H_0: r \leq 1$; $H_1: r = 2$; 95% Critical value: 25.87
Test 3: $H_0: r \leq 2$; $H_1: r = 3$; 95% Critical value: 12.52

Eigenvalue Test:
Test 1: $H_0: r = 0$; $H_1: r = 1$; 95% Critical value: 25.82
Test 2: $H_0: r \leq 1$; $H_1: r = 2$; 95% Critical value: 19.39
Test 3: $H_0: r \leq 2$; $H_1: r = 3$; 95% Critical value: 12.52

r denotes the cointegration rank and number of significant vectors.

3.4.3 Results for the Linear Vector Error Correction Model

We are now in a position to estimate our benchmark linear Vector Error Correction model, and report the results in Table 5 and Table 6 below. We can see that a long run relationship exists between the exchange rate and the parity fundamentals for only some of the exchange rate models. For some models, the adjustment coefficient θ is only significant and negative in some inflation equations and ranges between -0.029 and -0.280, which means that between 3% and 28% of a deviation from the parity equilibrium is adjusted for within one month. In other models, the adjustment occurs only in the interest rate equation, when between 3% and 6% of any deviation from the equilibrium is corrected within one month. In the short run, there is little relation between the exchange rate and the parity fundamentals. This is evident in the insignificant coefficient on the lagged variables. There are no observable differences in the adjustment speed between inflation targeting and non-targeting economies.

Table 5 Linear Vector Error Correction Model Results for Non-Targeting Countries

	USDEUR			USDCHF			EURCHF		
	Δs_t	$\Delta\tilde{\pi}_t$	$\Delta\tilde{\imath}_t$	Δs_t	$\Delta\tilde{\pi}_t$	$\Delta\tilde{\imath}_t$	Δs_t	$\Delta\tilde{\pi}_t$	$\Delta\tilde{\imath}_t$
μ	-0.00053	0.0027	0.00549	0.00164	0.000191	0.00702	0.0014*	0.00006	-0.00044
	(0.0012)	(0.0071)	(0.0040)	(0.0013)	(0.0099)	(0.0082)	(0.0007)	(0.0114)	(0.00754)
s_{t-1}	0.299***	1.106***	-0.340*	0.178***	0.0863	-0.480	0.170***	0.550	0.566
	(0.0552)	(0.335)	(0.189)	(0.0552)	(0.417)	(0.346)	(0.0599)	(0.970)	(0.639)
s_{t-2}	-0.127**	0.744**	0.395**	-0.0752	-0.104	0.291	-0.0580	0.635	0.653
	(0.0565)	(0.343)	(0.193)	(0.0552)	(0.417)	(0.346)	(0.0596)	(0.965)	(0.636)
$\tilde{\pi}_{t-1}$	0.00615	-0.271***	-0.0474	-0.00300	0.0642	-0.0260	-0.00272	0.0467	-0.0442
	(0.00979)	(0.0594)	(0.0335)	(0.00723)	(0.0546)	(0.0452)	(0.00329)	(0.0532)	(0.0350)
$\tilde{\pi}_{t-2}$	0.0110	0.117**	-0.0171	-0.0119*	0.149***	-0.0287	0.00258	0.305***	-0.0153
	(0.00936)	(0.0568)	(0.0320)	(0.0072)	(0.0545)	(0.0451)	(0.00324)	(0.0525)	(0.0346)
$\tilde{\imath}_{t-1}$	-0.0123	0.0339	0.212***	-0.0083	-0.143**	0.0182	0.00380	0.138	-0.107*
	(0.0162)	(0.0982)	(0.0553)	(0.0089)	(0.0672)	(0.0556)	(0.00564)	(0.0912)	(0.0601)
$\tilde{\imath}_{t-2}$	-0.0118	0.0481	-0.0327	-0.0137	0.0179	-0.0923*	0.00379	0.188**	-0.137**
	(0.0161)	(0.0978)	(0.0551)	(0.0089)	(0.0675)	(0.0559)	(0.00564)	(0.0912)	(0.0601)
θ	-0.0088***	-0.0297*	0.0137	0.00003	0.129***	-0.00354	0.00237*	0.110***	0.0224
	(0.0026)	(0.0157)	(0.0088)	(0.0037)	(0.0277)	(0.0229)	(0.00133)	(0.0215)	(0.0142)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

We perform a series of diagnostic tests to establish whether the linear model is data congruent. The results of these misspecification tests are reported in Table 7 and show that the models suffer from heteroscedasticity. Furthermore, since the results of the Gregory-Hansen test indicate the presence of regime shifts for several models, we proceed to test whether the data generating process is characterised by nonlinearities. If the model parameters are not constant, this can indicate the existence of a break or threshold which divides the model into two or more regimes.

Table 6 Linear Vector Error Correction Model Results for Inflation Targeting Countries

	GBPNZD			CADAUD			CADNZD			CADSEK			NZDSEK		
	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$
μ	0.00107	-0.00004	0.00004	0.0004	-0.00006	0.00013	0.00087	-0.000022	0.00034	-0.0003	0.00001	0.00067	-0.00096	0.00004	0.00024
	(0.0013)	(0.00817)	(0.00238)	(0.00104)	(0.0167)	(0.00218)	(0.00120)	(0.0159)	(0.0025)	(0.0011)	(0.0143)	(0.0033)	(0.0013)	(0.0123)	(0.0029)
s_{t-1}	0.137**	0.0228	-0.103	0.180***	0.237	-0.0847	0.191***	-0.954	-0.0845	0.132**	0.301	0.00923	0.201***	0.101	-0.172
	(0.0564)	(0.344)	(0.100)	(0.0555)	(0.892)	(0.117)	(0.0549)	(0.729)	(0.114)	(0.0543)	(0.680)	(0.157)	(0.0542)	(0.521)	(0.122)
$\tilde{\pi}_{t-1}$	0.00225	0.0103	-0.00829	0.00234	-0.0585	-0.00729	0.00293	-0.0543	-0.00708	0.00494	0.0454	-0.00916	-0.00500	0.116**	-0.0197
	(0.0090)	(0.0550)	(0.0160)	(0.00341)	(0.0548)	(0.00718)	(0.00414)	(0.0550)	(0.0086)	(0.00445)	(0.0558)	(0.0129)	(0.00562)	(0.0541)	(0.0126)
$\tilde{i}_{t-1}$	-0.0301	-0.0951	0.333***	-0.0241	0.938**	0.486***	-0.00037	0.268	0.358***	-0.00934	0.0369	0.355***	-0.00636	-0.197	0.349***
	(0.0304)	(0.186)	(0.0540)	(0.0236)	(0.378)	(0.0496)	(0.0253)	(0.335)	(0.0523)	(0.0182)	(0.228)	(0.0527)	(0.0230)	(0.221)	(0.0517)
θ	0.00312	0.0846***	-0.00183	0.0023***	0.0776***	-0.00338**	0.00414**	0.134***	-0.00178	0.0021***	0.0440***	-0.0001	-0.0001	0.205***	-0.0033
	(0.0035)	(0.0213)	(0.0062)	(0.00078)	(0.0126)	(0.0016)	(0.00196)	(0.0260)	(0.0041)	(0.0006)	(0.00771)	(0.00178)	(0.0043)	(0.0411)	(0.0096)
	GBPCAD			GBPAUD			GBPSEK			AUDNZD			AUDSEK		
	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{\pi}_t$	$\Delta \tilde{i}_t$
μ	0.00019	0.000096	-0.00057	0.00062	-0.00004	0.00006	0.00005	0.00002	0.000340	-0.0182	-0.289***	-0.068***	-0.00073	0.00006	0.00068
	(0.0011)	(0.0135)	(0.0028)	(0.0014)	(0.0081)	(0.0022)	(0.0011)	(0.0099)	(0.0028)	(0.0111)	(0.111)	(0.0233)	(0.0012)	(0.0131)	(0.0027)
s_{t-1}	0.119**	-1.303*	-0.0469	0.128**	0.621*	-0.202**	0.125**	0.172	-0.220	0.265***	-0.644	-0.284**	0.150***	1.076*	0.0492
	(0.0574)	(0.692)	(0.146)	(0.0601)	(0.349)	(0.0966)	(0.0585)	(0.534)	(0.149)	(0.0558)	(0.555)	(0.117)	(0.0563)	(0.619)	(0.127)
s_{t-2}	-0.0380	0.235	-0.0828	-0.158***	0.797**	0.0104	-0.0808	-0.267	0.200	-0.0777	1.192**	0.0817	-0.224***	0.661	-0.152
	(0.0562)	(0.677)	(0.143)	(0.0598)	(0.348)	(0.0962)	(0.0576)	(0.526)	(0.146)	(0.0564)	(0.561)	(0.118)	(0.0546)	(0.600)	(0.124)
s_{t-3}							-0.0263	-0.955*	0.262*				-0.0323	0.0626	0.245*
							(0.0575)	(0.525)	(0.146)				(0.0554)	(0.609)	(0.125)
$\tilde{\pi}_{t-1}$	0.0060	-0.0830	-0.0148	0.00343	0.0344	-0.00430	0.00386	0.0315	-0.00148	-0.00113	0.00828	0.0131	-0.00148	0.0238	-0.00673
	(0.0046)	(0.0555)	(0.0117)	(0.00871)	(0.0507)	(0.0140)	(0.00603)	(0.0551)	(0.0153)	(0.0054)	(0.0537)	(0.0113)	(0.0049)	(0.0542)	(0.0112)
$\tilde{\pi}_{t-2}$	-0.0025	0.175***	-0.0229**	-0.00408	-0.129**	0.0279**	0.00645	-0.0911*	0.0191	0.00603	0.0112	0.0190*	0.00321	-0.00393	0.0133
	(0.0045)	(0.0543)	(0.0115)	(0.00865)	(0.0503)	(0.0139)	(0.00592)	(0.0541)	(0.0151)	(0.0054)	(0.0532)	(0.0112)	(0.0048)	(0.0530)	(0.0109)
$\tilde{\pi}_{t-3}$							-0.00715	0.0357	-0.00191				0.00556	-0.0139	0.00286
							(0.00596)	(0.0544)	(0.0152)				(0.0048)	(0.0529)	(0.0109)
$\tilde{i}_{t-1}$	-0.0133	0.217	0.297***	-0.0393	-0.419*	0.311***	-0.0474**	-0.217	0.290***	0.0158	0.373	0.318***	0.00320	0.202	0.277***
	(0.0224)	(0.270)	(0.0570)	(0.0371)	(0.216)	(0.0597)	(0.0224)	(0.205)	(0.0570)	(0.0264)	(0.263)	(0.0552)	(0.0248)	(0.272)	(0.0561)
$\tilde{i}_{t-2}$	0.00709	0.00880	-0.0133	0.0116	1.276***	-0.0486	0.0455**	-0.136	-0.102*	0.0245	0.490*	-0.0665	-0.00110	0.428	0.0192
	(0.0224)	(0.270)	(0.0572)	(0.0366)	(0.213)	(0.0588)	(0.0231)	(0.211)	(0.0587)	(0.0263)	(0.261)	(0.0549)	(0.0253)	(0.278)	(0.0572)
$\tilde{i}_{t-3}$							-0.0463**	0.492**	0.217***				-0.0296	1.098***	0.153***
							(0.0222)	(0.203)	(0.0565)				(0.0247)	(0.271)	(0.0558)
θ	0.0054	0.428***	0.00871	0.00750	0.147***	0.00930	0.00456	0.194***	0.0126	-0.0182	-0.289***	-0.0676***	-0.00470**	-0.105***	0.00368
	(0.0062)	(0.0745)	(0.0158)	(0.00708)	(0.0412)	(0.0114)	(0.00498)	(0.0455)	(0.0127)	(0.0111)	(0.111)	(0.0233)	(0.00184)	(0.0202)	(0.00417)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

The issue of parameter instability can be addressed by extending the current model to account for potential nonlinearities, in particular those which are related to a threshold. Given the absence of a strong equilibrium-correction mechanism in the linear model and the results of the diagnostic tests, we proceed with estimating a Threshold Vector Error Correction model in the following with Taylor rule deviations as the threshold variable. Taylor rule deviations are an important indicator of central bank credibility and can be an interesting influence on the adjustment to the exchange rate parities.

Table 7 Misspecification Tests for the Linear Models

	Selected Lag	White Test for Heteroscedasticity	Breusch-Godfrey LM Test for Serial Correlation	Wald test for weak exogeneity	Gregory-Hansen test for cointegration with regime shifts
GBPCAD	2	0.0000***	0.9665	0.5998	-4.76
GBPAUD	2	0.0000***	0.2640	0.0000***	-5.69**
GBPNZD	1	0.0000***	0.1733	0.8550	-5.71**
GBPSEK	3	0.0000***	0.3223	0.0135**	-4.87
CADAUD	1	0.0000***	0.0655*	0.0441**	-5.92**
CADNZD	1	0.0000***	0.4053	0.2634	-5.77**
CADSEK	1	0.0000***	0.1711	0.9011	-4.62
AUDNZD	2	0.0000***	0.1328	0.0229**	-5.95**
AUDSEK	3	0.0000***	0.3530	0.0000***	-6.03***
NZDSEK	1	0.0000***	0.2004	0.6425	-5.71**
USDEUR	2	0.0000***	0.5313	0.0004***	-4.92
USDCHF	2	0.0000***	0.1919	0.3340	-5.57**
EURCHF	2	0.0000***	0.1306	0.0357**	-4.95

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. P-values reported for the first three tests.

White Test for Heteroscedasticity:
H_0: $homoscedastic\ errors$
H_1: $heteroscedastic\ errors$

Breusch-Godfrey LM Test for serial correlation:
H_0: $no\ serial\ correlation$
H_1: $serial\ correlation$

Wald F-Test for weak exogeneity:
H_0: $no\ endogeneity$
H_1: $weak\ endogenity$

Gregory-Hansen test for cointegration with regime shifts:
H_0: $no\ cointegration$
H_1: $cointegration\ with\ regime\ shifts$
Critical values: 10%: -5.23; 5%: -5.50; 1%: -5.97. Test statistics reported.

3.4.4 Taylor Rule Deviations

Before we are able to estimate the threshold model, we first need to create a measure of Taylor rule deviations. The GMM method, which we use to estimate the Taylor rules, requires all variables to be stationary; therefore we test the individual series for a unit root using the DF-GLS and KPSS tests. The results of these tests are reported in Table 8. We find that the interest rate and real effective exchange rate series are integrated of order $I(1)$; the inflation rate series are stationary and the output gap series are integrated of order $I(2)$[6].

Table 8 Unit Root Test Results for Individual Series Entering the Taylor Rule				
	Level series		Differenced series	
	DF-GLS	KPSS	DF-GLS	KPSS
Interest Rates				
UK	-2.193	2.64***	-4.678***	0.0911
Canada	-2.092	1.0***	-6.613***	0.0657
Australia	-0.880	4.9***	-4.820***	0.0918
New Zealand	-2.049	2.94***	-5.188***	0.0821
Sweden	-2.428	1.55***	-4.077***	0.0928
US	-1.557	1.79***	-3.259***	0.0971
Euro Area	-2.134	4.09***	-4.870***	0.0858
Switzerland	-2.672	3.41***	-5.017***	0.0338
Inflation Rates				
UK	-3.560***	1.42***	-4.834***	0.0558
Canada	-4.352***	0.519***	-5.291***	0.0091
Australia	-3.167**	1.65***	-4.630***	0.0243
New Zealand	-3.919***	1.59***	-8.055***	0.0284
Sweden	-3.497***	0.54***	-6.205***	0.0204
US	-4.159***	0.329***	-6.339***	0.0201
Euro Area	-3.333**	0.865***	-5.426***	0.0296
Switzerland	-3.396**	0.544***	-6.557***	0.0251
Output Gap				
UK	-2.299	3.86***	-0.932	5.86***
Canada	-1.805	2.65***	-0.906	4.89***
Australia	-0.471	2.66***	-1.939	1.42***
New Zealand	-1.295	3.99***	-2.351	3.07***
Sweden	-1.316	3.58***	-1.734	2.66***
US	-0.674	3.84***	-1.619	3.72***
Euro Area	-0.618	6.08***	-2.679	2.07***
Switzerland	-2.121	5.03***	-1.891	4.21***
Real Effective Exchange Rates				
UK	-1.618	4.32***	-4.991***	0.0758
Canada	-1.654	4.47***	-3.773***	0.017
Australia	-1.906	2.76***	-11.342***	0.0642
New Zealand	-2.497	1.25***	-9.201***	0.0648
Sweden	-2.593	1.56***	-6.511***	0.0482
US	-1.637	3.56***	-5.051***	0.0989
Euro Area	-2.010	2.32***	-11.045***	0.0991
Switzerland	-1.706	4.81***	-4.887***	0.0715

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.
Critical values:
DF-GLS: 1%: -3.452; 5%: -2.876; 10%: -2.570
H_0: variable contains a unit root
H_1: variable is stationary

KPSS: 1%: 0.216; 5%: 0.146; 10%: 0.119
H_0: variable is stationary
H_1: variable is not stationary

[6] The integration order $I(2)$ of the output gap suggests that the variable may have a quadratic trend. Since the output gap measure is the percentage deviation of GDP from a quadratic trend, it seems that real GDP lies close to potential GDP. This contradicts the standard assumption that the output gap is a mean-reverting variable for which shocks are non-persistent. The literature regarding the integration order of the output gap is mixed and output series with both deterministic and stochastic trends have been reported (Diebold and Senhadji 1996). When applying the Hodrick-Prescott filter to integrated time series, it can remove deterministic trends but not stochastic trends; and the filter has been found to generate business cycle characteristics in filtered data (Cogley and Nason, 1995).

The $I(1)$ series are included in the GMM model in their first differences and the $I(2)$ series in are included in their second differences. The results of the GMM Taylor rule estimations for individual countries are reported in Table 9.

Table 9 GMM Results for Individual Taylor Rules

		α	β	γ	δ	ρ
United Kingdom	Classical	30.92^{***}	0.471^{***}	-1.725^{***}		
		(1.393)	(0.0746)	(0.769)		
	Extended	8.140^{***}	0.733^{***}	-1.000^{***}	0.111^{***}	
		(1.161)	(0.0440)	(0.511)	(0.00483)	
	Smoothing	0.227	-0.0236^{*}	-1.000		0.989^{***}
		(0.336)	(0.0127)	(0.187)		(0.00671)
Canada	Classical	19.60^{***}	0.895^{***}	-1.096^{***}		
		(1.024)	(0.120)	(0.564)		
	Extended	21.35^{***}	0.976^{***}	-1.050^{***}	-0.0303^{***}	
		(1.034)	(0.120)	(0.568)	(0.00827)	
	Smoothing	0.540	-0.0413	-2.457		0.973^{***}
		(0.416)	(0.0317)	(0.221)		(0.0125)
Australia	Classical	15.97^{***}	1.005^{***}	-1.065^{***}		
		(0.607)	(0.0797)	(0.404)		
	Extended	11.96^{***}	0.983^{***}	-1.135^{***}	0.0557^{***}	
		(0.759)	(0.0639)	(0.370)	(0.00711)	
	Smoothing	0.288	-0.0273^{*}	-1.177		0.977^{***}
		(0.230)	(0.0163)	(0.153)		(0.0120)
New Zealand	Classical	11.78^{***}	0.969^{***}	-4.175^{***}		
		(0.379)	(0.0934)	(0.135)		
	Extended	4.185^{***}	0.967^{***}	-5.455^{***}	0.102^{***}	
		(0.577)	(0.0869)	(0.151)	(0.00641)	
	Smoothing	0.381^{**}	-0.0223	-1.126^{*}		0.973^{***}
		(0.175)	(0.0223)	(0.611)		(0.0124)
Sweden	Classical	31.18^{***}	0.742^{***}	-8.496^{***}		
		(1.117)	(0.0396)	(0.305)		
	Extended	17.86^{***}	0.585^{***}	-7.236^{***}	0.0898^{***}	
		(2.144)	(0.0513)	(0.187)	(0.0177)	
	Smoothing	3.060	0.0721	-8.330		0.892^{***}
		(2.392)	(0.0774)	(0.527)		(0.0908)
United States	Classical	9.349^{***}	1.087^{***}	-6.027^{***}		
		(1.516)	(0.148)	(0.814)		
	Extended	0.626	1.236^{***}	-4.897^{***}	0.0591^{***}	
		(1.751)	(0.148)	(0.737)	(0.00800)	
	Smoothing	0.138	0.0227	-9.599		0.976^{***}
		(0.210)	(0.0261)	(0.118)		(0.00713)
Euro-Area	Classical	29.89^{***}	1.000^{***}	-3.076^{***}		
		(1.571)	(0.110)	(0.151)		
	Extended	25.61^{***}	0.921^{***}	-3.116^{***}	0.0501^{***}	
		(1.836)	(0.0965)	(0.139)	(0.00868)	
	Smoothing	0.634	0.0372^{**}	-6.848		0.971^{***}
		(0.548)	(0.0183)	(0.559)		(0.0153)
Switzerland	**Classical**	8.371^{***}	1.281^{***}	-1.395^{***}		
		(0.773)	(0.0471)	(0.130)		
	Extended	8.867^{***}	1.290^{***}	-1.615^{***}	0.00772	
		(1.070)	(0.0476)	(0.345)	(0.0110)	
	Smoothing	0.346^{*}	0.0574^{***}	-5.907^{*}		0.946^{***}
		(0.202)	(0.0217)	(0.330)		(0.0161)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses. Selected Taylor rule models in **bold**. We account for heteroscedasticity and autocorrelation by using Newey-West consistent errors. All models are exactly identified. Model selection according to the J-statistic.

From the results in Table 9, we can see that the interest rates in most countries are best described by the extended Taylor rule, except in Switzerland, where the interest rate is best described by the classical Taylor rule. Our findings are consistent with those of other studies, since the extended Taylor rule, which includes the real exchange rate, should provide a more accurate description of monetary policy in open-economy inflation targeting countries than the classical rule (Svensson, 2000b). The classical Taylor rule might be optimal in a closed economy, but in open economies, the exchange rate represents an important aspect of the monetary transmission mechanism. This is confirmed by Taylor and Davradakis (2006), for instance, who have found that interest rate setting in the UK is better explained by a Taylor rule, which includes the exchange rate. Likewise, Canada is known for considering the real exchange rate it its Monetary Conditions Index. The Reserve Bank of Australia also openly considers the exchange rate in its policy setting, which we can confirm in our estimation (De Brouwer and Gilbert, 2005). Likewise, New Zealand has been known to consider the exchange rate in its inflation targeting policy (Huang et al., 2001). The Interest rate policy of Sweden's Riksbank can also be described by the extended rule, which is similar to the findings of other authors (Chappell Jr and McGregor, 2017). For non-targeting economies, the selected Taylor rule is the one which best describes the interest rate in each of the three economies, although the monetary authorities in these countries are not known to follow a Taylor rule.

Now that we have estimated the Taylor rules for each country, we can construct the Taylor rule deviations variable. We define Taylor rule deviations in a similar manner to Wilde (2012) and Nikolsko-Rzhevskyy et al. (2014), namely as the difference between the central bank interest rate and the target interest rate which is determined by the Taylor rule fundamentals. Since we identified which Taylor rules represent accurate interest rate reaction functions for each country, we can now estimate our Threshold Vector Error Correction model. Before we do so, we want to test the linear model for threshold-type nonlinearities.

3.4.5 Nonlinearity Tests and Results of the Threshold Model

As part of our threshold estimation, we perform two tests of threshold-type nonlinearity. The results of the sup-Wald test are reported in Table 10 and reject the null of linearity against the alternative of threshold-type nonlinearity for all exchange rate models. We also report the results of the Bai-Perron test, which identifies the number of thresholds and the corresponding threshold value empirically as those which minimise the residual sum of squares. For all exchange rate models, one threshold was identified as optimal. Based on the results of the two tests, we can confirm that the Threshold Vector Error Correction model is appropriate for our estimation.

Table 10 Nonlinearity Test and Model Selection

	Threshold variable	Lag	sup-Wald Test	Bai-Perron Threshold Test
GBPCAD	UK Taylor rule deviation	3	0.0000***	36.66**
	CA Taylor rule deviation	3	0.0000***	69.80**
GBPAUD	UK Taylor rule deviation	3	0.0000***	27.71**
	AU Taylor rule deviation	3	0.0000***	37.08**
GBPNZD	UK Taylor rule deviation	3	0.0000***	39.93**
	NZ Taylor rule deviation	3	0.0000***	58.77**
GBPSEK	UK Taylor rule deviation	3	0.0000***	47.77**
	SE Taylor rule deviation	3	0.0000***	34.61**
CADAUD	CA Taylor rule deviation	3	0.0000***	39.68**
	AU Taylor rule deviation	3	0.0000***	37.97**
CADNZD	CA Taylor rule deviation	3	0.0000***	44.83**
	NZ Taylor rule deviation	3	0.0000***	37.88**
CADSEK	CA Taylor rule deviation	3	0.0000***	31.99**
	SE Taylor rule deviation	3	0.0000***	32.37**
AUDNZD	AU Taylor rule deviation	3	0.0000***	96.64**
	NZ Taylor rule deviation	3	0.0000***	43.66**
AUDSEK	AU Taylor rule deviation	3	0.0000***	37.03**
	SE Taylor rule deviation	3	0.0000***	51.11**
NZDSEK	NZ Taylor rule deviation	3	0.0000***	41.06**
	SE Taylor rule deviation	3	0.0000***	33.73**
USDEUR	US Taylor rule deviation	3	0.0000***	34.20**
	EU Taylor rule deviation	3	0.0000***	27.19**
USDCHF	US Taylor rule deviation	3	0.0000***	49.81**
	CH Taylor rule deviation	3	0.0000***	61.98**
EURCHF	EU Taylor rule deviation	3	0.0000***	32.76**
	CH Taylor rule deviation	3	0.0000***	29.24**

UK = United Kingdom; CA = Canada; AU = Australia; NZ = New Zealand; SE = Sweden; US = United States; EU = Euro Area; CH = Switzerland

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Sup-Wald test hypothesis:
H_0: $linear\ error\ correction$
H_1: $threshold\ error\ correction$

Bai-Perron 5% Critical Value for Threshold Test: 27.03
H_0: $zero\ thresholds$
H_1: $one\ threshold$

Given the results of the threshold tests in Table 10, we can confirm that our models can be divided into two regimes, namely one regime of small Taylor rule deviations and one regime of large Taylor rule deviations. We find no significant short run relations between the variables in the threshold model and, similar to the linear model, there is no evidence for equilibrium correction in the exchange rate and interest rate equations. Therefore, instead of full results, we only report the differences in the adjustment speed in the inflation equation. Table 11 reports the threshold value for each model along with the adjustment coefficient in the inflation equation for both regimes. Regime one is the regime in which Taylor rule deviations are small and regime two is the regime in which Taylor rule deviations are large.

Table 11 Differences in Adjustment Speed in the Inflation Equation Between Regimes

	Threshold variable d_t	Threshold Value γ	θ in Regime 1	θ in Regime 2
GBPCAD	UK Taylor rule deviation	-0.7806	-0.3143***	-0.1117***
	CA Taylor rule deviation	-0.6977	-0.4083***	-0.0649
GBPAUD	UK Taylor rule deviation	1.2467	-0.0784***	-0.0687
	AU Taylor rule deviation	-0.4828	-0.0762	-0.0742**
GBPNZD	UK Taylor rule deviation	0.6558	-0.0614*	-0.2092
	NZ Taylor rule deviation	0.2724	-0.1778***	0.0156
GBPSEK	UK Taylor rule deviation	-1.2101	-0.2131***	-0.0669**
	SE Taylor rule deviation	-0.9102	-0.2203***	-0.0132
CADAUD	CA Taylor rule deviation	-0.4582	-0.4100***	-0.1524***
	AU Taylor rule deviation	-0.3214	-0.2370**	-0.2196***
CADNZD	CA Taylor rule deviation	-0.6514	-0.3437***	-0.0535
	NZ Taylor rule deviation	-0.8776	-0.3761***	-0.0555
CADSEK	CA Taylor rule deviation	-1.5045	-0.3253***	-0.1450***
	SE Taylor rule deviation	-0.1495	-0.2070**	-0.1291**
AUDNZD	AU Taylor rule deviation	1.0051	-0.1084***	-0.0028
	NZ Taylor rule deviation	-0.5349	-0.2195***	-0.0200
AUDSEK	AU Taylor rule deviation	-0.4861	-0.1000	-0.1866***
	SE Taylor rule deviation	-0.1639	-0.3103***	-0.0665*
NZDSEK	NZ Taylor rule deviation	-1.2343	-0.1936**	-0.1023***
	SE Taylor rule deviation	-0.1589	-0.2770***	-0.0391
USDEUR	US Taylor rule deviation	-0.1473	-0.0689	-0.0771
	EU Taylor rule deviation	0.8818	-0.1015**	0.3329
USDCHF	US Taylor rule deviation	0.2033	-0.0972**	-0.0870**
	CH Taylor rule deviation	1.0755	-0.1306***	0.1241
EURCHF	EU Taylor rule deviation	0.6664	-0.0929**	-0.1420
	CH Taylor rule deviation	0.6913	-0.2456***	-0.0671

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.
Threshold value γ with d_t as the threshold variable.
$\boldsymbol{\theta}$ = adjustment coefficient in the inflation equation.
UK = United Kingdom; CA = Canada; AU = Australia; NZ = New Zealand; SE = Sweden; US = United States; EU = Euro Area; CH = Switzerland

We do find substantial differences in the adjustment speed between the two regimes in the inflation equation. The adjustment speed is twice as fast in regime one (when Taylor rule deviations are small) than it is in regime two (when Taylor rule deviations are large). For some models, the error correction coefficient is only significant in regime one, which means that adjustment only occurs when Taylor rule deviations are small, but not otherwise. When Taylor rule deviations are small, between 6% and 41% of a deviation from the UIP- and PPP-implied equilibrium is corrected within one month; while when Taylor rule deviations are large, only between 6% and 21% of a deviation from the UIP- and PPP-implied equilibrium is corrected within one month. The size of the adjustment coefficient supports the idea that deviations from the long run relation between the exchange rate and the parity fundamentals are persistent but can be influenced by the size of Taylor rule deviations. It seems that small Taylor rule deviations are considered only temporary acts of monetary policy discretion, while large Taylor rule deviations are perceived as indicative of a permanent shift in monetary policy, which lowers the adjustment speed to UIP and PPP (Kahn, 2010; Neuenkirch and Tillmann, 2014).

In inflation targeting countries, the adjustment in the small Taylor rule deviations regime is more than twice as fast as it is in non-targeting countries. While in inflation targeting countries between 6% and 41% of a deviation from the UIP- and PPP-implied equilibrium is corrected within one month, in non-targeting economies, only between 6% and 24% of a deviation is corrected within one month. Considering the role of Taylor rule deviations accounts for the endogeneity of monetary policy, which seems to be more pronounced in inflation targeting regimes than in non-targeting regimes.

Table 12 Diagnostic Tests for the Nonlinear Model

	Threshold variable	**Breusch-Godfrey Test for Serial Correlation**	**Breusch-Pagan Test for Heteroscedasticity**	**CUSUM Test for Parameter Constancy**
GBPCAD	UK Taylor rule deviation	0.5097	0.1497	p-value > 0.05
	CA Taylor rule deviation	0.7554	0.1924	p-value > 0.05
GBPAUD	UK Taylor rule deviation	0.1933	0.2215	p-value > 0.05
	AU Taylor rule deviation	0.4888	0.5948	p-value > 0.05
GBPNZD	UK Taylor rule deviation	0.0624	0.4208	p-value > 0.05
	NZ Taylor rule deviation	0.8720	0.8064	p-value > 0.05
GBPSEK	UK Taylor rule deviation	0.3121	0.1202	p-value > 0.05
	SE Taylor rule deviation	0.1047	0.0010***	p-value > 0.05
CADAUD	CA Taylor rule deviation	0.3476	0.5688	p-value > 0.05
	AU Taylor rule deviation	0.6826	0.4962	p-value > 0.05
CADNZD	CA Taylor rule deviation	0.4125	0.7766	p-value > 0.05
	NZ Taylor rule deviation	0.3252	0.9309	p-value > 0.05
CADSEK	CA Taylor rule deviation	0.5078	0.3709	p-value > 0.05
	SE Taylor rule deviation	0.9002	0.9994	p-value > 0.05
AUDNZD	AU Taylor rule deviation	0.1392	0.6479	p-value > 0.05
	NZ Taylor rule deviation	0.7432	0.9984	p-value > 0.05
AUDSEK	AU Taylor rule deviation	0.1001	0.9815	p-value > 0.05
	SE Taylor rule deviation	0.9237	0.7708	p-value > 0.05
NZDSEK	NZ Taylor rule deviation	0.8747	0.8699	p-value > 0.05
	SE Taylor rule deviation	0.3778	0.8394	p-value > 0.05
USDEUR	US Taylor rule deviation	0.8456	0.9182	p-value > 0.05
	EU Taylor rule deviation	0.4092	0.0108**	p-value > 0.05
USDCHF	US Taylor rule deviation	0.4872	0.0000***	p-value > 0.05
	CH Taylor rule deviation	0.1998	0.7473	p-value > 0.05
EURCHF	EU Taylor rule deviation	0.9009	0.7772	p-value > 0.05
	CH Taylor rule deviation	0.4470	0.4451	p-value > 0.05

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Breusch-Godfrey LM Test for serial correlation:
$H_0: no\ serial\ correlation$
$H_1: serial\ correlation$

Breusch-Pagan LM Test for heteroscedasticity:
$H_0: homoscedasticity$
$H_1: heteroscedasticity$

CUSUM Test for parameter constancy:
$H_0: parameter\ constancy$
$H_1: no\ parameter\ constancy$

When comparing the results of the nonlinear model to that of the linear model, it becomes evident that the former explains the adjustment process substantially better than the linear model. While, in some cases, no error correction could be observed in the linear models, the adjustment is relatively fast in the nonlinear model. These findings suggest that the existence of an equilibrium correction mechanism is to some extent influenced by the size of Taylor rule deviations.

Finally, we test the adequacy of the nonlinear model by testing for serial correlation, heteroscedasticity and parameter constancy. The results of these tests are reported in Table 12 and indicate that the models do not suffer from any apparent misspecification. In particular, the parameter constancy tests suggest that the regression parameters are stable over the sample period and thus there is no evidence of an impact of the recent Covid-19 pandemic.

3.5 Conclusion

The empirical invalidity of UIP and PPP has been an ongoing issue for concern in international finance. The aim of this chapter was to provide an alternative explanation of the UIP and PPP puzzles by estimating a nonlinear model of the two parities jointly, which accounts for the role of Taylor rule deviations in inflation targeting countries. The analysis was conducted for the specific case of five countries that have adopted inflation targeting (the UK, Canada, Australia, New Zealand and Sweden) and compared to three economies which do not consider themselves to be inflation-targeters (the US, the Euro-Area and Switzerland). A nonlinear Threshold Vector Error Correction model with Taylor rule deviations as the threshold variable was estimated and assessed against a benchmark linear Vector Error Correction model which does not account for Taylor rule deviations.

Our analysis generates the following key findings. First, our findings suggest that the nonlinear framework is more appropriate to assess the adjustment of the inflation rate to the long run UIP- and PPP-implied equilibrium. While the linear framework provides only little support for the joint validity of UIP and PPP, the nonlinear model confirms the existence of a joint UIP and PPP equilibrium in the long run. The adjustment, which only occurs in the inflation equation, is more than twice as fast as any significant adjustment speed found in the linear model. Second, our analysis highlights the role of Taylor rule deviations, which has not been considered in analyses of UIP and PPP thus far. Our findings show that the adjustment speed is twice as fast when Taylor rule deviations are small, which suggests, that small Taylor rule deviations are considered temporary departures from the monetary policy rule, while large Taylor rule deviations are seen as indicative of permanent shifts in monetary policy. This is consistent with other studies in the field (Kahn, 2010). This suggests that credibility plays an important role in the inflation targeting economy and that the inflation targeting countries considered in this study did well at establishing credibility and reducing the impact of deviations from the monetary policy rule. Third, our findings suggest that the parities hold better in inflation targeting countries, since the adjustment speed is twice as fast as in non-targeting economies. However, the adjustment is also more strongly influenced by the size of Taylor rule deviations, which indicates that credibility is more important in inflation targeting regimes.

Overall, the findings provide support for the stronger relevance of credibility for the adjustment to UIP and PPP in inflation targeting regimes than in non-targeting regimes. The implications for inflation targeting policymakers are as follows. The success of the inflation targeting regime seems to have a greater dimension than previously believed. Inflation targeting central banks, through appropriately managing their credibility and reducing the impact of Taylor rule deviations, were able to ensure greater validity of the exchange rate parities than non-targeting economies. The results highlight the wider importance of credibility for inflation targeting central banks. Central banks might be able to use this information to support the public perception of their credibility and directly influence the exchange rate parities, should they wish to do so. By reducing the size of deviations from the Taylor rule, they can minimise the impact on goods and asset markets. Although the countries considered in this study did well at maintaining credibility, they might be able to achieve greater economic stability, either through the reduction of Taylor rule deviations or through increased communications around any sizable Taylor rule deviations.

4 Transparency, Credibility and Central Bank Announcements

The results obtained from the analysis in the previous chapter provide an interesting insight into the strength of central bank credibility in the inflation targeting regime and the strong validity of UIP and PPP, even in the presence of Taylor rule deviations. There are two important considerations to note. First, while Taylor rule deviations might indicate a loss of central bank credibility quantitatively, they do not provide a conclusive estimation of the perception of credibility held by the general public. Since market participants form their expectations based on different types of information they receive, a more accurate measure of perceived central bank credibility can be obtained from measures of expectations themselves. If market participants act upon their expectations, they can directly influence the fulfilment of central bank objectives, which makes expectations an important measure of credibility. As such, it is of interest to consider expectations held by the general public as measures of credibility in the subsequent empirical chapters. Second, whilst the joint analysis of the exchange rate parities is important to understand the linkages between goods and asset markets, it is of interest to investigate both UIP and PPP in more detail. In the following chapters, the two parities are regarded separately with Chapter 5 focusing on the UIP relation and Chapter 7 on the PPP relation. The present chapter offers a discussion of central bank transparency and the role of central bank communications to provide the conceptual background to the following empirical chapters.

4.1 Transparency and Central Bank Credibility

Inflation targeting is a commitment by the central bank to prioritise price level stabilisation above all else. Although transparency is not required to implement the inflation targeting regime in the first instance, the continuous demonstration of transparency is beneficial for the successful operation of the regime. Transparency can lead to a reduction in inflation bias and improve the central bank's credibility and reputation with the general public (Geraats, 2001). Inflation bias causes inflation to increase over time and can be prevented by effective communication and a commitment to transparent policies. Such inflationary pressures are important to consider since expectations of low inflation have the power to generate realised levels of low inflation. This, however, is only achievable if the central bank is perceived as credible. When independent central banks officially adopted inflation targeting regimes in the early 1990s, they had to increase their transparency through more frequent and detailed communications about the underlying motives for their policy decisions. This step was necessary in order to ensure their accountability towards the general public and to manage the expectations of market participants. Greater transparency and credibility can be achieved through the creation of scheduled news to influence expectations and the reduction of noise to increase the predictability of monetary policy (Blinder et al., 2008).

The process of achieving transparency in the inflation targeting regime is threefold. Firstly, the central bank makes a public commitment to maintain a low inflation rate and to stabilise inflation volatility. Secondly, this commitment is supported through the explicit announcement of the inflation target rate for the relevant time horizon. Thirdly, the central bank maintains frequent communication with the public about its monetary policy objectives and specific policies used to meet these objectives (Bernanke et al., 2018). The need for transparency requires the central bank to announce its future policies and thus should usually mitigate any inflation surprises. Announcements are regarded as essential to the success of the inflation targeting regime, since they help to manage inflation expectations in the absence of complete rationality. Only under complete rationality are agents well-informed and announcements become unnecessary (Kim and Verrecchia, 1991). The implementation and operation of an inflation targeting regime should therefore lead to substantial improvements in the communication between the monetary authority and the general public. If the central bank is fully transparent in its monetary policy and the Taylor rule it follows, then only announcements are required to indicate any future changes in monetary policy to the public. Unforeseen events and the existence of some degree of macroeconomic uncertainty, however, might require policymakers to adopt some moderate level of discretion and potentially deviate from their monetary policy path temporarily. This level of direction is necessary since the monetary policy rules central banks use do not account for all possible economic eventualities (Connolly and Kohler, 2004).

The degree of discretion can be determined in a well-specified framework along with the wider monetary policy objectives of the central bank. Through the imposition of a rules-based structure, which allows for a moderate degree of flexibility to navigate unforeseen economic circumstances, central banks can counter the dichotomy of the two approaches and benefit from both discipline and discretion. For instance, the occasional use of monetary policy to aid with short term economic stabilisation is possible but requires an evaluation of the consequences of these short term measures for the long term objective of maintaining low and stable inflation. Bernanke (2003) argues that apart from a semi-flexible policy framework, which allows for some level of discretion, the success of the inflation targeting regime is based on the existence of a prudent and appropriate communications strategy. Most inflation targeting central banks tend to follow a similar strategy of communicating with market participants in the private sector. Policymakers should possess the ability to translate macroeconomic policy decisions, which are based on complex mathematical models, into a language which is accessible to not only to economic experts, but also the general public. Through active communication of relevant information, policymakers can explain the motives for implementing any particular policy action, its intended outcome and how it translates into the economy overall. This level of clarification, if applied consistently and transparently, should be able to manage the uncertainty of market participants and anchor their expectations with the intended policy outcome (Roger, 2010).

4.2 Central Bank Communications

Central bank communications can take the form of several instruments. The one most commonly used is in the form of a *Monthly Bulletin*, which provides a consistent periodic update on central bank policy intentions. A second tool is that of scheduled weekly, monthly or quarterly announcements, which are less comprehensive than the Monthly Bulletins and provide the public with a concise informative statement about the central bank's view on the current economic climate. In addition, the central bank releases unscheduled announcements at various frequencies, which are regarded as surprise news (Cieslak and Schrimpf, 2019). The primary motive behind these communications is the dissemination of private information, which is held by the central bank and is key to the inflation targeting regime. The objective here is to inform the general public and to influence inflation expectations, which is intended to reduce inflation bias and aid with the fulfilment of the target. The content of central bank announcements can be dissected by using text and word analysis of central bank statements. Over time, we have seen some variation in the number of announcements released, their content and the language used. Given that central bank objectives change over time, this allows policymakers some flexibility when communicating with the public (Blinder et al., 2008).

Walsh (1999, 2003 and 2007) has intensively investigated the effect of central bank announcements on inflationary bias in order to assess the credibility of the monetary authority. In his 1999 paper, Walsh analysed the case for which the monetary authority is penalised for deviating from its target, but has the possibility to use announcements to reveal some of its private information. He reported that if the central bank is given the ability to announce its policy intentions, the response of public expectations to any new information is optimal even if policymakers do not reveal all their private information. An extension to this investigation was added in his 2003 paper, in which Walsh constructed a framework in which the weight placed on achieving the inflation target affects the monetary authority's incentive, which is used to obtain the optimal weight that ensures central bank accountability is balanced with the need to perfectly monitor the central bank. This optimal weight supports central bank transparency, which is a necessity under imperfect monitoring; and the greater central bank transparency, the greater the weight on achieving the target should be. In 2007, Walsh conducted an investigation of central bank transparency and monetary policy effectiveness; this time by creating a model which distinguishes between private and public information to establish whether and when inflation targets should be announced. The results suggest that although the announcement of short run targets can increase inflation volatility temporarily, partial announcements provide accurate public information and thereby can offset or even prevent inflation from being affected by real economic shocks.

It has become evident from the discussion above, that credibility, expectations and announcements are closely linked in the inflation targeting framework. The monetary authority's incentive when announcing inflation targets is to reveal information to the general public, especially when the central bank holds private information about the economy the general public does not possess. The announcement of an inflation target allows the monetary authority to reveal its private information and thereby influence the point of reference against which its performance is measured. Once the regime is in full operation, announcements usually contain information about changes in the interest rate rather than the inflation rate. This is an important shift, since these announcements are supposed to convey that any changes to the interest rate are undertaken to achieve and maintain the inflation target. As such, market participants might not only form expectations about future inflation, but also expectations about future changes in the interest rate. Such interest rate expectations represent agents' views of the future path of the interest rate and direction of future monetary policy, which makes measures of interest rate expectations an important indicator of central bank credibility.

The effect of monetary policy changes on the inflation rate can partially be channelled through inflation expectations and interest rate expectations, which themselves are influenced by central bank announcements. This means that central bank communications can affect the expectations formation process which in turn has a strong impact on the value of inflation and other real macroeconomic variables (Capistrán and Ramos-Francia, 2010). While announcements about changes in the interest rate are important tools to convey transparency, they do not necessarily ensure that expectations of market participants are aligned with their content. An indication of whether interest rate expectations are anchored can be observed in their behaviour between official interest rate announcements made by the central bank. If interest rate expectations were perfectly aligned with the content of central bank announcements, they would remain largely constant throughout the entire time span between announcements. Should they change frequently, the expectations are not anchored, indicating that central bank announcements are not perceived as credible (Lamla and Vinogradov, 2019)

The literature in economics has recognised that exchange rate and interest rate movements in response to scheduled and unscheduled announcements convey a great deal about public expectations and how these in turn affect the real economy (Glick and Leduc, 2012). While central bank announcements have been found to influence the path or volatility of other economic variables, such as the exchange rate or the interest rate, little is known to date about the role of interest rate expectations in influencing the adjustment to the equilibrium relation between the exchange rate and the interest rate. This is addressed in the following chapter which presents a framework of the UIP relation which controls for central bank announcements and interest rate expectations.

5 Testing for UIP: Nonlinearities, Monetary Announcements and Interest Rate Expectations

5.1 Introduction

The Uncovered Interest Rate Parity (UIP) hypothesis defines the interest rate differential as an optimal predictor of the depreciation in the exchange rate. This definition, however, has frequently been rejected in the empirical literature (see, for instance, Cumby and Obstfeld, 1981; Davidson, 1985; and Taylor, 1987), and the methods used in this context include simple Ordinary Least Squares (OLS) for estimating the slope coefficient in the UIP relation in early studies (see, for instance, Froot and Thaler, 1990; Engel, 1996), equilibrium-correction models of the term structure (Clarida and Taylor, 1997) and cointegration tests between the UIP and PPP relations to account for the interaction of goods and asset markets (Johansen and Juselius, 1992). Most empirical papers concerned with UIP reject the validity of the parity in the short run (see Engel, 1996; Sarno, 2005; Banerjee and Singh, 2006), and in some cases even in the long run (Lothian, 2016). These findings represent a puzzle for which the literature has offered a range of explanations, such as the existence of a time-varying risk premium (Li et al., 2012; Jiang et al., 2013), the occurrence of rational bubbles (Obstfeld, 1987; Canterbery, 2000) or deviations from rationality of market participants (Gregory, 1987; Chinn and Quayyum, 2012). To date it seems that, regardless of the increasing refinement of econometric methods used or improvements in the selection of data employed, no single convincing argument for the empirical failure of UIP has been put forward.

The validity of UIP is of importance to policymakers who use the interest rate as a tool to meet their monetary policy objectives, and who need to correctly assess the effects of interest rate changes on international capital flows and economic variables (Jamarillo and Servan, 2012). While the literature concerned with UIP has assessed the puzzle for countries which operate different monetary policy regimes (Lacerda et al., 2010), in the case of inflation targeting the existing studies only consider emerging markets (Coulibaly and Kempf, 2019). This chapter instead examines the issue using daily data for five inflation targeting developed countries, namely the UK, Canada, Australia, New Zealand and Sweden over the period from January 2000 to December 2020; for comparison purposes, the analysis is also carried out for three non-targeting economies, namely the US, the Euro-Area and Switzerland (Neumann and Von Hagen, 2002). More precisely, a linear Cointegrated Vector Autoregressive (CVAR) model of the UIP relation is estimated as a benchmark model; its specification also takes into account the effects of central bank announcements of interest rate changes on the exchange rate and the interest rate differential. Since macroeconomic announcements directly influence interest rate expectations (Connolly and Kohler, 2004), the inclusion of central bank announcements into our estimation seems important to control for monetary policy communications, which might affect the exchange rate and interest rate differentials directly.

Recently, the literature has extended existing methodologies by investigating potential nonlinearities in the UIP relation. In particular, models of the class of Smooth Transition Regression models have been found to have superior power in explaining the UIP puzzle than linear models (Sarno et al., 2006; Li et al., 2013). The use of these models allows the adjustment speed to differ depending on the size of a specified transition variable. The use of nonlinear estimation methods has been an important and successful addition to the literature concerned with the UIP puzzle, which partially motivates the extension of our linear model to a Smooth Transition Cointegrated Vector Autoregressive (STCVAR) model (Ripatti, 2001) of UIP. We control for central bank announcements and in addition, include a measure of interest rate expectations as the transition variable into the model. Interest rate expectations are an often neglected indicator of central bank credibility, and for inflation targeting central banks in particular, they provide an important measure of the credibility of the official central bank policy rate in the regime. The model allows us to account for asymmetric behaviour in two ways. Firstly, we allow the long run adjustment to the UIP relation to differ between regimes, which are determined by the change in the expected interest rate. Secondly, we control for asymmetric effects of central bank announcements by differentiating between the effects of positive and negative announcements on the variables in the UIP relation.

Our findings suggest that the nonlinear model is more appropriate to capture the adjustment to the long run UIP-implied equilibrium, since we find substantially stronger adjustment in the nonlinear model than in the linear model. The adjustment speed is between 10 and 40 times faster in the nonlinear model and is particularly strong when the market expects the interest rate to increase in the near future. This suggests that expected monetary contractions are considered as being more strongly aligned with adhering to the inflation target than monetary expansions. Central bank announcements seem to have a stronger impact on fundamentals in the asset market when interest rate expectations are accounted for. We observe that UIP holds better in inflation targeting countries than non-targeting countries, which indicates that the inflation targeting countries considered in this study were successful at establishing credibility.

The remainder of this chapter is structured as follows. Section 5.2 outlines the existing literature in the field, Section 5.3 outlines the econometric models used for our estimation, Section 5.4 presents the data and discusses the results and Section 5.5 provides concluding remarks.

5.2 Literature

5.2.1 Empirical Evidence for the Validity of UIP

The validity of UIP has been investigated in numerous papers and from various angles. Popular estimation methods range from the use of simple linear regressions (Lothian and Wu, 2011; Moore and Roche, 2010) to the use of more complex multivariate nonlinear models (Sarno et al., 2005). In a regression of the change in the spot exchange rate on the lagged difference between the domestic and foreign interest rates, the sign on the interest rate differential is required to be positive and equal to unity in order for the exchange rate to depreciate (Bussiere et al., 2018). In empirical investigations of simple linear regression models of UIP, however, the frequent finding of a non-positive interest rate differential implies an appreciation of the currency. As such, the interest rate differential is more often than not found to explain the exchange rate in the opposite direction of what the theoretical UIP relation postulates. This phenomenon, which is also referred to as the forward bias puzzle, has prompted the consideration of alternative estimation methods in the attempt to establish the validity of UIP.

While several studies have carried out cointegration analyses between spot and forward exchange rates which provide mixed evidence for the empirical validity of CIP (Brenner and Kroner, 1995; Zivot, 2000; Clarida et al., 2003), a similar analysis of the cointegration between the exchange rate and the interest rate differentials has not been extensively applied in the literature so far. Early attempts at using the methodology performed joint investigations of the PPP and UIP hypotheses in multivariate cointegration frameworks (see Johansen and Juselius, 1990; Juselius, 1992). In these papers, UIP was found to hold at best in the long run and its validity is determined by linkages between goods and asset market fundamentals. The few tests for cointegration between the exchange rate and interest rate differentials applied in the literature provide mixed evidence for the existence of a long run cointegrating relation (Georgoutsos and Kouretas, 2002; Weber, 2006).

Several authors in recent years have attempted a different angle when investigating the UIP relation by proposing the use of nonlinear models. Johansen et al. (2000) estimated a cointegration model with piecewise linear trends and break points, and reported favourable evidence for the validity of UIP. Lyons (2001) estimated a nonlinear model in which deviations of UIP are highly persistent. This persistence is explained by the lower Sharpe ratio of the forward rates, which move trade to more lucrative investment opportunities. Sarno et al. (2005) suggested that the forward bias commonly observed in the empirical literature might be a less suitable explanation of forward market inefficiencies than previously assumed. They used a Smooth Transition Regression (STR) model and found evidence for significant nonlinearities in the UIP relation; in particular, asymmetric deviations from UIP were found to be small, but more persistent, the closer they were to the UIP equilibrium. Baillie and Kilic (2006) analysed nonlinearities in a Logistic Smooth Transition Regression (LSTR) of the spot exchange rate and the lagged forward premium model with different transition variables. The results imply a strong nonlinear relation when the forward premium serves as the transition variable. Sarno et al. (2006) estimated a Smooth Transition Regression model of UIP with the expected excess return as the transition variable and also found that deviations from UIP exhibit significant nonlinearities. Using a LSTR model with the risk-adjusted forward premium as the transition variable, Amri (2008) found evidence of nonlinearities in the relation between expected exchange rate changes and the lagged forward premium. Applying the same methodology, but with different transition variables related to currency trading strategies, Baillie and Chang (2011) showed, that UIP holds only when carry trade strategies are perceived as profitable. When they are considered non-profitable, the findings confirm those by Lyons (2001) and provide additional support for nonlinearities in the UIP relation. Li et al. (2013) used the same methodology with different transition variables. They found that exchange rate volatility and the Sharpe ratio represent suitable transition variables to confirm the validity of UIP, whilst the use of the interest rate differential as the transition variable generally fails to support UIP. To date, it is still uncertain which factors are responsible for the empirical failure of UIP. However, the results of nonlinear estimations indicate, that if the true data generating process is in fact nonlinear, then the use of traditional linear regression models itself can be seen as an explanation for the well-documented UIP puzzle and the anomalies frequently reported in the empirical literature.

5.2.2 Interest Rate Expectations

One aspect which has received recent attention in the assessment of UIP is the role of market expectations. Interest rate expectations that are representative of the public perception of central bank credibility have found various applications in the literature. They have previously been found to influence important market indicators, such as the slope of the yield curve (Cook and Hahn, 1990), financial ratios (Chen and Ainina, 1994) and the exchange rate (Mauleón, 1998). Mauleón (1998) estimated a model of exchange rate reactions to interest rate expectations, which accounts for capital gains and losses. He found that expectations of higher interest rates cause an immediate exchange rate depreciation followed by an appreciation in the next period, if the interest rate expectation comes true. Investigations of UIP under the expectations hypothesis of the term structure have found that UIP holds as long as the interest rate on a long-term government bond is equal to the average expected future short-term rate (Bekaert et al., 2007). Juselius and Stillwagon (2018) analysed the role of interest rate expectations in the US dollar and British pound foreign exchange market and found that interest rate forecasts are the primary source of deviations from the exchange rate and interest rate equilibrium, which suggests the important role of speculative bubbles in determining exchange rates and interest rates.

Given these past findings regarding the impact of interest rate expectations, they seem to be relevant for the estimation of UIP, in particular at short horizons and when assessing the parity at daily frequency. Connolly and Kohler (2004) identified daily changes in interest rate futures and in particular daily changes in the 30-Day interest rate as measures of interest rate expectations. Interest rate futures are commonly used over the short to medium horizon, but future and forward rates can differ from market expectations due to the existence of a risk premium (Peacock, 2004). Although one could argue that the existence of a risk premium makes expectations derived from money market instruments a biased measure, no one money market instrument can be regarded as the optimal indicator of the true central bank future policy direction and related agent expectations (Brooke et al., 2000). Since official monetary policy decisions are usually only made once a month, the 30-day interest rate should not show great variation between monthly central bank decisions, if the central bank announcement is perceived to be credible.

5.2.3 UIP and Central Bank Announcements

Several studies provide evidence that central bank announcements strongly influence interest rate expectations (Moniz and De Jong, 2014), and that some central banks even use the content of their announcements intentionally to influence expectations of the future interest rate (Tietz, 2019).

Central bank announcements have been found to influence the fundamentals which comprise the UIP relation, namely the exchange rate and the interest rate, directly. Within the substantial existing literature in this context, announcements are found to impact exchange rate and interest rate movements at daily and intra-daily frequency (Dominguez, 2006; Bernoth and Hagen, 2004). Central bank interventions and communications have also been identified as causes for asymmetric movements and a nonlinear adjustment of the exchange rate (Li et al., 2013; Arghyrou and Pourpourides, 2016). Further evidence provided by Glick and Leduc (2012) suggests that central bank announcements of asset purchases by the Federal Reserve and the Bank of England have resulted in lower interest rates and a depreciation of the exchange rate. Announcements containing policy rate decisions are found to have a particularly strong effect on asset prices, including the exchange rate and interest rate, compared to other types of announcements (Sager and Taylor, 2004; Rosa and Verga, 2008). Kurihara (2014) reported that the impact of interest rate announcements on the exchange rate occurs indirectly via the effect such announcements have on expected future interest rates. The overwhelming evidence of the effect of announcements about policy rate changes on exchange rates and interest rates encourages the consideration of such announcements when investigating the UIP relation.

Some studies have attempted to assess the impact of scheduled and surprise announcements in the inflation targeting regime. Joyce and Read (2002) for instance, used survey data to assess the same day reaction of UK asset prices to RPI announcements in inflation targeting countries and find that markets act efficiently, since they only react to the surprise component and not the expected component of the announcement. They found evidence for an asymmetric effect of inflation news, to which inflation expectations decrease if RPI outturns are lower than expected, but remain the same if RPI outturns are higher than expected. This responsiveness to news declines after the first few years of inflation targeting, which suggests that central bank credibility in the inflation targeting framework improves over time. Demir and Yigit (2008) computed a time-varying credibility measure to assess the role of announcements and found that the more frequently announcements change and the more accurate they are, the stronger is the weight the general public assigns to them in their expectation formation. Any weight not assigned in the public expectation formation can partially be captured by market interest rate expectations. This latter finding highlights the role of interest rate expectations in affecting financial market indicators beyond the direct impact of central bank announcements.

Table 13 below summarises the main findings in the extensive UIP literature. As becomes evident, the empirical literature which investigates the role of interest rate expectations and central bank announcements in explaining the UIP puzzle, is surprisingly scarce. So far, there is little research in existence which is concerned with nonlinearities in the UIP relation as a result of changes in the expected interest rate. This chapter conducts such an analysis by using a nonlinear estimation method, which is discussed in the following section.

Table 13 Literature Review Summary UIP				
Authors	**Estimation Sample**	**Country**	**Methodology**	**Findings**
Empirical Evidence for the Validity of UIP				
Lothian and Wu (2011)	1791 to 1999	Dollar-sterling and franc-sterling exchange rates	Forward-premium regressions	UIP valid
Moore and Roche (2010)	Quarter 1 1973 to Quarter 4 2005	Canadian dollar, British pound, Japanese yen and euro	Out-of-sample forecasting models	Generate a negative slope in the standard forward market regression
Sarno et al. (2005)	4th January 1985 to 31st December 2002	US dollar exchange rates against the Japanese yen, the UK sterling, the German mark, the euro, and the Swiss franc	STR model of the Fama regression	Stronger support for UIP than linear models
Bussiere et al. (2018)	January 1999 to June 2017	Eight advanced exchange rates against the USD	Fama regressions	UIP invalid at less frequency with the Fama regression coefficient being positive and large after the global financial crisis
Brenner and Kroner (1995)	Theoretical Model	Theoretical Model	Theoretical Model	Unbiasedness hypothesis should be rejected due to cost of carry
Zivot (2000)	January 1976 to June 1996	UK, Canada, Japan	VAR (1) model	Standard methods are often inappropriate for modeling the cointegrated behaviour of spot and forward exchange rates
Clarida et al. (2003)	Weekly data from January 1979 to December 1998	USD against four currencies	Term structure forecasting model based on a regime-switching VECM	Nonlinear model outperforms linear model in modelling UIP
Georgoutsos and Kouretas (2002)	May 1991 to May 2001	USDJPY and USDDEM	Cointegrated VAR	They find support for UIP for USDJPY but not for USDDEM
Weber (2006)	January 1994 to June 2005	UK, US and EU	Cointegration framework with backward recursive calculations	UIP valid
Johansen et al. (2000)	Quarter 2 1973 to Quarter 4 1995	Germany and Italy	Cointegration model with structural breaks, piecewise linear trend and known break points	UIP valid
Lyons (2001)	April 1995 to April 1998	US, Germany, Japan against various currencies	Two-regime model of the exchange rate with floating rates in regime 1 and fixed rates in regime 2 for the EU integration	UIP deviations highly persistent and attributed to the Sharpe ratio
Baillie and Kilic (2006)	December 1978 to December 1998	Nine currencies	LSTR models with lagged forward premium, monetary and income fundamentals and time varying risk premium as transition variables	UIP valid in the upper regime
Sarno et al. (2006)	4th January 1985 to 31st December 2002	US dollar exchange rates against the Japanese yen, the UK sterling, the German mark, the euro, and the Swiss franc	STR model of the Fama regression with expected excess return as the transition variable	UIP holds in the upper regime only
Amri (2008)	January 1982 to January 2007	Sterling Pound, Swedish Crown, Euro, Canadian and the Swiss franc	LSTR of the Fama regression with risk adjusted forward premia as transition variable	UIP valid in the nonlinear model, especially when forward premia are large
Baillie and Chang (2011)	December 1978 to December 1998	Nine currencies	LSTR models to estimate forward premium regressions	UIP is more likely to hold in regimes and times when carry trades appear the most attractive on the basis of interest differentials, consistent with predictions based on the limits to speculation hypothesis

Li et al. (2013)	January 1986 to December 2009	Selected developing and emerging countries	LSTR and ESTR models with Sharpe ratios, interest rate differentials and exchange rate volatilities as transition variables	UIP holds best in the upper regimes with volatilities as transition variables.
Interest Rate Expectations				
Chen and Ainina (1994)	1965 to 1985	Seven industries for 85 firms	Traditional financial ratio adjustment model based on OLS	Economic shocks (changes in interest rate expectations) affect the speed of adjustment coefficients for over 1/3 of the sampling firms.
Mauleón (1998)	Quarter 1 1977 to Quarter 4 1995	U.S. dollar against the British pound, German mark, and Japanese yen	Simple regression simulations	UIP holds in the SR
Bekaert et al. (2007)	August 1978 to December 1998	US, Germany, Japan and the UK	VAR model with Monte Carlo analysis	Deviations from UIP are less pronounced than previously documented and are currency-, not horizon-dependent
Juselius and Stillwagon (2018)	March 2001 to July 2013	USDGBP	CVAR model	Interest rate expectations are the primary source of long-swings in the exchange rate, moves away from equilibrium in the medium-run and then adjusts
UIP and Central Banks Announcements				
Moniz and De Jong (2014)	July 1997 to March 2014	UK	Automated 4-phase system	Central bank communications have a strong effect on investors' interest rate expectations
Dominguez (2006)	Intra-daily and daily data from August 1989 to August 1995	G3 countries	Measure tick-by-tick price and volatility	Within day and daily impact of interventions on exchange rate volatility, but little evidence that interventions influence longer-term volatility
Bernoth and Hagen (2004)	Daily closing rates from March 1999 to September 2003	19 three-month Euribor futures contracts	Examine announcement effects via a panel approach	The new Euro money markets were able to predict SR rates well
Arghyrou and Pourpourides (2016)	Theoretical model	Theoretical model	Theoretical model explaining the reported asymmetries in exchange-rate responses to unanticipated inflation announcements under a credible inflation-targeting regime	Exchange rates respond asymmetrically to positive/negative inflation surprises, based on asymmetries in monetary policy preferences
Glick and Leduc (2012)	Daily data from January 2004 to July 2011	USD and GBP	Examine announcement effects with simple regressions	Announcements about large scale central bank asset purchases led to lower long-term interest rates and depreciations on announcement days
Sager and Taylor (2004)	5-minute data from 2002 to 2003	EURUSD	Examine systematic patterns using 5-minute data in a MS-switching model with regimes of a high-volatility, informed-trading state and a low-volatility, liquidity-trading state	Policy announcements contain significant news content
Rosa and Verga (2008)	Tick-by-tick data from 1999 to 2006	ECB	Ordered Probit	The unexpected component of central bank explanations has a significant and sizable impact on futures prices
Kurihara (2014)	Daily data from 2000 to 2013	ECB	OLS	Policy announcements effectively impact future interest rates, stock prices, and exchange rates via future interest rates
Joyce and Read (2002)	Intra-day data from early 1980s to April 1997	UK	Announcements are decomposed into expected and unexpected 'news' components using survey data on inflation expectations	Markets are efficient, in that asset prices do not respond to the expected component of RPI announcements and the pre-independence IT framework was not seen as fully credible by the financial markets
Demir and Yigit (2008)	Daily data from 1993 to 2006	UK and New Zealand	Time-varying credibility measure	The accuracy and the frequency of inflation announcements have a positive impact on how much attention the public pays to target announcements

Abbreviations: IT = inflation targeting; LR = long run; SR = short run

5.3 Empirical Framework

In order to investigate the issue of interest, we estimate a linear Cointegrated VAR as well as a nonlinear Smooth Transition Cointegrated VAR model of the UIP relation. Both models require all endogenous variables to be integrated of the same order $I(1)$ and cointegrated with one another. Therefore, we first test all individual series for a unit root by using the Dickey Fuller Generalised Least Squares (DF-GLS) test as well as the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test (Elliott et al., 1992). The former tests the null of a unit root against the alternative of stationarity, while the latter test the null of trend stationarity against the alternative of no trend stationarity.[7] Should we establish that the order of integration of the individual series is $I(1)$, we are in a position to test for the cointegration rank by using the Johansen (1991) cointegration trace and eigenvalue tests. The tests allow us to investigate the existence of a long-run relationship between the exchange rates and the interest rate differentials for all inflation targeting countries. In order to be able to estimate a Cointegrated VAR model, the system needs to possess reduced rank, which means that in a system with p endogenous variables, the rank needs to be $p - 1$. Should we find evidence for cointegration, we can proceed with estimating a Cointegrated VAR model.

5.3.1 The Cointegrated VAR (CVAR) Model

The standard linear Cointegrated VAR model takes the following general form:

$$\Delta x_t = \Pi x_{t-1} + \sum_{i=1}^{q} \Gamma_i \Delta x_{t-i} + \Phi D_t + \varepsilon_t \tag{5.1}$$

where x_t is a vector with the series under examination, Δ is the difference operator, $\Pi = \theta\beta'$ is a matrix given by the product of two vectors including the adjustment and the cointegrating coefficients respectively, Γ_i is the coefficient matrix of the parameters governing the short-run behaviour of the variables, D_t is a vector of exogenous dummy variables and Φ the corresponding coefficient matrix. The model has r cointegrating relations and p endogenous variables. The CVAR model is a system model in which the endogenous variables are being pushed away from the long run equilibrium by exogenous

[7] For the former, we use *Case I – Constant Only*, which is particularly applicable for non-trending macroeconomic and financial time series, since under the alternative hypothesis, only a constant is included to identify the nonzero mean. The maximum lag length of the series in both tests is chosen according to the Schwert criterion (Schwert, 2002).

shocks and in which they are being pulled back to the long run equilibrium by the short run adjustment dynamics. How fast the system is pulled back to the equilibrium after an unanticipated shock depends on the size of the coefficient θ. Our empirical CVAR model is specified as follows:

$$\Delta s_t = \theta\beta' x_{t-1} + \sum_{i=1}^{q} \gamma_{11,i}\, \Delta s_{t-i} + \sum_{i=1}^{q} \gamma_{12,i}\, \Delta\tilde{\imath}_{t-i} + \varphi_1 d_p + \varphi_2 d_n + \varepsilon_t$$

$$\Delta\tilde{\imath}_t = \theta\beta' x_{t-1} + \sum_{i=1}^{q} \gamma_{21,i}\, \Delta s_{t-i} + \sum_{i=1}^{q} \gamma_{22,i}\, \Delta\tilde{\imath}_{t-i} + \varphi_1 d_p + \varphi_2 d_n + \varepsilon_t \tag{5.2}$$

where s_t is the nominal exchange rate (defined as domestic currency units per unit of foreign currency), $\tilde{\imath}_t = i_t - i_t^*$ is the difference between the domestic and foreign interest rates, and d_p and d_n are announcement dummies corresponding respectively to the announcement dates for interest rate increases and decreases. They are set equal to 1 on the announcement date and 0 elsewhere and only enter the short-run deterministic component of the model, thus capturing the transitory impulse effects of announcements of policy changes without affecting the long-run UIP mechanism (Juselius, 2018). The construction of the announcement variables allows us to represent positive and negative announcements separately and therefore account for asymmetric effects of central bank announcements on the exchange rate and the interest rate differential in the CVAR system. All other variables are defined as before.

When estimating a CVAR model, there are two important aspects to consider for appropriate specification. One is the role of deterministic trends in both the short run and the long run relations. Our choice of variables in our CVAR system does not require the inclusion of a deterministic linear or quadratic trend. Since the exchange rate and interest rates tend to have a mean growth rate which is zero, any trending behaviour should be stochastic, not deterministic. The other consideration is, that short run and long run identification in the model is only possible when appropriate restrictions are placed on the model parameters.[8] These restrictions have to satisfy the identification rank conditions for the model (Juselius,

[8] The minimum number of restrictions required for long run identification is $r(r-1)$, which in our case is zero, and the minimum number of restrictions required for short run adjustment identification is $p(p-1)$, which is our case is two, but under economic identification, the model is satisfied with zero restrictions (Martins, 2010).

2018). In order for economic identification of the short run structure to be possible, the residuals need to be uncorrelated. This can be most easily achieved by identifying the appropriate lag structure at which there exists no serial correlation. Therefore, we use the Breusch-Godfrey Lagrange Multiplier (LM) test to test for residual serial correlation at different lag structures. The lag length is chosen using appropriate lag selection criteria, such as the Likelihood-Ratio (LR) Test, to select the most parsimonious specification which ensures that there is no serial correlation. In addition, we test the CVAR models for their stability.

5.3.2 The Smooth Transition Cointegrated VAR Model

Cointegration analysis can be a most suitable method to estimate the true short and long run relations between variables, but it is dependent on the conditions of the model. If these conditions change then the coefficients in the model might change too (Juselius, 2018). In the context of cointegration analysis and unit root testing, it is sometimes more appropriate to consider whether structural changes occur in the underlying adjustment parameter to the cointegration relations, and if so, whether these are abrupt or gradual. A deviation from UIP can occur in response to a shock, which either pushes the interest rate differential, the exchange rate or both away from the long run equilibrium UIP relation. Adjustment then occurs when the variables are pulled back to the UIP relation. However, the assumption that this deviation and adjustment process is identical over long time spans is rather unrealistic. The push and pull dynamics could vary depending on some change in the model conditions or exogenous influences. Therefore, a nonlinear Smooth Transition Cointegrated Vector Autoregressive (STCVAR) model (Ripatti, 2001), which allows for the asymmetric adjustment to the UIP equilibrium relationship, might be more appropriate[9]. The general model takes the following form:

$$\Delta x_t = \theta \beta' x_{t-1} \cdot G(z_t) + \left(\sum_{i=1}^{q} \Gamma_i \, \Delta x_{t-i} \right) \cdot G(z_t) + \Phi D_t \cdot G(z_t) + \varepsilon_t \qquad (5.3)$$

where x_t is the $(m \times 1)$ vector of the series of interest, Δ is again the difference operator, Γ_i is the $(m \times m)$ matrix of the short-run coefficients, D_t is a vector of dummy variables with a parameter matrix Φ, and as before the θ and β vectors include the adjustment speed and cointegrating coefficients respectively. $G(z_t) = diag\{G_1(\gamma_1, c_1, z_t), \dots, G_m(\gamma_m, c_m, z_t)\}$ is

[9] A pictorial representation of the model selection process can be found in Appendix B.

the transition function, where γ is the slope parameter, c is the transition value and z_t is the transition variable. The transition function allows the parameters of the model to change smoothly from one regime to the next as a function of the transition variable z_t. The diagonal elements $G_i(\gamma_i, c_i, z_t); i = 1, \dots, m$ on the $(m \times m)$ parameter matrices are transition functions such that $0 \leq G_i(\gamma_i, c_i, z_t) \geq 1$ (Hubrich and Teräsvirta, 2018).

It is assumed that the transition variable and the parameters of its transition function are identical for all equations in the system. Very commonly, the transition variable is a lagged endogenous variable, but can also be exogenous or a function of multiple lagged endogenous variables. In some cases, the transition variable can take the form of a linear time trend in a model with smoothly changing parameters. In the latter case, the model allows for the transition between a continuum of regimes (Dijk et al., 2002). Choosing the transition variable is not always straightforward, since economic theory does not always specify which variable is most appropriate. One could test the linearity hypothesis for all explanatory variables in the model to obtain the transition variable. Alternatively, the choice of transition variable can be made on the basis of theory. After the transition variable is chosen, an appropriate transition function needs to be determined.

As our transition variable, we consider the change in the 30-day interest rate, which can be seen as an indicator of changes in interest rate expectations. Central bank meetings and decisions about changes in the interest rate generally occur in monthly cycles, meaning that announcements of changes in the interest rate take place once a month at the most. Therefore, the 30-day interest rate should not vary greatly over the span of the month if interest rate expectations are aligned with the official monetary policy rate (Connolly and Kohler, 2004). If instead it does, this implies a change in market expectations of the monetary policy rate in the near future and can indicate that the central bank is not perceived as fully credible. The empirical model corresponding to equation (5.3) can be written as follows:

$$\Delta s_t = \theta\beta' x_{t-1} \cdot G(z_t) + \left(\sum_{i=1}^{q} \gamma_{11,i} \, \Delta s_{t-i} + \sum_{i=1}^{q} \gamma_{12,i} \, \Delta\tilde{\imath}_{t-i} \right) \cdot G(z_t) + \\ + \left(\varphi_1 d_p + \varphi_2 d_n\right) \cdot G(z_t) + \varepsilon_t \tag{5.4}$$

$$\Delta\tilde{\imath}_t = \theta\beta' x_{t-1}\cdot G(z_t) + \left(\sum_{i=1}^{q}\gamma_{21,i}\,\Delta s_{t-i} + \sum_{i=1}^{q}\gamma_{22,i}\,\Delta\tilde{\imath}_{t-i}\right)\cdot G(z_t) + \\ + \left(\varphi_1 d_p + \varphi_2 d_n\right)\cdot G(z_t) + \varepsilon_t$$

where all variables are defined as before. The STCVAR model nests the linear CVAR model, but the parameters and the coefficient of $\beta' x_{t-1}$ are allowed to change in a nonlinear fashion. The dummies control for any noise resulting from central bank announcements of interest rate changes and allow us to better separate the effect of the change in the 30-day interest rate as the transition variable from any effect created by announcements of interest rate changes. The way in which we construct the model allows us to analyse the dynamic adjustment of deviations from UIP depending on the size and sign of the change in the expected 30-day interest rate, while controlling for central bank announcements. Unlike linear models, smooth transition models allow for non-constant adjustment speeds and therefore are more appropriate for modelling the dynamic adjustment of deviations from UIP. The lag length in the model is chosen using the Likelihood-Ratio (LR) Test to select the most parsimonious specification which ensures that there is no serial correlation.

The cointegrated VAR methodology provides a way to study both short run and long run effects in the same model framework, while the STCVAR model allows for additional smooth changes in the adjustment term. In the STCVAR model, the dynamic behaviour of the endogenous variables transitions smoothly from one state to another, which makes this class of models often more appropriate to estimate regime changes, since abrupt switches between regimes are less realistic to apply in reality. Expectations of the future interest rate can give an indication of how the market perceives interest rate changes or interest rate announcements in general, while also accounting for other exogenous factors which might influence interest rate expectations. In addition, expected interest rates factor in market information beyond the information released by the central bank. Therefore, the realized change in UIP may occur gradually with changes in expectations, even if a particular date can be related to a policy change or announcement (He et al., 2008).

5.3.3 Testing for Smooth Transition Nonlinearity

An important step prior to the estimation of the nonlinear model is the employment of a test for linearity. This step is important to ensure that the adjustment to the underlying cointegration relationship is accurately described by the most suitable model. If the linear model is sufficient to this respect, then estimation of the nonlinear version of the model is unnecessary. Furthermore, when the true data generating process is linear, the nonlinear STCVAR model is not identified. A suitable linearity test in this case takes the form of a test for linearity against an STR-type model. The null is that $\gamma = 0$ versus $\gamma > 0$ where γ is the slope parameter, which indicates the smoothness of the transition from one regime to another. Teräsvirta and Yang (2014) compare a range of tests for linearity against smooth transition type-nonlinearity. They report that Rao's F-statistic has advantageous finite sample properties compared to other tests and therefore they recommend the test in particular for empirical use.

Rao's F-test is a function of Wilks' lambda. The test statistic for the hypothesis $H_0: \theta = \theta_0$ is: $RSS = S(\theta_0)'[I(\theta_0)]^{-1}S(\theta_0)$, where S is the score vector and I is the Fisher information matrix. The test follows a chi-square distribution with r degrees of freedom, where r is the number of parameter vectors. It uses only the null value of θ, whereas other tests, such as the Wald test, use the alternative value of θ (Rao, 1948). The Rao F-test does not suffer from size distortions, even when the lag length is large. In comparison, the standard LM test tends to over-reject the null, while the rescaled LM test tends to under-reject the null. In order to correct the size of the LM tests, critical values of the test statistic would have to be obtained by simulation. These findings support those presented earlier by Edgerton and Shukur (1999), who report that Rao's F-Test exhibits a superior performance to other types of tests. For most F-tests the use of a bootstrap is only marginally superior to using asymptotic critical values. We use the test to test the linear Cointegrated Vector Autoregressive model against a Logistic Smooth Transition Cointegrated Vector Autoregressive model and against an Exponential Smooth Transition Cointegrated Vector Autoregressive model. We perform the test equation by equation to establish whether all equations in the Cointegrated VAR model are nonlinear of the smooth transition-type. Once linearity is rejected against smooth transition-type nonlinearity, one also wants to test for the type of transition function. This is done by determining a transition variable and then performing a test of the shape of the transition function. The test is based on a conventional STAR model, which can be expressed as follows:

$$y_t = \pi' X_t + G(z_{t-d}, \gamma, c) + \Theta' X_t + u_t \tag{5.5}$$

where $X_t = (1, y_{t-1}, \dots, y_{t-p})$ and $G(z_{t-d}, \gamma, c)$ is the transition function, where z_{t-d} is the transition variable with $1 \leq d \leq p$, γ is the smoothness parameter and c is the transition value. STAR-type models can either be logistic or exponential. The first order logistic transition function is:

$$G(z_{t-d}, \gamma, c) = [1 - \exp\{-\gamma (z_{t-d} - c)^2\}] \tag{5.6}$$

The exponential transition function is:

$$G(z_{t-d}, \gamma, c) = \left[\{1 + \exp(-\gamma\ (z_{t-d} - c))\}^{-1} - \frac{1}{2}\right] \tag{5.7}$$

After the null of linearity is rejected one has to choose between a logistic and exponential transition function. In order to be able to make this decision, Teräsvirta (1994) suggests a selection process based on the below auxiliary regression, which is a 3rd order Taylor approximation of the generic transition function $F(z_{t-d}, \gamma, c)$:

$$y_t = \delta_0 + \delta_1' \tilde{x}_t + \beta_1' \tilde{x}_t z_{t-d} + \beta_2' \tilde{x}_t z_{t-d}^2 + \beta_3' \tilde{x}_t z_{t-d}^3 + \vartheta_{3t} \tag{5.8}$$

Using an F-test, the following hypotheses are tested:

$$H_{0_3}: \beta_3' = 0$$
$$H_{0_2}: \beta_2' = 0 \mid \beta_3' = 0$$
$$H_{0_1}: \beta_1' = 0 \mid \beta_2' = \beta_3' = 0$$

The rejection of the null of H_{0_3} implies a rejection of the exponential transition function, whereas rejection of the null of H_{0_2} implies a rejection of the logistic transition function. If H_{0_1} is rejected after H_{0_2} could not be rejected, a logistic transition function should be selected. If H_{0_1} cannot be rejected after H_{0_2} was rejected, an exponential transition function should be selected.

The Teräsvirta method presents a number of shortcomings. For one, for the case that the threshold value is non-zero, a forth order expansion generates non-zero third order terms. Apart from that, the hypotheses might not be able to differentiate between a logistic transition function with a threshold value of zero and an exponential transition function due to a potentially asymmetric data distribution between the regimes. Another important point to note is that if the real transition function is in fact logistic and by restricting the third order terms to be zero, the test of the joint significance of the second order terms will also be zero. This leaves these terms to approximate the transition function which might have otherwise been successfully achieved by the third order terms.

Escribano and Jordá (2001) recognise the shortcomings of the Teräsvirta method and propose a variation which is based on a 4th order Taylor approximation of the auxiliary regression and features four steps. After the null of linearity is rejected (step 1), they suggest the use of an F-test to test the null hypothesis $H_{0_L}: \beta_2' = \beta_4' = 0$ and obtain the p-value for test statistic F_L (step 2), as well as the use of an F-test to test the null hypothesis $H_{0_E}: \beta_1' = \beta_3' = 0$ and obtain the p-value for test statistic F_E (step 3). Step 4 evaluates the two test statistics and if the p-value of F_E is the minimum p-value, a logistic model should be selected. The exponential model is more appropriate otherwise. An important advantage of the procedure is that it is also effective for non-zero thresholds, since the hypotheses test for the joint significance of the second and forth order terms separately from testing the significance of the first and third order terms. We follow the method proposed by Escribano and Jordá (short E-J) to select the most suitable transition function for each model.

5.3.4 Misspecification Tests for Smooth Transition Models

Nonlinear Smooth Transition models can suffer from several types of misspecification issues. Generic misspecification tests are often accompanied with problematic power distortions. Eitrheim and Teräsvirta (1996) develop parametric testing procedures with desirable power properties to address the issue of misspecification in Smooth Transition models. The first test is a test of no additional nonlinearity, which is an LM-type test of the null of remaining nonlinearity against the alternative of no remaining nonlinearity. The test has power against a model with an omitted additive logistic or exponential component as well as a component for which the functional form is not specified. If the null of no remaining nonlinearity is rejected, then an additive can be added to the transition function. If the functional form is not specified in the alternative, the rejection of the null leaves the investigator with no solution towards next steps.

Nonlinear Smooth Transition models are estimated under the assumption that the parameters in the model are constant. As such, a test for parameter constancy needs to be applied to confirm that this is the case. Apart from the cumulative sum of squares (CUSUM) test, which tests parameter constancy against a single structural break of an alternative which is not specified, there are also parametric tests that allow parameters to change smoothly. The parameter constancy test tests the null of constant parameters during the transition against the alternative of a smooth or abrupt change. The parameter constancy test developed by Eitrheim and Teräsvirta (1996) is also an LM-type test which can be carried out by means of a simple auxiliary regression.

The third misspecification test for STAR-type models developed by Eitrheim and Teräsvirta (1996) is an LM test of serial independence of the error. After the Smooth Transition model is estimated under the assumption of serial independence of the errors, one obtains the residual sum of squares. The test statistic for the score test is $F_{LM} = \{(SSR_0 - SSR)/q\}/\{SSR/(T-n-q)\}$ where SSR_0 are the residual sum of squares obtained from the Smooth Transition model, SSR are the residual sum of squares obtained from an auxiliary regression, n is the dimension of the gradient vector $\hat{z}_t$ and q is the number of lags. The test follows a χ^2 distribution with $T-n-q$ degrees of freedom (Lukkonen and Teräsvirta, 1988).

5.4 Data and Empirical Results

5.4.1 Data Description

We use daily economic data from 1st January 2000 to 31st December 2020[10] for five inflation targeting countries, namely the UK, Canada, Australia, New Zealand and Sweden; as well as three non-inflation targeting economies, namely the US, the Euro-Area and Switzerland (Neumann and Von Hagen, 2002). The nominal exchange rate series are obtained from the Pacific Exchange Rate Service database. The interest rate series for the UK is the Bank of England Overnight London Interbank Offered Rate (LIBOR) based on British Pound and is obtained from the Federal Reserve Bank of St Louis economic database. The interest rate series for Canada is the Bank of Canada Overnight Repo Rate obtained from the Bank of Canada statistics database. The interest rate series for Australia is the Reserve Bank of Australia Interbank Overnight Cash Rate obtained from the Reserve Bank of Australia statistics database. The interest rate series for New Zealand is the Reserve Bank of New

[10] Although the five inflation targeting countries adopted their inflation targeting regimes in the early 1990s, due to data availability considerations regarding the 30-Day interest rate series for all countries, the sample starts on 1st January 2000.

Zealand Interbank Overnight Cash Rate obtained from the Reserve Bank of New Zealand statistics database. The interest rate series for Sweden it is the Swedish Riksbank Deposit Rate obtained from the Riksbank statistics database. The interest rate series for the US is the Treasury Overnight London Interbank Offered Rate (LIBOR) based on US Dollar, and the series for Switzerland is the Swiss National Bank Overnight London Interbank Offered Rate (LIBOR) based on Swiss Franc; both series are obtained from the Federal Reserve Bank of St Louis economics database. The interest rate series for the Euro-Area are the European Central Bank EMU Convergence criteria daily interest rate series obtained from Eurostat. All exchange rate and interest rate series are transformed to their natural logarithm. Central bank announcement data are collected from the Bloomberg release calendars for individual central banks and comprise announcements of both positive and negative changes in the interest rate. The data for all 30-day interest rate series are obtained from Bloomberg. For the UK, the series is the 1-month LIBOR rate in British pound; for Canada, the series is the 1-month Canadian banker acceptances rate; for Australia and New Zealand, the series are the 30-day interbank cash rate future contracts; and for Sweden, the series is the 1-month interbank offered rate. The series for the US is the 30-day Federal funds future rate; the series for the Euro-Area is the 1-month EURIBOR rate; and the series for Switzerland is the 1-month LIBOR in Swiss franc. The series are included as the change from one day to the next and are therefore representative of daily changes in the expected interest rate over the next month.

5.4.2 Unit Root and Cointegration Tests

We first perform the DF-GLS and KPSS unit root tests on the nominal exchange rate and the interest rate differential series. The results of these tests are reported in Table 14 and confirm that all series are integrated of order $I(1)$.

Since all variables are integrated of the same order $I(1)$, we proceed to test for cointegration of the series. The results of the Johansen cointegration trace and eigenvalue tests are reported in Table 15 and show that the cointegration rank is $r = 1$, which means that exactly one cointegration relation exists in each exchange rate model. The existence of exactly one long run equilibrium relationship between the exchange rate and the interest rate differentials supports the idea of the long run validity of UIP.

Table 14 Unit Root Test Results				
	DF-GLS Test		KPSS Test	
	Level series	Differenced series	Level series	Differenced series
Nominal Exchange Rates				
GBPCAD	-1.981	-15.484***	89.2***	0.042
GBPAUD	-1.906	-16.760***	103***	0.0676
GBPNZD	-2.616	-16.538***	68.8***	0.0315
GBPSEK	-2.314	-14.824***	94.7***	0.0326
CADAUD	-2.532	-13.089***	51.3***	0.0292
CADNZD	-2.741	-15.218***	32.2***	0.0282
CADSEK	-2.241	-15.186***	17.4***	0.0181
AUDNZD	-2.524	-14.633***	80.7***	0.0382
AUDSEK	-2.789	-13.267***	59.2***	0.0203
NZDSEK	-2.033	-15.562***	19***	0.0133
USDEUR	-1.553	-14.132***	149***	0.0675
USDCHF	-2.005	-15.993***	140***	0.029
EURCHF	-1.598	-16.754***	97.7***	0.0653
Interest Rate Differentials				
UK-Canada	-2.038	-17.027***	40.5***	0.0061
UK-Australia	-0.056	-16.351***	133***	0.0105
UK-New Zealand	-0.443	-17.102***	123***	0.0031
UK-Sweden	-1.007	-15.722***	61.7***	0.0587
Canada-Australia	-0.357	-16.056***	138***	0.0407
Canada-New Zealand	-0.463	-17.295***	108***	0.0084
Canada-Sweden	-0.921	-16.653***	64.5***	0.0219
Australia-New Zealand	-1.517	-17.606***	74.7***	0.0098
Australia-Sweden	-0.261	-16.425***	29.8***	0.0249
New Zealand-Sweden	-0.276	-17.566***	35.3***	0.119
US- Euro Area	-0.852	-12.248***	119***	0.0782
US-Switzerland	-1.811	-17.526***	116***	0.0019
Euro Area-Switzerland	-2.231	-16.243***	25.3***	0.0012

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

DF-GLS:
H_0: variable contains a unit root
H_1: variable is stationary

KPSS:
H_0: variable is trend stationary
H_1: variable is not trend stationary

Table 15 Johansen Trace and Eigenvalue Tests for Cointegration				
	Trace Test		Eigenvalue Test	
	Test 1	Test 2	Test 1	Test 2
UK-Canada	0.0003***	0.4879	0.0001***	0.4879
UK-Australia	0.0129**	0.9323	0.0023***	0.9323
UK-New Zealand	0.0130**	0.4064	0.0103***	0.4064
UK-Sweden	0.0022**	0.2151	0.0012***	0.6755
Canada-Australia	0.0252**	0.5501	0.0149***	0.5501
Canada-New Zealand	0.0246**	0.5144	0.0014***	0.5186
Canada-Sweden	0.0364**	0.8298	0.0068***	0.2032
Australia-New Zealand	0.0006***	0.6791	0.0001***	0.6791
Australia-Sweden	0.0005***	0.5822	0.0019***	0.1831
New Zealand-Sweden	0.0185**	0.9249	0.0037***	0.9249
US-Euro Area	0.0057***	0.3192	0.0005***	0.9924
US-Switzerland	0.0000***	0.5672	0.0000***	0.5672
Euro Area-Switzerland	0.0000***	0.6506	0.0000***	0.6506

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Trace Test:
Test 1: $H_0: r = 0$; $H_1: r = 1$; 95% Critical value: 25.87
Test 2: $H_0: r \leq 1$; $H_1: r = 2$; 95% Critical value: 12.52

Eigenvalue Test:
Test 1: $H_0: r = 0$; $H_1: r = 1$; 95% Critical value: 19.39
Test 2: $H_0: r \leq 1$; $H_1: r = 2$; 95% Critical value: 12.52

r denotes the cointegration rank and number of significant vectors. P-vales reported for all.

5.4.3 Results for the Linear CVAR Model

We are now in a position to estimate the linear Cointegrated Vector Autoregressive model. Table 16 reports the results of LR tests to determine the optimal lag length for each CVAR model for which there exists no serial correlation.

Table 16 Lag Selection in the CVAR Model

Lag	GBPCAD	GBPAUD	GBPNZD	GBPSEK	CADAUD	CADNZD	CADSEK
1	202.52	281.66	378.38	157.26	34.535	575.39	31.95
2	111.79	148.31	112.84	75.801	35.189	63.019	3.7235*
3	84.766*	90.054*	125.91	41.771	16.667	98.968*	1.0889
4	83.636	92.736	88.224	36.602	27.725	38.668	3.857
5	25.886	25.359	27.667	9.5262*	1.961*	16.924	0.749
6	44.641	59.112	58.974*	34.912	8.4577	9.7212	4.657
Lag	**AUDNZD**	**AUDSEK**	**NZDSEK**	**USDEUR**	**USDCHF**	**EURCHF**	
1	569.2	19.606	268.73	5.4953	789.68	791.48	
2	53.556	9.4629	11.58	28.972	243.08	212.93	
3	73.951*	4.4599*	33.226	3.1102*	100.29	79.738*	
4	64.427	16.419	16.652	14.305	263.16	278.17	
5	21.852	6.5165	9.84*	32.522	85.31*	333.98	
6	13.433	11.993	0.729	21.335	335.8	81.863	

Likelihood Ratio Test: sequential modified LR test statistic at 5%
* indicates chosen lag at which there exists no serial correlation

The results of the CVAR models are reported in Table 17 for non-targeting countries and in Table 18 and Table 19 for inflation targeting countries. We can see that a long run relationship exists between the exchange rate and the interest rate differential for most exchange rate models. However, the adjustment speed is low with a maximum value of 1.7% for the AUDNZD exchange rate. These findings indicate that deviations from the UIP-implied equilibrium are highly persistent at daily frequency. In the short run, there is no relation between the exchange rate and the interest rate differential. Central bank announcements, which communicate a reduction in the interest rate have a general negative effect on the exchange rate and the interest rate differential. This suggests that the announcement of a future lower interest rate, which is consistent with a monetary expansion, causes a decrease in the interest rate differential and a small appreciation in the exchange rate. Regarding the push and pull dynamics in the model, we can see that once the system is pushed away from the UIP-implied equilibrium, the pulling forces are weak and adjustment is slow. There is no observable difference between inflation targeting countries and non-targeting economies.

Table 17 Linear CVAR Model Results for Non-Targeting Countries						
	USDEUR		USDCHF		EURCHF	
	$\Delta \boldsymbol{s}_t$	$\Delta \tilde{\boldsymbol{\iota}}_t$	$\Delta \boldsymbol{s}_t$	$\Delta \tilde{\boldsymbol{\iota}}_t$	$\Delta \boldsymbol{s}_t$	$\Delta \tilde{\boldsymbol{\iota}}_t$
μ_0	0.00002	0.00021	0.00003	0.00039	0.00003	0.00017
	(0.00006)	(0.00025)	(0.00006)	(0.00181)	(0.00004)	(0.0019)
Δs_{t-1}	0.00753	-0.047	0.0273**	0.00697	0.127***	0.801
	(0.0114)	(0.05)	(0.0114)	(0.325)	(0.0114)	(0.551)
Δs_{t-2}	0.00628	0.0351	0.00788	-0.159	-0.0304***	0.118
	(0.0114)	(0.05)	(0.0114)	(0.325)	(0.0115)	(0.555)
Δs_{t-3}	-0.00048	0.0286	-0.013	0.519	-0.0164	0.0502
	(0.0114)	(0.05)	(0.0114)	(0.324)	(0.0114)	(0.551)
Δs_{t-4}			-0.0275**	0.129		
			(0.0114)	(0.324)		
Δs_{t-5}			0.0067	0.383		
			(0.0114)	(0.324)		
$\Delta \tilde{\iota}_{t-1}$	-0.00111	-0.0254**	0.00043	-0.444***	-0.00004	-0.365***
	(0.0026)	(0.0114)	(0.00039)	(0.0112)	(0.00024)	(0.0116)
$\Delta \tilde{\iota}_{t-2}$	-0.00209	-0.0599***	-0.00004	-0.295***	0.00002	-0.201***
	(0.0026)	(0.0114)	(0.00042)	(0.0119)	(0.00025)	(0.012)
$\Delta \tilde{\iota}_{t-3}$	0.00193	-0.0171	-0.00044	-0.234***	-0.00010	-0.100***
	(0.0026)	(0.0114)	(0.00042)	(0.0121)	(0.00024)	(0.0114)
$\Delta \tilde{\iota}_{t-4}$			0.00004	-0.266***		
			(0.00042)	(0.0119)		
$\Delta \tilde{\iota}_{t-5}$			-0.00017	-0.206***		
			(0.00039)	(0.0112)		
θ	-0.00081*	0.00008	-0.00056*	0.0118	-0.00012	0.170***
	(0.00044)	(0.0019)	(0.00033)	(0.00925)	(0.00039)	(0.0186)
d_p	0.00004	-0.0032**	0.00160***	-0.00561	0.00003	-0.00419
	(0.0003)	(0.0015)	(0.000491)	(0.014)	(0.00027)	(0.0131)
d_n	0.00026	-0.0156***	0.00259***	-0.021	0.00259***	-0.00942
	(0.0009)	(0.0039)	(0.000815)	(0.0232)	(0.00049)	(0.0236)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

Table 18 Linear CVAR Model Results for Inflation Targeting Countries (1)										
	GBPCAD		GBPAUD		CADNZD		AUDNZD		AUDSEK	
	Δs_t	$\Delta\tilde{i}_t$	Δs_t	$\Delta\tilde{i}_t$	Δs_t	$\Delta\tilde{i}_t$	Δs_t	$\Delta\tilde{i}_t$	Δs_t	$\Delta\tilde{i}_t$
μ_0	0.00004	-0.0004	0.00002	0.000069	0.000058	0.000249	0.00004	-0.00018	-0.00004	-0.00007
	(0.00006)	(0.0004)	(0.00007)	(0.00039)	(0.00007)	(0.000286)	(0.000047)	(0.00026)	(0.00007)	(0.0002)
Δs_{t-1}	0.00424	0.0819	-0.0106	-0.0918	-0.0106	-0.00956	-0.0152	0.0462	-0.0382***	-0.108***
	(0.0114)	(0.0801)	(0.0114)	(0.066)	(0.0114)	(0.0496)	(0.0114)	(0.0643)	(0.0114)	(0.0404)
Δs_{t-2}	-0.0138	0.183**	0.00969	0.00939	-0.00838	-0.0449	-0.00554	-0.0786	0.0281**	-0.036
	(0.0114)	(0.0801)	(0.0114)	(0.066)	(0.0114)	(0.0496)	(0.0114)	(0.0642)	(0.0114)	(0.0404)
Δs_{t-3}	0.015	0.113	-0.00827	0.0633	-0.00926	-0.015	-0.00888	-0.0633	-0.0246**	-0.0072
	(0.0114)	(0.0801)	(0.0114)	(0.066)	(0.0114)	(0.0495)	(0.0114)	(0.0642)	(0.0114)	(0.0404)
$\Delta\tilde{i}_{t-1}$	0.00002	-0.193***	-0.00264	-0.231***	-0.00257	-0.297***	0.00152	-0.300***	0.00212	-0.00134
	(0.00162)	(0.0114)	(0.00197)	(0.0114)	(0.00258)	(0.0112)	(0.00201)	(0.0113)	(0.00323)	(0.0114)
$\Delta\tilde{i}_{t-2}$	-0.00227	-0.134***	-0.00009	-0.161***	0.0019	-0.120***	-0.00211	-0.124***	0.00453	-0.00002
	(0.00163)	(0.0114)	(0.002)	(0.0115)	(0.00267)	(0.0116)	(0.00208)	(0.0117)	(0.00323)	(0.0114)
$\Delta\tilde{i}_{t-3}$	0.00169	-0.101***	-0.0006	-0.107***	-0.00356	-0.110***	-0.00254	-0.148***	-0.000345	0.00005
	(0.00161)	(0.0113)	(0.00197)	(0.0114)	(0.00258)	(0.0112)	(0.002)	(0.0113)	(0.00323)	(0.0114)
θ	0.000074	-0.0120***	-0.00144**	-0.00605*	-0.00129**	0.000702	-0.00198**	-0.0171***	-0.00237***	0.00246
	(0.00028)	(0.00196)	(0.00056)	(0.00325)	(0.000589)	(0.00255)	(0.000827)	(0.00465)	(0.000782)	(0.00277)
d_p	0.000099	-0.00064	0.000237	-0.000258	-0.000462	0.00224*	-0.000511**	0.00104	0.000121	0.000118
	(0.00024)	(0.0017)	(0.000309)	(0.00179)	(0.00030)	(0.00131)	(0.000243)	(0.00136)	(0.000301)	(0.00106)
d_n	0.000539	0.0366***	0.00201**	-0.0116**	-0.00147*	-0.0518***	-0.000161	0.0227***	0.00201***	-0.00244
	(0.00060)	(0.00421)	(0.000786)	(0.00454)	(0.000781)	(0.00339)	(0.000648)	(0.00365)	(0.000766)	(0.00271)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

Table 19 Linear CVAR Model Results for Inflation Targeting Countries (2)										
	GBPNZD		GBPSEK		CADAUD		CADSEK		AUDSEK	
	Δs_t	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{i}_t$	Δs_t	$\Delta \tilde{i}_t$
μ_0	0.00006	-0.00006	0.0000068	0.00001	0.00001	0.00043***	-0.00002	0.000354	-0.000074	-0.00003
	(0.00007)	(0.00045)	(0.00006)	(0.00044)	(0.00006)	(0.00015)	(0.00006)	(0.00026)	(0.00007)	(0.00034)
Δs_{t-1}	0.00828	-0.0667	0.0149	-0.123	-0.0433***	-0.0317	0.0000722	-0.0874*	-0.0214*	-0.0799
	(0.0114)	(0.0739)	(0.0114)	(0.0845)	(0.0114)	(0.0285)	(0.0114)	(0.046)	(0.0114)	(0.055)
Δs_{t-2}	-0.01	-0.0845	-0.0138	0.162*	0.0134	-0.0621**	-0.000795	0.00395	0.00314	-0.0636
	(0.0114)	(0.0738)	(0.0114)	(0.0845)	(0.0114)	(0.0285)	(0.0114)	(0.0459)	(0.0114)	(0.055)
Δs_{t-3}	0.00468	0.0193	-0.0194*	-0.0087	-0.0355***	-0.0175			-0.0174	-0.0148
	(0.0114)	(0.0738)	(0.0114)	(0.0845)	(0.0114)	(0.0284)			(0.0114)	(0.0549)
Δs_{t-4}	-0.0193*	-0.165**	-0.0199*	-0.0898	-0.0366***	-0.0182			-0.0346***	0.0102
	(0.0114)	(0.0738)	(0.0114)	(0.0845)	(0.0114)	(0.0284)			(0.0114)	(0.0549)
Δs_{t-5}	-0.00404	-0.059	-0.0135	-0.148*	0.00254	-0.0118			0.00598	-0.0152
	(0.0114)	(0.0738)	(0.0114)	(0.0845)	(0.0114)	(0.0284)			(0.0114)	(0.0549)
Δs_{t-6}	-0.00325	0.0122								
	(0.0114)	(0.0738)								
$\Delta \tilde{i}_{t-1}$	-0.00286	-0.285***	0.00184	-0.167***	-0.00254	-0.0483***	-0.00755***	-0.0518***	0.00118	-0.191***
	(0.00177)	(0.0114)	(0.00154)	(0.0114)	(0.0043)	(0.0107)	(0.00278)	(0.0112)	(0.00237)	(0.0114)
$\Delta \tilde{i}_{t-2}$	0.000159	-0.187***	0.000841	-0.115***	0.0214***	-0.0195*	0.00405	-0.0139	0.00557**	-0.0355***
	(0.00184)	(0.0119)	(0.00156)	(0.0115)	(0.0043)	(0.0107)	(0.00278)	(0.0112)	(0.00241)	(0.0116)
$\Delta \tilde{i}_{t-3}$	0.000822	-0.178***	-0.00058	-0.0840***	0.00193	-0.0317***			-0.00128	-0.0691***
	(0.00185)	(0.012)	(0.00157)	(0.0116)	(0.00431)	(0.0108)			(0.00241)	(0.0116)
$\Delta \tilde{i}_{t-4}$	-0.00167	-0.132***	-0.00105	-0.0689***	0.00778*	-0.0405***			-0.00299	-0.0288**
	(0.00185)	(0.0119)	(0.00156)	(0.0115)	(0.00431)	(0.0108)			(0.00241)	(0.0116)
$\Delta \tilde{i}_{t-5}$	0.00369**	-0.0803***	-0.000323	-0.0257**	0.00473	-0.00773			0.0000498	-0.00703
	(0.00183)	(0.0118)	(0.00154)	(0.0114)	(0.00431)	(0.0107)			(0.00237)	(0.0114)
$\Delta \tilde{i}_{t-6}$	-0.000434	-0.0873***								
	(0.00176)	(0.0114)								
θ	-0.000731	-0.00442	-0.000956*	-0.00209	-0.00290***	0.00211	-0.00369***	0.00746*	-0.00179**	0.000657
	(0.000446)	(0.00288)	(0.000529)	(0.00391)	(0.000839)	(0.00209)	(0.000946)	(0.00381)	(0.000698)	(0.00336)
d_p	0.0000431	0.00144	0.00033	-0.000196	0.000298	0.000014	0.00014	0.000156	0.000412	0.00094
	(0.000361)	(0.00233)	(0.000273)	(0.00202)	(0.000246)	(0.000614)	(0.000262)	(0.00106)	(0.000361)	(0.00174)
d_n	0.00163*	-0.00763	0.000704	-0.0170***	-0.00335***	-0.0529***	0.000297	-0.0468***	0.00230***	-0.0141***
	(0.000867)	(0.0056)	(0.000638)	(0.00472)	(0.000664)	(0.00166)	(0.000649)	(0.00261)	(0.00085)	(0.00409)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

We perform a series of diagnostic tests to establish whether the linear model is data congruent. The results of these diagnostic tests are reported in Table 20 and show that none of the models suffer from serial correlation or a violation of the VAR stability condition.

Table 20 Diagnostic Tests for the Linear Models

	Lag	Breusch-Godfrey LM Test for serial correlation	Stability condition satisfied
GBPCAD	3	0.75406	Stable
GBPAUD	3	0.43204	Stable
GBPNZD	6	0.39567	Stable
GBPSEK	5	0.55324	Stable
CADAUD	5	0.46546	Stable
CADNZD	3	0.43545	Stable
CADSEK	2	0.18093	Stable
AUDNZD	3	0.31659	Stable
AUDSEK	3	0.78240	Stable
NZDSEK	5	0.08901	Stable
USDEUR	3	0.59991	Stable
USDCHF	5	0.68162	Stable
EURCHF	3	0.32374	Stable

We use the Newey-West coefficient covariance matrix.

Breusch-Godfrey LM Test for serial correlation:
$H_0: no\ serial\ correlation$
$H_1: serial\ correlation$

VAR test for eigenvalue stability conditions. 'Stable' means that all eigenvalues lie inside the unit circle and the model is satisfies the stability conditions

However, given the mixed results concerning the adjustment speed in the linear models, we proceed to test for the existence of potential nonlinearities. While the linear model controls for the direct effects of central bank announcements on the nominal exchange rate and the interest rate differential, it does not provide any indication of how the adjustment to the UIP-implied equilibrium is affected by central bank credibility. The use of a nonlinear model allows such a distinction, motivating the estimation of a Smooth Transition CVAR in the following.

5.4.4 Nonlinearity Tests and Results of the Smooth Transition Model

First, we are interested in testing for smooth transition-type nonlinearity. We do so by using the Rao F-test and report the results in Table 21. We reject the null of linearity for all models which indicates that the data exhibits nonlinearities of the smooth transition-type. Since this is confirmed, we now want to select the most appropriate transition function for each model by using the Escribano and Jordá selection method. The outcome of this selection process is also reported in Table 21. Based on the results of the two tests, we can confirm that the Smooth Transition Cointegrated VAR model is appropriate for our analysis.

Table 21 Linearity Tests: Rao F-Test; Escribano-Jordá Test and Transition Function				
		Rao F-Test	Escribano-Jordá Test	Transition function
GBPCAD	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic
GBPAUD	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic
GBPNZD	Exchange Rate Equation	0.0000***	0.0000***	Logistic
	Interest Rate Equation	0.0000***	0.0000***	Logistic
GBPSEK	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic
CADAUD	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic
CADNZD	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic
CADSEK	Exchange Rate Equation	0.0000***	0.0000***	Logistic
	Interest Rate Equation	0.0000***	0.0000***	Exponential
AUDNZD	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic
AUDSEK	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Exponential
NZDSEK	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic
USDEUR	Exchange Rate Equation	0.0000***	0.0000***	Logistic
	Interest Rate Equation	0.0000***	0.0000***	Logistic
USDCHF	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Exponential
EURCHF	Exchange Rate Equation	0.0000***	0.0000***	Exponential
	Interest Rate Equation	0.0000***	0.0000***	Logistic

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. P-values reported for both tests.

Rao-F Test:

H_0: $linearity$

H_1: $smooth\ transition\ nonlinearity$

Escribano-Jordá Test:

Logistic Transition Function:

$H_{0_L}: \beta_2' = \beta_4' = 0$

$H_{1_L}: \beta_2' \neq \beta_4' \neq 0$

Exponential Transition Function:

$H_{0_L}: \beta_1' = \beta_3' = 0$

$H_{1_L}: \beta_1' \neq \beta_3' \neq 0$

The lag length in the nonlinear models is selected by using the LR test to determine the lag length at which there exists no serial correlation. The results of this test are reported in Table 22 below.

Table 22 Lag Selection in the STCVAR Model							
Lag	GBPCAD	GBPAUD	GBPNZD	GBPSEK	CADAUD	CADNZD	CADSEK
1	22.12	77.1	23.6	17.7	6.96	4.32	5.86*
2	19.48	6.14	16.16	6.52*	54.62	0.56	11.08
3	6.8*	32.4*	24.17	0.18	33.38*	9.32*	0.98
4	3.18	59.18	10.70*	3.88	4.74	2.7	3.66
5	4.06	25.12	8.724	2.46	0.56	9	3.08
6	22.12	77.1	23.6	17.7	6.96	4.32	5.86
Lag	AUDNZD	AUDSEK	NZDSEK	USDEUR	USDCHF	EURCHF	
1	14.04	129.84	16.28	5.5	6.62	7.46*	
2	3.96	13.86	13.12	19.38*	15.98*	4.98	
3	8.02*	31.14*	10.42*	42.7	8.7	97.74	
4	6.18	16.52	4.9	13.8	0.82	97.58	
5	8.5	8.56	0.06	18.4	93.62	6.82	
6	14.04	129.84	16.28	5.5	6.62	7.46	

Likelihood Ratio Test: sequential modified LR test statistic at 5%
* indicates chosen lag at which there exists no serial correlation

We now report the results of the nonlinear STCVAR model in Table 23, Table 24 and Table 25 below for inflation targeting countries and in Table 26 for non-targeting countries.

Table 23 Smooth Transition CVAR Model Results for Inflation Targeting Countries (1)

	GBPCAD		GBPAUD		GBPNZD		CADAUD	
	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$
	Regime 1							
μ_0	0.0002	-0.052***	0.0003	-0.028***	-0.091***	-0.034***	0.001***	-0.024***
	(0.0008)	(0.005)	(0.0006)	(0.0018)	(0.005)	(0.003)	(0.0003)	(0.002)
Δs_{t-1}	0.0127	0.557*	-0.007	-0.457***	-0.137	-0.245	0.256***	0.111
	(0.014)	(0.332)	(0.012)	(0.164)	(0.648)	(0.249)	(0.053)	(0.158)
Δs_{t-2}	-0.0172	1.908***	-0.013	1.122***	0.143	0.404	0.139***	0.740***
	(0.014)	(0.364)	(0.012)	(0.197)	(0.738)	(0.297)	(0.046)	(0.198)
Δs_{t-3}	-0.0355	-0.890**	-0.005	-0.339*	0.742	-0.764**	0.243***	-5.170***
	(0.022)	(0.347)	(0.012)	(0.199)	(0.756)	(0.312)	(0.059)	(0.381)
Δs_{t-4}					-0.359	-0.871***		
					(0.714)	(0.322)		
$\Delta \tilde{\imath}_{t-1}$	-0.0018	-0.396***	-0.005**	-0.465***	-0.456***	-0.467***	-0.067***	-0.842***
	(0.0020)	(0.041)	(0.002)	(0.027)	(0.080)	(0.038)	(0.020)	(0.247)
$\Delta \tilde{\imath}_{t-2}$	-0.0003	-0.410***	0.001	-0.523***	-0.521***	-0.663***	0.049***	-0.537***
	(0.0019)	(0.044)	(0.002)	(0.032)	(0.099)	(0.057)	(0.013)	(0.060)
$\Delta \tilde{\imath}_{t-3}$	0.0009	-0.104**	0.001	-0.141***	-0.345***	-0.229***	0.014	4.282***
	(0.002)	(0.044)	(0.002)	(0.033)	(0.101)	(0.047)	(0.017)	(0.665)
$\Delta \tilde{\imath}_{t-4}$					-0.390***	-0.238***		
					(0.104)	(0.048)		
θ	0.0006**	0.069***	-0.002***	0.203***	0.114***	0.169***	0.009**	0.201***
	(0.0003)	(0.012)	(0.0006)	(0.015)	(0.039)	(0.021)	(0.004)	(0.025)
d_p	-0.0009	0.012	0.001***	-0.004	-0.030	-0.017*	-0.002**	0.191***
	(0.004)	(0.008)	(0.0003)	(0.005)	(0.021)	(0.010)	(0.001)	(0.023)
d_n	-0.002***	0.011	-0.0001	-0.001	-0.048	-0.020	0.002	-0.053***
	(0.0008)	(0.011)	(0.0009)	(0.009)	(0.033)	(0.012)	(0.002)	(0.015)
	Regime 2							
μ_0	-0.002**	0.087***	-0.0002	0.050***	0.064***	0.058***	-0.003***	0.024***
	(0.0010)	(0.008)	(0.0007)	(0.003)	(0.006)	(0.005)	(0.0006)	(0.0019)
Δs_{t-1}	-0.1914	-0.705	0.0873	0.786***	0.363	0.450	-0.582***	-0.155
	(0.1425)	(0.552)	(0.070)	(0.277)	(0.704)	(0.409)	(0.070)	(0.0016)
Δs_{t-2}	0.0645	-3.039***	1.087***	-1.908***	-0.088	-0.809	-0.28***	-0.801***
	(0.132)	(0.604)	(0.311)	(0.330)	(0.786)	(0.496)	(0.093)	(0.002)
Δs_{t-3}	0.848***	1.734***	-0.231**	0.779**	-0.681	1.421***	-0.545***	5.177***
	(0.186)	(0.577)	(0.115)	(0.337)	(0.803)	(0.514)	(0.092)	(0.038)
Δs_{t-4}					0.498	1.309**		
					(0.765)	(0.542)		
$\Delta \tilde{\imath}_{t-1}$	0.0188*	0.358***	0.109***	0.476***	0.254***	0.349***	0.125***	0.806***
	(0.011)	(0.065)	(0.041)	(0.048)	(0.092)	(0.064)	(0.037)	(0.002)
$\Delta \tilde{\imath}_{t-2}$	-0.029***	0.504***	0.019	0.739***	0.432***	0.904***	-0.069**	0.522***
	(0.011)	(0.070)	(0.044)	(0.056)	(0.108)	(0.093)	(0.030)	(0.061)
$\Delta \tilde{\imath}_{t-3}$	0.016	0.013	-0.095**	0.092	0.234**	0.153*	-0.023	-4.31***
	(0.018)	(0.072)	(0.044)	(0.057)	(0.110)	(0.079)	(0.033)	(0.067)
$\Delta \tilde{\imath}_{t-4}$					0.343***	0.257***		
					(0.112)	(0.080)		
θ	0.0006	-0.133***	0.005	-0.379***	-0.174***	-0.298***	-0.02***	-0.200***
	(0.003)	(0.019)	(0.006)	(0.024)	(0.041)	(0.033)	(0.0073)	(0.026)
d_p	0.0033	-0.018	-0.042***	0.012	-0.017	0.037**	0.003	-0.191***
	(0.005)	(0.014)	(0.014)	(0.009)	(0.023)	(0.016)	(0.002)	(0.023)
d_n	-0.017***	-0.017	-0.013	0.007	0.056	0.027	-0.005	0.059***
	(0.0056)	(0.019)	(0.010)	(0.015)	(0.041)	(0.020)	(0.004)	(0.016)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

Table 24 Smooth Transition CVAR Model Results for Inflation Targeting Countries (2)								
	CADNZD		AUDNZD		AUDSEK		NZDSEK	
	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$
	Regime 1							
μ_0	0.005***	-0.0002	-0.156***	-0.034***	-0.0002	0.025	-0.0006	0.010
	(0.0002)	(0.0003)	(0.006)	(0.002)	(0.0009)	(0.446)	(0.0007)	(0.009)
Δs_{t-1}	0.034*	-0.0025	0.027***	-0.060	-0.035**	-0.066	-0.0085	0.246
	(0.021)	(0.050)	(0.001)	(0.437)	(0.015)	(98.843)	(0.013)	(1.413)
Δs_{t-2}	-0.025	-0.0337	0.092	-0.098	-0.129***	-0.120	-0.014	0.446
	(0.020)	(0.050)	(1.159)	(0.421)	(0.039)	(112.16)	(0.012)	(1.418)
Δs_{t-3}	0.026	-0.013	-0.016	-0.088	-0.012	1.46	-0.010	0.255
	(0.021)	(0.050)	(1.357)	(0.419)	(0.017)	(132.23)	(0.012)	(1.410)
$\Delta \tilde{\imath}_{t-1}$	-0.0008	-0.279***	0.096	-0.206***	0.0004	0.076	-0.0013	0.470
	(0.004)	(0.011)	(0.271)	(0.076)	(0.005)	(108.88)	(0.003)	(0.296)
$\Delta \tilde{\imath}_{t-2}$	0.0014	-0.115***	0.071	-0.016	0.007	-0.146***	0.0047	0.613**
	(0.004)	(0.012)	(0.411)	(0.076)	(0.004)	(0.018)	(0.003)	(0.309)
$\Delta \tilde{\imath}_{t-3}$	0.003	-0.100***	0.713**	-0.067	-0.081**	-1.141***	0.0004	0.444
	(0.004)	(0.011)	(0.332)	(0.072)	(0.038)	(0.015)	(0.002)	(0.293)
θ	-0.002**	0.0021	0.067	0.100***	-0.001	0.136	-0.0015	0.006
	(0.001)	(0.003)	(0.115)	(0.011)	(0.001)	(8.801)	(0.0008)	(0.086)
d_p	0.0009	0.0014	-0.041	0.023**	0.0005	0.010	0.0002	-0.02
	(0.0005)	(0.001)	(0.032)	(0.009)	(0.0005)	(6.619)	(0.0004)	(0.045)
d_n	-0.004***	-0.012***	0.121**	-0.035	0.0009	-0.095	0.0029**	0.052
	(0.0013)	(0.004)	(0.055)	(0.028)	(0.0010)	(5.576)	(0.0011)	(0.108)
	Regime 2							
μ_0	-0.002***	0.016***	0.015**	0.038***	-0.0004	-0.016	0.0004**	0.010
	(0.0005)	(0.003)	(0.0066)	(0.005)	(0.0006)	(0.437)	(0.0002)	(0.014)
Δs_{t-1}	-0.167***	-0.046	-0.030	-1.437	-0.020	0.067	-0.055**	-0.120***
	(0.053)	(0.297)	(1.197)	(1.022)	(0.073)	(99.68)	(0.027)	(0.0163)
Δs_{t-2}	0.059	-0.050	-1.039	-0.387	1.426***	0.121	0.115***	-0.391***
	(0.066)	(0.338)	(1.177)	(1.197)	(0.195)	(112.97)	(0.032)	(0.0533)
Δs_{t-3}	-0.141**	-0.834**	0.154	-0.295	-0.130	-1.07***	-0.049	-0.138**
	(0.066)	(0.330)	(1.376)	(1.236)	(0.107)	(133.20)	(0.033)	(0.0189)
$\Delta \tilde{\imath}_{t-1}$	-0.009	-0.97***	-0.256	-0.454**	0.0211	-0.076	0.010*	0.176***
	(0.014)	(0.068)	(0.275)	(0.197)	(0.037)	(109.35)	(0.006)	(0.0240)
$\Delta \tilde{\imath}_{t-2}$	-0.001	-0.152**	-0.846**	-0.653***	-0.013	0.158	0.002	-0.279**
	(0.013)	(0.060)	(0.414)	(0.245)	(0.012)	(0.180)	(0.005)	(0.0379)
$\Delta \tilde{\imath}_{t-3}$	-0.024	-0.058	-0.819**	-0.744***	0.886**	1.158	-0.016*	-0.420***
	(0.013)	(0.056)	(0.333)	(0.266)	(0.448)	(1501.1)	(0.009)	(0.0572)
θ	0.004	0.100***	0.034	-0.330***	-0.016**	-0.378***	-0.002	-0.383***
	(0.004)	(0.024)	(0.116)	(0.029)	(0.008)	(0.088)	(0.002)	(0.0522)
d_p	-0.0016	0.060***	0.028	0.015	-0.002	-0.010	-0.001	-0.043
	(0.002)	(0.008)	(0.033)	(0.023)	(0.004)	(6.714)	(0.0009)	(0.0592)
d_n	0.009***	-0.12***	-0.131**	-0.025	0.004	0.097	-0.003	0.011***
	(0.003)	(0.014)	(0.057)	(0.048)	(0.004)	(5.502)	(0.002)	(0.002)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

Table 25 Smooth Transition CVAR Model Results for Inflation Targeting Countries (3)				
	GBPSEK		CADSEK	
	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$
	Regime 1			
μ_0	-0.0002*	0.013	0.00008	0.0007**
	(0.0001)	(0.028)	(0.0001)	(0.0003)
Δs_{t-1}	-0.021	0.125***	0.0017	0.0138
	(0.021)	(0.042)	(0.0135)	(0.0555)
Δs_{t-2}	0.036	-0.080		
	(0.024)	(0.067)		
$\Delta \tilde{\imath}_{t-1}$	0.002	0.124***	-0.009***	-0.051***
	(0.003)	(0.019)	(0.0034)	(0.015)
$\Delta \tilde{\imath}_{t-2}$	-0.005	0.332***		
	(0.003)	(0.020)		
θ	-0.0006	0.319***	-0.001	-0.016**
	(0.0009)	(0.030)	(0.0013)	(0.0067)
d_p	0.0001	-0.119***	-0.0002	0.0011
	(0.0004)	(0.012)	(0.0003)	(0.0013)
d_n	0.003**	-0.342	0.003***	0.025***
	(0.0013)	(0.881)	(0.0008)	(0.0032)
	Regime 2			
μ_0	0.006***	-0.781***	-0.0004**	-0.014***
	(0.0002)	(0.028)	(0.0002)	(0.0031)
Δs_{t-1}	0.098**	-0.127***	-0.0083	-1.192***
	(0.038)	(0.042)	(0.028)	(0.355)
Δs_{t-2}	-0.140***	0.817***		
	(0.043)	(0.068)		
$\Delta \tilde{\imath}_{t-1}$	-0.0007	-0.120***	0.011*	0.060
	(0.004)	(0.019)	(0.006)	(0.052)
$\Delta \tilde{\imath}_{t-2}$	0.012**	-0.328***		
	(0.005)	(0.020)		
θ	-0.0013	-0.323***	-0.011***	-0.425***
	(0.002)	(0.030)	(0.003)	(0.069)
d_p	0.0008	0.0011	-0.0004	0.011
	(0.0010)	(0.012)	(0.0007)	(0.014)
d_n	-0.007***	0.098	-0.0012	-0.049***
	(0.0019)	(0.885)	(0.0014)	(0.011)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

Unlike the linear model, the nonlinear model now provides some evidence for the existence of a short run relation between the exchange rate and the interest rate differentials in both regimes. The interest rate differential has a negative effect on the exchange rate in regime one, which becomes positive in regime two, while in some countries the exchange rate affects negatively the interest rate differential in regime two. This suggests that the nonlinear model which accounts for interest rate expectations improves the short run relations between the UIP fundamentals. Both positive and negative central bank announcements now influence the exchange rate and the interest rate differential. An interesting observation is that the effect of central bank announcements changes signs between regimes. This suggests that the effect of interest rate announcements on the short term movement in the UIP fundamentals partially depends on the level of market expectations of the interest rate.

We find less evidence for a short run relation between the exchange rate and the interest rate differential in non-targeting economies.

Table 26 Smooth Transition CVAR Model Results for Non-Targeting Countries

	USDEUR		USDCHF		EURCHF	
	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$	Δs_t	$\Delta \tilde{\imath}_t$
Regime 1						
μ_0	0.0001	0.0001	0.0002	-0.0012	-0.00005	0.0016
	(0.0002)	(0.0002)	(0.0002)	(0.0030)	(0.00005)	(0.0019)
Δs_{t-1}	0.073***	0.0022	-0.087*	-0.0829	-0.0038	0.6241
	(0.0278)	(0.0454)	(0.0346)	(0.6158)	(0.0220)	(0.6668)
Δs_{t-2}	-0.026	0.077*	-0.029	-0.236		
	(0.0316)	(0.0454)	(0.0271)	(0.4513)		
$\Delta \tilde{\imath}_{t-1}$	-0.009	0.049***	0.0006	0.0112	-0.0003	-0.2498***
	(0.0059)	(0.0110)	(0.0007)	(0.0397)	(0.00032)	(0.0113)
$\Delta \tilde{\imath}_{t-2}$	-0.008	-0.103***	0.0001	0.0119		
	(0.0055)	(0.0106)	(0.0007)	(0.0296)		
θ	-0.0003	-0.0004	-0.0009	-0.032***	0.00014	-0.0764***
	(0.0002)	(0.0004)	(0.0007)	(0.0042)	(0.00015)	(0.0053)
d_p	0.0025***	-0.0010	0.0034***	-0.025	-0.00057	-0.0095
	(0.0009)	(0.0013)	(0.0013)	(0.0363)	(0.00036)	(0.0137)
d_n	0.0041***	-0.024***	0.0002	0.0283	0.00025	-0.0177
	(0.0016)	(0.0036)	(0.0016)	(0.070)	(0.0008)	(0.0245)
Regime 2						
μ_0	-0.0001	-0.476	0.0009**	0.0007	0.00030**	-0.0627***
	(0.0002)	(0.398)	(0.0004)	(0.0038)	(0.00013)	(0.0102)
Δs_{t-1}	-0.110***	-0.880	0.244***	0.267	0.2617***	-0.768
	(0.0398)	(68.548)	(0.0461)	(0.7336)	(0.0326)	(1.3224)
Δs_{t-2}	0.047	-0.628	0.089	0.296		
	(0.0456)	(66.942)	(0.0584)	(0.6625)		
$\Delta \tilde{\imath}_{t-1}$	0.012	-1.775	-0.0004	-0.504***	0.00089	-0.1999***
	(0.0076)	(1.5558)	(0.0014)	(0.0419)	(0.0006)	(0.0429)
$\Delta \tilde{\imath}_{t-2}$	0.011	-1.40	-0.0007	-0.276***		
	(0.0076)	(1.1302)	(0.0014)	(0.0322)		
θ	0.0004	-0.209***	0.0009	-0.132***	-0.0008**	-0.1815***
	(0.0003)	(0.016)	(0.0016)	(0.0050)	(0.00035)	(0.0264)
d_p	-0.006***	-0.660	-0.008***	0.0203	0.0019**	0.1779***
	(0.0013)	(0.6038)	(0.0023)	(0.0396)	(0.0008)	(0.0496)
d_n	-0.005**	1.470	0.0041*	-0.0284	-0.00001	0.1198
	(0.0022)	(0.9988)	(0.0025)	(0.070)	(0.0012)	(0.1135)

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. Standard errors in parentheses.

Table 27 provides information about the properties of the transition function, namely the transition parameter c and the smoothness parameter γ. We also compare coefficient θ, which is the speed of adjustment parameter between regimes. The optimal number of regimes is selected as the one which minimises the sum of squared residuals. We identified two regimes as optimal for all models.

		Regimes		Transition	
	Equation	Regime 1: θ	Regime 2: $\theta \cdot G_t$	c	γ
GBPCAD	Δs_t	0.0006**	0.0006	-0.055868	14.78672
	$\Delta \tilde{i}_t$	0.069***	-0.133***	-0.016814	22.65341
GBPAUD	Δs_t	-0.002***	0.005	-0.005186	13.16741
	$\Delta \tilde{i}_t$	0.203***	-0.379***	-0.006006	45.75886
GBPNZD	Δs_t	0.114***	-0.174***	-0.012500	62.36919
	$\Delta \tilde{i}_t$	0.169***	-0.298***	-0.012345	31.67953
GBPSEK	Δs_t	-0.0006	-0.0013	0.020142	65.02806
	$\Delta \tilde{i}_t$	0.319***	-0.323***	-0.272267	66.07738
CADAUD	Δs_t	0.009**	-0.02***	-0.173465	21.68449
	$\Delta \tilde{i}_t$	0.201***	-0.200***	-0.192480	15.45625
CADNZD	Δs_t	-0.002**	0.004	-0.050491	85.06376
	$\Delta \tilde{i}_t$	0.0021	0.100***	0.081161	18.91247
CADSEK	Δs_t	-0.001	-0.011***	0.009453	42.40906
	$\Delta \tilde{i}_t$	-0.016**	-0.425***	0.047907	16.40401
AUDNZD	Δs_t	0.067	0.034	-0.088433	88.81159
	$\Delta \tilde{i}_t$	0.100***	-0.330***	0.014948	46.41960
AUDSEK	Δs_t	-0.001	-0.016**	-0.107431	8.321685
	$\Delta \tilde{i}_t$	0.136	-0.378***	0.135389	2.311828
NZDSEK	Δs_t	-0.0015	-0.002	0.010824	13.86116
	$\Delta \tilde{i}_t$	0.006	-0.383***	2.131533	31.05755
USDEUR	Δs_t	-0.0003	0.0004	-0.001864	34.44399
	$\Delta \tilde{i}_t$	-0.0004	-0.209***	0.162205	26.28246
USDCHF	Δs_t	-0.0009	0.0009	-0.018740	12.51957
	$\Delta \tilde{i}_t$	-0.032***	-0.132***	0.000023	1.940000
EURCHF	Δs_t	0.00014	-0.0008**	0.003511	67.78872
	$\Delta \tilde{i}_t$	-0.0764***	-0.1815***	0.016260	17.30912

Table 27 Smooth Transition Model Regimes

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.
Transition variable z_t: change in the 30-day interest rate.
θ is the speed of adjustment parameter in regime 1; $\theta \cdot G_t$ is the speed of adjustment parameter in regime 2; c is the transition value, which indicates where the transition takes place; and γ is the smoothness parameter which indicates the speed of transition.

We can see that the adjustment speed in the nonlinear model is now substantially faster than in the linear model. Now, between 10% and 43% of a deviation from UIP is corrected within one day, which suggests that the UIP relation is better explained by the nonlinear model than the linear model. While the adjustment occurs in both the interest rate and the exchange rate equations, the speed is substantially faster in the case of the former. These findings imply that it is the interest rate differential, rather than the exchange rate, which adjusts to restore the UIP equilibrium. The adjustment is particularly fast in regime two, i.e. when the change in the expected interest rate exceeds the transition value c. This suggests that UIP tends to hold better when interest rates are expected to increase. The positive coefficient in regime one in some equations indicates that deviations from UIP are persistent or even increasing when the market expects the interest rate to fall in the near future. The findings indicate that the interest rate differential is the variable, which adjusts to restore the UIP equilibrium and not the exchange rate. Non-targeting economies seem to experience a lower adjustment speed than inflation targeting economies, on average, which suggests, that interest rate expectations play a more important role for the adjustment to UIP in the inflation targeting regime.

Given the results in Table 27, we can draw some conclusions about the push and pull dynamics in the models. As previously mentioned, the system is being pulled back towards the equilibrium by an adjustment in the interest rate equation, but only when the market expects the central bank to adopt a contractionary monetary policy stance by raising the interest rate in the near future. This suggests that the inclusion of interest rate expectations as the transition variable explains the adjustment dynamics well.

To check the adequacy of the nonlinear STCVAR model specification we conduct various tests. Table 28 reports the Lagrange Multiplier (LM) Test of serial correlation, the Lagrange Multiplier (LM) test of no remaining nonlinearity and the Lagrange Multiplier (LM) test of parameter constancy. The results of these misspecification tests show that the nonlinear models do not suffer from any misspecification issues and provide an appropriate framework in this context. In particular, the results of the parameter constancy tests indicate that there is no evidence of an impact of the recent COVID-19 pandemic.

Table 28 Misspecification Tests for the Nonlinear Models

	Lag	Serial Independence	No remaining nonlinearity	Parameter constancy
GBPCAD	3	0.5916	0.1141	0.0531
GBPAUD	3	0.9698	0.1629	0.1800
GBPNZD	4	0.1462	0.7581	0.1623
GBPSEK	2	0.6140	0.1560	0.3158
CADAUD	3	0.5677	0.1083	0.4600
CADNZD	3	0.9876	0.7039	0.1369
CADSEK	1	0.7790	0.8870	0.9510
AUDNZD	3	0.7638	0.6959	0.0762
AUDSEK	3	0.7067	0.4491	0.3835
NZDSEK	3	0.2819	0.0704	0.1590
USDEUR	2	0.3147	0.2530	0.1393
USDCHF	2	0.9187	0.2895	0.1517
EURCHF	1	0.5752	0.2070	0.2442

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. P-values reported for all tests.

Lagrange Multiplier (LM) Test of serial correlation:
H_0: *no serial correlation*
H_1: *serial correlation*

Lagrange Multiplier (LM) test of no remaining nonlinearity:
H_0: *no remaining nonlinearity*
H_1: *remaining nonlinearity*

Lagrange Multiplier (LM) test of parameter constancy:
H_0: *parameter constancy*
H_1: *no parameter constancy*

5.5 Conclusion

This chapter re-examined the UIP relation by estimating a model of the nominal exchange rate and interest rate differentials which accounts for the effect of central bank announcements as well as the role of changes in interest rate expectations. The analysis was conducted for the specific case of five countries that have adopted inflation targeting, namely the UK, Canada, Australia, New Zealand and Sweden; and compared to three economies which do not consider themselves to be inflation-targeters, specifically the US, the Euro-Area and Switzerland. In particular, both a benchmark linear Cointegrated VAR model and a Smooth Transition Cointegrated VAR model were estimated for this purpose.

Our analysis generates the following key findings. Firstly, our results suggest that the nonlinear framework is more appropriate to capture the adjustment to the UIP-implied equilibrium than the linear model, which is consistent with the findings of other studies in the field (see, for example, Sarno et al., 2005; Sarno et al., 2006; Li et al., 2013). Our analysis provides evidence that the speed of adjustment is substantially faster (up to 40 times) in the nonlinear model, which lends greater support toward the long run validity of UIP than in the linear framework. We further report stronger short run relations in the nonlinear model than in the linear model. Secondly, our analysis highlights the importance of interest rate expectations, which are rarely considered as measures of central bank credibility and in the context of the UIP puzzle. Our findings show that a fast adjustment only occurs when the market expects the interest rate to increase in the near future, suggesting that monetary contractions are considered more strongly aligned with keeping inflation at its target rate than monetary expansions. This stands in direct contrast to some of the findings in the existing literature (see, for instance, Wray, 1997; Baydur and Süslü, 2004). It therefore seems that credibility plays an important role in the inflation targeting economy and that the inflation targeting countries considered in this study did well at establishing credibility when adhering closer to the inflation target. Thirdly, our findings show that central bank announcements have a more sizable short run effect on the UIP fundamentals in the nonlinear model when interest rate expectations are considered. This suggests that announcements of interest rate changes are more influential on asset market fundamentals and might be perceived as more credible when they are aligned with interest rate expectations. Fourth, our findings suggest that UIP holds better in inflation targeting countries, since the adjustment speed is faster than in non-targeting economies. This suggests that, irrespective of the direction of interest rate expectations, the inflation targeting framework tends to generate a higher degree of credibility for monetary authorities thereby reducing deviations of the exchange rate from the UIP-implied equilibrium.

Overall, the findings provide support for the stronger relevance of credibility for the adjustment to UIP in inflation targeting regimes than in non-targeting regimes. The implications for inflation targeting policymakers are as follows. The fact that the adjustment to UIP only occurs when the market expects monetary policy to contract means that central banks are perceived as more credible when they implement policy actions which lead to a reduction in the inflation rate. This suggests that policymakers are able to create greater stability in the asset markets through tighter adherence to the goal of keeping inflation at a low and stable rate. Although the countries considered in this study did well at maintaining credibility, they might be able to achieve greater economic stability by considering the role of interest rate expectations in their policymaking. In particular, measuring interest rate expectations of the general public might be able to provide an indication of the general state of credibility in the regime. This information could be used by the central bank to estimate the overall impact of interest rate announcements on expectations and possibly the inflation rate.

6 Inflation Expectations and Monetary Policy Transmission

After having investigated nonlinearities in the adjustment to UIP and PPP jointly and the UIP-implied equilibrium separately, it is now of final interest to investigate the PPP relation, which shall be the focus of the subsequent empirical analysis. In the previous chapter it was established that interest rate expectations of a future monetary contraction strongly influence the adjustment to UIP. Interest rate expectations are therefore an important indicator of the view of market participants and provide an indication of the monetary policy transmission mechanism. Monetary policy transmission to the economy, especially to the goods market and inflation, is essential to the fulfilment of the inflation target and therefore deserves its own section below.

6.1 Monetary Policy Transmission

Monetary policy can be transmitted to the inflation rate through various channels. The first is the aggregate demand channel which operates via the interest rate. Changes in the interest rate affect long term real interest rates and other asset prices and thereby have a direct effect on investment and consumer expenditure (Loayza and Schmidt-Hebbel, 2002). A second important channel is the inflation expectations channel, through which inflation expectations affect consumption and investment behaviour. For instance, if market participants expect inflation to increase in the future, they will alter their spending and investment choices to increase consumption in the present. Likewise, if market participants expect inflation to fall in the future, they will lower their current expenditure in anticipation of lower prices and either higher purchasing power in the future. Inflation expectations play a key role in the permanent success of the inflation targeting regime, since they represent the opinions of market participants about future values of the inflation rate. More often than not it is not the central bank policy action itself which moves inflation to the target value but its impact on inflation expectations which ultimately has the power to lower inflation and align it with the intended target (Coibion et al., 2020). The reason for this is that if inflation expectations are not aligned with monetary policy actions, agents' behaviour in accordance with their expectations will move inflation closer to their expected value rather than the one intended by the central bank. Inflation expectations can therefore negatively or positively affect the monetary policy transmission mechanism.

Apart from the direct aggregate demand channel and the expectations channel, monetary policy can also be transmitted to inflation via the exchange rate and this can occur in two direct ways. One is through the effect on CPI inflation, which is the result of changes in the domestic price paid for imported goods when converted at the new exchange rate. This applies to both imported final goods and imported intermediate goods, for which the latter will affect the final price of domestic goods (Svensson, 2000b). Monetary policy therefore has a direct effect on CPI inflation through the exchange rate, which can result in shorter transmission lags. The second way is through the transmission of foreign shocks to aggregate demand and inflation, which can impact the demand for and prices of domestic goods. The exchange rate channel can also work through the UIP condition. Domestic interest rate changes should lead to an adjustment of the exchange rate to satisfy UIP, which in turn should impact aggregate demand and inflation. In particular, prices in the goods market are affected by the real exchange rate, which can transmit interest rate changes through the nominal exchange rate (Frenkel and Taylor, 2006).

Based on the importance of monetary policy transmission through the expectations channel, the operation of an inflation targeting regime requires the central bank's commitment to not only keep inflation, but also inflation expectations under control. The reason for the latter stems from the role of inflation expectations as a transmitter of policy changes as well as economic shocks to actual inflation. The following section discusses the role of inflation expectations in more detail.

6.2 Anchoring of Inflation Expectations

While Chapter 5 showed that accounting for interest rate expectations provides an interesting insight into understanding the adjustment of deviations from UIP, it is expectations about future inflation, rather than the interest rate that are considered most crucial to the fulfilment of the inflation target (Strohsal and Winkelmann, 2015). While announcements are used by the central bank to convey credibility, inflation expectations demonstrate to what extent the central bank is perceived as credible by the general public. The central bank commitment to maintaining price stability should anchor expectations about future inflation held by market participants in the regime. Well-anchored inflation expectations can loosely be defined as the continuous public expectation of low and stable inflation. Firmly anchored inflation expectations should be close to the target rate of inflation and not react to economic shocks or news. This means that well-anchored expectations should be stable, even if the actual inflation rate temporarily deviates from the target. Any abrupt changes or shocks to inflation expectations indicate that the inflation target set by the central bank is not perceived as fully credible by the general public (Gerlach-Kristen and Mössner, 2014). Economic shocks, crises and discretionary monetary policy actions by the monetary authorities can introduce elements of uncertainty and thereby change the anchoring of inflation expectations. Inflation expectations that are above the target rate can reflect the public belief that policymakers have lost the ability to combat high inflation rates, while inflation expectations that are below the target rate can indicate market participants' doubt in the monetary authority's power to reflate the economy (Nautz et al., 2019).

When inflation expectations are well-anchored, the achievement of the objective of price stability becomes substantially easier for the central bank in the long run. This is due to the nature and role of inflation expectations as a transmitter of monetary policy to actual inflation (Çiçek and Akar, 2014). The policy anticipations hypothesis, for instance, postulates that if current inflation is above or below target inflation, markets will expect policymakers to adjust interest rates to move inflation back to its target rate (Roley and Walsh, 1985). The hypothesis is seen as consistent with central bank credibility, since the monetary authority is assumed to commit to the inflation target and is expected to counteract any inflationary pressures, which arise from public expectations formed in response to contemporary inflation news. The importance of inflation expectations in determining the effectiveness of monetary policy is set out in the expectations hypothesis. Unlike the policy anticipations hypothesis, the expectations hypothesis postulates that the expectation of low inflation will consequently lead to the realisation of low inflation. This means that inflationary pressures in the economy will decline if the public expects low inflation in the future (Gürkaynak et al., 2010). If the public considers the central bank and the inflation target as credible and expects inflation to be low in the future, their actions today will reflect this expectation and lead to the realisation of lower inflation. If this is the case, the central bank does not have to use great interest rate measures to control inflation, provided that the central bank is perceived as credible. As such, proactively managing inflation expectations is one of the key tasks of the inflation targeting central bank.

The public concerned with monetary policy can be categorised into two broad groups. The first of which does not fully comprehend the content and implications of central bank announcements, which is often attributable to a lower degree of financial literacy. The second group is familiar with the language used by the central bank and is in a better position to understand the content and implications of announcements, but only represents a fraction of the total population (Bruine de Bruin et al., 2010). Public inflation expectations comprise the individual expectations of both groups; however, depending on which measure of inflation expectations is used, the approximate weight each group's expectations contribute to overall expectations can vary. A heterogeneous audience usually requires greater frequency and consistency of communication in order to address differences in financial literacy. Central banks could decide to communicate less frequently and instead rely on the anchor, which is provided by the operation of the inflation targeting regime itself. Inflation expectations are said to be anchored when long term expectations are not influenced by short term expectations or macroeconomic news and shocks. However, central banks, which use frequent and consistent communications, are perceived as more predictable than central banks which use less frequent and consistent communications (Blinder et al., 2008).

The adoption of constrained discretion can have a positive effect on anchoring inflation expectations (Bernanke, 2003). Seemingly, central banks, who have moved away from a strict targeting policy and allowed for some level of discretion, have experienced less volatile fluctuations in inflation and therefore do not always require a strong policy response to keep prices stable (Bianchi and Melosi, 2018). The combination of constrained discretion in the monetary policy framework with a well-developed and appropriate communication strategy can support the anchoring of inflation expectations and thereby aid with the achievement of price stability. In fact, while effective communication with the general public has several benefits, the most important one is the positive effect it has on anchoring inflation expectations.

This brings us to the focus of the next empirical chapter. While the benefits of the use of constrained discretion for inflation targeting policymakers have been highlighted in previous chapters, the issue of anchoring inflation expectations remains a relevant one. To date, the nature of the formation and behaviour of inflation expectations has only been uncovered to some extent, and questions remain about the power of inflation expectations over macroeconomic variables. One of these, which shall be addressed in the following, is the influence of inflation expectations on Purchasing Power Parity.

6.3 Measuring Inflation Expectations

How inflation expectations are measured, how volatile they are and whether they are rational has been a concern in the economic literature for decades. Empirically, inflation expectations can be measured in a number of ways. Household and business surveys are a widely used measure of inflation expectations, albeit individual surveys can differ greatly from one another. The differences become apparent in the wording of the questions, the selection of the target audience and the sample size (Armantier et al., 2013). Survey measures can be quantitative in nature, by asking participates for their precise expectation of inflation in the next period, or qualitative by providing participants with a range of possible future outcomes. Depending on the survey, the frequency can be monthly or quarterly but some of them are only conducted semi-annually or annually. A continuous record of inflation expectations is therefore difficult to obtain. Surveys conducted by different bodies can use different methodologies as the basis for the survey content and therefore results from different surveys can vary substantially. Heterogeneity in the way in which expectations are formed by the general public is a common phenomenon, which can be identified through survey measures of expectations, but disagreement between individual participants in surveys can be significant (Mankiw et al., 2003). Furthermore, surveys can represent inflation expectations as more volatile than they are.

Another way to measure inflation expectations is by using market-based measures. A common one are CPI futures, which themselves capture market expectations regarding the expected future inflation rate in their price. The decisions of investors of whether to buy or sell these CPI futures depends on their expectations of future inflation and monetary policy direction. A long position indicates that investors expect a future monetary contraction and a short position indicates that investors expect a future monetary expansion (Carlson et al., 1995). This measure not only provides an indication of what the general public believes monetary policy actions will be, but also how they are expected to impact future inflation. A second market-derived way of measuring inflation expectations is through the yield curve. The gap between nominal and inflation-indexed yields at long horizons is directly proportional to the expected future increase in inflation. Therefore, a widening in the yield gap represents an expected increase in future inflation whereas a contraction in the yield curve represents an expected reduction in future inflation. The yield curve measure reflects market expectations regarding the value of current yield curve fundamentals and their expected change over the future time path. The inflation expectations measure for long-term bonds also includes the inflation expectation for shorter term bonds, but tends to be less variable at longer horizons (Chernov and Mueller, 2012). Using yield curve data as a measure of inflation expectations captures market expectations overall rather than only household expectations of future inflation.

The merits and demerits of both market and survey measures of inflation expectations makes it worthwhile to consider both as approximations to measuring central bank credibility. Given the importance of inflation expectations for the success of the inflation targeting regime and their effect on real economic variables, inflation expectations represent a main focus of the subsequent analysis of PPP.

7 Asymmetric Adjustment to PPP in Response to Real, Nominal and Inflation Expectations Shocks

7.1 Introduction

The well-known PPP puzzle represents the fact that real exchange rates appear to be more volatile and exhibit more persistent deviations from their mean values than implied by most exchange rate determination models (Rogoff, 1996). The extensive literature in this context has since aimed to identify possible reasons for the empirical failure of PPP (see Taylor, 2006 for a detailed review). Amongst the most noteworthy suggestions are the persistence of nominal wages and prices (Rogoff, 1996) or the failure to account for the non-tradability of goods (Sarno and Chowdhury, 2003). The literature has also proposed different empirical methods as possible solutions to solving the PPP puzzle. In this context, simple and panel unit root tests to assess the degree of mean reversion have produced mixed results (see, for instance, Murray and Papell, 2005; Chortareas and Kapetanios, 2009; Taylor et al., 2001), whilst more advanced nonlinear methods lend more conclusive support towards real exchange rate mean reversion (see, for instance, Baum et al., 2001; Chortareas et al., 2002; Norman, 2010; Christopoulos and León-Ledesma, 2010). An important issue for the investigation of the PPP puzzle is the possible role of the monetary policy framework adopted by central banks (Lavesson, 2011). It is noteworthy that only a few papers have carried out this type of analysis in the case of inflation targeting countries, which appear to be characterised by faster mean reversion (Ding and Kim, 2012) and lower volatility (Kim, 2014) of the real exchange rate. The papers by Ding and Kim (2012) and Kim (2014) focus primarily on establishing whether the existence of an inflation targeting regime implies a stronger validity of PPP. However, the existing literature fails to identify the precise factors within the inflation targeting regime which influence this stronger mean reversion to PPP.

The present chapter aims to conduct such an analysis by estimating a model of the real exchange rate including key fundamentals in the inflation targeting regime as well as inflation expectations. We consider five inflation targeting countries, namely the UK, Canada, Australia, New Zealand and Sweden over the period from January 1993 to December 2020; and additionally three non-targeting economies, namely the US, the Euro-Area and

Switzerland, for comparison (see Neumann and Von Hagen, 2002). In inflation targeting countries the credibility of the central bank can directly affect inflation expectations and through them deviations of the real exchange rate from the PPP-implied long-run equilibrium. Recent papers have estimated Autoregressive Distributed Lag (ARDL) models to investigate PPP (see, for example, Ariff and Zarei, 2015). We start with this empirical framework of the real exchange rate which also includes macroeconomic fundamentals that are of relevance to the inflation targeting regime, namely output, money supply, the interest rate and inflation expectations. Within the literature concerned with the PPP puzzle, recent studies have considered the possible importance of nonlinearities and asymmetric adjustment to the long-run equilibrium in the case of real exchange rates (see Taylor et al., 2001). The suitability of nonlinear model in providing solutions to the PPP puzzle partially motives our decision to also estimate a Nonlinear Autoregressive Distributed Lag (NARDL) model.

Both empirical models allow us to account for the role of shocks in influencing the real exchange rate; a topic which has received increasing attention in the PPP literature in recent years. The real exchange rate has found to be influenced by real shocks in both the short and the long run (Zhou, 1995), but the evidence on the long run effect of nominal shocks is mixed (Clarida and Gali, 1994; Fisher and Huh, 2002). In our empirical models, we include a combination of real and nominal shocks as well as use two alternative measures of inflation expectations, namely one market-based measure derived from the yield curve and one survey measure.

Our findings suggest that the nonlinear model is more suitable to capture the adjustment to the joint long run PPP-implied equilibrium than the linear model. With an adjustment speed up to nine times faster than in the linear model, the nonlinear model provides a more suitable explanation of the real exchange rate response to shocks. Nominal and real shocks, as well as central bank credibility shocks, have a strong impact on the real exchange rate in both the short and long run. By including two alternative measures of inflation expectations, we show that inflation expectations are an important determinant of the real exchange rate. Survey-based inflation expectations have a particularly strong effect on real exchange rate deviations, which suggests that they are more conclusive of the degree of credibility of the central bank than market-based measures. The impact of shocks is found to be more important in inflation targeting countries than in non-targeting economies, implying that inflation targeting central banks are able to influence the real exchange rate through policies which reduce the occurrence of economic shocks.

The remainder of this chapter is organised as follows. Section 7.2 discusses the existing literature in the field; Section 7.3 outlines the econometric model used for our estimation; Section 7.4 presents the data and discusses the results; and Section 7.5 concludes.

7.2 Literature

7.2.1 Empirical Evidence on the Validity of PPP

The empirical literature on PPP is extensive. Early studies assessed the validity of the parity by using simple Augmented Dickey-Fuller (ADF) unit root tests to test for the random walk hypothesis of the real exchange rate, but failed to find sufficient supportive evidence for the validity of PPP (Froot and Rogoff, 1995; Lothian and Taylor, 1996). The use of a more powerful unit root test, namely the modified Dickey-Fuller Generalised Least Squares (DF-GLS) test, generated stronger support for PPP and real exchange rate mean reversion (Cheung and Lai, 1994). These early tests along with subsequent studies investigated PPP by assessing the behaviour of the real exchange rate. The relative version of PPP assumes that the real exchange rate is constant over time. This can be tested by assessing the degree of mean reversion of the real exchange rate. Given the properties above, PPP holds if the real exchange rate is mean-reverting, i.e. if the real exchange rate converges to its mean value in the long run. The topic of real exchange rate mean reversion has received much attention in the literature since the early 1990s. Since then, however, several papers have confirmed that standard unit root tests have low power in detecting mean reversion (Taylor, 2001).

More recent studies have, instead, focused on panel methods to investigate the PPP puzzle, since panel unit root tests have superior inference properties than standard unit root tests (MacDonald, 1996). Frankel and Rose (1996) conducted a panel estimation of 150 countries and found evidence for the occurrence of deviations from PPP. These deviations were found to converge to their long run equilibrium by circa 15% per year with half-lives of approximately four years. Similar results were obtained by Rogoff (1996), who reported that half-lives of three to five years were confirmed by most other studies at that time. Evidence for shorter half-lives was presented by Coakley and Fuertes (1997), who used panel unit toot tests to assess real exchange rate mean reversion for the G10 countries. They found evidence of half-lives of less than three years in response to one-time shocks. This was supported by other studies at the time, which reported shorter half-lives of between 2 years (Wu, 1996) and 2.5 years (Papell, 1997).

These findings were contradicted by Murray and Papell (2005), who criticised prior studies for their use of simple unit root tests in panel estimations of PPP, which can lead to downward bias in the least squares estimate of the sum of autoregressive coefficients. Instead, they presented an alternative method by using a median-unbiased panel estimation, which provided strong evidence for the earlier findings of longer half-lives of approximately 4 years. Some studies were undertaking attempts to compare half-life models of the exchange rate with other exchange rate determination models. Chortareas and Kapetanios (2009) extended classical panel methods of PPP by accounting for the stationarity of individual real exchange rates and cross-sectional dependence within a panel. The method was based on heterogeneous unit root tests, which were applied to a panel of 25 OECD countries, and the results indicated that mean-reversion is significantly stronger under the revised stationarity test. The empirical findings regarding the performance of half-life models of the real exchange rate suggest that they provide a suitable solution to the PPP puzzle. In fact, when directly comparing the half-life model of PPP with a first order autoregressive model of PPP, it was found that the former is superior in forecasting real exchange rates at both short and long horizons than the random walk model (Ca'Zorzi et al., 2016).

7.2.2 Nonlinear Adjustment of Real Exchange Rate Deviations

Within the vast literature on exchange rate mean reversion, some studies adopted nonlinear models to account for possible nonlinearities in the adjustment process to the long-run equilibrium implied by PPP. Taylor et al. (2001) analysed a number of real exchange rates for potential nonlinear adjustment during the Bretton-Woods period. They used multivariate unit root tests using the empirical critical values obtained by Monte Carlo simulations, and reported stronger mean-reversion of the real exchange rates if they are further distant from the equilibrium. The evidence on the faster adjustment speeds of the half-lives suggests, that standard unit root tests are less suitable if the real exchange rate mean reversion is nonlinear. Baum et al. (2001) estimated an exponential Smooth Transition Autoregressive (STAR) model based on the Johansen cointegration method and found evidence of nonlinear mean-reversion with an adjustment speed, which is dependent on the size of the deviation from the PPP equilibrium. Sollis et al. (2002) used a similar nonlinear STAR model to test for asymmetries in the mean reversion of the real exchange rate and report stronger rejections of the unit root null hypothesis than under standard unit root tests. The same methodology was used by Chortareas et al. (2002) to assess whether real exchange rates between G7 nations follow a nonlinear stationary process. Specifically, they implemented a de-trending method suggested by Schmidt and Phillips (1992) to derive an alternative test statistic for the unit root test, which is more powerful against linear trend-stationary processes. They found evidence for the nonlinear mean reversion of most real exchange rates even in cases where standard unit root tests were unable to detect linear mean reversion. These results were confirmed by Bahmani-Oskooee et al. (2008), who used the nonlinear unit root test suggested by Kapetanios et al. (2003) to assess the validity of PPP in a STAR framework for 23 nations. They found that real exchange rates revert to their mean in a nonlinear fashion, providing evidence for the validity of PPP in more countries than was previously found by using the standard ADF test.

Norman (2010) estimated a STAR model to determine the empirical distribution of half-lives in response to frequent shocks. The findings provide evidence of nonlinear mean reversion with half-lives of less than the typical 3 to 5 years reported in previous studies. He concluded, that half-lives of less than 5 years occur 100% of the time and half-lives of less than 3 years occur 30% of the time. This confirms that nonlinear mean reversion is a key feature of the real exchange rate and a potential solution to the PPP puzzle. Christopoulos and León-Ledesma (2010) developed a test for unit roots that accounts for both structural breaks and nonlinear adjustment of the real exchange rate. The test allows for several endogenous breaks and for adjustments following a nonlinear exponential STAR process and was applied to 15 bilateral real exchange rates against the US Dollar during the Bretton-Woods period. Their findings confirm the nonlinear mean reversion of the real exchange rate to a smooth-breaking mean in almost all cases. Feenstra and Kendall (1997) tested two hypotheses to uncover the PPP puzzle; one was the partial adjustment of prices in response to exchange rate changes, thereby leading to an incomplete pass-through and the other was the exclusion of the interest rate differential from the PPP relation of the spot exchange rate. Their results indicate that the pass-through behaviour of the exchange rate is able to explain at least one-third of the deviation from PPP, whilst interest differentials, which are mostly stationary, are unable to explain the mostly non-stationary deviations from PPP.

7.2.3 The Real Exchange Rate and Economic Shocks

Within the literature concerned with PPP and the real exchange rate, the role of nominal and real economic shocks has received great attention. Zhou (1995) used a cointegration model to investigate the reaction of the Yen-Dollar and Markka-Dollar real exchange rates to various types of real and nominal shocks, *inter alia* the real world oil price, domestic and foreign consumption to GDP ratios, and money supply differentials. He confirmed the existence of a long run relationship of the real exchange rate with the real variables, but not the monetary variables, suggesting that monetary policy is ineffective in influencing the long-run trend of the real exchange rate. While many studies find that nominal shocks do not have any influence over the real exchange rate in the long run (see, for instance, Clarida and Gali, 1994; Lee and Chinn, 1998), Prasad (1999) reports that nominal shocks can explain a considerable amount of the short-run variability of the real exchange rate. Fisher and Huh (2002), who estimated a VAR model of PPP with aggregate demand shocks, aggregate supply shocks and monetary shocks for the G7, even confirmed the existence of a long run effect of nominal shocks on the real exchange rate. Kutan and Dibooglu (1998) also reported that nominal shocks play an important role in explaining real exchange rate movements.

The potential asymmetric effect of economic shocks on PPP was analysed by Peltonen et al. (2011), who estimated an Exponential Panel Smooth Transition Autoregressive (EPSTAR) model to test for the nonlinear effect of labour productivity shocks on the real exchange rate in 23 OECD countries. The findings suggest that the nonlinear model reduces the half-life persistence generally found in linear models. Adu et al. (2019) estimated a Structural VAR model with Impulse Response Analysis for the West African Monetary Zone countries, and found evidence for a strong asymmetric effect of productivity, oil price, and demand preference shocks on the real exchange rate. Apart from these studies, the use of nonlinear models to assess the asymmetric impact of real and nominal economic shocks on PPP is surprisingly scarce. This chapter aims to conduct such an analysis by investigating the asymmetric response of the real exchange rate to different types of nominal and real shocks.

Table 29 below summarises the extensive PPP literature and its main findings. The extensive evidence of nonlinearities and asymmetries in real exchange behaviour discussed above motivates our estimation of a NARDL model in addition to the standard ARDL specification as discussed in the next section.

Authors	Estimation Sample	Country	Methodology	Findings
Table 29 Literature Review Summary PPP				
Empirical Evidence on the Validity of PPP				
Froot and Rogoff (1995)	Literature Review	Literature Review	Literature Review	RER appears stationary over sufficiently long horizons with univariate unit root tests confirming stationarity, while multivariate tests tend not to
Lothian and Taylor (1996)	Past two centuries	Franc-sterling and dollar-sterling	Stationary autoregressive models are compared to nonstationary models in dynamic forecasting exercises	Evidence for mean-reverting RER behaviour with half-lives of 3 to 6 years
Cheung and Lai (1994)	1900 to 1992	Canada, France, Germany, Italy, Japan, Netherlands, Switzerland, UK and US	MLE cointegration model which accounts for measurement errors of price series	Confirm LR cointegration between the exchange rate and prices
Taylor (2001)	19th century	20 countries	Univariate and multivariate unit root tests of higher power	Floating periods are associated with greater deviations from PPP, which is not due to greater persistence (half-lives) but larger shocks
MacDonald (1996)	1973 to 1992	OECD countries	Levin-Lin panel unit root tests	Unit root null is rejected
Frankel and Rose (1996)	The 45 years after WWII	150 countries	Panel unit root tests	Mean-reversion with a 15% erosion of PPP deviations a year and half-lives of 4 years
Rogoff (1996)	Literature Review	Literature Review	Literature Review	Half-lives tend to be 3-5 years and PPP deviations die out at a rate of 15% per year
Coakley and Fuertes (1997)	January 1973 to December 1996	G10 economies and Switzerland	Two IPS (Im, Pesaran, Shin) panel unit root tests	Half-lives of less than 3 years
Papell (1997)	January 1974 to April 1993	German mark against the US dollar	Panel unit root tests which account for autocorrelation and use the Levin-Lin test with Monte Carlo methods to compute exact finite sample critical values	PPP valid in the LR with the unit root null rejected more frequently in larger panels
Murray and Papell (2005)	Quarter 1 1973 to Quarter 2 1998	20 U.S. dollar denominated real exchange rates	Median-unbiased estimation methods	LS methods underestimate half-lives of PPP deviations and overestimate the mean reversion speed
Chortareas and Kapetanios (2009)	Quarter 1 1957 to Quarter 4 1998	25 OECD countries	Panel unit root tests	Evidence of mean-reversion is significantly stronger as in the existing literature
Ca'Zorzi et al. (2016)	January 1975 to March 2012	Nine major currencies	Simple autoregression model	The half-life PPP model is able to forecast real exchange rates better than the random walk model at both short and long horizons
Nonlinear Adjustment of Real Exchange Rate Deviations				
Taylor et al. (2001)	January 1973 to December 1996	UK sterling, German mark, French franc, and Japanese yen against the US dollar	STAR model of the RER with Monte Carlo simulations of the multivariate ADF statistic	Faster adjustment of the real exchange rate than found in previous studies
Baum et al. (2001)	August 1973 to December 1995	17 US trading partners	Johansen cointegration test and ESTAR models	Mean reversion depends nonlinearly on the magnitude of the PPP disequilibrium, but convergence is slow
Sollis et al. (2002)	April 1973 to November 1997	17 monthly RERs against USD and 14 against DEM	STAR models	Rejection of the unit root null only occurs when asymmetry in mean reversion is allowed
Chortareas et al. (2002)	Quarter 1 1960 to Quarter 4 2000	Bilateral DM and US dollar real exchange rates for the G7 countries	Modified the unit root test in STAR models by Kapetanios, Shin and Snell (2001) by using a detrending method by Schmidt and Phillips (1992)	Confirm real exchange rate mean reversion where standard DF tests do not

Bahmani-Oskooee et al. (2008)	January 1980 to August 2005	88 developing countries	Test the null of nonstationarity against linear stationarity and compare it to a test of the same null against nonlinear stationarity	Mean reversion in RER occurs more often for high-inflation countries
Kapetanios et al. (2003)	Quarter 1 1957 to Quarter 4 1998	11 OECD countries against the USD	Derive limiting nonstandard distribution for tests of nonstationarity against globally stationary ESTAR with the use of Monte Carlo simulations	The test has better power than the DF test in explaining PPP
Norman (2010)	January 1973 to December 1998 for France, Germany, and Italy and from January 1973 to December 2007 for Japan and UK	France, Germany, Italy, Japan, and the UK against the US dollar	STAR model	Nonlinear mean reversion with half-lives of less than the typical 3 to 5 years
Christopoulos and León-Ledesma (2010)	Quarter 1 1974 to Quarter 4 2006	15 OECD countries	Develop unit root tests which jointly account for structural breaks and nonlinear adjustment and estimate an ESTAR model	Unit root null is rejected in 14 cases
Feenstra and Kendall (1997)	Quarter 1 1974 to Quarter 4 1994	US against Canada, the Federal Republic of Germany, Japan and the UK	Unit root and cointegration tests	PPP holds on forward rather than spot rates but changes in prices affect the PPP relation
The Real Exchange Rate and Economic Shocks				
Zhou (1995)	Quarter 1 1973 to Quarter 2 1993	Yen-Dollar and Markka-Dollar real exchange rates	VECM and common stochastic trend approach	Shocks to fundamentals have a persistent influence on the RER apart from monetary shocks
Clarida and Gali (1994)	Quarter 2 1974 to Quarter 1 1992	Germany, Japan, Canada, and Britain	VAR model	Monetary and demand shocks explain most of the SR variance of the RER, but supply shocks only little
Lee and Chinn (1998)	Quarter 2 1979 to Quarter 4 1994	G7 countries	Structural VAR with minimal identification assumptions	Permanent productivity shocks have LR effects, while monetary shocks have large SR effects on the RER.
Prasad (1999)	Post-Bretton Woods period	G7 countries	Reduced-form VAR model and impulse response functions	Nominal monetary shocks depreciate the exchange rate in the SR while nominal shocks are important for RER fluctuations at SR and LR forecasting horizons
Fisher and Huh (2002)	Quarter 2 1973 to Quarter 4 1997	G7 countries	Structural VAR models	Nominal shocks are found to have a significant long-run effect on each country's real exchange rate
Kutan and Dibooglu (1998)	January 1990 to February 1998	Hungary and Poland	Finite order bivariate VAR for	Whether real and nominal shocks explain SR RER movements is heterogeneously country-dependent
Peltonen et al. (2011)	1980 to 2003	23 OECD countries	EPSTAR model (panel application of the ESTAR model)	Half-lives in the nonlinear model with productivity shocks are much shorter than when using linear PPP and more consistent with the observed volatility of RERs
Adu et al. (2019)	1980–2015	WAMZ economies	Country-by-country VECM and structural VAR and report	Country differences in the response of the RER to oil price, supply and demand shocks in SR and LR

Abbreviations: RER = real exchange rate; IT = inflation targeting; LR = long run; SR = short run

7.3 Empirical Framework

7.3.1 The Linear ARDL Model

To investigate the issues of interest we start by following a standard ARDL approach (see Pesaran and Shin, 1998 for more details). In its general form the linear benchmark model can be expressed as follows:

$$y_t = \alpha + \sum_{i=1}^{p} \varphi_i \Delta x_{t-i} + \sum_{j=1}^{q} \theta_j x_{t-j} + \varepsilon_t \qquad (7.1)$$

where x_{t-j} are the lagged explanatory variables and Δ stands for the difference operator. We apply this framework to estimate the following model of the real exchange rate:

$$q_t = \theta_t \tilde{m}_t + \varphi_t \tilde{y}_t + \lambda_t \tilde{\imath}_t + \omega_t \tilde{x}_t + \varepsilon_t \qquad (7.2)$$

where q_t is the real exchange rate, $\tilde{m}_t = m_t - m_t^*$ is the difference between domestic and foreign money supply (in nominal terms), $\tilde{y}_t = y_t - y_t^*$ is the difference between domestic and foreign output (in real terms), $\tilde{\imath}_t = i_t - i_t^*$ is the nominal interest rate differential and finally $\tilde{x}_t = x_t - x_t^*$ is the inflation expectation differential. Despite the proposition of economic theory, that nominal shocks have no long run effect on the real exchange rate, we consider both real and nominal variables in our model. We include variables which were found to represent an important origin of shocks in previous studies (see, for example, Rogers, 1995) combined with variables which are of particular relevance to the inflation targeting regime. As such, real output and money supply represent real and monetary shocks, respectively. Since monetary policy is endogenous and the money supply no longer serves as the main monetary policy tool in inflation targeting countries, we additionally include the interest rate as a potential shock variable. Lastly and most importantly, we include a measure of inflation expectations. This variable is included following Kamada and Nakajima (2014), who suggest that the real exchange rate should be defined as $q_t = \frac{x_t^*}{x_t} \times s_t$, namely as the difference between inflation expectations multiplied by the nominal exchange rate, which can be informative about the role of central bank credibility in the context of PPP. The chosen setup allows for the possible effects of both real and nominal shocks, since the latter can also influence the real exchange rate in the presence of sluggish price adjustment (Stockman, 1987; Clarida and Gali, 1994).

The empirical specification of the ARDL model is then the following:

$$\Delta q_t = \alpha + \sum_{i}^{p} \gamma_i \Delta q_{t-i} + \varphi_1 \Delta \tilde{m}_{t-1} + \varphi_2 \Delta \tilde{\iota}_{t-1} + \varphi_3 \Delta \tilde{y}_{t-1} + \varphi_4 \Delta \tilde{x}_{t-1} + \rho ecm_{t-1} + $$
$$+ \theta_1 \tilde{m}_{t-1} + \theta_2 \tilde{\iota}_{t-1} + \theta_3 \tilde{y}_{t-1} + \theta_4 \tilde{x}_{t-1} + \varepsilon_t \qquad (7.3)$$

where ecm_{t-1} is the error correction term and all other variables are defined as before.

The individual series have to be tested for their order of integration since variables whose order is higher than $I(1)$ cannot be included in the model. Following the example of Cheung and Lai (1994), we use the Dickey Fuller Generalised Least Squares (DF-GLS) test for this purpose. After estimating the linear ARDL model, we want to assess whether the model is data congruent and therefore provides a suitable approximation to the true data generating process. In order for a model to be data congruent, certain conditions must hold. Firstly, the errors need to be homoscedastic and serially uncorrelated. Secondly, the conditioning variables for the parameters of interest must be weakly exogenous (Bontemps and Mizon, 2003). These assumptions can be tested by model misspecification tests, which provide an estimation of partial congruence. For condition one, we use the Breusch-Pagan test for heteroscedasticity and the Breusch-Godfrey Lagrange multiplier (LM) test for serial correlation. For condition two, we report the F-test of a Wald statistic of the hypothesis that the regressors are weakly exogenous.

7.3.2 The Nonlinear ARDL (NARDL) Model

Given the evidence from the existing literature on possible nonlinearities in real exchange rate behaviour we then consider a Nonlinear ARDL (NARDL) specification which allows for asymmetric effects of the regression parameters[11]. One should note that although there is no formal testing procedure for the presence of nonlinearities prior to the estimation of the model, parameter symmetry tests can be carried out after the estimation has been performed.

This model allows the long-run cointegrating relation between the variables as well as the short-run dynamics to be characterised by asymmetries and thus to distinguish between the impact of positive and negative changes in variables such as inflation expectations on PPP

[11] A pictorial representation of the model selection process can be found in Appendix B.

deviations and the real exchange rate adjustment to equilibrium (Arize et al., 2017). It was developed by Shin et al. (2014) and is a fairly novel addition to the class of nonlinear cointegration models. Within this framework, the regressors can be decomposed by using the partial sum of positive and negative changes, which allows to test the relationship for short- and/or long-run asymmetries or for a combination of the two (the so-called dynamic multiplier) which might arise.

The nonlinear ARDL (p, q) model can then be represented as follows:

$$y_t = \alpha + \sum_{i=1}^{p} \varphi_j \Delta x_{t-i} + \sum_{j=0}^{q} \left(\theta_j^{+'} x_{t-j}^{+} + \theta_j^{-'} x_{t-j}^{-} \right) + \varepsilon_t \tag{7.4}$$

where x_t is a $k \times 1$ vector of multiple regressors, which are defined such that $x_t = x_0 + x_t^+ + x_t^-$. φ_j is the autoregressive parameter and θ_j^+ and θ_j^- are the positive and negative distributed lag parameters capturing the asymmetries. The corresponding error correction specification takes the following general form:

$$\Delta y_t = \alpha + \rho ecm_{t-1} + \sum_{i}^{p} \gamma_i \Delta q_{t-i} + \sum_{j=1}^{p} \left(\varphi_j^{+'} \Delta x_{t-j}^{+} + \varphi_j^{-'} \Delta x_{t-j}^{-} \right) + \\ + \sum_{j=1}^{q} \left(\theta_j^{+'} x_{t-j}^{+} + \theta_j^{-'} x_{t-j}^{-} \right) + \varepsilon_t \tag{7.5}$$

and the specific model we estimate is the following:

$$\Delta q_t = \alpha + \rho ecm_{t-1} + \gamma \Delta q_{t-1} + \varphi_1^{+'} \Delta \tilde{m}_{t-1}^{+} + \varphi_1^{-'} \Delta \tilde{m}_{t-1}^{-} + \varphi_2^{+'} \Delta \tilde{\imath}_{t-1}^{+} + \varphi_2^{-'} \Delta \tilde{\imath}_{t-1}^{-} + \\ \varphi_3^{+'} \Delta \tilde{y}_{t-1}^{+} + \varphi_3^{+'} \Delta \tilde{y}_{t-1}^{-} + \varphi_4^{+'} \Delta \tilde{x}_{t-1}^{+} + \varphi_4^{+'} \Delta \tilde{x}_{t-1}^{-} + \theta_1^{+'} \tilde{m}_{t-1}^{+} + \theta_1^{-'} \tilde{m}_{t-1}^{-} + \theta_2^{+'} \tilde{\imath}_{t-1}^{+} + \\ \theta_2^{-'} \tilde{\imath}_{t-1}^{-} + \theta_3^{+'} \tilde{y}_{t-1}^{+} + \theta_3^{-'} \tilde{y}_{t-1}^{-} + \theta_4^{+'} \tilde{x}_{t-1}^{+} + \theta_4^{-'} \tilde{x}_{t-1}^{-} + \varepsilon_t \tag{7.6}$$

where all variables are defined as before but are now entered as their partial sum decompositions. The difference between a traditional error correction model and an ARDL one is that in the latter the error correction term is replaced with the first lag of the dependent and cointegrating variables. This allows one to enter the same lagged variables in levels as in a standard error correction model, but without any restrictions on the coefficients. Therefore, this model is also called a conditional or unrestricted error correction model. It is nonlinear in the variables but linear in the parameters on all short- and long-run variables (Shin et al., 2014). The null hypothesis that the positive and negative coefficients in the short- or long-run relationships are symmetric, i.e. $\left(\frac{-\theta^{+}}{\rho}\right)' = \left(\frac{-\theta^{-}}{\rho}\right)'$, can be tested by means of a Wald statistic (Hu et al., 2018). From the specification above we can see that the model does not directly account for differences in the adjustment speed via regime-dependence. However, we are able to obtain an estimation of the dynamic multiplier behaviour of the adjustment parameter via inference from the coefficients on positive and negative partial sum components. The coefficient ρ on the nonlinear error correction term, ecm_{t-1}, is defined as $\rho = q_t - \beta^{+\prime}x_t^{+} - \beta^{-\prime}x_t^{-}$ where x_t^{+} and x_t^{-} are the positive and negative partial sum components of the variables which enter the long-run cointegration relation and $\beta^{+} = -\frac{\theta^{+}}{\rho}$ and $\beta^{-} = -\frac{\theta^{-}}{\rho}$ are the asymmetric long-run parameters. Since the model is linear in all parameters including the coefficients on the partial sum components of the regressors, it can be conveniently estimated by Ordinary Least Squares (Pesaran and Shin, 1998).

The NARDL model is the nonlinear version of the ARDL one, which allows for the inclusion of both $I(1)$ and $I(0)$ variables but is unstable in the presence of variables with higher integration orders. It provides information about both the short-run dynamics and the long-run equilibrium in an error correction specification which also includes unrestricted lags of the regressors (Pesaran and Shin, 1998; Nkoro and Uko, 2016). An advantage of this model is that it corrects for weak endogeneity of nonstationary explanatory variables. Both the ARDL and NARDL approaches are only applicable if there is a single cointegrating vector, otherwise the Johansen and Juselius (1990) method needs to be adopted. The NARDL model can be estimated by OLS and inference allows to differentiate between various types of asymmetries. The first type is reaction asymmetry, which is asymmetry of the long-run coefficients, i.e. $\beta^{+} \neq \beta^{-}$. The second type is impact asymmetry of the short-run coefficients on the first differences of the independent variables, i.e. $\Delta x^{+} \neq \Delta x^{-}$. The third type is dynamic adjustment asymmetry combining reaction and impact asymmetries in the error correction coefficient. This is also referred to as dynamic multiplier behaviour. In particular, the last type of asymmetry allows us to differentiate between the effects of positive and negative shocks. Accounting for asymmetric shocks which originate from the interest rate, money supply, real GDP and inflation expectations allows us to control for nonlinearities arising from UIP shocks (interest rate), output shocks (real GDP), monetary shocks (money supply) and central bank credibility shocks (inflation expectations). In order to gain a comprehensive view of the impact of central bank credibility shocks, we estimate two versions of the NARDL model in equation (7.6), which control for the impact of different types of expectations; one which includes a market-based measure of inflation expectations; and one which includes a survey measure.

7.3.3 Model Misspecification Tests

To test for the existence of a stable long-run relationship between the variables we use the dynamic Bounds testing procedure, which is valid regardless of whether the underlying regressors are $I(0)$ or $I(1)$. The Bounds test for the existence of an asymmetric long-run relationship is an F-test for the joint null $\rho = \theta^{+} = \theta^{-} = 0$, where ρ is the coefficient of the nonlinear error correction term in the NARDL model. The lower bound hypothesis is that all level regressors x_t^+ and x_t^- are $I(0)$ and there is therefore no cointegrating relationship between the variables whilst the upper bound hypothesis is that that all level regressors are $I(1)$ and a cointegrating relationship exists between the variables. The critical values for the test are provided by Pesaran et al. (2001); when the computed F-statistic exceeds the upper bound critical value then H_0 is rejected and there exists one cointegration relationship between the variables.

However, Pesaran and Shin (1998) argue that in small samples empirical critical values should be used for statistical inference. Therefore we perform a residual bootstrap to obtain empirical values and confidence intervals for the Bounds test F-statistic. These are generated by estimating an appropriate NARDL model with optimal lag length by means of OLS while excluding the coefficient values on the independent weakly exogenous variables, which imposes restrictions of the null hypothesis of no cointegration for the F-Test. This restricted model is estimated for the regressand while for the regressors an unrestricted NARDL model is estimated. The residuals of the models are saved, resampled with replacement and re-centred, which generates the bootstrap residuals (Goh et al., 2017). Afterwards, the models are estimated again using the bootstrap sample and the bootstrap t- and F-test statistics are generated. The above procedure is repeated 1000 times to compute an entire bootstrap distribution from which bootstrap critical values can be obtained according to:

$$c_{1-\alpha}^{*} = min\left\{c: \sum_{b=1}^{B} I(T_b^* > c) \leq \alpha\right\}$$

$$c_{\alpha}^{*} = max\left\{c: \sum_{b=1}^{B} I(T_b^* < c) \leq \alpha\right\} \quad (7.7)$$

where T_b^* is the bootstrap test statistic and α is the nominal level of the test (McNown et al., 2018). The null hypothesis is rejected if the F-test statistic for the restricted model is greater than $c_{1-\alpha}^{*}$ or the t-test statistic for the unrestricted model is less than c_{α}^{*}.

To assess model adequacy, we perform various diagnostic tests (Shin et al., 2014). The first one is the Wald test for the symmetry of the short- and long-run parameters. The test is used to examine the overall impact of the independent partial sum components on the real exchange rate and to check the structural stability of the short and long run coefficients in the model. We further test for serial correlation by using the Breusch-Godfrey LM test and for normality by using the Jarque-Bera test. We also test for the presence of ARCH effects by using the ARCH LM test and the Cumulative Sum (CUSUM) test for parameter constancy to check model adequacy in each case. Finally, we compare the in-sample and out-of-sample performance of the linear and the nonlinear ARDL models. In particular, we run rolling regressions with a 120-month window, using data over the period January 1993 – December 2020, and use the remaining 216 observations to produce out-of-sample forecasts. We then compute the mean squared prediction errors (MSPEs) of a 120-month rolling window 1-month ahead forecast with real-time data obtained for both specifications, where a lower MSPE indicates a better forecasting performance (see Clark and West, 2007). We follow the procedure proposed by Clark and West (2007), who construct a t-type statistic, which is asymptotically normal even for nested models. Under the null hypothesis, the two MSPEs are equal, whilst under the alternative, the MSPE of the restricted model is higher than that of the unrestricted model.

7.4 Data and Empirical Results

7.4.1 Data Description

We investigate five inflation targeting countries, namely the UK, Canada, Australia, New Zealand and Sweden; and three non-targeting economies, namely the US, the Euro-Area and

Switzerland (Neumann and Von Hagen, 2002). The data used for the estimations are monthly and span the time period from January 1993 until December 2020[12]. The interest rate series are obtained from the OECD (Organisation for Economic Co-operation and Development) and are the nominal short term rates, which are the monthly averages of daily three-month money market rates. All nominal exchange rate series are obtained from the Pacific Exchange Rate Service database. The money supply data are obtained from the OECD Broad Money (M3) series for all countries. The data obtained for the output series are volume estimates of real GDP in national currency and are retrieved from the Federal Reserve Bank of St Louis Economic Database. The real exchange rates series are effective CPI-based measures and are obtained from the BIS (Bank for International Settlements) Statistics Warehouse. All variables are transformed to their natural logarithm.

We use two measures of inflation expectations, one of which is a market-based measure and the other is a survey measure. As previously mentioned, the market-based measure of inflation expectations is derived from the yield curve. Specifically, we take the difference between nominal and inflation-indexed 10-year bond yields (the latter representing real forward interest rates), which is essentially the compensation demanded by investors to offset expected future inflation and any associated risks (Sack, 2000). Low volatility of this measure suggests that the inflation targeting framework has been successful in anchoring long-run inflation expectations. The data for the nominal 10-year government bond yields for all countries are obtained from the Federal Reserve Bank of St Louis Economic Database. The data for the 10-year inflation-indexed government bond yields are obtained from Bloomberg.

The second measure we use is based on quantitative rather than qualitative survey data. More precisely, we compute the monthly 12-months ahead mean inflation forecast. Unlike financial instrument-based measures, survey measures do not necessarily represent expectations on which agents are willing to act but have the advantage of being a more direct estimate of inflation expectations. Data for the survey measure of inflation expectations for inflation targeting countries are obtained from the respective central bank databases. Data for the UK was obtained from the Inflation Attitudes Survey published by the Bank of

[12] The official dates when inflation targeting was adopted in each country are as follows: UK – October 1992; Canada – February 1991; Australia – January 1993; New Zealand – December 1989; Sweden – January 1993. The time period 1993-2020 therefore captures the entire time range of the inflation targeting regime up until recently in these countries.

England; for Canada, the data was obtained from Canadian Survey of Consumer Expectations released by the Bank of Canada; for Australia, we use a survey measure of consumer expectations about increases in final prices for the 12-month ahead period published by the Reserve Bank of Australia; for New Zealand the series comes from the Monetary Conditions Survey published by the Reserve Bank of New Zealand; and for Sweden this series was obtained from the Survey of Inflation Expectations released by the Swedish Riksbank. Survey data for non-targeters (The United States, the Euro-Area and Switzerland) are obtained from the Federal Reserve Bank of St Louis Economic Database Consumer Opinion Survey of Future Tendency of Inflation.

Table 30 Unit Root Test Results for the Real Exchange Rate and Fundamental Differentials

	Level series	Differenced series	Level series	Differenced series
	Real Exchange Rate		**Interest Rate Differential**	
UK-Canada	-1.513	-4.306***	-2.432	-4.480***
UK-Australia	-1.463	-3.917***	-1.935	-4.249***
UK-New Zealand	-1.838	-4.881***	-1.446	-9.103***
UK-Sweden	-1.520	-4.225***	-2.586	-4.021***
Canada-Australia	-2.631	-13.277***	-1.492	-6.940***
Canada-New Zealand	-1.879	-10.871***	-2.118	-8.238***
Canada-Sweden	-1.773	-3.982***	-2.041	-8.851***
Australia-New Zealand	-2.681	-12.061***	-2.627	-6.884***
Australia-Sweden	-2.735	-3.286**	-2.455	-7.455***
New Zealand-Sweden	-2.691	-9.839***	-2.665	-9.155***
US-Euro Area	-1.879	-11.101***	-1.882	-6.364***
US-Switzerland	-1.925	-11.630***	-1.945	-4.652***
Euro Area-Switzerland	-2.146	-5.509***	-2.795	-4.935***
	Money Supply Differential		**Output Differential**	
UK-Canada	-0.984	-9.634***	-5.502***	-6.607***
UK-Australia	-1.110	-7.268***	-6.576***	-19.091***
UK-New Zealand	-0.655	-8.851***	-5.743***	-16.962***
UK-Sweden	-0.852	-7.599***	-10.740***	-15.026***
Canada-Australia	-0.909	-10.284***	-4.309***	-10.637***
Canada-New Zealand	-0.746	-11.425***	-6.089***	-9.686***
Canada-Sweden	-1.585	-12.257***	-3.084***	-5.493***
Australia-New Zealand	-0.999	-8.496***	-2.754***	-14.280***
Australia-Sweden	-1.197	-8.073***	-11.960***	-11.339***
New Zealand-Sweden	-1.807	-7.994***	-3.000***	-10.630***
US-Euro Area	-1.159	-11.289***	-5.891***	-16.538***
US-Switzerland	-0.794	-4.649***	-4.168***	-20.612***
Euro Area-Switzerland	-2.618	-10.572***	-6.031***	-19.613***

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.
DF-GLS Test Hypotheses:
H_0: variable contains a unit root
H_1: variable is stationary

As a first step, we test for the order of integration of all series using the DF-GLS test since, as already explained, variables of order higher than $I(1)$ cannot be included in an ARDL model. The results in Table 30 and Table 31 imply that real exchange rates, money supply and interest rate differentials are $I(1)$ while GDP and both inflation expectations measures are $I(0)$; therefore all variables can enter the model.

Table 31 Unit Root Test Results for Inflation Expectations Differentials

	Level series	Differenced series	Level series	Differenced series
	Market-based Inflation Expectations Differential		Survey-based Inflation Expectations Differential	
UK-Canada	-5.208***	-11.842***	-5.624***	-17.852***
UK-Australia	-3.907***	-14.935***	-5.807***	-9.894***
UK-New Zealand	-3.533***	-6.817***	-3.867***	-15.811***
UK-Sweden	-3.413**	-14.683***	-4.563***	-19.834***
Canada-Australia	-4.249***	-13.353***	-5.305***	-10.674***
Canada-New Zealand	-4.573***	-12.360***	-4.929***	-17.061***
Canada-Sweden	-3.453**	-15.358***	-6.074***	-18.256***
Australia-New Zealand	-3.084**	-12.489***	-4.684***	-14.222***
Australia-Sweden	-2.566**	-13.263***	-6.217***	-8.184***
New Zealand-Sweden	-3.368**	-12.715***	-3.114***	-9.317***
US-Euro Area	-3.582***	-10.790***	-3.823***	-13.857***
US-Switzerland	-3.757***	-11.429***	-5.006***	-9.780***
Euro Area-Switzerland	-4.185***	-11.272***	-6.889***	-14.252***

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.
DF-GLS Test Hypotheses:
H_0: variable contains a unit root
H_1: variable is stationary

7.4.2 Results for the Linear ARDL Model

The results for the linear ARDL model for inflation targeting countries are reported in Table 32 and Table 33 below. It can be seen that the error correction coefficient is not always significant, implying that only in some cases there exists a long-run relationship between the real exchange rate and fundamentals. The speed of adjustment is low and ranges between 1% and 3%. In the short run, positive changes in the money supply differential lead to a real exchange rate appreciation in the majority of cases. However, the real exchange rate depreciates in response to increases in the interest rate differential. Likewise, expectations of higher inflation rates cause the real exchange rate to depreciate, but this effect is not significant. The output differential is only significant in a few cases, when a higher differential leads to a depreciation of the real exchange rate. In the long run, most of the standard fundamentals and inflation expectation variables are insignificant, which implies that there is no long-run relationship linking the real exchange rate to fundamentals. The results for non-targeters are reported in Table 34. There are no strong observable differences compared to inflation targeting countries.

Table 32 Linear ARDL Model Results with Market Expectations for Inflation Targeting Countries

	GBPCAD	**GBPAUD**	**GBPNZD**	**GBPSEK**	**CADAUD**
α	0.0038	0.0031	0.0099	0.0007	0.0002
	(0.0033)	(0.0057)	(0.0188)	(0.0066)	(0.0028)
ecm_{t-1}	-0.0097	-0.0243*	-0.0107**	-0.0146***	-0.0279**
	(0.0089)	(0.0130)	(0.0046)	(0.0011)	(0.0129)
$\Delta\tilde{m}_{t-1}$	-0.3805**	-0.3077*	-0.1709	0.0156	-0.1569
	(0.1354)	(0.1689)	(0.1287)	(0.0920)	(0.1574)
$\Delta\tilde{x}_{t-1}$	0.0045	-0.0114*	0.0061	-0.0023	-0.0015
	(0.0045)	(0.0064)	(0.0083)	(0.0061)	(0.0032)
$\Delta\tilde{\imath}_{t-1}$	0.1007***	0.2530***	0.1323***	0.1183***	0.0856***
	(0.0209)	(0.0303)	(0.0270)	(0.0204)	(0.0218)
$\Delta\tilde{y}_{t-1}$	0.0118	0.0041	0.0027**	0.0085	0.0027
	(0.0070)	(0.0063)	(0.0012)	(0.0062)	(0.0048)
$\tilde{m}_{t-1}$	-0.0192*	0.0124	0.0123	-0.0174	-0.0044
	(0.0101)	(0.0102)	(0.0127)	(0.0125)	(0.0064)
$\tilde{x}_{t-1}$	0.0006	-0.0008	0.0061*	0.0048	0.0030
	(0.0027)	(0.0041)	(0.0033)	(0.0031)	(0.0022)
$\tilde{\imath}_{t-1}$	0.0074	0.0085	0.0088*	0.0041	0.0017
	(0.0056)	(0.0060)	(0.0048)	(0.0033)	(0.0032)
$\tilde{y}_{t-1}$	-0.0041	0.0030	-0.0040**	-0.0005	0.0003
	(0.0092)	(0.0088)	(0.0088)	(0.0086)	(0.0064)
$\bar{R}^2$	0.1073	0.1884	0.0670	0.0978	0.0649
	CADNZD	**CADSEK**	**AUDNZD**	**AUDSEK**	**NZDSEK**
α	-0.0092	-0.0019	-0.0495***	0.0095	0.0101
	(0.0156)	(0.0058)	(0.0159)	(0.0089)	(0.0255)
ecm_{t-1}	-0.0131	-0.0097	-0.0750***	-0.0602***	-0.0502***
	(0.0108)	(0.0078)	(0.0194)	(0.0210)	(0.0193)
$\Delta\tilde{m}_{t-1}$	0.0061	-0.1015	0.1450	0.0078	0.0648
	(0.1449)	(0.0831)	(0.1470)	(0.1113)	(0.0991)
$\Delta\tilde{x}_{t-1}$	0.0041	0.0034	-0.0003	-0.0016	0.0027
	(0.0039)	(0.0037)	(0.0066)	(0.0047)	(0.0050)
$\Delta\tilde{\imath}_{t-1}$	0.0535**	0.0199	0.1051***	0.0558**	0.0252
	(0.0235)	(0.0151)	(0.0300)	(0.0222)	(0.0202)
$\Delta\tilde{y}_{t-1}$	0.0034**	0.0031	0.0138**	0.0082	0.0012
	(0.0016)	(0.0053)	(0.0060)	(0.0054)	(0.0066)
$\tilde{m}_{t-1}$	-0.0326	-0.0233*	0.0146	0.0200*	0.0409***
	(0.0276)	(0.0129)	(0.0113)	(0.0121)	(0.0204)
$\tilde{x}_{t-1}$	0.0024	0.0036	-0.0027	0.0019	0.0026
	(0.0022)	(0.0022)	(0.0029)	(0.0023)	(0.0022)
$\tilde{\imath}_{t-1}$	-0.0004	0.0033	0.0176*	0.0007	0.0007
	(0.0042)	(0.0022)	(0.0092)	(0.0039)	(0.0036)
$\tilde{y}_{t-1}$	0.0035***	0.0018	0.0232***	0.0122	0.0015***
	(0.0007)	(0.0075)	(0.0087)	(0.0076)	(0.0003)
$\bar{R}^2$	0.0180	0.0171	0.0655	0.0378	0.0524

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Table 33 Linear ARDL Model Results with Survey Expectations for Inflation Targeting Countries					
	GBPCAD	**GBPAUD**	**GBPNZD**	**GBPSEK**	**CADAUD**
α	0.0050	0.0039	0.0004	0.0015	-0.0001
	(0.0034)	(0.0051)	(0.0186)	(0.0067)	(0.0029)
ecm_{t-1}	-0.0130	-0.0318**	-0.0264**	-0.0186***	-0.0336**
	(0.0092)	(0.0133)	(0.0135)	(0.0012)	(0.0167)
$\Delta\widetilde{m}_{t-1}$	-0.3724***	-0.3044*	-0.2821**	-0.0053	-0.1685
	(0.1352)	(0.1678)	(0.1280)	(0.0090)	(0.1585)
$\Delta\tilde{x}_{t-1}$	-0.0019	0.0012	0.0021	0.0033	-0.0002
	(0.0019)	(0.0027)	(0.0027)	(0.0027)	(0.0017)
$\Delta\tilde{\imath}_{t-1}$	0.1046***	0.2579***	0.1182***	0.1209***	0.0926***
	(0.0207)	(0.0302)	(0.0268)	(0.0205)	(0.0213)
$\Delta\tilde{y}_{t-1}$	0.0114	0.0043	0.0033	0.0082	0.0028
	(0.0070)	(0.0063)	(0.0079)	(0.0062)	(0.0048)
$\widetilde{m}_{t-1}$	-0.0200**	0.0166*	0.0109	-0.0077	-0.0056
	(0.0099)	(0.0104)	(0.0132)	(0.0112)	(0.0069)
$\tilde{x}_{t-1}$	-0.0007	-0.0049	-0.0040	-0.0001	-0.0002
	(0.0017)	(0.0032)	(0.0028)	(0.0030)	(0.0016)
$\tilde{\imath}_{t-1}$	0.0089	0.0079	0.0110*	0.0047	0.0033
	(0.0056)	(0.0048)	(0.0059)	(0.0033)	(0.0032)
$\tilde{y}_{t-1}$	-0.0048	0.0045	0.0015**	0.0005	0.0007
	(0.0092)	(0.0087)	(0.0006)	(0.0087)	(0.0064)
$\bar{R}^2$	0.1071	0.1968	0.07339	0.0956	0.0567
	CADNZD	**CADSEK**	**AUDNZD**	**AUDSEK**	**NZDSEK**
α	-0.0094	-0.0032	-0.0447***	0.0095	-0.0004
	(0.0159)	(0.0058)	(0.0154)	(0.0090)	(0.0257)
ecm_{t-1}	-0.0214**	-0.0105	-0.0796***	-0.0587***	-0.0821***
	(0.0108)	(0.0081)	(0.0192)	(0.0207)	(0.0204)
$\Delta\widetilde{m}_{t-1}$	-0.0315	-0.1080	0.1383	0.0066	-0.0108
	(0.1464)	(0.0831)	(0.1454)	(0.1098)	(0.0974)
$\Delta\tilde{x}_{t-1}$	-0.0002	-0.0008	0.0011	-0.0007	-0.0029
	(0.0022)	(0.0020)	(0.0027)	(0.0036)	(0.0040)
$\Delta\tilde{\imath}_{t-1}$	0.0589**	0.0235	0.0996***	0.0607***	0.0296
	(0.0233)	(0.0149)	(0.0298)	(0.0220)	(0.0198)
$\Delta\tilde{y}_{t-1}$	0.0040	0.0030	0.0136**	0.0081	-0.0012
	(0.0066)	(0.0054)	(0.0058)	(0.0054)	(0.0066)
$\widetilde{m}_{t-1}$	-0.0473	-0.0260**	0.0147	0.0180	0.0492**
	(0.0272)	(0.0127)	(0.0113)	(0.0121)	(0.0200)
$\tilde{x}_{t-1}$	-0.0023	0.0005	-0.0052**	-0.0038	-0.0132***
	(0.0019)	(0.0018)	(0.0025)	(0.0044)	(0.0037)
$\tilde{\imath}_{t-1}$	0.0017	0.0039*	0.0176*	0.0012	0.0044
	(0.0041)	(0.0023)	(0.0091)	(0.0038)	(0.0036)
$\tilde{y}_{t-1}$	0.0028	0.0014	0.0188**	0.0128	-0.0037
	(0.0078)	(0.0075)	(0.0084)	(0.0077)	(0.0089)
$\bar{R}^2$	0.0154	0.0097	0.0793	0.0376	0.0467

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Table 35 reports some diagnostic tests. The presence of serial correlation cast doubts on the data congruence of the model and partially motivate our subsequent estimation of a nonlinear model.

Table 34 Linear ARDL Model Results for Non-Targeting Countries						
	Market Expectations			Survey Expectations		
	USDEUR	USDCHF	EURCHF	USDEUR	USDCHF	EURCHF
α	-0.0057	0.0948**	-0.0735***	0.0003	0.1042**	-0.0837**
	(0.0060)	(0.0366)	(0.0263)	(0.0069)	(0.0369)	(0.0264)
ecm_{t-1}	-0.0159*	-0.0079**	-0.0110	-0.0109**	-0.0137*	-0.0135**
	(0.0089)	(0.0044)	(0.0067)	(0.0054)	(0.0078)	(0.0062)
$\Delta\tilde{m}_{t-1}$	0.0638	-0.4017**	0.1510	0.1044	-0.3504**	0.0877
	(0.2048)	(0.1690)	(0.1073)	(0.2095)	(0.1676)	(0.1067)
$\Delta\tilde{x}_{t-1}$	-0.0224**	-0.0040	-0.0026	0.0001	0.0033	-0.0012
	(0.010)	(0.0101)	(0.0055)	(0.0035)	(0.0026)	(0.0016)
$\Delta\tilde{\imath}_{t-1}$	0.0281	-0.0128	-0.0410***	0.0192	-0.0146	-0.0416***
	(0.0204)	(0.0081)	(0.0067)	(0.0208)	(0.0082)	(0.0069)
$\Delta\tilde{y}_{t-1}$	0.0047	-0.0084	0.0127	0.0044	-0.0083	0.0093
	(0.0085)	(0.0068)	(0.0065)	(0.0087)	(0.0069)	(0.0065)
$\tilde{m}_{t-1}$	-0.0023	-0.0227**	-0.0048	-0.0206	-0.0230**	0.0059
	(0.0193)	(0.0103)	(0.0064)	(0.0198)	(0.0110)	(0.0065)
$\tilde{x}_{t-1}$	0.0104**	0.0105*	0.0036	0.0051	0.0043	0.0039*
	(0.0048)	(0.0041)	(0.0028)	(0.0023)	(0.0034)	(0.0016)
$\tilde{\imath}_{t-1}$	0.0006	0.0033*	-0.0012	0.0030	0.0036**	0.0023
	(0.0030)	(0.0016)	(0.0032)	(0.0030)	(0.0017)	(0.0034)
$\tilde{y}_{t-1}$	0.0068	-0.0145	0.0299***	0.0079	-0.0152	0.0252***
	(0.0114)	(0.0092)	(0.0084)	(0.0117)	(0.0093)	(0.0087)
$\bar{R}^2$	0.0250	0.0472	0.1371	0.0111	0.0274	0.1414

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Table 35 ARDL Model Misspecification Tests						
	Model using Market-based Inflation Expectations			Model using Survey-based Inflation Expectations		
	Breusch-Pagan Test	Breusch-Godfrey Test	Wald Test	Breusch-Pagan Test	Breusch-Godfrey Test	Wald Test
GBPCAD	0.1569	0.0013***	0.9707	0.2024	0.0013***	0.9614
GBPAUD	0.0000***	0.0090***	0.9432	0.0000***	0.0056***	0.7718
GBPNZD	0.0240**	0.0124**	0.8333	0.0244**	0.0023***	0.8975
GBPSEK	0.6711	0.1443	0.8904	0.4467	0.0590*	0.9851
CADAUD	0.0098***	0.0021***	0.8592	0.0221**	0.0010***	0.9444
CADNZD	0.1546	0.0005***	0.865	0.3022	0.0010***	0.68
CADSEK	0.8878	0.0370**	0.5978	0.8617	0.0313**	0.8302
AUDNZD	0.1153	0.0000***	0.1129	0.0247**	0.0000***	0.0376**
AUDSEK	0.2895	0.0000***	0.4271	0.2837	0.0000***	0.5033
NZDSEK	0.8948	0.0000***	0.4641	0.791	0.0000***	0.0369**
USDEUR	0.0859*	0.0000***	0.8261	0.0037***	0.0000***	0.8157
USDCHF	0.214	0.0004***	0.1182	0.3119	0.0011***	0.4248
EURCHF	0.0002***	0.0003***	0.0686*	0.0007***	0.0003***	0.0395**

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. P-values reported for all.

Breusch-Pagan Test for Heteroscedasticity:	Breusch-Godfrey LM Test for serial correlation:	Wald F-Test for weak exogeneity:
$H_0: homoscedastic\ errors$	$H_0: no\ serial\ correlation$	$H_0: no\ endogeneity$
$H_1: heteroscedastic\ errors$	$H_1: serial\ correlation$	$H_1: weak\ endogenity$

7.4.3 Results for the NARDL (Nonlinear ARDL) Model

The estimates of the NARDL specifications including market- and survey-based inflation expectations in turn are reported in Table 36 and Table 37 respectively for inflation targeting countries; and in Table 38**Error! Reference source not found.** for non-targeters. It appears that when nonlinearities are taken into account, evidence can be obtained of mean reversion to a long-run relationship between the real exchange rate and key fundamentals as implied by the negative and significant coefficient on the adjustment term ecm_{t-1}. As for the short-run dynamics, in cases when the estimated coefficients are significant, they indicate that both positive and negative money supply and output changes lead to a real exchange rate appreciation, while both positive and negative interest rate changes lead to an exchange rate depreciation. This finding confirms the presence of short-run asymmetric effects of these variables.

Unlike in the linear ARDL, the inflation expectation differential now also plays a role and has an asymmetric effect; more precisely, only positive inflation expectation changes are significant and cause an appreciation of the real exchange rate. In other words, deviations from PPP occur only when the market expects inflation to be higher than the target rate in the future, i.e. when the central bank lacks credibility. A positive (negative) sign for the coefficient on the negative (positive) partial sum component means that convergence (divergence) between expected future inflation between the two countries will lead to a depreciation (appreciation) of the real exchange rate. For most exchange rates, changes in inflation expectations lead to an appreciation regardless of whether inflation expectations converge or not. Furthermore, only one of the partial sum components has a significant short-run effect. Finally, the adjustment speed ranges between 9% and 27% and is therefore up to nine times faster than in the linear ARDL models and slightly faster in the model including survey-based expectations.

The results for non-targeting economies show that the adjustment term ecm_{t-1} ranges between 21% and 32% and is therefore slightly larger than for the inflation targeting countries. This indicates that deviations from PPP are less persistent and mean reversion occurs at a faster rate for non-targeters. Thus, it seems that macroeconomic shocks, including those arising from changes in inflation expectations, are related to a faster traverse of adjustment to PPP than in inflation targeting countries. This suggests that monetary policy in non-targeting countries generates more flexibility for the real exchange rate to revert to its mean after the occurrence of a shock, which stands in contrast to the findings of previous studies (Ding and Kim, 2012). There is less evidence for a significant effect of fundamentals and inflation expectations on the real exchange rate in non-targeting economies, which suggests that they are less important in those countries.

Table 36 NARDL Model Results with Market Expectations for Inflation Targeting Countries

	GBPCAD	GBPAUD	GBPNZD	GBPSEK	CADAUD	CADNZD	CADSEK	AUDNZD	AUDSEK	NZDSEK
α	0.0106*	0.0016	0.0095**	-0.0003	0.0021	0.0020	-0.0016	-0.0202***	-0.0048	0.0012
	(0.0063)	(0.0059)	(0.0048)	(0.0047)	(0.0038)	(0.0047)	(0.0032)	(0.0051)	(0.0050)	(0.0041)
ecm_{t-1}	-0.1675***	-0.1343**	-0.1228**	-0.0928**	-0.1772***	-0.1883***	-0.0997**	-0.2753***	-0.2161***	-0.2104***
	(0.0529)	(0.0522)	(0.0555)	(0.0452)	(0.0569)	(0.0563)	(0.0457)	(0.0548)	(0.0540)	(0.0557)
Δq_{t-1}	-0.2226***	-0.2737***	-0.1373*	-0.158**	-0.3174***	-0.1730**	-0.1835**	-0.3479***	-0.4415***	-0.2614***
	(0.0801)	(0.0783)	(0.0825)	(0.0797)	(0.0834)	(0.0865)	(0.0819)	(0.0843)	(0.0811)	(0.0848)
$\Delta\tilde{m}^{+}_{t-1}$	-0.3143**	-0.2160**	-0.0863	0.1103	-0.1182	-0.0080	-1.1809	0.1854	-0.0919	-1.1516
	(0.1456)	(0.1168)	(0.1375)	(0.1310)	(0.1634)	(0.1584)	(0.7533)	(0.5691)	(0.1742)	(1.3939)
$\Delta\tilde{m}^{-}_{t-1}$	-0.6283**	-2.2698**	-0.3929	-0.1012	0.1568	0.0480	-0.0854	0.2504*	-0.0055	0.0848
	(0.2878)	(1.0270)	(0.3344)	(0.1351)	(0.7682)	(0.4802)	(0.0847)	(0.1473)	(0.1066)	(0.0974)
$\Delta\tilde{x}^{+}_{t-1}$	0.0052**	-0.0063***	-0.0016**	0.0025	-0.0003	0.0002	0.0093**	-0.0075***	0.0011***	0.0089***
	(0.0025)	(0.0012)	(0.0008)	(0.0072)	(0.0093)	(0.0095)	(0.0047)	(0.0009)	(0.0001)	(0.0035)
$\Delta\tilde{x}^{-}_{t-1}$	-0.0083	-0.0175*	0.0175	-0.0086	-0.0023	0.0030	0.0006	0.0025	-0.0023	-0.0020**
	(0.0150)	(0.0103)	(0.0152)	(0.0127)	(0.0038)	(0.0046)	(0.0045)	(0.0104)	(0.0078)	(0.0008)
$\widetilde{\Delta i}^{+}_{t-1}$	0.1140***	0.1055**	0.0275	0.1107***	0.0303	0.0039	0.0442**	0.2275***	0.0726**	0.0283
	(0.0294)	(0.0515)	(0.0604)	(0.0246)	(0.0154)	(0.0657)	(0.0209)	(0.0674)	(0.0239)	(0.0215)
$\Delta\tilde{i}^{-}_{t-1}$	0.0859**	0.3008***	0.1562***	0.1291***	0.0945***	0.0609**	0.0132	0.0569	-0.0079	-0.0122
	(0.0333)	(0.0387)	(0.0326)	(0.0451)	(0.0255)	(0.0261)	(0.0228)	(0.0338)	(0.0685)	(0.0606)
$\Delta\tilde{y}^{+}_{t-1}$	0.0287**	0.0070	0.0028	0.0283***	-0.0003	0.0049	0.0046	-0.0026	-0.0031	-0.0019
	(0.0118)	(0.0079)	(0.0133)	(0.0084)	(0.0057)	(0.0111)	(0.0077)	(0.0076)	(0.0077)	(0.0091)
$\Delta\tilde{y}^{-}_{t-1}$	-0.0072	-0.0136	0.0006	-0.0065	0.0318	-0.0046	0.0003	0.0119	0.0062	-0.0072
	(0.0115)	(0.0263)	(0.0117)	(0.0093)	(0.0261)	(0.0104)	(0.0079)	(0.0086)	(0.0078)	(0.0100)
$\tilde{m}^{+}_{t-1}$	-0.0517***	0.0178	0.0017	-0.0103**	-0.0037**	-0.0301	-0.4634**	0.2881	-0.8196	0.9435
	(0.0178)	(0.0112)	(0.01399)	(0.0048)	(0.0016)	(0.0314)	(0.5929)	(0.1877)	(0.7964)	(0.9674)
$\tilde{m}^{-}_{t-1}$	0.0674*	0.1641	0.2589**	-0.0129	-0.0309	0.1893	-0.0205	-0.0168**	0.0095	0.0382*
	(0.0367)	(0.6251)	(0.1090)	(0.0259)	(0.2364)	(0.2337)	(0.0143)	(0.0069)	(0.0127)	(0.0207)
$\tilde{x}^{+}_{t-1}$	0.0004	0.0105**	0.0036**	0.0038**	0.0010	0.0031**	0.0037	0.0066**	0.0046	0.0076**
	(0.0033)	(0.0046)	(0.0015)	(0.0014)	(0.0054)	(0.0014)	(0.0063)	(0.0032)	(0.0039)	(0.0030)
$\tilde{x}^{-}_{t-1}$	0.0077	-0.0131*	0.0061	0.0060	0.0037	0.0004	0.0030	-0.0003	0.0022	0.0013
	(0.0078)	(0.0076)	(0.0099)	(0.0074)	(0.0028)	(0.0032)	(0.0033)	(0.0060)	(0.0043)	(0.0043)
$\tilde{i}^{+}_{t-1}$	0.0059	0.0048	-0.0208	0.0007	-0.0036	-0.0134	0.0022	0.0430**	0.0065	0.0011
	(0.0085)	(0.0261)	(0.0323)	(0.0066)	(0.0155)	(0.0299)	(0.0034)	(0.0195)	(0.0044)	(0.0042)
$\tilde{i}^{-}_{t-1}$	0.0220*	0.0090	0.0148**	0.0110	0.0026	0.0009	0.0093	0.0024	-0.0098	-0.0134
	(0.0117)	(0.0062)	(0.0062)	(0.0114)	(0.0040)	(0.0058)	(0.0076)	(0.0138)	(0.0127)	(0.0203)
$\tilde{y}^{+}_{t-1}$	0.0349**	0.0014	-0.0063	0.0313***	-0.0027	-0.0109	0.0009	-0.0038	-0.0095	0.0005
	(0.0170)	(0.0112)	(0.0177)	(0.0116)	(0.0078)	(0.0161)	(0.0108)	(0.0110)	(0.0116)	(0.0134)
$\tilde{y}^{-}_{t-1}$	-0.0458***	0.0019	-0.0056	-0.0006	0.0322	0.0051	0.0068	0.0169	0.0149	-0.0251**
	(0.0159)	(0.0377)	(0.0175)	(0.0126)	(0.0364)	(0.0157)	(0.0105)	(0.0122)	(0.0105)	(0.0122)
$\bar{R}^2$	0.1736	0.2095	0.1330	0.1169	0.1081	0.0359	0.0467	0.1308	0.0638	0.0622

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Table 37 NARDL Model Results with Survey Expectations for Inflation Targeting Countries										
	GBPCAD	**GBPAUD**	**GBPNZD**	**GBPSEK**	**CADAUD**	**CADNZD**	**CADSEK**	**AUDNZD**	**AUDSEK**	**NZDSEK**
α	0.0087	0.0026	0.0096**	0.0030	0.0064	-0.0030	-0.0017	-0.0232***	-0.0059	0.0108**
	(0.0062)	(0.0057)	(0.0047)	(0.0046)	(0.0043)	(0.0045)	(0.0033)	(0.0051)	(0.0049)	(0.0051)
ecm_{t-1}	-0.1748**	-0.1663***	-0.1370**	-0.1049**	-0.1857***	-0.1799***	-0.1039**	-0.2502***	-0.2353***	-0.2361***
	(0.0527)	(0.0526)	(0.0538)	(0.04387)	(0.0547)	(0.0568)	(0.0454)	(0.0547)	(0.0541)	(0.0555)
Δq_{t-1}	-0.2328***	-0.3014***	-0.1074	-0.1534*	-0.3112***	-0.1582	-0.1892**	-0.3131***	-0.4513***	-0.2627***
	(0.0798)	(0.0788)	(0.0810)	(0.0797)	(0.0831)	(0.0865)	(0.0821)	(0.0846)	(0.0821)	(0.0854)
$\Delta\tilde{m}^{+}_{t-1}$	-0.3191**	-0.1655	-0.1472	0.0921	-0.0877	-0.0437	-1.2219**	0.2523	-0.0057	-1.3037
	(0.1453)	(0.1671)	(0.1355)	(0.1282)	(0.1628)	(0.1602)	(0.5787)	(0.5673)	(0.7467)	(1.3834)
$\Delta\tilde{m}^{-}_{t-1}$	-0.5893**	-3.3581***	-1.1679***	-0.1333	0.0792	-0.2023	-0.0725	0.2195	0.0130	-0.0045
	(0.2839)	(1.2218)	(0.4174)	(0.1355)	(0.7621)	(0.5516)	(0.0837)	(0.1594)	(0.1058)	(0.1010)
$\Delta\tilde{x}^{+}_{t-1}$	0.0015	-0.0063**	-0.0055**	0.0033	-0.0030***	0.0019	0.0002	0.0190**	0.0070**	-0.0007
	(0.0026)	(0.0024)	(0.0026)	(0.0060)	(0.0013)	(0.0091)	(0.0051)	(0.0094)	(0.0032)	(0.0047)
$\Delta\tilde{x}^{-}_{t-1}$	-0.0045	0.0044	0.0015	0.0040	-0.0005	-0.0008	-0.0012**	-0.0034	-0.0097	-0.0269
	(0.0033)	(0.0044)	(0.0032)	(0.0038)	(0.0025)	(0.0026)	(0.0005)	(0.0035)	(0.0060)	(0.0183)
$\widetilde{\Delta i}^{+}_{t-1}$	0.1190***	0.1170**	0.0161	0.1177***	0.0288	-0.0040	0.0467**	0.2126***	0.0802***	0.0304
	(0.0287)	(0.0495)	(0.0585)	(0.0249)	(0.0503)	(0.0659)	(0.0212)	(0.0691)	(0.0237)	(0.0225)
$\Delta\tilde{i}^{-}_{t-1}$	0.0879***	0.3089***	0.1443***	0.1358***	0.0999***	0.0628**	0.0143	0.0480	-0.0208	0.0048
	(0.0334)	(0.0406)	(0.0327)	(0.0449)	(0.0252)	(0.0261)	(0.0227)	(0.0339)	(0.0683)	(0.0600)
$\Delta\tilde{y}^{+}_{t-1}$	0.0287**	0.0069	0.0016	0.0259***	0.0006	0.0052	0.0045	-0.0006	-0.0032	-0.0020
	(0.0118)	(0.0079)	(0.0130)	(0.0084)	(0.0057)	(0.0110)	(0.0076)	(0.0077)	(0.0077)	(0.0092)
$\Delta\tilde{y}^{-}_{t-1}$	-0.0074	-0.0104	0.0055	-0.0067	0.0307	-0.0028	0.0008	0.0138	0.0060	-0.0071
	(0.0114)	(0.0262)	(0.0117)	(0.0093)	(0.0260)	(0.0105)	(0.0078)	(0.0088)	(0.0078)	(0.0100)
$\tilde{m}^{+}_{t-1}$	-0.0566***	0.0215**	0.0067	0.0075	-0.0105*	-0.0390	-0.5127***	0.3469*	-0.7858	0.1191
	(0.0186)	(0.0106)	(0.0143)	(0.0252)	(0.0061)	(0.0301)	(0.0963)	(0.1868)	(0.7959)	(0.9430)
$\tilde{m}^{-}_{t-1}$	0.0642*	0.0460	0.2999***	-0.0040	-0.0511**	0.1837	-0.0200	-0.0044***	0.0094	0.0523**
	(0.0379)	(0.642)	(0.1031)	(0.0263)	(0.0233)	(0.2422)	(0.0140)	(0.0010)	(0.0127)	(0.0205)
$\tilde{x}^{+}_{t-1}$	0.0026**	-0.0088**	0.0023	-0.0065	-0.0125**	0.0068***	0.0006	0.0157	0.0013	-0.0151***
	(0.0012)	(0.0044)	(0.0079)	(0.0055)	(0.0049)	(0.0012)	(0.0072)	(0.0105)	(0.0080)	(0.0047)
$\tilde{x}^{-}_{t-1}$	-0.0031*	-0.0054*	-0.0100**	0.0048	0.0032	-0.0032	-0.0002	-0.0115***	-0.0102	-0.0178
	(0.0011)	(0.0029)	(0.0039)	(0.0051)	(0.0022)	(0.0022)	(0.0021)	(0.0038)	(0.0076)	(0.0236)
$\tilde{i}^{+}_{t-1}$	0.0124	0.0223*	-0.0214	0.0001	-0.0112	-0.0187	0.0014	0.0308*	0.0067*	0.0034
	(0.0079)	(0.0129)	(0.0292)	(0.0063)	(0.0167)	(0.0295)	(0.0034)	(0.0181)	(0.0040)	(0.0042)
$\tilde{i}^{-}_{t-1}$	0.0197*	0.0044**	0.0203***	0.0129	0.0046*	0.0038	0.0138*	0.0074	-0.0070	0.0349
	(0.0118)	(0.0018)	(0.0064)	(0.0111)	(0.0024)	(0.0056)	(0.0072)	(0.0118)	(0.0122)	(0.0217)
$\tilde{y}^{+}_{t-1}$	0.0339**	0.0059	-0.0019	0.0278**	-0.0026	-0.0117	0.0012	-0.0021	-0.0117	-0.0104
	(0.0170)	(0.0111)	(0.0175)	(0.0116)	(0.0076)	(0.0161)	(0.0108)	(0.0111)	(0.0116)	(0.0133)
$\tilde{y}^{-}_{t-1}$	-0.0472***	0.0016	0.0012	-0.0008	0.0328	0.0073	0.0069	0.0179**	0.0073	0.0161
	(0.0159)	(0.0378)	(0.0173)	(0.0124)	(0.0362)	(0.0157)	(0.0105)	(0.0082)	(0.0105)	(0.013)
$\bar{R}^2$	0.1965	0.2138	0.1252	0.1160	0.1004	0.0329	0.0392	0.1617	0.0529	0.0540

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Table 38 NARDL Model Results for Non-Targeting Countries						
	Market Expectations			Survey Expectations		
	USDEUR	**USDCHF**	**EURCHF**	**USDEUR**	**USDCHF**	**EURCHF**
α	0.0041	-0.0018	0.0014	0.0088	0.0037	0.0052**
	(0.0078)	(0.0047)	(0.0022)	(0.0088)	(0.0035)	(0.0025)
ecm_{t-1}	-0.3241***	-0.2087***	-0.2650***	-0.3190***	-0.2277***	-0.2925***
	(0.0564)	(0.0576)	(0.0563)	(0.0574)	(0.0587)	(0.0609)
Δq_{t-1}	-0.4164***	-0.2709***	-0.3812***	-0.4310***	-0.2927***	-0.4184***
	(0.0901)	(0.0879)	(0.0857)	(0.0915)	(0.0897)	(0.0950)
$\Delta\widetilde{m}_{t-1}^{+}$	-0.3894	-0.5056**	-0.0783	-0.4379	-0.5213**	-0.1340
	(0.3822)	(0.2564)	(0.1791)	(0.3860)	(0.2603)	(0.1754)
$\Delta\widetilde{m}_{t-1}^{-}$	-0.0094	-0.5309	0.4895**	0.1094	-0.3322	0.4230**
	(0.2453)	(0.3805)	(0.2080)	(0.2473)	(0.3812)	(0.2066)
$\Delta\tilde{x}_{t-1}^{+}$	-0.0134	-0.0068	-0.0089	0.0116**	-0.0052	-0.0083
	(0.0106)	(0.0118)	(0.0083)	(0.0054)	(0.0043)	(0.0083)
$\Delta\tilde{x}_{t-1}^{-}$	-0.0005	0.0361	0.0015	-0.0043	0.0049	-0.0035
	(0.0368)	(0.0342)	(0.0088)	(0.0074)	(0.0063)	(0.0022)
$\widetilde{\Delta\iota}_{t-1}^{+}$	-0.0453	-0.0169**	-0.0605***	-0.0457	-0.0178**	-0.0659***
	(0.0277)	(0.0083)	(0.0078)	(0.0278)	(0.0083)	(0.0083)
$\Delta\tilde{\iota}_{t-1}^{-}$	0.0860***	0.1060	0.0158	0.0829**	0.0490	0.0218
	(0.0329)	(0.1403)	(0.0144)	(0.0337)	(0.1398)	(0.0145)
$\Delta\tilde{y}_{t-1}^{+}$	0.0011	-0.0107	-0.0018	0.0002	-0.0064	-0.0066
	(0.0084)	(0.0108)	(0.0098)	(0.0085)	(0.0108)	(0.0097)
$\Delta\tilde{y}_{t-1}^{-}$	0.2046	-0.0017	0.0040	0.2289	-0.0022	0.0068
	(0.2511)	(0.0101)	(0.0093)	(0.2529)	(0.0101)	(0.0092)
$\widetilde{m}_{t-1}^{+}$	-0.0229	-0.4107	0.1410	-0.0390	-0.2473	0.0405
	(0.0340)	(0.2903)	(0.2484)	(0.0360)	(0.2854)	(0.2445)
$\widetilde{m}_{t-1}^{-}$	0.0612	-0.3356	0.2414	0.0694	-0.1703	0.1913
	(0.0471)	(0.5188)	(0.2704)	(0.0474)	(0.5162)	(0.2663)
$\tilde{x}_{t-1}^{+}$	0.0077	0.0047	0.0020	0.0210**	-0.0088	-0.0091
	(0.0056)	(0.0054)	(0.0042)	(0.0088)	(0.0072)	(0.0114)
$\tilde{x}_{t-1}^{-}$	0.0200	0.0510**	0.0030	-0.0006	0.0057	0.0035**
	(0.0335)	(0.0255)	(0.0057)	(0.0035)	(0.0076)	(0.0016)
$\tilde{\iota}_{t-1}^{+}$	0.0008	0.0018	-0.0586***	0.0026	0.0009	-0.0528***
	(0.0043)	(0.0017)	(0.0115)	(0.0046)	(0.0017)	(0.0120)
$\tilde{\iota}_{t-1}^{-}$	0.0067	-0.0020	0.0022	0.0103	0.0125	0.0108
	(0.0081)	(0.0253)	(0.0205)	(0.0078)	(0.0239)	(0.0200)
$\tilde{y}_{t-1}^{+}$	0.0021	-0.0219	-0.0047	0.0019	-0.0157	-0.0044
	(0.0116)	(0.0146)	(0.0135)	(0.0116)	(0.0145)	(0.0133)
$\tilde{y}_{t-1}^{-}$	0.1668	-0.0007	0.0074	0.2076	-0.0019	0.0059
	(0.3597)	(0.0147)	(0.0133)	(0.3611)	(0.0146)	(0.0131)
$\bar{R}^2$	0.0647	0.0437	0.1893	0.0394	0.0599	0.1953

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Table 39 and Table 40 report the long-run asymmetric coefficients associated with positive and negative changes in the independent variables for inflation-targeters and non-targeters, respectively. It can be seen that positive (negative) money supply shocks have a negative (positive) impact, with the negative multipliers being greater than the positive ones. Both positive and negative interest rate shocks, which represent UIP shocks, have a positive effect. Also, both types of inflation expectation shocks cause an exchange rate appreciation, while the effect of positive and negative output shocks on the real exchange rate varies. Finally, negative shocks to fundamentals or inflation expectations have a greater impact than positive ones, which is consistent with the evidence reported by other studies on the presence of asymmetries (Holmes and Wang, 2006). Contrary to most other studies (Zhou, 1995), we find supportive evidence for the long run impact of monetary shocks (Fisher and Huh, 2002). On the whole, money supply has the largest long-run effects, but output, UIP and inflation expectation shocks also have a significant impact on real exchange rate deviations from PPP and the adjustment process to the PPP equilibrium. In addition, changes in survey-based expectations have a more sizable impact than those in market-based ones. In the case of non-targeting economies, only some coefficients are significant, providing substantially less evidence for a long run impact of shocks to fundamentals on the real exchange rate than in inflation targeting countries.

Table 39 Long Run Asymmetries in Inflation Targeting Countries

Market Expectations					
	GBPCAD	**GBPAUD**	**GBPNZD**	**GBPSEK**	**CADAUD**
$L\tilde{m}^+$	-7.6591667***	-12.472564***	-4.116098**	-6.03784***	-3.962200***
$L\tilde{m}^-$	22.7937058***	116.833243***	16.135259**	5.11274***	4.608256***
$L\tilde{\imath}^+$	2.6087083***	6.596803***	0.890035**	5.45248***	1.007207***
$L\tilde{\imath}^-$	2.3465314***	18.597831***	7.393748**	5.99089***	2.471350***
$L\tilde{x}^+$	-0.132555**	0.150138***	-0.039459***	-0.094886***	-0.019247***
$L\tilde{x}^-$	0.138649**	-0.139336***	-0.044322***	0.099620***	-0.011082***
$L\tilde{y}^+$	0.6571159***	0.305602***	0.218681**	1.31388***	0.017192***
$L\tilde{y}^-$	-0.1252707***	-0.692689***	0.022153**	-0.33370***	0.700369***
	CADNZD	**CADSEK**	**AUDNZD**	**AUDSEK**	**NZDSEK**
$L\tilde{m}^+$	-5.77682*	-87.785981**	-0.7984895***	-10.606197**	6.235738***
$L\tilde{m}^-$	9.38647*	1.725676**	1.8116616***	0.229855***	0.563278***
$L\tilde{\imath}^+$	-0.67945*	0.347322**	2.1195480***	0.107705***	0.019645***
$L\tilde{\imath}^-$	0.34211*	0.792638**	0.6228775***	-0.224435***	-0.458710***
$L\tilde{x}^+$	-0.073608**	-0.007402***	-0.040286***	-0.043744***	0.0579240***
$L\tilde{x}^-$	-0.068810**	-0.010273***	0.035626***	-0.048025***	-0.1218487***
$L\tilde{y}^+$	0.53348*	0.264927**	-0.0376514***	-0.082738***	0.035550***
$L\tilde{y}^-$	-0.22192*	-0.098602**	0.0854952***	0.165901***	-0.025944***
Survey Expectations					
	GBPCAD	**GBPAUD**	**GBPNZD**	**GBPSEK**	**CADAUD**
$L\tilde{m}^+$	-5.582271**	-6.874874***	-2.533705***	2.359674***	-3.980913***
$L\tilde{m}^-$	21.046177**	77.866348***	20.541685***	3.826521***	4.340526***
$L\tilde{\imath}^+$	2.337193**	4.261298***	0.424483***	2.933303***	1.026140***
$L\tilde{\imath}^-$	2.198646**	10.824804***	5.264343***	3.216596***	2.542755***
$L\tilde{x}^+$	-0.2333615***	-1.564427***	-0.240241**	0.27787***	-0.062666***
$L\tilde{x}^-$	-0.6571159***	0.305602***	-0.218681**	-1.31388***	-0.017192***
$L\tilde{y}^+$	0.620016**	0.273312***	0.296055***	0.663830***	0.015612***
$L\tilde{y}^-$	-0.107006**	-0.531308***	0.175058***	-0.167705***	0.741114***
	CADNZD	**CADSEK**	**AUDNZD**	**AUDSEK**	**NZDSEK**
$L\tilde{m}^+$	-5.187279**	-46.786807***	-0.584855***	-8.717218***	2.4964354***
$L\tilde{m}^-$	4.308215**	-1.119979***	0.656714***	0.301618***	0.5529628***
$L\tilde{\imath}^+$	-0.875659**	0.055414***	1.506530***	0.112743***	0.0208087***
$L\tilde{\imath}^-$	0.396846**	0.659625***	0.579444***	-0.105258***	0.2006298***
$L\tilde{x}^+$	-0.18054*	0.408486**	-0.0087976***	-0.104073***	-0.060318***
$L\tilde{x}^-$	-0.19550*	-0.414639**	-0.0309896***	0.079901***	-0.052265***
$L\tilde{y}^+$	0.616504**	0.239424***	-0.017802***	-0.087677***	0.0151036***
$L\tilde{y}^-$	-0.358002**	-0.141120***	0.085864***	0.164897***	0.0065565***

* significant at 10% level, ** significant at 5% level, *** significant at 1% level. L^+ and L^+ denote the positive and negative long run coefficients, which are defined by $\beta^+ = -\frac{\theta^+}{\rho}$ and $\beta^- = -\frac{\theta^-}{\rho}$.

Table 40 Long Run Asymmetries in Non-Targeting Countries						
	Market Expectations			Survey Expectations		
	USDEUR	**USDCHF**	**EURCHF**	**USDEUR**	**USDCHF**	**EURCHF**
$L\widetilde{m}^{+}$	-0.349680	-38.59336	-0.14935	-0.665856	-61.92131	1.136382
$L\widetilde{m}^{-}$	2.628722**	-67.02351	19.77484	2.798504**	-130.20431	9.889844
$L\tilde{\imath}^{+}$	0.075033	-1.61790	-3.45195*	0.126354	-3.79496	-2.03637***
$L\tilde{\imath}^{-}$	0.271485	-0.88279	1.15096	0.389150	-2.89670	0.634899
$L\tilde{x}^{+}$	0.196367	1.27874	0.11750	0.059211	1.42498	0.270376**
$L\tilde{x}^{-}$	-1.293814**	1.35208	0.14088	0.070376	1.43065	0.158854
$L\tilde{y}^{+}$	0.063757	-0.47158	-0.46807	0.210890	-1.11288	-0.328976
$L\tilde{y}^{-}$	6.180549	0.28373	0.27227	6.451833	0.50999	0.116710

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

The results of the Wald tests for symmetry of both the short- and long-run parameters (required as part of the NARDL procedure) are reported in Table 41 and imply a rejection of the null of parameter symmetry, thus confirming the presence of nonlinearities. As noted earlier, there are three types of possible asymmetries in the NARDL model. The first is reaction asymmetry, namely asymmetry of the long-run coefficients, i.e. $\beta^{+} \neq \beta^{-}$, for which we find plenty of evidence. Of particular interest is the result that negative inflation expectation shocks have a more pronounced effect than positive ones, which suggests that central banks are perceived as more credible when aiming to reduce (rather than increase) inflation. The second type is impact asymmetry of the short-run coefficients on the first differences of the independent variables, i.e. $\Delta x^{+} \neq \Delta x^{-}$. Our results are less supportive of the existence of such asymmetries. The third type is dynamic adjustment asymmetry combining reaction and impact asymmetries in the error correction coefficient. Its estimated values are substantially larger than those yielded by the linear model, and therefore allowing for nonlinearities provides evidence of faster adjustment to the long-run equilibrium value implied by PPP.

Table 41 Wald Test of Parameter Symmetry				
	Market Expectations		Survey Expectations	
	Wald Test for long run symmetry	**Wald Test for short run symmetry**	**Wald Test for long run symmetry**	**Wald Test for short run symmetry**
GBPCAD	0.0006***	0.0000***	0.0000***	0.0224**
GBPAUD	0.0000***	0.0017***	0.0000***	0.0073***
GBPNZD	0.0000***	0.0409**	0.0000***	0.0014***
GBPSEK	0.0000***	0.0055***	0.0000***	0.0046***
CADAUD	0.0000***	0.0732*	0.0000***	0.0037***
CADNZD	0.0000***	0.0038***	0.0000***	0.0209**
CADSEK	0.0000***	0.0019***	0.0000***	0.0050***
AUDNZD	0.0000***	0.0056***	0.0000***	0.0333**
AUDSEK	0.0000***	0.0054***	0.0000***	0.0003***
NZDSEK	0.0000***	0.0422**	0.0000***	0.0383**
USDEUR	0.0000***	0.0081***	0.0000***	0.0051***
USDCHF	0.0000***	0.0418**	0.0000***	0.0081***
EURCHF	0.0000***	0.0456**	0.0000***	0.0286**

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

7.4.4 NARDL Model Performance and Misspecification Tests

To check the adequacy of the NARDL specification we conduct various tests. Table 42 reports the F-test statistics of the Bounds test using both the asymptotic and bootstrapped critical values; the null hypothesis of no cointegration cannot be rejected in either case.

Table 42 Bounds Test Results using Asymptotic and Bootstrap Critical Values

	F-statistic for NARDL model (1) using market-based inflation expectations	F-statistic for NARDL model (2) using survey-based inflation expectations
GBPCAD	4.379***	4.345***
GBPAUD	6.150***	6.514***
GBPNZD	3.491**	4.073**
GBPSEK	3.748**	3.722**
CADAUD	5.371***	5.792***
CADNZD	6.517***	6.480***
CADSEK	5.161***	5.339***
AUDNZD	3.910**	3.706**
AUDSEK	3.974**	3.900***
NZDSEK	3.524**	3.504**
USDEUR	4.862***	4.789***
USDCHF	4.112***	3.803**
EURCHF	8.406***	8.104***

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.
Asymptotic critical values: 10%: 3.09, 5%: 3.49, 1%: 4.37
Bootstrap critical values: 10%: 2.11, 5%: 3.15, 1%: 3.49

Table 43 reports the results of the tests for serial correlation and normality, while Table 44 reports the results of the tests for ARCH effects and parameter stability. Unlike in the linear case, there is no evidence of serial correlation, which supports the choice of a nonlinear model.

Table 43 Tests for Serial Correlation and Normality in the NARDL Model

		Model using Market-based Inflation Expectations		Model using Survey-based Inflation Expectations	
	Selected Lag	Breusch-Godfrey LM Test	Jarque-Bera Test	Breusch-Godfrey LM Test	Jarque-Bera Test
GBPCAD	1	0.2493	0.1333	0.3144	0.0839
GBPAUD	1	0.2266	0.6453	0.2243	0.7282
GBPNZD	1	0.3036	0.4538	0.3335	0.5306
GBPSEK	1	0.3852	0.6524	0.2969	0.6686
CADAUD	1	0.2051	0.4608	0.1962	0.5215
CADNZD	1	0.1797	0.4525	0.1862	0.5698
CADSEK	1	0.3087	0.8886	0.2894	0.7841
AUDNZD	1	0.1190	0.8947	0.1122	0.8975
AUDSEK	1	0.1573	0.9837	0.1604	0.9857
NZDSEK	1	0.1425	0.8424	0.1489	0.9200
USDEUR	1	0.1124	0.0209**	0.1258	0.0751
USDCHF	1	0.1644	0.0002***	0.1644	0.0005***
EURCHF	1	0.1435	0.0000***	0.1875	0.0000***

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Breusch-Godfrey LM Test for serial correlation:
$H_0: no\ serial\ correlation$
$H_1: serial\ correlation$

Jarque-Bera Test for normality:
$H_0: normality$
$H_1: no\ normality$

Table 44 Tests for ARCH Effects and Parameter Stability in the NARDL Model					
		Model using Market-based Inflation Expectations		**Model using Survey-based Inflation Expectations**	
	Selected Lag	**ARCH-LM Test**	**CUSUM Test**	**ARCH-LM Test**	**CUSUM Test**
GBPCAD	1	0.6559	p-value > 0.05	0.8978	p-value > 0.05
GBPAUD	1	0.7096	p-value > 0.05	0.9873	p-value > 0.05
GBPNZD	1	0.0785	p-value > 0.05	0.1442	p-value > 0.05
GBPSEK	1	0.6132	p-value > 0.05	0.7595	p-value > 0.05
CADAUD	1	0.2395	p-value > 0.05	0.1589	p-value > 0.05
CADNZD	1	0.1165	p-value > 0.05	0.0756	p-value > 0.05
CADSEK	1	0.6370	p-value > 0.05	0.8114	p-value > 0.05
AUDNZD	1	0.1376	p-value > 0.05	0.0775	p-value > 0.05
AUDSEK	1	0.9758	p-value > 0.05	0.8031	p-value > 0.05
NZDSEK	1	0.1957	p-value > 0.05	0.6088	p-value > 0.05
USDEUR	1	0.0510	p-value > 0.05	0.5198	p-value > 0.05
USDCHF	1	0.5441	p-value > 0.05	0.0577	p-value > 0.05
EURCHF	1	0.3456	p-value > 0.05	0.6332	p-value > 0.05

* significant at 10% level, ** significant at 5% level, *** significant at 1% level.

LM Test for ARCH Effects:
$H_0: no\ ARCH\ effects$
$H_1: ARCH\ effects$

CUSUM Test for parameter constancy:
$H_0: parameter\ constancy$
$H_1: no\ parameter\ constancy$

The results of the parameter constancy test suggest that the regression parameters are stable over the sample period and thus there is no evidence of an impact of the recent Covid-19 pandemic.

Table 45 In-Sample and Out-of-Sample Forecasting Performance of the ARDL and NARDL Models				
	CW Statistic for models using market-based inflation expectations		**CW Statistic for models using survey-based inflation expectations**	
	In-sample Performance	**Out-of-sample Performance**	**In-sample Performance**	**Out-of-sample Performance**
GBPCAD	3.753734**	11.02393**	6.640884**	6.55601**
GBPAUD	10.776**	22.44595**	10.8138**	7.856317**
GBPNZD	1.999921**	19.13329**	1.902211**	5.972678**
GBPSEK	2.326065**	25.17077**	2.362526**	19.33484**
CADAUD	5.954779**	9.654666**	12.10979**	8.873499**
CADNZD	19.15081**	38.6404**	19.1128**	40.1059**
CADSEK	7.950445**	15.58328**	5.669201**	15.41812**
AUDNZD	47.83918**	127.0993**	3.889614**	184.7364**
AUDSEK	3.876119**	24.24949**	3.870782**	22.69863**
NZDSEK	8.171137**	61.28642**	7.790731**	55.54899**
USDEUR	11.2463**	6.170697**	15.70218**	5.842778**
USDCHF	3.589623**	5.429641**	3.39798**	5.505266**
EURCHF	8.235723**	16.35547**	9.591053**	16.65116**

** indicates significance at normal critical value of 5%: 1.645
CW = Clark and West test statistic for comparing the MSPE of the NARDL model with the MSPE of the linear ARDL model.
t-Test hypotheses:
$H_0: MSPE_{ARDL} = MSPE_{NARDL}$
$H_1: MSPE_{ARDL} > MSPE_{NARDL}$

As a final step, we compare both the in-sample and out-of-sample performance of the previously estimated linear and nonlinear specifications. Table 45 reports the computed Clark and West statistics for all models; as can be seen, these indicate that the nonlinear model outperforms the linear one in all cases. We can confirm that the nonlinear model seems to be an improvement to the linear model in estimating the short run and long run dynamics between the variables.

7.5 Conclusion

The aim of this chapter was to shed new light on the PPP puzzle by estimating a model of the real exchange rate with selected real and nominal fundamentals as well as two alternative measures of inflation expectations in inflation targeting countries. The analysis was conducted for the specific case of five countries that have adopted inflation targeting, namely the UK, Canada, Australia, New Zealand and Sweden; and compared to three economies which do not consider themselves to be inflation-targeters, specifically the US, the Euro-Area and Switzerland. In particular, both a benchmark linear ARDL model and a nonlinear ARDL (NARDL) model are estimated for this purpose.

Our analysis yields the following key findings. First, our findings suggest that the nonlinear framework is more appropriate to capture the behaviour of the real exchange rate than the linear model, which is consistent with the findings of other studies in the field (for example, Taylor et al., 2001; Baum et al., 2001; Sollis et al., 2002). The speed of adjustment to the PPP-implied long-run equilibrium is up to nine times faster in the nonlinear framework, and provides stronger support for the long run validity of PPP than in the linear model. Second, by using two different measures of inflation expectations as additional variables in the model, we show that inflation expectations are an important addition to the other fundamentals considered in this study and can explain some of the asymmetric real exchange rate adjustment to the PPP-implied equilibrium. Our analysis highlights the role of inflation expectations, which is often overlooked in models of the real exchange rate. In particular, survey-based inflation expectations appear to have a more sizable effect than market-based measures; and they seem to be more conclusive of the degree of credibility of a central bank and the possible impact of monetary policy on the real exchange rate. Since inflation expectations can be a cause of deviations from PPP and influence the adjustment process to the PPP-implied equilibrium, it is important that monetary authorities achieve a high degree of credibility and adopt appropriate policies to manage their credibility and consequently currency fluctuations effectively (Baharumshah et al., 2017). Third, and contrary to the findings of most other studies, we found evidence of a long run impact of monetary shocks on the real exchange rate. Our findings suggest, that both real and nominal shocks, as well as central bank credibility shocks, influence deviations from the long run PPP-implied equilibrium. Fourth, our findings suggest that in inflation targeting, the impact of nominal and real shocks, as well as central bank credibility shocks, seems to be more important for explaining the real exchange rate than in non-targeting countries. As such, the inflation targeting framework has proven to be generally successful and therefore is also well placed in this respect.

Overall, the findings provide support for the stronger relevance of credibility for the adjustment to PPP in inflation targeting regimes than in non-targeting regimes. The implications for inflation targeting policymakers are as follows. The fact that nominal shocks influence the real exchange rate and PPP, suggests that policymakers are able to influence the real exchange rate in the long run to improve international competitiveness (Kutan and Dibooglu, 1998). Central banks can use this information about the impact of monetary and UIP shocks to develop appropriate monetary policy strategies in this respect (Lavesson, 2011). Although the countries considered in this study did well at maintaining credibility, they could achieve greater economic stability through monitoring inflation expectations more closely. Policymakers might want to consider putting measures in place to counter the adverse impact of inflation expectations. In particular, conducting more frequent surveys about the inflation outlook of the general public might be able to provide a clearer indication of the evolvement of inflation expectations in the regime, which can be used to estimate the overall impact on the real exchange rate and the inflation rate itself.

8 Conclusion and Policy Implications

8.1 Summary and Conclusions

The aim of this thesis was to investigate the UIP and PPP relations in inflation targeting countries. The main focus was placed on assessing potential nonlinearities in the adjustment of deviations from the exchange rate parities, which are influenced by the degree of central bank credibility. Such an analysis was conducted for a selection of five countries that have pioneered the adoption of inflation targeting, namely the UK, Canada, Australia, New Zealand and Sweden; and in comparison for three economies which do not consider themselves to be inflation-targeters, namely the US, the Euro-Area and Switzerland. Three different types of nonlinear empirical frameworks were applied to assess the validity of UIP and PPP; and each accounted for a different measure of central bank credibility.

Chapter 3 began the empirical investigation with a joint analysis of UIP and PPP to answer the question of how the exchange rate parities are influenced by deviations from the Taylor rule as a measure of central bank credibility. As part of this, three types of empirical Taylor rules were estimated in order to select the one which best describes the interest rate setting mechanism in each country; from there a Taylor rule deviations variable was constructed. The variable served as the threshold variable in a Threshold Vector Error Correction model which assessed the adjustment to the exchange rate parities under regimes of small and large Taylor rule deviations. It was shown that the nonlinear model is more appropriate to explain the exchange rate parities, since the adjustment speed is twice as fast as in the benchmark linear Vector Error Correction model of UIP and PPP. It was further reported that the adjustment speed is twice as fast when Taylor rule deviations are small than when they are large. These findings suggest that small Taylor rule deviations are considered temporary departures from the monetary policy rule, while large Taylor rule deviations are seen as indicative of permanent shifts in monetary policy. This confirms the general consensus in the literature regarding the size of Taylor rule deviations (Kahn, 2010; Neuenkirch and Tillmann, 2014). Credibility seems to be more important for the validity of UIP and PPP in inflation targeting countries than in non-targeting economies. Overall, it seems, that the inflation targeting countries considered in this study did well at establishing credibility and reducing the impact of deviations from the monetary policy rule.

Chapter 5 investigated the UIP relation by addressing the question of how changes in interest rate expectations influence the adjustment to UIP. A nonlinear Smooth Transition Cointegrated Vector Autoregressive Model was estimated in which the 30-day interest rate served as the transition variable. The model controlled for the effect of positive and negative central bank announcements of changes in the interest rate, and was assessed against a benchmark linear Cointegrated Vector Autoregressive Model. It was shown that the adjustment speed is substantially faster in the nonlinear model, but only occurs when the market expects the interest rate to increase in the near future. This finding suggests that the general public considers monetary contractions as being more strongly aligned with keeping inflation at its target rate than monetary expansions, which contradicts some of the findings in the existing literature (Wray, 1997; Baydur and Süslü, 2004). It was further reported that central bank announcements of interest rate changes seem to be more influential on asset market fundamentals when interest rate expectations are controlled for. This highlights the importance of interest rate expectations, which are rarely considered as measures of central bank credibility and in the context of the UIP puzzle. Overall, credibility seems to play an important role in the inflation targeting economy and the inflation targeting countries considered in this study did well at establishing credibility when adhering closer to the inflation target.

Chapter 7 investigated the PPP relation by addressing the question of whether shocks to inflation expectations affect the adjustment of the real exchange rate. In order to differentiate the impact of central bank credibility shocks from that of other macroeconomic shocks, several variables were included in the model which accounted for money supply shocks, output shocks and UIP shocks alongside inflation expectations shocks. Then a Nonlinear Autoregressive Distributed Lag (NARDL) model was estimated to assess the asymmetric dynamic short and long run relationships between the real exchange rate and these fundamentals. In order to fully capture central bank credibility, two different measures of inflation expectations were included separately into the model; one was based on a market measure derived from the yield curve and the other was a survey measure. It was shown that the nonlinear model is more appropriate to explain the real exchange rate, since the adjustment speed is up to nine times faster than in the linear benchmark ARDL model of PPP. This finding is consistent with those of other studies (Taylor et al., 2001; Baum et al., 2001; Sollis et al., 2002). It was found that shocks to inflation expectations, in particular those obtained from surveys, are an important explanation of deviations from PPP and the asymmetric adjustment to the long run implied equilibrium. It was further reported that both nominal and real shocks have significant long run effects on the real exchange rate in inflation targeting countries. The findings imply that it is important that monetary authorities achieve a high degree of credibility and adopt appropriate policies to manage their credibility, since this can reduce real exchange rate fluctuations (Baharumshah et al., 2017). Although the inflation targeting framework has proven to be generally successful, inflation targeting central banks, in particular, need to be aware of the strong impact of economic shocks on goods market stability.

This thesis was able to answer some questions regarding the validity of the parities and the adjustment of deviations from the UIP- and PPP-implied equilibria in inflation targeting countries. The main contributions are as follows. For one, it has been established that UIP and PPP are valid in the inflation targeting countries considered in this thesis when credibility and nonlinearities are considered. The validity of the exchange rate parities is substantially stronger when nonlinearities are accounted for. In terms of an explanation for the exchange rate parity puzzles, the research in this thesis confirms the findings of previous studies, namely that nonlinear estimation methods are more suitable for explaining the adjustment to the UIP- and PPP-implied equilibrium (Sarno et al., 2006; Taylor et al., 2001). However, the thesis presents an additional solution to the parity puzzles, which has not received great attention in the UIP and PPP literature thus far, namely by accounting for central bank credibility. Central bank credibility seems to play an important role in explaining the adjustment to UIP and PPP in inflation targeting countries, therefore seeming to provide an alternative solution to the UIP and PPP puzzles, which constitutes the main contribution of this thesis. It can further be concluded that central bank credibility seems to be more crucial for the exchange rate parities in inflation targeting regimes than in non-targeting regimes. In inflation targeting countries, credibility seems to be most important, not only for the success of the inflation targeting regime, but for wider economic stabilisation. This key finding extends those of previous studies which discuss the implications of central bank credibility on the achievement of the inflation target but fail to assess the impact on other parts of the economy (Bordo and Siklos, 2015; Aguir, 2018; Henckel et al., 2019). As we have shown, the interaction between goods and asset markets is strongly influenced by Taylor rule deviations while expectations about fundamentals in the goods and asset markets, specifically the inflation rate and the interest rate, influence the achievement of the exchange rate equilibria in these markets. This confirms the importance of credibility as a pillar of the inflation targeting regime.

8.2 Implications for the Understanding of the Exchange Rate Parities

For the general understanding of the exchange rate parities, the results provide some interesting insight. The fact that factors representing central bank credibility influence the adjustment speed to the UIP- and PPP-implied equilibria provides an entirely novel solution to the parity puzzles. The role of credibility, monetary policy deviations and expectations seems to be an interesting explanation of the adjustment to the parities which has been neglected to date. A second important finding is the noticeably superior validity of the parities in inflation targeting countries. For the understanding of the parity puzzles, this means that accounting for the endogeneity of monetary policy and the related central bank credibility seems to be an accurate description of monetary policy in inflation targeting countries and provides a stronger explanation of UIP and PPP.

While the empirical analysis in this thesis offers an alternative solution to the puzzles by considering credibility in the inflation targeting regime, some further conclusions can be drawn for the understanding of the UIP and PPP puzzles. It was established, that the adjustment to the parity-implied equilibrium occurs via the inflation rate (Chapter 3) and the interest rate (Chapter 5) but not the exchange rate. This stands in direct contrast to the theoretical formulation of UIP and PPP, in which the exchange rate is expected to adjust to restore the parity equilibria. This finding offers an interesting insight into the more volatile nature of the exchange rate as an asset price which does not seem to be attached to restore any one equilibrium (Engel and West, 2005). It seems that it is the UIP and PPP fundamentals, which represent key policy variables in the inflation targeting regime, that seem to be particularly relevant as exchange rate equilibrium restorers in the goods and asset markets.

Another important point to note is that the connection between the monetary regime and the exchange rate seems to be more nuanced than previously assumed. It seems that it is not only the conduct of monetary policy itself, but also the general state of credibility, which influences the exchange rate and the validity of the parities. This observation might be important to consider when extending theoretical formulations of monetary policy and the exchange rate. Overall, the findings in this thesis could inform future theoretical and empirical research in the following ways. Firstly, similar to the findings of earlier studies in the field (Sarno et al., 2006; Taylor et al., 2001), the findings in this thesis confirm that the nonlinear framework seems to be well placed in this respect. Given the extensive evidence in support of UIP and PPP generated by the use of nonlinear methods, it might be worthwhile for future research to consider nonlinearities more strongly in empirical studies of the exchange rate parities or consider incorporating nonlinearities into theoretical formulations of UIP and PPP. Secondly, given the strong long run effects of real and nominal shocks on the real exchange rate reported in Chapter 7, future empirical work might want to consider the use of alternative methods to assess the precise impact of these shocks on the real exchange rate. Thirdly, an interesting area for further research might be the consideration of central bank credibility in theoretical models of the exchange rate. Lastly, another theoretical and empirical extension might be through establishing a stronger link between expectations generated in the monetary regime, rationality and the exchange rate (Cumby and Obstfeld, 1984).

8.3 Implications for Policymakers

For policymakers in inflation targeting countries, the findings in this thesis have the following implications. The main conclusion which can be drawn from the analysis is that the inflation targeting regime seems to be more successful at establishing credibility and consequently at consolidating the exchange rate equilibria in the goods and asset markets than non-targeting regimes. This shows that the success of the inflation targeting regimes has greater dimensions than that of price level stability by further stabilising exchange rate equilibria in the goods and asset markets. However, there is cause for caution; while credibility is more important for monetary policy in the inflation targeting regime than in other monetary regimes, it means that a gain in credibility can support the success of the regime but that, equally, a loss in credibility can amplify any negative or adverse impact. Through appropriately managing their credibility, central banks might be able to reduce the impact of deviations from the inflation target or adverse interest rate and inflation expectations on the wider economy. In addition, one can note that there were no changes to the influence of credibility on the adjustment to the exchange rate parities during either the 2008 Financial

Crisis or the recent COVID-19 pandemic. This suggests that the inflation targeting regime was able to establish credibility which is relatively stable, even during periods of crisis.

A quote was presented at the beginning of this thesis which stated that inflation targeting central banks should consider any information in their policy making which is relevant to forecasting inflation. The findings in this thesis can be useful for policymakers in inflation targeting countries to enhance their estimations when making forecasts of the impact of their policies under consideration of the degree of central bank credibility. While there is little reason to suggest that the central bank should intervene in the exchange rate goods and asset market relations, there is room for central banks to regard the equilibrium conditions in the two markets more directly in their policymaking, especially as indicators of the impact of changes in credibility. Policymakers can consider taking a closer look at putting measures in place to reduce any sizable deviations from the Taylor rule to minimise any adverse impact on the goods and asset markets. It would seem that policymakers are able to create greater exchange rate stability in the goods and asset markets through tighter adherence to keeping inflation low, while greater exchange rate stability in the goods market can be achieved through a reduction of shocks to inflation expectations. Alternatively, during periods in which the central bank adopts a more discretionary policy stance, the central bank might be able to control the impact of discretionary policies on its overall credibility and the wider economy through greater transparency and increased communication (Bernanke, 2003).

While policymakers can display some degree of flexibility and moderate discretion, it seems that large deviations from the target are not perceived as credible by the general public which has repercussions on other markets (Neuenkirch and Tillmann, 2014). This suggests that there seems to be a strong impact of central bank credibility on the monetary policy transmission mechanism. Through the strict commitment to the inflation target, either through an absence of Taylor rule deviations or the implementation of efforts to reduce shocks to inflation expectations and high inflation rates through monetary tightening, the central bank might be able to establish much greater credibility and consequently wider economics stability. Policymakers might further want to consider the closer monitoring of not only inflation expectations, but also interest rate expectations and the general consensus regarding central bank credibility in the general public. Lastly, policymakers might want to consider developing appropriate monetary policy strategies to reduce the impact of monetary and interest rate shocks, particularly on the goods market, to improve international competitiveness in the long run (Kutan and Dibooglu, 1998; Lavesson, 2011).

In conclusion, the inflation targeting regime seems to have been successful at establishing credibility. The additional stability generated in the goods and asset markets might in turn be able to support the overall credibility of the central bank. To what extent this is the case is left for future research.

8.4 Avenues for Future Research

There are several potential avenues for future research within the specific topic area that investigates the exchange rate parities in inflation targeting countries. Firstly, further research is necessary to potentially relate the findings in this thesis to individual macroeconomic structures and institutional features, which might shape the way monetary policy is conducted and credibility is achieved in each inflation targeting country. Secondly, nonlinear methodologies seem to provide a more suitable explanation of the adjustment process than linear methods. It might be interesting to assess how these nonlinear models might be able to explain the adjustment process to UIP and PPP in a panel of inflation targeting countries. Such an analysis could provide interesting insights into the linkages between the parities in different inflation targeting regimes. Thirdly, future studies might want to explore how credibility and expectations affect the monetary transmission mechanism in more detail, particularly through the goods and asset market connection the parities provide. Alternatively, further research might want to assess the implications of central bank credibility on other financial markets. Finally, an interesting area for further research is to formalise the theoretical link between the exchange rate parities, inflation targeting and credibility, which can guide subsequent empirical research.

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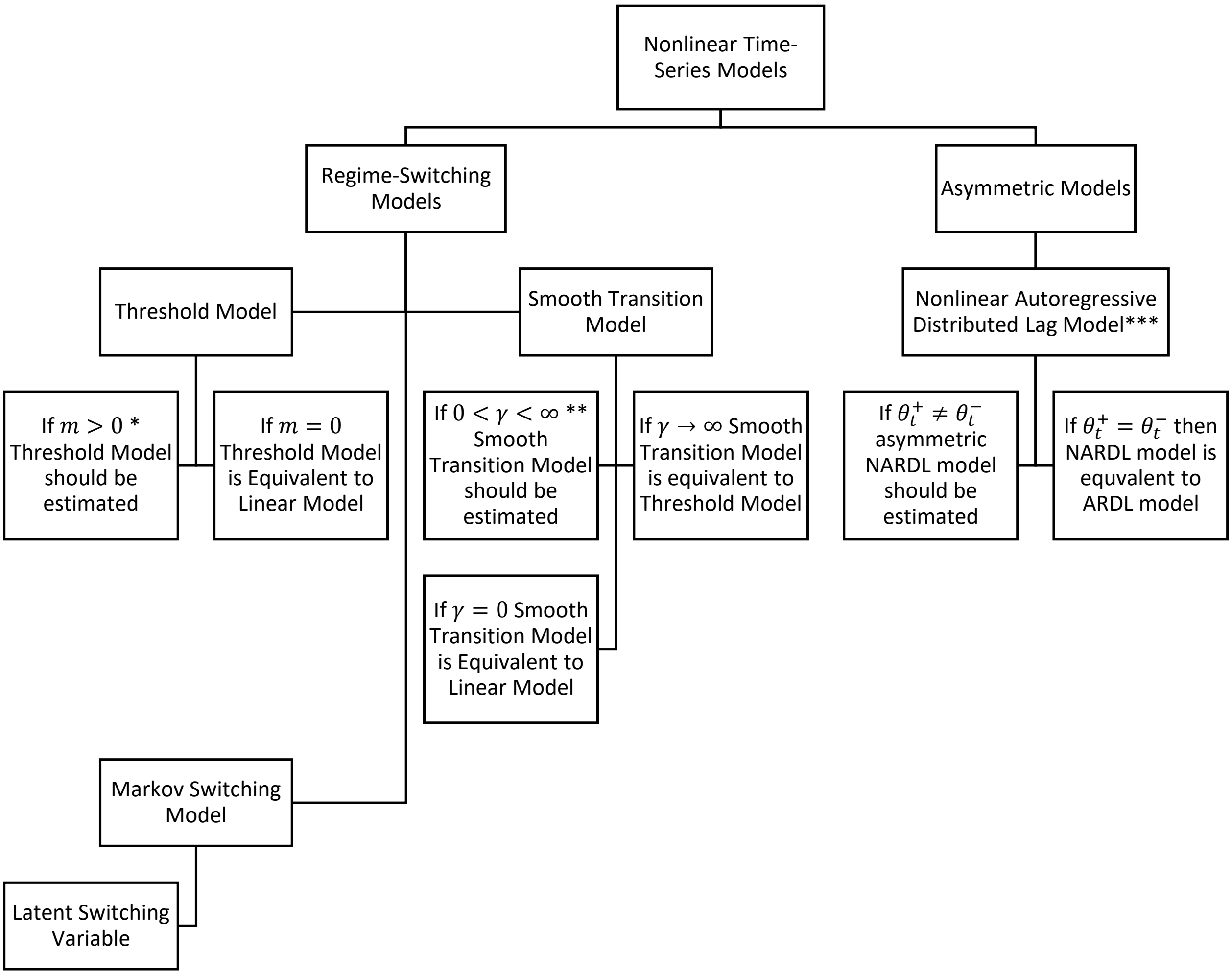
Appendix A – Nonlinear Time Series Model Flowchart



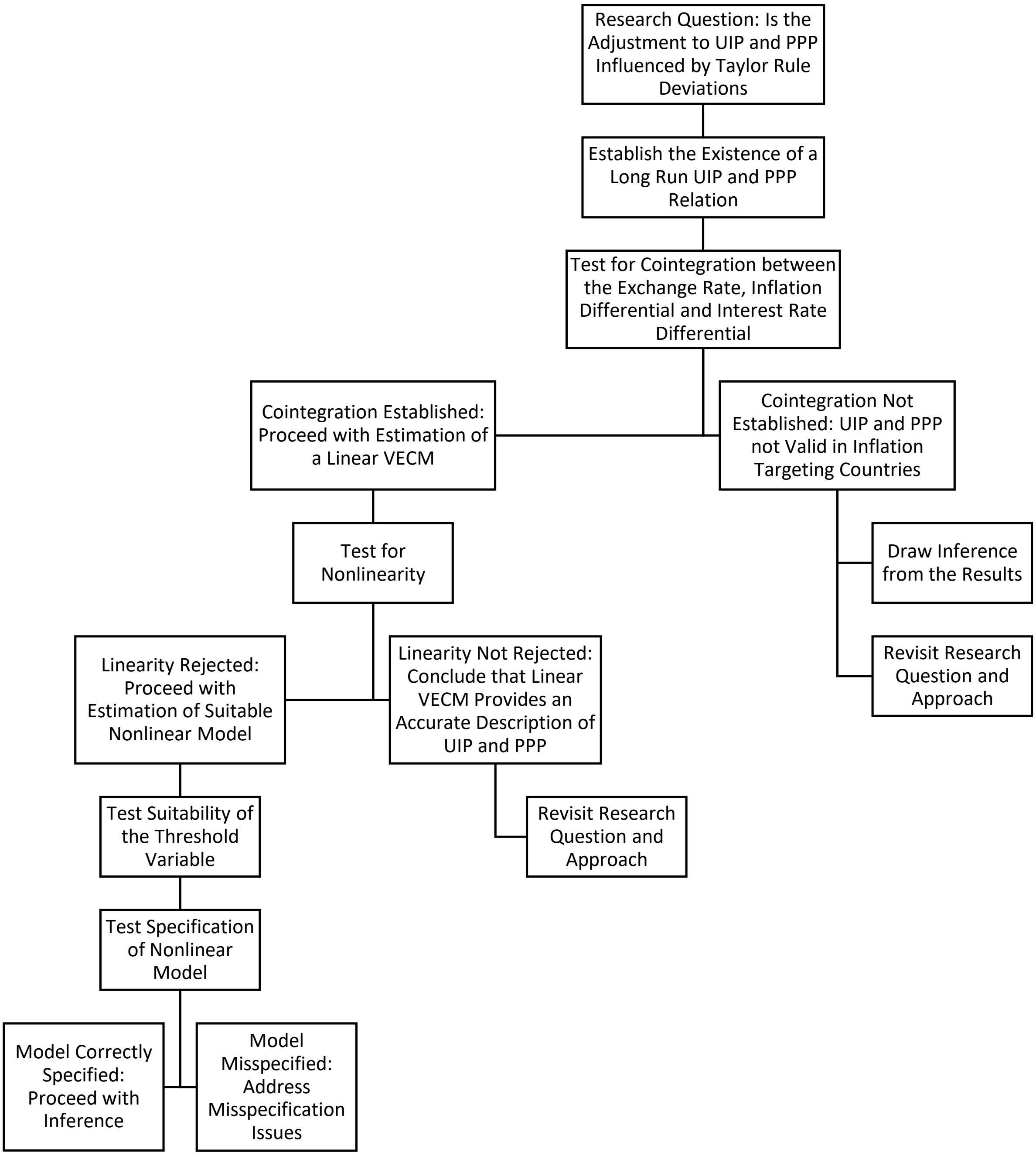
*Where m is the number of thresholds

**Where γ is the smoothness parameter

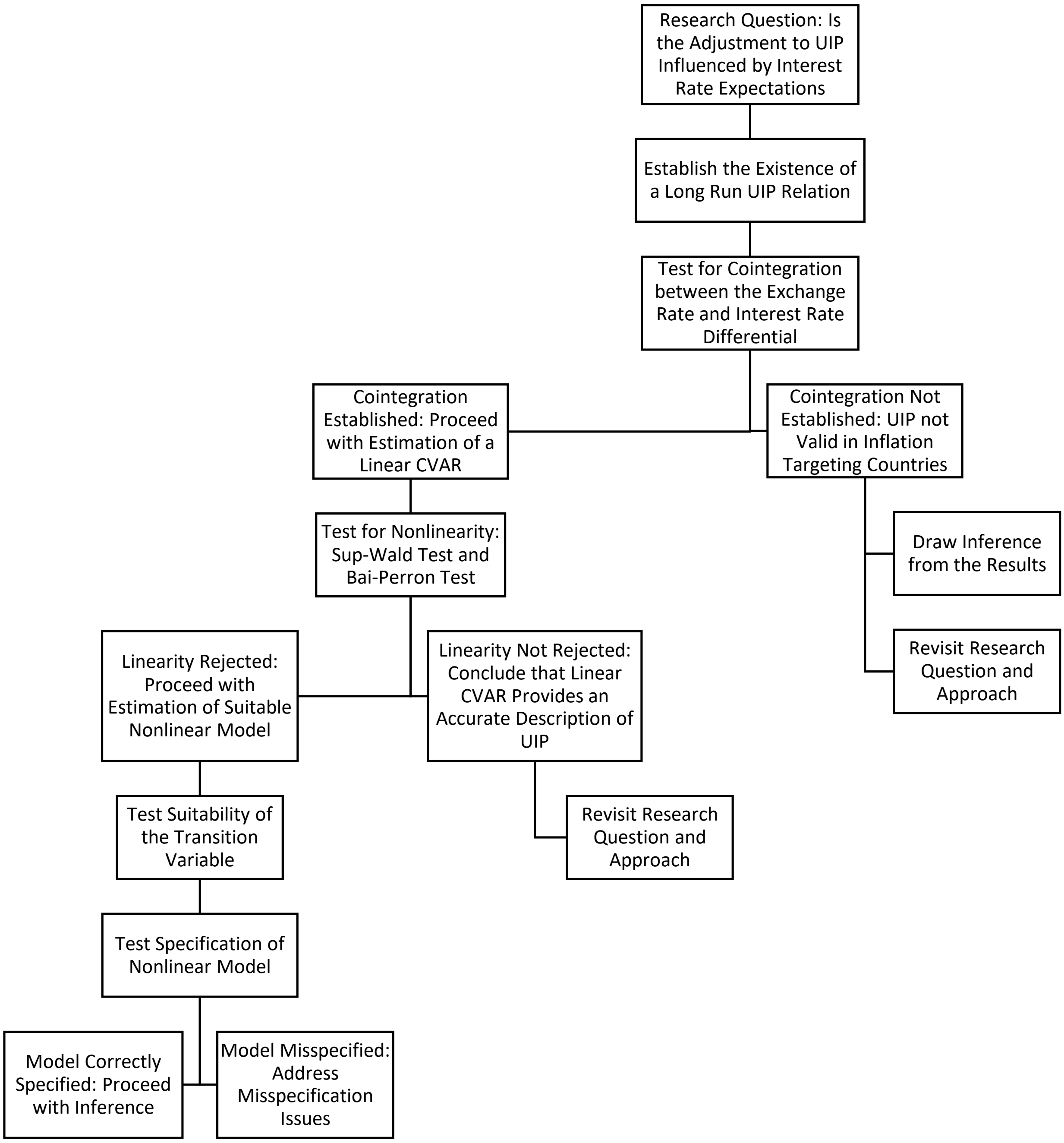
***The NARDL model can also be regarded as a regime-switching model with two regimes around a threshold value of zero on the parameters. However, the model is not classified as a regime-switching model. Another difference to regime-switching models is that the NARDL model allows for hidden cointegration, meaning it allows for the presence of asymmetries in the cointegrating vector, while regime-switching models only allow for nonlinearities in the adjustment speed (Shin et al., 2014).

Appendix B – Model Selection Flowchart

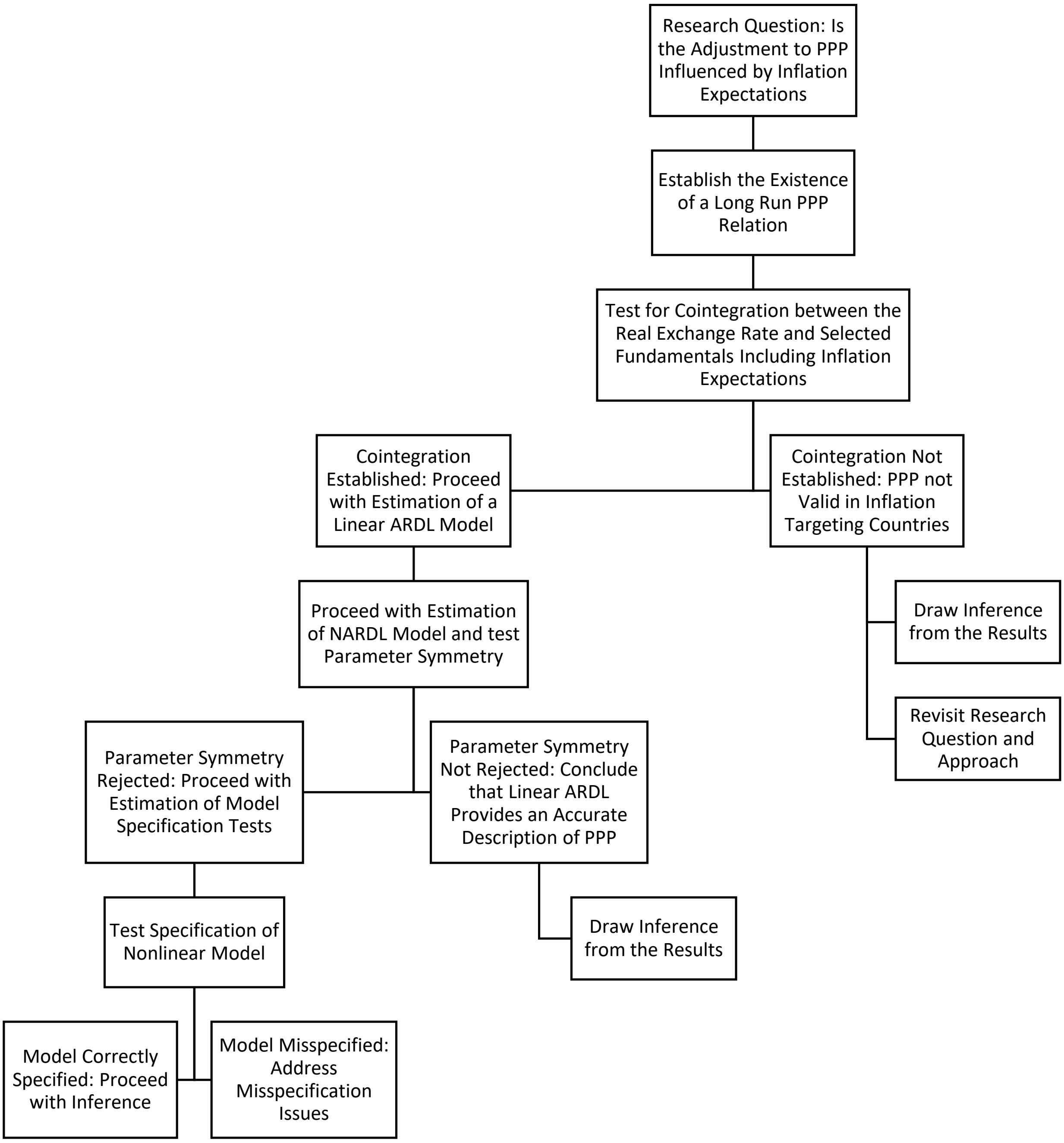
Model Selection Flowchart – Chapter 3:



Model Selection Flowchart – Chapter 5:



Model Selection Flowchart – Chapter 7:



Appendix C – Data Sources, Software Codes and Outputs

Chapter 3

Data Sources

Frequency: Monthly
Time Period: January 1993 – December 2020

Inflation data for Australia is obtained from the Reserve Bank of Australia Measures of Consumer Price Inflation series, while inflation data for New Zealand is obtained from the Reserve Bank of New Zealand Statistics for Inflation series. The remaining data for the inflation rate series as well as all interest rate series are obtained from the OECD (Organisation for Economic Co-operation and Development). The inflation rate series is the Annual Percentage Change in CPI series, while the interest rate series are the nominal short term rates, which are the monthly averages of daily three-month money market rates. All nominal exchange rate series are obtained from the Pacific Exchange Rate Service database. The data obtained for the real GDP series are volume estimates of real GDP in national currency and are retrieved from the Federal Reserve Bank of St Louis Economic Database. The real exchange rates series are effective CPI-based measures and are obtained from the BIS (Bank for International Settlements) Statistics Warehouse. All variables are transformed to their natural logarithm.

Data Abbreviation	**Variable**
lngbpcad	Log of GBPCAD Exchange Rate
lngbpaud	Log of GBPAUD Exchange Rate
lngbpnzd	Log of GBPNZD Exchange Rate
lngbpsek	Log of GBPSEK Exchange Rate
lncadaud	Log of CADAUD Exchange Rate
lncadnzd	Log of CADNZD Exchange Rate
lncadsek	Log of CADSEK Exchange Rate
lnaudnzd	Log of AUDNZD Exchange Rate
lnaudsek	Log of AUDSEK Exchange Rate
lnnzdsek	Log of NZDSEK Exchange Rate
lnusdeur	Log of USDEUR Exchange Rate
lnusechf	Log of USDCHF Exchange Rate
lneurchf	Log of EURCHF Exchange Rate
lnukcainf	Log of UK-Canada Inflation Differential
lnukauinf	Log of UK-Australia Inflation Differential
lnuknzinf	Log of UK-New Zealand Inflation Differential
lnukseinf	Log of UK-Sweden Inflation Differential
lncaauinf	Log of Canada-Australia Inflation Differential
lncanzinf	Log of Canada-New Zealand Inflation Differential
lncaseinf	Log of Canada-Sweden Inflation Differential
lnaunzinf	Log of Australia-New Zealand Inflation Differential
lnauseinf	Log of Australia-Sweden Inflation Differential
lnnzseinf	Log of New Zealand-Sweden Inflation Differential

lnuseuinf	Log of US-Euro Area Inflation Differential
lnuschinf	Log of US-Switzerland Inflation Differential
lneuchinf	Log of Euro Area-Switzerland Inflation Differential
lnukcair	Log of UK-Canada Interest Rate Differential
lnukauir	Log of UK-Australia Interest Rate Differential
lnuknzir	Log of UK-New Zealand Interest Rate Differential
lnukseir	Log of UK-Sweden Interest Rate Differential
lncaauir	Log of Canada-Australia Interest Rate Differential
lncanzir	Log of Canada-New Zealand Interest Rate Differential
lncaseir	Log of Canada-Sweden Interest Rate Differential
lnaunzir	Log of Australia-New Zealand Interest Rate Differential
lnauseir	Log of Australia-Sweden Interest Rate Differential
lnnzseir	Log of New Zealand-Sweden Interest Rate Differential
lnuseuir	Log of US-Euro Area Interest Rate Differential
lnuschir	Log of US-Switzerland Interest Rate Differential
lneuchir	Log of Euro Area-Switzerland Interest Rate Differential
lnukir	Log of UK Interest Rate
lncair	Log of Canada Interest Rate
lnauir	Log of Australia Interest Rate
lnnzir	Log of New Zealand Interest Rate
lnseir	Log of Sweden Interest Rate
lnusir	Log of US Interest Rate
lneuir	Log of Euro-Area Interest Rate
lnchir	Log of Switzerland Interest Rate
lnukoutgap	Log of UK Output Gap
lncaoutgap	Log of Canada Output Gap
lnauoutgap	Log of Australia Output Gap
lnnzoutgap	Log of New Zealand Output Gap
lnseoutgap	Log of Sweden Output Gap
lnusoutgap	Log of US Output Gap
lneuoutgap	Log of Euro-Area Output Gap
lnchm3	Log of Switzerland Money Supply M3
lnukinf	Log of UK Inflation Rate
lncainf	Log of Canada Inflation Rate
lnauinf	Log of Australia Inflation Rate
lnnzinf	Log of New Zealand Inflation Rate
lnseinf	Log of Sweden Inflation Rate
lnusinf	Log of US Inflation Rate
lneuinf	Log of Euro-Area Inflation Rate
lnchinf	Log of Switzerland Inflation Rate
lnukrer	Log of UK Real Exchange Rate
lncarer	Log of Canada Real Effective Exchange Rate
lnaurer	Log of Australia Real Effective Exchange Rate
lnnzrer	Log of New Zealand Real Effective Exchange Rate
lnserer	Log of Sweden Real Effective Exchange Rate
lnusrer	Log of US Real Effective Exchange Rate
lneurer	Log of Euro-Area Real Effective Exchange Rate
lnchrer	Log of Switzerland Real Effective Exchange Rate

Software Codes and Outputs

Dickey-Fuller GLS Unit Root Tests:

Nominal Exchange Rate in levels:

UK-Canada: dfgls lngbpcad

```
DF-GLS test for unit root
Variable: lngbpcad
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau          1%             5%             10%
-------------------------------------------------------------------
     16          -1.571       -3.480         -2.814         -2.533
     15          -1.475       -3.480         -2.820         -2.539
     14          -1.377       -3.480         -2.827         -2.545
     13          -1.494       -3.480         -2.833         -2.551
     12          -1.509       -3.480         -2.839         -2.556
     11          -1.451       -3.480         -2.845         -2.562
     10          -1.328       -3.480         -2.851         -2.567
      9          -1.350       -3.480         -2.857         -2.572
      8          -1.441       -3.480         -2.862         -2.577
      7          -1.552       -3.480         -2.868         -2.582
      6          -1.669       -3.480         -2.873         -2.587
      5          -1.634       -3.480         -2.878         -2.592
      4          -1.700       -3.480         -2.883         -2.596
      3          -1.622       -3.480         -2.888         -2.600
      2          -1.572       -3.480         -2.892         -2.604
      1          -1.535       -3.480         -2.896         -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0199762
Min SIC  = -7.790282 at lag 1 with RMSE = .0199762
Min MAIC = -7.805216 at lag 1 with RMSE = .0199762
```

UK-Australia: dfgls lngbpaud

```
DF-GLS test for unit root
Variable: lngbpaud
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau          1%             5%             10%
-------------------------------------------------------------------
     16          -1.736       -3.480         -2.814         -2.533
     15          -1.752       -3.480         -2.820         -2.539
     14          -1.813       -3.480         -2.827         -2.545
     13          -1.736       -3.480         -2.833         -2.551
     12          -1.844       -3.480         -2.839         -2.556
     11          -1.933       -3.480         -2.845         -2.562
     10          -1.801       -3.480         -2.851         -2.567
      9          -1.898       -3.480         -2.857         -2.572
      8          -1.866       -3.480         -2.862         -2.577
      7          -2.027       -3.480         -2.868         -2.582
      6          -1.913       -3.480         -2.873         -2.587
```

5	-1.710	-3.480	-2.878	-2.592
4	-1.636	-3.480	-2.883	-2.596
3	-1.605	-3.480	-2.888	-2.600
2	-1.576	-3.480	-2.892	-2.604
1	-1.796	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 6 with RMSE = .0247006
Min SIC  = -7.329439 at lag 1 with RMSE = .0251526
Min MAIC = -7.354673 at lag 2 with RMSE = .0249323
```

UK-New Zealand: dfgls lngbpnzd

```
DF-GLS test for unit root
Variable: lngbpnzd
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value	---------	
[lags]	DF-GLS tau	1%	5%	10%
16	-1.916	-3.480	-2.814	-2.533
15	-1.958	-3.480	-2.820	-2.539
14	-2.066	-3.480	-2.827	-2.545
13	-2.134	-3.480	-2.833	-2.551
12	-2.131	-3.480	-2.839	-2.556
11	-2.171	-3.480	-2.845	-2.562
10	-2.157	-3.480	-2.851	-2.567
9	-2.289	-3.480	-2.857	-2.572
8	-2.182	-3.480	-2.862	-2.577
7	-2.217	-3.480	-2.868	-2.582
6	-2.166	-3.480	-2.873	-2.587
5	-1.976	-3.480	-2.878	-2.592
4	-1.939	-3.480	-2.883	-2.596
3	-2.017	-3.480	-2.888	-2.600
2	-1.981	-3.480	-2.892	-2.604
1	-2.035	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 6 with RMSE = .0241198
Min SIC  = -7.398313 at lag 1 with RMSE = .0243012
Min MAIC = -7.401873 at lag 1 with RMSE = .0243012
```

UK-Sweden: dfgls lngbpsek

```
DF-GLS test for unit root
Variable: lngbpsek
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value	---------	
[lags]	DF-GLS tau	1%	5%	10%
16	-1.672	-3.480	-2.814	-2.533
15	-1.526	-3.480	-2.820	-2.539
14	-1.670	-3.480	-2.827	-2.545
13	-1.758	-3.480	-2.833	-2.551
12	-1.775	-3.480	-2.839	-2.556
11	-1.807	-3.480	-2.845	-2.562

10	-1.746	-3.480	-2.851	-2.567
9	-1.743	-3.480	-2.857	-2.572
8	-1.855	-3.480	-2.862	-2.577
7	-1.996	-3.480	-2.868	-2.582
6	-1.826	-3.480	-2.873	-2.587
5	-1.647	-3.480	-2.878	-2.592
4	-1.502	-3.480	-2.883	-2.596
3	-1.485	-3.480	-2.888	-2.600
2	-1.499	-3.480	-2.892	-2.604
1	-1.629	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 7 with RMSE = .0193062
Min SIC  = -7.822904 at lag 1 with RMSE =  .019653
Min MAIC = -7.837491 at lag 2 with RMSE = .0195997
```

Canada-Australia: dfgls lncadaud

```
DF-GLS test for unit root
Variable: lncadaud
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-2.457	-3.480	-2.814	-2.533
15	-2.547	-3.480	-2.820	-2.539
14	-2.326	-3.480	-2.827	-2.545
13	-2.158	-3.480	-2.833	-2.551
12	-2.252	-3.480	-2.839	-2.556
11	-2.346	-3.480	-2.845	-2.562
10	-2.282	-3.480	-2.851	-2.567
9	-2.286	-3.480	-2.857	-2.572
8	-2.547	-3.480	-2.862	-2.577
7	-2.554	-3.480	-2.868	-2.582
6	-2.644	-3.480	-2.873	-2.587
5	-2.696	-3.480	-2.878	-2.592
4	-2.569	-3.480	-2.883	-2.596
3	-2.843	-3.480	-2.888	-2.600
2	-2.650	-3.480	-2.892	-2.604
1	-2.919	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 15 with RMSE =  .018248
Min SIC  = -7.912791 at lag  1 with RMSE = .0187893
Min MAIC = -7.906328 at lag  4 with RMSE = .0185327
```

Canada-New Zealand: dfgls lncadnzd

```
DF-GLS test for unit root
Variable: lncadnzd
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-2.310	-3.480	-2.814	-2.533
15	-2.289	-3.480	-2.820	-2.539

14	-2.227	-3.480	-2.827	-2.545
13	-2.371	-3.480	-2.833	-2.551
12	-2.189	-3.480	-2.839	-2.556
11	-2.065	-3.480	-2.845	-2.562
10	-2.191	-3.480	-2.851	-2.567
9	-2.112	-3.480	-2.857	-2.572
8	-2.116	-3.480	-2.862	-2.577
7	-2.026	-3.480	-2.868	-2.582
6	-2.143	-3.480	-2.873	-2.587
5	-2.068	-3.480	-2.878	-2.592
4	-2.115	-3.480	-2.883	-2.596
3	-2.446	-3.480	-2.888	-2.600
2	-2.327	-3.480	-2.892	-2.604
1	-2.262	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 4 with RMSE = .0215438
Min SIC  = -7.609358 at lag 1 with RMSE = .0218675
Min MAIC = -7.620467 at lag 4 with RMSE = .0215438
```

Canada-Sweden: dfgls lncadsek

```
DF-GLS test for unit root
Variable: lncadsek
Lag selection: Schwert criterion           Maximum lag   =  16
```

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
16	-3.025	-3.480	-2.814	-2.533
15	-2.929	-3.480	-2.820	-2.539
14	-2.855	-3.480	-2.827	-2.545
13	-2.134	-3.480	-2.833	-2.551
12	-2.202	-3.480	-2.839	-2.556
11	-2.178	-3.480	-2.845	-2.562
10	-2.079	-3.480	-2.851	-2.567
9	-2.093	-3.480	-2.857	-2.572
8	-2.463	-3.480	-2.862	-2.577
7	-2.313	-3.480	-2.868	-2.582
6	-2.308	-3.480	-2.873	-2.587
5	-2.593	-3.480	-2.878	-2.592
4	-2.406	-3.480	-2.883	-2.596
3	-2.241	-3.480	-2.888	-2.600
2	-2.094	-3.480	-2.892	-2.604
1	-2.195	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 9 with RMSE = .0199314
Min SIC  = -7.763684 at lag 1 with RMSE = .0202436
Min MAIC = -7.727662 at lag 1 with RMSE = .0202436
```

Australia-New Zealand: dfgls lnaudnzd

```
DF-GLS test for unit root
Variable: lnaudnzd
Lag selection: Schwert criterion           Maximum lag   =  16
```

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%

```
------------------------------------------------------------------------------
     16          -1.971        -3.480        -2.814        -2.533
     15          -1.942        -3.480        -2.820        -2.539
     14          -1.795        -3.480        -2.827        -2.545
     13          -1.831        -3.480        -2.833        -2.551
     12          -1.845        -3.480        -2.839        -2.556
     11          -1.929        -3.480        -2.845        -2.562
     10          -2.020        -3.480        -2.851        -2.567
      9          -1.768        -3.480        -2.857        -2.572
      8          -1.776        -3.480        -2.862        -2.577
      7          -1.734        -3.480        -2.868        -2.582
      6          -1.720        -3.480        -2.873        -2.587
      5          -1.735        -3.480        -2.878        -2.592
      4          -1.946        -3.480        -2.883        -2.596
      3          -2.250        -3.480        -2.888        -2.600
      2          -2.440        -3.480        -2.892        -2.604
      1          -2.699        -3.480        -2.896        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 10 with RMSE = .0157624
Min SIC  = -8.193624 at lag  1 with RMSE = .0163278
Min MAIC = -8.224592 at lag  5 with RMSE = .0159488
```

Australia-Sweden: dfgls lnaudsek

```
DF-GLS test for unit root
Variable: lnaudsek
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------------------
     16          -2.570        -3.480        -2.814        -2.533
     15          -2.703        -3.480        -2.820        -2.539
     14          -2.820        -3.480        -2.827        -2.545
     13          -3.126        -3.480        -2.833        -2.551
     12          -3.380        -3.480        -2.839        -2.556
     11          -3.779        -3.480        -2.845        -2.562
     10          -3.654        -3.480        -2.851        -2.567
      9          -3.790        -3.480        -2.857        -2.572
      8          -3.785        -3.480        -2.862        -2.577
      7          -3.877        -3.480        -2.868        -2.582
      6          -3.544        -3.480        -2.873        -2.587
      5          -3.581        -3.480        -2.878        -2.592
      4          -3.506        -3.480        -2.883        -2.596
      3          -3.350        -3.480        -2.888        -2.600
      2          -3.319        -3.480        -2.892        -2.604
      1          -3.934        -3.480        -2.896        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE = .0206637
Min SIC  = -7.652217 at lag  2 with RMSE = .0212114
Min MAIC = -7.619376 at lag  2 with RMSE = .0212114
```

New Zealand-Sweden: dfgls lnnzdsek

```
DF-GLS test for unit root
Variable: lnnzdsek
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
		-------- Critical value ---------		
16	-2.159	-3.480	-2.814	-2.533
15	-2.146	-3.480	-2.820	-2.539
14	-2.328	-3.480	-2.827	-2.545
13	-2.519	-3.480	-2.833	-2.551
12	-2.596	-3.480	-2.839	-2.556
11	-2.825	-3.480	-2.845	-2.562
10	-2.940	-3.480	-2.851	-2.567
9	-3.071	-3.480	-2.857	-2.572
8	-3.151	-3.480	-2.862	-2.577
7	-3.107	-3.480	-2.868	-2.582
6	-3.023	-3.480	-2.873	-2.587
5	-3.016	-3.480	-2.878	-2.592
4	-3.131	-3.480	-2.883	-2.596
3	-3.256	-3.480	-2.888	-2.600
2	-3.198	-3.480	-2.892	-2.604
1	-3.455	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0220447
Min SIC  = -7.549672 at lag  1 with RMSE =   .02253
Min MAIC = -7.511151 at lag  2 with RMSE = .0224685
```

US-Euro Area: dfgls lnusdeur

```
DF-GLS test for unit root
Variable: lnusdeur
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
		-------- Critical value ---------		
16	-1.904	-3.480	-2.814	-2.533
15	-1.803	-3.480	-2.820	-2.539
14	-1.722	-3.480	-2.827	-2.545
13	-1.796	-3.480	-2.833	-2.551
12	-1.883	-3.480	-2.839	-2.556
11	-1.905	-3.480	-2.845	-2.562
10	-2.045	-3.480	-2.851	-2.567
9	-1.930	-3.480	-2.857	-2.572
8	-2.035	-3.480	-2.862	-2.577
7	-1.933	-3.480	-2.868	-2.582
6	-2.101	-3.480	-2.873	-2.587
5	-2.032	-3.480	-2.878	-2.592
4	-2.051	-3.480	-2.883	-2.596
3	-1.957	-3.480	-2.888	-2.600
2	-1.909	-3.480	-2.892	-2.604
1	-2.084	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0209546
Min SIC  = -7.694646 at lag 1 with RMSE = .0209546
Min MAIC = -7.701121 at lag 2 with RMSE = .0208876
```

US-Switzerland: dfgls lnusdchf

DF-GLS test for unit root
Variable: lnusdchf
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.084	-3.480	-2.814	-2.533
15	-1.974	-3.480	-2.820	-2.539
14	-1.877	-3.480	-2.827	-2.545
13	-2.037	-3.480	-2.833	-2.551
12	-2.003	-3.480	-2.839	-2.556
11	-2.151	-3.480	-2.845	-2.562
10	-2.244	-3.480	-2.851	-2.567
9	-2.021	-3.480	-2.857	-2.572
8	-1.990	-3.480	-2.862	-2.577
7	-1.806	-3.480	-2.868	-2.582
6	-1.931	-3.480	-2.873	-2.587
5	-1.836	-3.480	-2.878	-2.592
4	-1.948	-3.480	-2.883	-2.596
3	-1.965	-3.480	-2.888	-2.600
2	-2.000	-3.480	-2.892	-2.604
1	-2.094	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 10 with RMSE = .0228516
Min SIC = -7.486055 at lag 1 with RMSE = .0232581
Min MAIC = -7.488013 at lag 1 with RMSE = .0232581

Euro Area-Switzerland: dfgls lneurchf

DF-GLS test for unit root
Variable: lneurchf
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.149	-3.480	-2.814	-2.533
15	-2.076	-3.480	-2.820	-2.539
14	-2.042	-3.480	-2.827	-2.545
13	-2.029	-3.480	-2.833	-2.551
12	-2.121	-3.480	-2.839	-2.556
11	-2.160	-3.480	-2.845	-2.562
10	-1.986	-3.480	-2.851	-2.567
9	-1.964	-3.480	-2.857	-2.572
8	-2.143	-3.480	-2.862	-2.577
7	-2.070	-3.480	-2.868	-2.582
6	-1.967	-3.480	-2.873	-2.587
5	-1.878	-3.480	-2.878	-2.592
4	-1.788	-3.480	-2.883	-2.596
3	-2.018	-3.480	-2.888	-2.600
2	-1.882	-3.480	-2.892	-2.604
1	-1.942	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 4 with RMSE = .0125622
Min SIC = -8.693691 at lag 1 with RMSE = .0127157

Min MAIC = -8.707976 at lag 4 with RMSE = .0125622

Nominal Exchange Rate in first differences:

UK-Canada: dfgls D.lngbpcad

DF-GLS test for unit root
Variable: D.lngbpcad
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-4.215	-3.480	-2.813	-2.533
15	-4.546	-3.480	-2.820	-2.539
14	-4.141	-3.480	-2.827	-2.545
13	-4.061	-3.480	-2.833	-2.551
12	-4.066	-3.480	-2.839	-2.556
11	-4.069	-3.480	-2.845	-2.562
10	-4.080	-3.480	-2.851	-2.567
9	-4.141	-3.480	-2.857	-2.572
8	-4.220	-3.480	-2.863	-2.577
7	-4.295	-3.480	-2.868	-2.582
6	-4.371	-3.480	-2.873	-2.587
5	-4.444	-3.480	-2.878	-2.592
4	-4.686	-3.480	-2.883	-2.596
3	-4.910	-3.480	-2.888	-2.600
2	-4.490	-3.480	-2.892	-2.604
1	-4.540	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 15 with RMSE = .020163
Min SIC = -7.589437 at lag 5 with RMSE = .0212994
Min MAIC = -7.671059 at lag 15 with RMSE = .020163

UK-Australia: dfgls D.lngbpaud

DF-GLS test for unit root
Variable: D.lngbpaud
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-4.563	-3.480	-2.813	-2.533
15	-4.567	-3.480	-2.820	-2.539
14	-4.569	-3.480	-2.827	-2.545
13	-4.121	-3.480	-2.833	-2.551
12	-4.604	-3.480	-2.839	-2.556
11	-4.610	-3.480	-2.845	-2.562
10	-4.624	-3.480	-2.851	-2.567
9	-4.745	-3.480	-2.857	-2.572
8	-4.777	-3.480	-2.863	-2.577
7	-4.926	-3.480	-2.868	-2.582
6	-4.938	-3.480	-2.873	-2.587
5	-4.181	-3.480	-2.878	-2.592
4	-3.669	-3.480	-2.883	-2.596
3	-3.254	-3.480	-2.888	-2.600

2	-4.121	-3.480	-2.892	-2.604
1	-5.840	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 13 with RMSE = .0253563
Min SIC  = -7.178633 at lag  6 with RMSE = .0259201
Min MAIC = -7.248189 at lag 10 with RMSE = .0255235
```

UK-New Zealand: dfgls D.lngbpnzd

```
DF-GLS test for unit root
Variable: D.lngbpnzd
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-5.572	-3.480	-2.813	-2.533
15	-5.608	-3.480	-2.820	-2.539
14	-4.634	-3.480	-2.827	-2.545
13	-4.641	-3.480	-2.833	-2.551
12	-4.666	-3.480	-2.839	-2.556
11	-4.730	-3.480	-2.845	-2.562
10	-4.782	-3.480	-2.851	-2.567
9	-4.870	-3.480	-2.857	-2.572
8	-4.302	-3.480	-2.863	-2.577
7	-4.081	-3.480	-2.868	-2.582
6	-4.213	-3.480	-2.873	-2.587
5	-4.466	-3.480	-2.878	-2.592
4	-4.025	-3.480	-2.883	-2.596
3	-3.644	-3.480	-2.888	-2.600
2	-4.302	-3.480	-2.892	-2.604
1	-5.775	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 8 with RMSE =  .025231
Min SIC  = -7.214561 at lag 5 with RMSE = .0256904
Min MAIC = -7.273695 at lag 8 with RMSE =  .025231
```

UK-Sweden: dfgls D.lngbpsek

```
DF-GLS test for unit root
Variable: D.lngbpsek
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-4.376	-3.480	-2.813	-2.533
15	-3.966	-3.480	-2.820	-2.539
14	-3.665	-3.480	-2.827	-2.545
13	-3.607	-3.480	-2.833	-2.551
12	-3.623	-3.480	-2.839	-2.556
11	-3.741	-3.480	-2.845	-2.562
10	-3.851	-3.480	-2.851	-2.567
9	-4.104	-3.480	-2.857	-2.572
8	-4.351	-3.480	-2.863	-2.577
7	-4.374	-3.480	-2.868	-2.582

```
      6          -4.370        -3.480        -2.873        -2.587
      5          -4.966        -3.480        -2.878        -2.592
      4          -4.854        -3.480        -2.883        -2.596
      3          -6.182        -3.480        -2.888        -2.600
      2          -7.649        -3.480        -2.892        -2.604
      1          -9.866        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0195362
Min SIC  = -7.707346 at lag  6 with RMSE = .0198989
Min MAIC = -7.638372 at lag 15 with RMSE = .0195362
```

Canada-Australia: dfgls D.lncadaud

```
DF-GLS test for unit root
Variable: D.lncadaud
Lag selection: Schwert criterion           Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -4.150        -3.480        -2.813        -2.533
     15          -4.595        -3.480        -2.820        -2.539
     14          -4.575        -3.480        -2.827        -2.545
     13          -5.145        -3.480        -2.833        -2.551
     12          -5.808        -3.480        -2.839        -2.556
     11          -5.878        -3.480        -2.845        -2.562
     10          -5.959        -3.480        -2.851        -2.567
      9          -6.487        -3.480        -2.857        -2.572
      8          -6.912        -3.480        -2.863        -2.577
      7          -7.302        -3.480        -2.868        -2.582
      6          -7.215        -3.480        -2.873        -2.587
      5          -7.515        -3.480        -2.878        -2.592
      4          -7.979        -3.480        -2.883        -2.596
      3          -9.382        -3.480        -2.888        -2.600
      2          -9.434        -3.480        -2.892        -2.604
      1         -12.401        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE = .0187764
Min SIC  = -7.894028 at lag 1 with RMSE = .0189655
Min MAIC = -6.564073 at lag 2 with RMSE = .0189103
```

Canada-New Zealand: dfgls D.lncadnzd

```
DF-GLS test for unit root
Variable: D.lncadnzd
Lag selection: Schwert criterion           Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -3.724        -3.480        -2.813        -2.533
     15          -4.059        -3.480        -2.820        -2.539
     14          -4.195        -3.480        -2.827        -2.545
     13          -4.414        -3.480        -2.833        -2.551
     12          -4.306        -3.480        -2.839        -2.556
     11          -4.791        -3.480        -2.845        -2.562
```

```
      10          -5.305        -3.480        -2.851        -2.567
       9          -5.250        -3.480        -2.857        -2.572
       8          -5.751        -3.480        -2.863        -2.577
       7          -6.120        -3.480        -2.868        -2.582
       6          -6.953        -3.480        -2.873        -2.587
       5          -7.124        -3.480        -2.878        -2.592
       4          -8.204        -3.480        -2.883        -2.596
       3          -9.050        -3.480        -2.888        -2.600
       2          -8.603        -3.480        -2.892        -2.604
       1         -10.668        -3.480        -2.897        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  3 with RMSE = .0218658
Min SIC  = -7.580864 at lag  1 with RMSE = .0221803
Min MAIC = -6.772674 at lag 16 with RMSE = .0214198
```

Canada-Sweden: dfgls D.lncadsek

```
DF-GLS test for unit root
Variable: D.lncadsek
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
------------------------------------------------------------------
      16          -6.271        -3.480        -2.813        -2.533
      15          -6.103        -3.480        -2.820        -2.539
      14          -5.158        -3.480        -2.827        -2.545
      13          -5.214        -3.480        -2.833        -2.551
      12          -5.212        -3.480        -2.839        -2.556
      11          -5.274        -3.480        -2.845        -2.562
      10          -5.389        -3.480        -2.851        -2.567
       9          -4.525        -3.480        -2.857        -2.572
       8          -4.679        -3.480        -2.863        -2.577
       7          -4.670        -3.480        -2.868        -2.582
       6          -4.951        -3.480        -2.873        -2.587
       5          -5.196        -3.480        -2.878        -2.592
       4          -5.289        -3.480        -2.883        -2.596
       3          -5.792        -3.480        -2.888        -2.600
       2          -5.658        -3.480        -2.892        -2.604
       1          -6.489        -3.480        -2.897        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .0207559
Min SIC  = -7.561846 at lag  4 with RMSE = .0217918
Min MAIC = -7.604662 at lag 16 with RMSE = .0207559
```

Australia-New Zealand: dfgls D.lnaudnzd

```
DF-GLS test for unit root
Variable: D.lnaudnzd
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
------------------------------------------------------------------
      16          -3.113        -3.480        -2.813        -2.533
      15          -3.093        -3.480        -2.820        -2.539
      14          -3.649        -3.480        -2.827        -2.545
```

13	-3.245	-3.480	-2.833	-2.551
12	-3.795	-3.480	-2.839	-2.556
11	-4.012	-3.480	-2.845	-2.562
10	-4.097	-3.480	-2.851	-2.567
9	-4.160	-3.480	-2.857	-2.572
8	-5.206	-3.480	-2.863	-2.577
7	-5.744	-3.480	-2.868	-2.582
6	-6.647	-3.480	-2.873	-2.587
5	-7.757	-3.480	-2.878	-2.592
4	-9.220	-3.480	-2.883	-2.596
3	-9.862	-3.480	-2.888	-2.600
2	-10.244	-3.480	-2.892	-2.604
1	-11.663	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 14 with RMSE = .0160614
Min SIC  = -8.144991 at lag  1 with RMSE = .0167289
Min MAIC = -7.507814 at lag 15 with RMSE = .0160446
```

Australia-Sweden: dfgls D.lnaudsek

```
DF-GLS test for unit root
Variable: D.lnaudsek
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	-------- Critical value --------- 1%	5%	10%
16	-4.931	-3.480	-2.813	-2.533
15	-4.751	-3.480	-2.820	-2.539
14	-4.814	-3.480	-2.827	-2.545
13	-4.870	-3.480	-2.833	-2.551
12	-5.873	-3.480	-2.839	-2.556
11	-5.894	-3.480	-2.845	-2.562
10	-5.852	-3.480	-2.851	-2.567
9	-5.982	-3.480	-2.857	-2.572
8	-5.044	-3.480	-2.863	-2.577
7	-5.213	-3.480	-2.868	-2.582
6	-5.340	-3.480	-2.873	-2.587
5	-4.778	-3.480	-2.878	-2.592
4	-4.111	-3.480	-2.883	-2.596
3	-4.738	-3.480	-2.888	-2.600
2	-5.195	-3.480	-2.892	-2.604
1	-7.147	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 16 with RMSE = .0222102
Min SIC  = -7.445045 at lag  6 with RMSE = .0226875
Min MAIC = -7.493832 at lag 10 with RMSE = .0224215
```

New Zealand-Sweden: dfgls D.lnnzdsek

```
DF-GLS test for unit root
Variable: D.lnnzdsek
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	-------- Critical value --------- 1%	5%	10%

16	-1.853	-3.480	-2.813	-2.533
15	-1.917	-3.480	-2.820	-2.539
14	-2.127	-3.480	-2.827	-2.545
13	-2.166	-3.480	-2.833	-2.551
12	-2.199	-3.480	-2.839	-2.556
11	-2.354	-3.480	-2.845	-2.562
10	-2.377	-3.480	-2.851	-2.567
9	-2.473	-3.480	-2.857	-2.572
8	-2.570	-3.480	-2.863	-2.577
7	-2.735	-3.480	-2.868	-2.582
6	-3.073	-3.480	-2.873	-2.587
5	-3.596	-3.480	-2.878	-2.592
4	-4.196	-3.480	-2.883	-2.596
3	-4.826	-3.480	-2.888	-2.600
2	-5.684	-3.480	-2.892	-2.604
1	-7.679	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0236163
Min SIC  = -7.323862 at lag  2 with RMSE = .0249942
Min MAIC = -7.343077 at lag 15 with RMSE = .0236163
```

US-Euro Area: dfgls D.lnusdeur

```
DF-GLS test for unit root
Variable: D.lnusdeur
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.423	-3.480	-2.813	-2.533
15	-2.647	-3.480	-2.820	-2.539
14	-2.907	-3.480	-2.827	-2.545
13	-3.203	-3.480	-2.833	-2.551
12	-3.293	-3.480	-2.839	-2.556
11	-3.368	-3.480	-2.845	-2.562
10	-3.565	-3.480	-2.851	-2.567
9	-3.572	-3.480	-2.857	-2.572
8	-4.027	-3.480	-2.863	-2.577
7	-4.137	-3.480	-2.868	-2.582
6	-4.753	-3.480	-2.873	-2.587
5	-4.842	-3.480	-2.878	-2.592
4	-5.540	-3.480	-2.883	-2.596
3	-6.191	-3.480	-2.888	-2.600
2	-7.546	-3.480	-2.892	-2.604
1	-9.568	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0210102
Min SIC  = -7.589469 at lag  1 with RMSE = .0220851
Min MAIC = -7.480094 at lag 16 with RMSE = .0210102
```

US-Switzerland: dfgls D.lnusdchf

```
DF-GLS test for unit root
Variable: D.lnusdchf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
16	-2.426	-3.480	-2.813	-2.533
15	-2.518	-3.480	-2.820	-2.539
14	-2.702	-3.480	-2.827	-2.545
13	-2.922	-3.480	-2.833	-2.551
12	-2.879	-3.480	-2.839	-2.556
11	-3.067	-3.480	-2.845	-2.562
10	-3.055	-3.480	-2.851	-2.567
9	-3.101	-3.480	-2.857	-2.572
8	-3.550	-3.480	-2.863	-2.577
7	-3.860	-3.480	-2.868	-2.582
6	-4.663	-3.480	-2.873	-2.587
5	-4.928	-3.480	-2.878	-2.592
4	-5.895	-3.480	-2.883	-2.596
3	-6.519	-3.480	-2.888	-2.600
2	-7.761	-3.480	-2.892	-2.604
1	-9.643	-3.480	-2.897	-2.608

(Critical value: 1%, 5%, 10%)

```
Opt lag (Ng-Perron seq t) = 1 with RMSE =  .023262
Min SIC  = -7.356517 at lag  1 with RMSE = .0248132
Min MAIC = -7.281864 at lag 16 with RMSE = .0232336
```

Euro Area-Switzerland: dfgls D.lneurchf

```
DF-GLS test for unit root
Variable: D.lneurchf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
16	-3.919	-3.480	-2.813	-2.533
15	-4.099	-3.480	-2.820	-2.539
14	-4.350	-3.480	-2.827	-2.545
13	-4.547	-3.480	-2.833	-2.551
12	-4.722	-3.480	-2.839	-2.556
11	-4.673	-3.480	-2.845	-2.562
10	-4.742	-3.480	-2.851	-2.567
9	-5.358	-3.480	-2.857	-2.572
8	-5.670	-3.480	-2.863	-2.577
7	-5.402	-3.480	-2.868	-2.582
6	-5.927	-3.480	-2.873	-2.587
5	-6.725	-3.480	-2.878	-2.592
4	-7.681	-3.480	-2.883	-2.596
3	-9.154	-3.480	-2.888	-2.600
2	-8.982	-3.480	-2.892	-2.604
1	-11.651	-3.480	-2.897	-2.608

(Critical value: 1%, 5%, 10%)

```
Opt lag (Ng-Perron seq t) = 8 with RMSE = .0125378
Min SIC  = -8.678106 at lag 1 with RMSE = .0128146
Min MAIC = -7.626522 at lag 7 with RMSE = .0125944
```

Inflation Differential in levels:

UK-Canada: dfgls lnukcainf

```
DF-GLS test for unit root
Variable: lnukcainf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.903	-3.480	-2.814	-2.533
15	-2.968	-3.480	-2.820	-2.539
14	-2.130	-3.480	-2.827	-2.545
13	-2.048	-3.480	-2.833	-2.551
12	-2.364	-3.480	-2.839	-2.556
11	-2.007	-3.480	-2.845	-2.562
10	-2.871	-3.480	-2.851	-2.567
9	-2.828	-3.480	-2.857	-2.572
8	-2.670	-3.480	-2.862	-2.577
7	-2.722	-3.480	-2.868	-2.582
6	-2.052	-3.480	-2.873	-2.587
5	-2.007	-3.480	-2.878	-2.592
4	-2.047	-3.480	-2.883	-2.596
3	-2.845	-3.480	-2.888	-2.600
2	-3.208	-3.480	-2.892	-2.604
1	-3.555	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 12 with RMSE =  .238661
Min SIC  = -2.744123 at lag  2 with RMSE = .2468016
Min MAIC = -2.676906 at lag 13 with RMSE = .2377686
```

UK-Australia: dfgls lnukauinf

```
DF-GLS test for unit root
Variable: lnukauinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.103	-3.480	-2.814	-2.533
15	-2.031	-3.480	-2.820	-2.539
14	-1.642	-3.480	-2.827	-2.545
13	-1.735	-3.480	-2.833	-2.551
12	-1.647	-3.480	-2.839	-2.556
11	-2.055	-3.480	-2.845	-2.562
10	-1.974	-3.480	-2.851	-2.567
9	-1.823	-3.480	-2.857	-2.572
8	-2.062	-3.480	-2.862	-2.577
7	-2.046	-3.480	-2.868	-2.582
6	-1.953	-3.480	-2.873	-2.587
5	-1.897	-3.480	-2.878	-2.592
4	-1.907	-3.480	-2.883	-2.596
3	-1.856	-3.480	-2.888	-2.600
2	-1.907	-3.480	-2.892	-2.604
1	-2.277	-3.480	-2.896	-2.608

```
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .1493423
Min SIC  = -3.614056 at lag  2 with RMSE = .1597513
Min MAIC =  -3.67664 at lag 15 with RMSE = .1493423
```

UK-New Zealand: dfgls lnuknzinf

```
DF-GLS test for unit root
Variable: lnuknzinf
Lag selection: Schwert criterion           Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------------------
     16          -2.173        -3.480        -2.814        -2.533
     15          -2.081        -3.480        -2.820        -2.539
     14          -2.030        -3.480        -2.827        -2.545
     13          -2.186        -3.480        -2.833        -2.551
     12          -2.392        -3.480        -2.839        -2.556
     11          -3.609        -3.480        -2.845        -2.562
     10          -3.533        -3.480        -2.851        -2.567
      9          -3.206        -3.480        -2.857        -2.572
      8          -3.503        -3.480        -2.862        -2.577
      7          -3.479        -3.480        -2.868        -2.582
      6          -3.307        -3.480        -2.873        -2.587
      5          -3.664        -3.480        -2.878        -2.592
      4          -3.457        -3.480        -2.883        -2.596
      3          -3.498        -3.480        -2.888        -2.600
      2          -2.723        -3.480        -2.892        -2.604
      1          -3.011        -3.480        -2.896        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 12 with RMSE = .1324703
Min SIC  = -3.807848 at lag 12 with RMSE = .1324703
Min MAIC = -3.922497 at lag 14 with RMSE = .1317798
```

UK-Sweden: dfgls lnukseinf

```
DF-GLS test for unit root
Variable: lnukseinf
Lag selection: Schwert criterion           Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------------------
     16          -2.493        -3.480        -2.814        -2.533
     15          -2.489        -3.480        -2.820        -2.539
     14          -2.465        -3.480        -2.827        -2.545
     13          -2.677        -3.480        -2.833        -2.551
     12          -2.523        -3.480        -2.839        -2.556
     11          -3.224        -3.480        -2.845        -2.562
     10          -3.131        -3.480        -2.851        -2.567
      9          -2.997        -3.480        -2.857        -2.572
      8          -2.911        -3.480        -2.862        -2.577
      7          -3.032        -3.480        -2.868        -2.582
      6          -2.960        -3.480        -2.873        -2.587
      5          -2.761        -3.480        -2.878        -2.592
      4          -3.116        -3.480        -2.883        -2.596
```

3	-2.984	-3.480	-2.888	-2.600
2	-2.983	-3.480	-2.892	-2.604
1	-3.413	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 12 with RMSE = .1767755
Min SIC  = -3.342438 at lag  1 with RMSE = .1846503
Min MAIC =  -3.32978 at lag 12 with RMSE = .1767755
```

Canada-Australia: dfgls lncaauinf

```
DF-GLS test for unit root
Variable: lncaauinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-2.455	-3.480	-2.814	-2.533
15	-2.381	-3.480	-2.820	-2.539
14	-2.438	-3.480	-2.827	-2.545
13	-2.364	-3.480	-2.833	-2.551
12	-2.580	-3.480	-2.839	-2.556
11	-3.133	-3.480	-2.845	-2.562
10	-2.936	-3.480	-2.851	-2.567
9	-2.898	-3.480	-2.857	-2.572
8	-2.958	-3.480	-2.862	-2.577
7	-2.932	-3.480	-2.868	-2.582
6	-3.085	-3.480	-2.873	-2.587
5	-3.292	-3.480	-2.878	-2.592
4	-3.317	-3.480	-2.883	-2.596
3	-3.776	-3.480	-2.888	-2.600
2	-4.244	-3.480	-2.892	-2.604
1	-4.249	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 13 with RMSE = .2953156
Min SIC  =  -2.29133 at lag  1 with RMSE = .3123167
Min MAIC = -2.307041 at lag 13 with RMSE = .2953156
```

Canada-New Zealand: dfgls lncanzinf

```
DF-GLS test for unit root
Variable: lncanzinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-2.758	-3.480	-2.814	-2.533
15	-2.844	-3.480	-2.820	-2.539
14	-3.003	-3.480	-2.827	-2.545
13	-2.674	-3.480	-2.833	-2.551
12	-2.396	-3.480	-2.839	-2.556
11	-2.391	-3.480	-2.845	-2.562
10	-2.126	-3.480	-2.851	-2.567
9	-2.848	-3.480	-2.857	-2.572
8	-2.844	-3.480	-2.862	-2.577

```
       7          -2.734        -3.480        -2.868        -2.582
       6          -2.915        -3.480        -2.873        -2.587
       5          -3.141        -3.480        -2.878        -2.592
       4          -3.169        -3.480        -2.883        -2.596
       3          -3.567        -3.480        -2.888        -2.600
       2          -3.905        -3.480        -2.892        -2.604
       1          -2.573        -3.480        -2.896        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 13 with RMSE = .2771814
Min SIC  = -2.420339 at lag  1 with RMSE = .2928068
Min MAIC = -2.373009 at lag 16 with RMSE = .2765095
```

Canada-Sweden: dfgls lncaseinf

```
DF-GLS test for unit root
Variable: lncaseinf
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
      16          -1.829        -3.480        -2.814        -2.533
      15          -1.778        -3.480        -2.820        -2.539
      14          -2.018        -3.480        -2.827        -2.545
      13          -2.175        -3.480        -2.833        -2.551
      12          -2.202        -3.480        -2.839        -2.556
      11          -2.833        -3.480        -2.845        -2.562
      10          -2.787        -3.480        -2.851        -2.567
       9          -2.630        -3.480        -2.857        -2.572
       8          -2.845        -3.480        -2.862        -2.577
       7          -2.876        -3.480        -2.868        -2.582
       6          -2.884        -3.480        -2.873        -2.587
       5          -3.120        -3.480        -2.878        -2.592
       4          -3.162        -3.480        -2.883        -2.596
       3          -3.453        -3.480        -2.888        -2.600
       2          -4.178        -3.480        -2.892        -2.604
       1          -5.007        -3.480        -2.896        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .2439142
Min SIC  = -2.658267 at lag  3 with RMSE = .2553095
Min MAIC = -2.693176 at lag 15 with RMSE = .2439142
```

Australia-New Zealand: dfgls lnaunzinf

```
DF-GLS test for unit root
Variable: lnaunzinf
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
      16          -2.514        -3.480        -2.814        -2.533
      15          -2.485        -3.480        -2.820        -2.539
      14          -2.673        -3.480        -2.827        -2.545
      13          -2.648        -3.480        -2.833        -2.551
      12          -2.625        -3.480        -2.839        -2.556
      11          -3.343        -3.480        -2.845        -2.562
```

10	-3.292	-3.480	-2.851	-2.567
9	-3.244	-3.480	-2.857	-2.572
8	-3.018	-3.480	-2.862	-2.577
7	-2.982	-3.480	-2.868	-2.582
6	-2.947	-3.480	-2.873	-2.587
5	-2.967	-3.480	-2.878	-2.592
4	-2.910	-3.480	-2.883	-2.596
3	-2.855	-3.480	-2.888	-2.600
2	-3.130	-3.480	-2.892	-2.604
1	-3.084	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 12 with RMSE = .1615502
Min SIC  = -3.536399 at lag  1 with RMSE = .1675837
Min MAIC = -3.504621 at lag 12 with RMSE = .1615502
```

Australia-Sweden: dfgls lnauseinf

```
DF-GLS test for unit root
Variable: lnauseinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-1.382	-3.480	-2.814	-2.533
15	-1.390	-3.480	-2.820	-2.539
14	-1.397	-3.480	-2.827	-2.545
13	-1.600	-3.480	-2.833	-2.551
12	-1.550	-3.480	-2.839	-2.556
11	-2.114	-3.480	-2.845	-2.562
10	-2.073	-3.480	-2.851	-2.567
9	-2.036	-3.480	-2.857	-2.572
8	-2.090	-3.480	-2.862	-2.577
7	-2.069	-3.480	-2.868	-2.582
6	-2.216	-3.480	-2.873	-2.587
5	-2.184	-3.480	-2.878	-2.592
4	-2.127	-3.480	-2.883	-2.596
3	-2.250	-3.480	-2.888	-2.600
2	-2.438	-3.480	-2.892	-2.604
1	-2.566	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 14 with RMSE = .2408221
Min SIC  = -2.705108 at lag  1 with RMSE = .2539477
Min MAIC = -2.743585 at lag 14 with RMSE = .2408221
```

New Zealand-Sweden: dfgls lnnzseinf

```
DF-GLS test for unit root
Variable: lnnzseinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-1.678	-3.480	-2.814	-2.533
15	-1.791	-3.480	-2.820	-2.539

```
      14          -1.728       -3.480       -2.827       -2.545
      13          -2.096       -3.480       -2.833       -2.551
      12          -2.121       -3.480       -2.839       -2.556
      11          -3.043       -3.480       -2.845       -2.562
      10          -3.087       -3.480       -2.851       -2.567
       9          -2.992       -3.480       -2.857       -2.572
       8          -3.184       -3.480       -2.862       -2.577
       7          -3.096       -3.480       -2.868       -2.582
       6          -3.367       -3.480       -2.873       -2.587
       5          -3.328       -3.480       -2.878       -2.592
       4          -3.187       -3.480       -2.883       -2.596
       3          -3.192       -3.480       -2.888       -2.600
       2          -3.227       -3.480       -2.892       -2.604
       1          -3.368       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE = .2131754
Min SIC  = -2.899701 at lag  1 with RMSE = .2304035
Min MAIC = -2.973752 at lag 14 with RMSE = .2131754
```

US-Euro Area: dfgls lnuseuinf

```
DF-GLS test for unit root
Variable: lnuseuinf
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
      16          -2.568       -3.480       -2.814       -2.533
      15          -2.312       -3.480       -2.820       -2.539
      14          -2.249       -3.480       -2.827       -2.545
      13          -2.220       -3.480       -2.833       -2.551
      12          -2.467       -3.480       -2.839       -2.556
      11          -2.941       -3.480       -2.845       -2.562
      10          -2.878       -3.480       -2.851       -2.567
       9          -3.070       -3.480       -2.857       -2.572
       8          -3.270       -3.480       -2.862       -2.577
       7          -3.254       -3.480       -2.868       -2.582
       6          -3.218       -3.480       -2.873       -2.587
       5          -3.270       -3.480       -2.878       -2.592
       4          -3.054       -3.480       -2.883       -2.596
       3          -3.165       -3.480       -2.888       -2.600
       2          -3.400       -3.480       -2.892       -2.604
       1          -2.789       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 13 with RMSE = .1225192
Min SIC  =  -4.08285 at lag  2 with RMSE = .1263709
Min MAIC = -4.050769 at lag 13 with RMSE = .1234317
```

US-Switzerland: dfgls lnuschinf

```
DF-GLS test for unit root
Variable: lnuschinf
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
```

[lags]	DF-GLS tau	1%	5%	10%
16	-2.555	-3.480	-2.814	-2.533
15	-2.292	-3.480	-2.820	-2.539
14	-2.504	-3.480	-2.827	-2.545
13	-2.388	-3.480	-2.833	-2.551
12	-2.181	-3.480	-2.839	-2.556
11	-2.699	-3.480	-2.845	-2.562
10	-2.788	-3.480	-2.851	-2.567
9	-2.670	-3.480	-2.857	-2.572
8	-2.668	-3.480	-2.862	-2.577
7	-3.162	-3.480	-2.868	-2.582
6	-3.898	-3.480	-2.873	-2.587
5	-3.020	-3.480	-2.878	-2.592
4	-3.573	-3.480	-2.883	-2.596
3	-3.898	-3.480	-2.888	-2.600
2	-4.143	-3.480	-2.892	-2.604
1	-3.701	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 16 with RMSE = .1709021
Min SIC  = -3.374994 at lag  2 with RMSE = .1800346
Min MAIC = -3.320714 at lag 12 with RMSE = .1726764
```

Euro Area-Switzerland: dfgls lneuchinf

```
DF-GLS test for unit root
Variable: lneuchinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	-------- Critical value ---------		
		1%	5%	10%
16	-2.946	-3.480	-2.814	-2.533
15	-2.867	-3.480	-2.820	-2.539
14	-2.151	-3.480	-2.827	-2.545
13	-2.767	-3.480	-2.833	-2.551
12	-2.306	-3.480	-2.839	-2.556
11	-3.131	-3.480	-2.845	-2.562
10	-3.112	-3.480	-2.851	-2.567
9	-3.053	-3.480	-2.857	-2.572
8	-3.411	-3.480	-2.862	-2.577
7	-3.124	-3.480	-2.868	-2.582
6	-3.570	-3.480	-2.873	-2.587
5	-3.420	-3.480	-2.878	-2.592
4	-3.348	-3.480	-2.883	-2.596
3	-3.922	-3.480	-2.888	-2.600
2	-3.387	-3.480	-2.892	-2.604
1	-3.159	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 14 with RMSE = .1970308
Min SIC  = -3.071348 at lag  2 with RMSE = .2095521
Min MAIC = -2.974237 at lag 12 with RMSE = .2008564
```

Inflation Differential in first differences:

UK-Canada: dfgls D.lnukcainf

```
DF-GLS test for unit root
Variable: D.lnukcainf
Lag selection: Schwert criterion           Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%            10%
-------------------------------------------------------------------
     16          -4.101        -3.480        -2.813        -2.533
     15          -4.604        -3.480        -2.820        -2.539
     14          -4.898        -3.480        -2.827        -2.545
     13          -5.064        -3.480        -2.833        -2.551
     12          -5.701        -3.480        -2.839        -2.556
     11          -5.680        -3.480        -2.845        -2.562
     10          -5.153        -3.480        -2.851        -2.567
      9          -5.651        -3.480        -2.857        -2.572
      8          -6.140        -3.480        -2.863        -2.577
      7          -7.027        -3.480        -2.868        -2.582
      6          -7.793        -3.480        -2.873        -2.587
      5          -8.016        -3.480        -2.878        -2.592
      4          -9.242        -3.480        -2.883        -2.596
      3         -10.979        -3.480        -2.888        -2.600
      2         -10.761        -3.480        -2.892        -2.604
      1         -11.842        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .2477304
Min SIC  = -2.660123 at lag  3 with RMSE = .2550487
Min MAIC = -.5508222 at lag  1 with RMSE = .2601386
```

UK-Australia: dfgls D.lnukauinf

```
DF-GLS test for unit root
Variable: D.lnukauinf
Lag selection: Schwert criterion           Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%            10%
-------------------------------------------------------------------
     16          -3.946        -3.480        -2.813        -2.533
     15          -4.122        -3.480        -2.820        -2.539
     14          -4.349        -3.480        -2.827        -2.545
     13          -5.420        -3.480        -2.833        -2.551
     12          -5.370        -3.480        -2.839        -2.556
     11          -5.999        -3.480        -2.845        -2.562
     10          -4.912        -3.480        -2.851        -2.567
      9          -5.383        -3.480        -2.857        -2.572
      8          -6.266        -3.480        -2.863        -2.577
      7          -5.732        -3.480        -2.868        -2.582
      6          -6.153        -3.480        -2.873        -2.587
      5          -7.055        -3.480        -2.878        -2.592
      4          -8.148        -3.480        -2.883        -2.596
      3          -9.387        -3.480        -2.888        -2.600
      2         -11.711        -3.480        -2.892        -2.604
      1         -14.935        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE = .1507463
Min SIC  = -3.613871 at lag  1 with RMSE = .1612088
```

```
Min MAIC =  -1.34755 at lag 16 with RMSE = .1505878
```

UK-New Zealand: dfgls D.lnuknzinf

```
DF-GLS test for unit root
Variable: D.lnuknzinf
Lag selection: Schwert criterion          Maximum lag   =  16

                                -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-----------------------------------------------------------------
     16          -4.797        -3.480        -2.813        -2.533
     15          -5.284        -3.480        -2.820        -2.539
     14          -5.990        -3.480        -2.827        -2.545
     13          -6.795        -3.480        -2.833        -2.551
     12          -7.004        -3.480        -2.839        -2.556
     11          -7.074        -3.480        -2.845        -2.562
     10          -4.934        -3.480        -2.851        -2.567
      9          -5.233        -3.480        -2.857        -2.572
      8          -6.084        -3.480        -2.863        -2.577
      7          -5.878        -3.480        -2.868        -2.582
      6          -6.262        -3.480        -2.873        -2.587
      5          -7.078        -3.480        -2.878        -2.592
      4          -6.817        -3.480        -2.883        -2.596
      3          -7.839        -3.480        -2.888        -2.600
      2          -8.569        -3.480        -2.892        -2.604
      1         -13.957        -3.480        -2.897        -2.608
-----------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 11 with RMSE = .1356947
Min SIC  =  -3.77726 at lag 11 with RMSE = .1356947
Min MAIC = -2.342235 at lag  4 with RMSE = .1488685
```

UK-Sweden: dfgls D.lnukseinf

```
DF-GLS test for unit root
Variable: D.lnukseinf
Lag selection: Schwert criterion          Maximum lag   =  16

                                -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-----------------------------------------------------------------
     16          -5.257        -3.480        -2.813        -2.533
     15          -5.390        -3.480        -2.820        -2.539
     14          -5.644        -3.480        -2.827        -2.545
     13          -5.992        -3.480        -2.833        -2.551
     12          -5.812        -3.480        -2.839        -2.556
     11          -6.496        -3.480        -2.845        -2.562
     10          -5.381        -3.480        -2.851        -2.567
      9          -5.746        -3.480        -2.857        -2.572
      8          -6.300        -3.480        -2.863        -2.577
      7          -6.888        -3.480        -2.868        -2.582
      6          -7.062        -3.480        -2.873        -2.587
      5          -7.804        -3.480        -2.878        -2.592
      4          -9.326        -3.480        -2.883        -2.596
      3          -9.328        -3.480        -2.888        -2.600
      2         -11.440        -3.480        -2.892        -2.604
      1         -14.683        -3.480        -2.897        -2.608
```

```
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 11 with RMSE = .1790811
Min SIC  = -3.324154 at lag  1 with RMSE = .1863373
Min MAIC = -.6481089 at lag  3 with RMSE = .1862516
```

Canada-Australia: dfgls D.lncaauinf

```
DF-GLS test for unit root
Variable: D.lncaauinf
Lag selection: Schwert criterion          Maximum lag   =  16

                                  -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------------------
     16          -3.880        -3.480        -2.813        -2.533
     15          -4.090        -3.480        -2.820        -2.539
     14          -4.463        -3.480        -2.827        -2.545
     13          -4.724        -3.480        -2.833        -2.551
     12          -5.399        -3.480        -2.839        -2.556
     11          -5.412        -3.480        -2.845        -2.562
     10          -4.704        -3.480        -2.851        -2.567
      9          -5.456        -3.480        -2.857        -2.572
      8          -6.087        -3.480        -2.863        -2.577
      7          -6.628        -3.480        -2.868        -2.582
      6          -7.768        -3.480        -2.873        -2.587
      5          -8.512        -3.480        -2.878        -2.592
      4          -9.298        -3.480        -2.883        -2.596
      3         -11.331        -3.480        -2.888        -2.600
      2         -12.182        -3.480        -2.892        -2.604
      1         -13.353        -3.480        -2.897        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 13 with RMSE = .3087392
Min SIC  = -2.206852 at lag  1 with RMSE = .3257759
Min MAIC =  .2326091 at lag 16 with RMSE = .3066532
```

Canada-New Zealand: dfgls D.lncanzinf

```
DF-GLS test for unit root
Variable: D.lncanzinf
Lag selection: Schwert criterion          Maximum lag   =  16

                                  -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------------------
     16          -4.407        -3.480        -2.813        -2.533
     15          -5.057        -3.480        -2.820        -2.539
     14          -5.240        -3.480        -2.827        -2.545
     13          -5.448        -3.480        -2.833        -2.551
     12          -6.046        -3.480        -2.839        -2.556
     11          -5.871        -3.480        -2.845        -2.562
     10          -4.881        -3.480        -2.851        -2.567
      9          -5.409        -3.480        -2.857        -2.572
      8          -6.174        -3.480        -2.863        -2.577
      7          -6.706        -3.480        -2.868        -2.582
      6          -7.688        -3.480        -2.873        -2.587
```

```
      5          -8.281        -3.480        -2.878        -2.592
      4          -8.821        -3.480        -2.883        -2.596
      3         -10.197        -3.480        -2.888        -2.600
      2         -11.040        -3.480        -2.892        -2.604
      1         -12.360        -3.480        -2.897        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .2879655
Min SIC  = -2.338333 at lag  1 with RMSE = .3050479
Min MAIC = -.2136447 at lag  1 with RMSE = .3050479
```

Canada-Sweden: dfgls D.lncaseinf

```
DF-GLS test for unit root
Variable: D.lncaseinf
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -4.183        -3.480        -2.813        -2.533
     15          -4.610        -3.480        -2.820        -2.539
     14          -5.294        -3.480        -2.827        -2.545
     13          -5.280        -3.480        -2.833        -2.551
     12          -5.469        -3.480        -2.839        -2.556
     11          -6.061        -3.480        -2.845        -2.562
     10          -5.202        -3.480        -2.851        -2.567
      9          -5.712        -3.480        -2.857        -2.572
      8          -6.676        -3.480        -2.863        -2.577
      7          -6.899        -3.480        -2.868        -2.582
      6          -7.679        -3.480        -2.873        -2.587
      5          -8.886        -3.480        -2.878        -2.592
      4          -9.663        -3.480        -2.883        -2.596
      3         -11.622        -3.480        -2.888        -2.600
      2         -13.992        -3.480        -2.892        -2.604
      1         -15.358        -3.480        -2.897        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .2548396
Min SIC  = -2.603395 at lag  2 with RMSE = .2647745
Min MAIC =  .3915835 at lag  1 with RMSE = .2693796
```

Australia-New Zealand: dfgls D.lnaunzinf

```
DF-GLS test for unit root
Variable: D.lnaunzinf
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -5.055        -3.480        -2.813        -2.533
     15          -5.323        -3.480        -2.820        -2.539
     14          -5.631        -3.480        -2.827        -2.545
     13          -5.376        -3.480        -2.833        -2.551
     12          -5.722        -3.480        -2.839        -2.556
     11          -6.133        -3.480        -2.845        -2.562
     10          -4.930        -3.480        -2.851        -2.567
      9          -5.181        -3.480        -2.857        -2.572
```

8	-5.470	-3.480	-2.863	-2.577
7	-6.202	-3.480	-2.868	-2.582
6	-6.690	-3.480	-2.873	-2.587
5	-7.302	-3.480	-2.878	-2.592
4	-8.010	-3.480	-2.883	-2.596
3	-9.236	-3.480	-2.888	-2.600
2	-11.226	-3.480	-2.892	-2.604
1	-12.489	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 11 with RMSE = .1638375
Min SIC  = -3.503155 at lag  1 with RMSE = .1703846
Min MAIC = -1.569885 at lag  1 with RMSE = .1703846
```

Australia-Sweden: dfgls D.lnauseinf

```
DF-GLS test for unit root
Variable: D.lnauseinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-5.240	-3.480	-2.813	-2.533
15	-5.687	-3.480	-2.820	-2.539
14	-6.054	-3.480	-2.827	-2.545
13	-6.498	-3.480	-2.833	-2.551
12	-6.191	-3.480	-2.839	-2.556
11	-6.895	-3.480	-2.845	-2.562
10	-5.486	-3.480	-2.851	-2.567
9	-5.912	-3.480	-2.857	-2.572
8	-6.421	-3.480	-2.863	-2.577
7	-6.724	-3.480	-2.868	-2.582
6	-7.421	-3.480	-2.873	-2.587
5	-7.547	-3.480	-2.878	-2.592
4	-8.523	-3.480	-2.883	-2.596
3	-10.089	-3.480	-2.888	-2.600
2	-11.535	-3.480	-2.892	-2.604
1	-13.263	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 13 with RMSE =  .243725
Min SIC  = -2.680316 at lag  1 with RMSE = .2571032
Min MAIC = -.4893174 at lag  1 with RMSE = .2571032
```

New Zealand-Sweden: dfgls D.lnnzseinf

```
DF-GLS test for unit root
Variable: D.lnnzseinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-5.562	-3.480	-2.813	-2.533
15	-6.185	-3.480	-2.820	-2.539
14	-6.398	-3.480	-2.827	-2.545

13	-7.407	-3.480	-2.833	-2.551
12	-6.815	-3.480	-2.839	-2.556
11	-7.480	-3.480	-2.845	-2.562
10	-5.625	-3.480	-2.851	-2.567
9	-5.846	-3.480	-2.857	-2.572
8	-6.411	-3.480	-2.863	-2.577
7	-6.432	-3.480	-2.868	-2.582
6	-7.139	-3.480	-2.873	-2.587
5	-7.058	-3.480	-2.878	-2.592
4	-7.751	-3.480	-2.883	-2.596
3	-9.089	-3.480	-2.888	-2.600
2	-10.503	-3.480	-2.892	-2.604
1	-12.715	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 13 with RMSE = .2182886
Min SIC  =  -2.85723 at lag  1 with RMSE = .2353375
Min MAIC = -1.044527 at lag  5 with RMSE = .2350983
```

US-Euro Area: dfgls D.lnuseuinf

```
DF-GLS test for unit root
Variable: D.lnuseuinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.633	-3.480	-2.813	-2.533
15	-3.582	-3.480	-2.820	-2.539
14	-4.276	-3.480	-2.827	-2.545
13	-4.788	-3.480	-2.833	-2.551
12	-5.366	-3.480	-2.839	-2.556
11	-5.369	-3.480	-2.845	-2.562
10	-4.867	-3.480	-2.851	-2.567
9	-5.389	-3.480	-2.857	-2.572
8	-5.481	-3.480	-2.863	-2.577
7	-5.548	-3.480	-2.868	-2.582
6	-6.053	-3.480	-2.873	-2.587
5	-6.723	-3.480	-2.878	-2.592
4	-7.351	-3.480	-2.883	-2.596
3	-9.049	-3.480	-2.888	-2.600
2	-10.374	-3.480	-2.892	-2.604
1	-11.829	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 15 with RMSE = .1259082
Min SIC  = -4.041508 at lag  1 with RMSE = .1301752
Min MAIC = -2.364034 at lag 15 with RMSE = .1259082
```

US-Switzerland: dfgls D.lnuschinf

```
DF-GLS test for unit root
Variable: D.lnuschinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%

16	-4.534	-3.480	-2.813	-2.533
15	-4.474	-3.480	-2.820	-2.539
14	-5.077	-3.480	-2.827	-2.545
13	-5.012	-3.480	-2.833	-2.551
12	-5.460	-3.480	-2.839	-2.556
11	-6.244	-3.480	-2.845	-2.562
10	-5.704	-3.480	-2.851	-2.567
9	-5.881	-3.480	-2.857	-2.572
8	-6.473	-3.480	-2.863	-2.577
7	-6.969	-3.480	-2.868	-2.582
6	-6.533	-3.480	-2.873	-2.587
5	-7.535	-3.480	-2.878	-2.592
4	-8.010	-3.480	-2.883	-2.596
3	-7.567	-3.480	-2.888	-2.600
2	-10.035	-3.480	-2.892	-2.604
1	-11.017	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 11 with RMSE =  .178203
Min SIC  = -3.325005 at lag  1 with RMSE = .1862581
Min MAIC = -2.096546 at lag  3 with RMSE = .1838862
```

Euro Area-Switzerland: dfgls D.lneuchinf

```
DF-GLS test for unit root
Variable: D.lneuchinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-4.508	-3.480	-2.813	-2.533
15	-4.554	-3.480	-2.820	-2.539
14	-4.904	-3.480	-2.827	-2.545
13	-4.809	-3.480	-2.833	-2.551
12	-5.648	-3.480	-2.839	-2.556
11	-7.154	-3.480	-2.845	-2.562
10	-6.211	-3.480	-2.851	-2.567
9	-6.747	-3.480	-2.857	-2.572
8	-7.517	-3.480	-2.863	-2.577
7	-7.567	-3.480	-2.868	-2.582
6	-6.950	-3.480	-2.873	-2.587
5	-6.721	-3.480	-2.878	-2.592
4	-7.376	-3.480	-2.883	-2.596
3	-7.996	-3.480	-2.888	-2.600
2	-9.698	-3.480	-2.892	-2.604
1	-9.931	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 13 with RMSE =  .206124
Min SIC  = -2.984904 at lag  1 with RMSE = .2207837
Min MAIC = -1.773703 at lag  1 with RMSE = .2207837
```

Interest Rate Differential in levels:

UK-Canada: dfgls lnukcair

```
DF-GLS test for unit root
Variable: lnukcair
Lag selection: Schwert criterion           Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -2.078        -3.480        -2.814        -2.533
     15          -2.176        -3.480        -2.820        -2.539
     14          -2.153        -3.480        -2.827        -2.545
     13          -2.269        -3.480        -2.833        -2.551
     12          -2.311        -3.480        -2.839        -2.556
     11          -2.361        -3.480        -2.845        -2.562
     10          -2.277        -3.480        -2.851        -2.567
      9          -2.432        -3.480        -2.857        -2.572
      8          -2.055        -3.480        -2.862        -2.577
      7          -1.971        -3.480        -2.868        -2.582
      6          -1.969        -3.480        -2.873        -2.587
      5          -1.990        -3.480        -2.878        -2.592
      4          -1.975        -3.480        -2.883        -2.596
      3          -2.038        -3.480        -2.888        -2.600
      2          -2.162        -3.480        -2.892        -2.604
      1          -2.169        -3.480        -2.896        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 9 with RMSE = .0490811
Min SIC  = -5.960315 at lag 1 with RMSE = .0498753
Min MAIC = -5.960295 at lag 1 with RMSE = .0498753
```

UK-Australia: dfgls lnukauir

```
DF-GLS test for unit root
Variable: lnukauir
Lag selection: Schwert criterion           Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -1.812        -3.480        -2.814        -2.533
     15          -1.935        -3.480        -2.820        -2.539
     14          -1.705        -3.480        -2.827        -2.545
     13          -1.744        -3.480        -2.833        -2.551
     12          -1.719        -3.480        -2.839        -2.556
     11          -1.821        -3.480        -2.845        -2.562
     10          -1.857        -3.480        -2.851        -2.567
      9          -1.932        -3.480        -2.857        -2.572
      8          -1.889        -3.480        -2.862        -2.577
      7          -1.670        -3.480        -2.868        -2.582
      6          -1.600        -3.480        -2.873        -2.587
      5          -1.409        -3.480        -2.878        -2.592
      4          -1.375        -3.480        -2.883        -2.596
      3          -1.122        -3.480        -2.888        -2.600
      2          -0.941        -3.480        -2.892        -2.604
      1          -1.066        -3.480        -2.896        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0402948
Min SIC  =  -6.33334 at lag  1 with RMSE = .0413889
```

```
Min MAIC = -6.358474 at lag  4 with RMSE = .0408393
```

UK-New Zealand: dfgls lnuknzir

```
DF-GLS test for unit root
Variable: lnuknzir
Lag selection: Schwert criterion          Maximum lag   =  16

                                  -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%             10%
-------------------------------------------------------------------
     16          -1.446        -3.480        -2.814          -2.533
     15          -1.741        -3.480        -2.820          -2.539
     14          -1.684        -3.480        -2.827          -2.545
     13          -1.781        -3.480        -2.833          -2.551
     12          -1.706        -3.480        -2.839          -2.556
     11          -1.771        -3.480        -2.845          -2.562
     10          -1.822        -3.480        -2.851          -2.567
      9          -1.731        -3.480        -2.857          -2.572
      8          -1.966        -3.480        -2.862          -2.577
      7          -1.622        -3.480        -2.868          -2.582
      6          -1.720        -3.480        -2.873          -2.587
      5          -1.636        -3.480        -2.878          -2.592
      4          -1.780        -3.480        -2.883          -2.596
      3          -1.717        -3.480        -2.888          -2.600
      2          -1.649        -3.480        -2.892          -2.604
      1          -1.876        -3.480        -2.896          -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .0395321
Min SIC  = -6.367231 at lag  1 with RMSE = .0406934
Min MAIC = -6.380475 at lag  2 with RMSE = .0405433
```

UK-Sweden: dfgls lnukseir

```
DF-GLS test for unit root
Variable: lnukseir
Lag selection: Schwert criterion          Maximum lag   =  16

                                  -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%             10%
-------------------------------------------------------------------
     16          -2.498        -3.480        -2.814          -2.533
     15          -2.586        -3.480        -2.820          -2.539
     14          -2.265        -3.480        -2.827          -2.545
     13          -2.091        -3.480        -2.833          -2.551
     12          -2.110        -3.480        -2.839          -2.556
     11          -2.015        -3.480        -2.845          -2.562
     10          -1.812        -3.480        -2.851          -2.567
      9          -1.986        -3.480        -2.857          -2.572
      8          -1.906        -3.480        -2.862          -2.577
      7          -2.032        -3.480        -2.868          -2.582
      6          -1.981        -3.480        -2.873          -2.587
      5          -2.113        -3.480        -2.878          -2.592
      4          -1.717        -3.480        -2.883          -2.596
      3          -1.583        -3.480        -2.888          -2.600
      2          -1.229        -3.480        -2.892          -2.604
      1          -1.349        -3.480        -2.896          -2.608
```

```
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0482864
Min SIC  = -5.894039 at lag  5 with RMSE = .0497255
Min MAIC = -5.940901 at lag  5 with RMSE = .0497255
```

Canada-Australia: dfgls lncaauir

```
DF-GLS test for unit root
Variable: lncaauir
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau            1%             5%            10%
------------------------------------------------------------------------------
     16          -1.493        -3.480         -2.814         -2.533
     15          -1.492        -3.480         -2.820         -2.539
     14          -1.227        -3.480         -2.827         -2.545
     13          -1.096        -3.480         -2.833         -2.551
     12          -1.186        -3.480         -2.839         -2.556
     11          -1.255        -3.480         -2.845         -2.562
     10          -1.267        -3.480         -2.851         -2.567
      9          -1.227        -3.480         -2.857         -2.572
      8          -1.161        -3.480         -2.862         -2.577
      7          -1.177        -3.480         -2.868         -2.582
      6          -1.184        -3.480         -2.873         -2.587
      5          -1.288        -3.480         -2.878         -2.592
      4          -1.263        -3.480         -2.883         -2.596
      3          -1.343        -3.480         -2.888         -2.600
      2          -1.380        -3.480         -2.892         -2.604
      1          -1.361        -3.480         -2.896         -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0366216
Min SIC  = -6.553738 at lag  1 with RMSE = .0370702
Min MAIC = -6.571821 at lag  1 with RMSE = .0370702
```

Canada-New Zealand: dfgls lncanzir

```
DF-GLS test for unit root
Variable: lncanzir
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau            1%             5%            10%
------------------------------------------------------------------------------
     16          -2.277        -3.480         -2.814         -2.533
     15          -2.118        -3.480         -2.820         -2.539
     14          -1.826        -3.480         -2.827         -2.545
     13          -1.918        -3.480         -2.833         -2.551
     12          -2.018        -3.480         -2.839         -2.556
     11          -2.216        -3.480         -2.845         -2.562
     10          -2.122        -3.480         -2.851         -2.567
      9          -2.300        -3.480         -2.857         -2.572
      8          -1.841        -3.480         -2.862         -2.577
      7          -1.720        -3.480         -2.868         -2.582
      6          -1.770        -3.480         -2.873         -2.587
      5          -1.825        -3.480         -2.878         -2.592
```

```
       4          -1.708        -3.480        -2.883        -2.596
       3          -1.903        -3.480        -2.888        -2.600
       2          -1.949        -3.480        -2.892        -2.604
       1          -1.660        -3.480        -2.896        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0405927
Min SIC  = -6.293868 at lag  1 with RMSE = .0422139
Min MAIC = -6.310731 at lag  2 with RMSE = .0418391
```

Canada-Sweden: dfgls lncaseir

```
DF-GLS test for unit root
Variable: lncaseir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------
      16          -3.108        -3.480        -2.814        -2.533
      15          -2.729        -3.480        -2.820        -2.539
      14          -2.408        -3.480        -2.827        -2.545
      13          -2.353        -3.480        -2.833        -2.551
      12          -2.347        -3.480        -2.839        -2.556
      11          -2.260        -3.480        -2.845        -2.562
      10          -2.232        -3.480        -2.851        -2.567
       9          -2.491        -3.480        -2.857        -2.572
       8          -2.210        -3.480        -2.862        -2.577
       7          -2.087        -3.480        -2.868        -2.582
       6          -2.068        -3.480        -2.873        -2.587
       5          -2.039        -3.480        -2.878        -2.592
       4          -2.235        -3.480        -2.883        -2.596
       3          -2.492        -3.480        -2.888        -2.600
       2          -2.240        -3.480        -2.892        -2.604
       1          -2.041        -3.480        -2.896        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE =  .054787
Min SIC  = -5.669512 at lag  1 with RMSE = .0576809
Min MAIC = -5.674028 at lag  5 with RMSE =  .056849
```

Australia-New Zealand: dfgls lnaunzir

```
DF-GLS test for unit root
Variable: lnaunzir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------
      16          -2.405        -3.480        -2.814        -2.533
      15          -2.467        -3.480        -2.820        -2.539
      14          -2.272        -3.480        -2.827        -2.545
      13          -2.372        -3.480        -2.833        -2.551
      12          -2.432        -3.480        -2.839        -2.556
      11          -2.541        -3.480        -2.845        -2.562
      10          -2.440        -3.480        -2.851        -2.567
       9          -2.340        -3.480        -2.857        -2.572
       8          -2.366        -3.480        -2.862        -2.577
```

```
      7          -2.360        -3.480        -2.868        -2.582
      6          -2.394        -3.480        -2.873        -2.587
      5          -2.574        -3.480        -2.878        -2.592
      4          -2.476        -3.480        -2.883        -2.596
      3          -2.627        -3.480        -2.888        -2.600
      2          -2.262        -3.480        -2.892        -2.604
      1          -2.289        -3.480        -2.896        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE = .0319293
Min SIC  = -6.827071 at lag 1 with RMSE = .0323349
Min MAIC = -6.823857 at lag 3 with RMSE = .0319293
```

Australia-Sweden: dfgls lnauseir

```
DF-GLS test for unit root
Variable: lnauseir
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -2.455        -3.480        -2.814        -2.533
     15          -2.166        -3.480        -2.820        -2.539
     14          -1.892        -3.480        -2.827        -2.545
     13          -2.141        -3.480        -2.833        -2.551
     12          -2.230        -3.480        -2.839        -2.556
     11          -2.135        -3.480        -2.845        -2.562
     10          -2.025        -3.480        -2.851        -2.567
      9          -1.988        -3.480        -2.857        -2.572
      8          -1.776        -3.480        -2.862        -2.577
      7          -1.781        -3.480        -2.868        -2.582
      6          -1.725        -3.480        -2.873        -2.587
      5          -1.541        -3.480        -2.878        -2.592
      4          -1.276        -3.480        -2.883        -2.596
      3          -1.033        -3.480        -2.888        -2.600
      2          -0.571        -3.480        -2.892        -2.604
      1          -0.313        -3.480        -2.896        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .0480397
Min SIC  = -5.938176 at lag  1 with RMSE = .0504304
Min MAIC = -5.979219 at lag  3 with RMSE = .0496522
```

New Zealand-Sweden: dfgls lnnzseir

```
DF-GLS test for unit root
Variable: lnnzseir
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -2.665        -3.480        -2.814        -2.533
     15          -2.381        -3.480        -2.820        -2.539
     14          -2.003        -3.480        -2.827        -2.545
     13          -2.045        -3.480        -2.833        -2.551
     12          -2.183        -3.480        -2.839        -2.556
     11          -2.063        -3.480        -2.845        -2.562
```

```
     10          -1.987       -3.480       -2.851       -2.567
      9          -2.050       -3.480       -2.857       -2.572
      8          -1.909       -3.480       -2.862       -2.577
      7          -1.781       -3.480       -2.868       -2.582
      6          -1.637       -3.480       -2.873       -2.587
      5          -1.659       -3.480       -2.878       -2.592
      4          -1.602       -3.480       -2.883       -2.596
      3          -1.572       -3.480       -2.888       -2.600
      2          -1.378       -3.480       -2.892       -2.604
      1          -1.122       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .0493328
Min SIC  = -5.912547 at lag  1 with RMSE = .0510808
Min MAIC =  -5.93433 at lag  1 with RMSE = .0510808
```

US-Euro Area: dfgls lnuseuir

```
DF-GLS test for unit root
Variable: lnuseuir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -2.328       -3.480       -2.814       -2.533
     15          -2.509       -3.480       -2.820       -2.539
     14          -2.310       -3.480       -2.827       -2.545
     13          -2.108       -3.480       -2.833       -2.551
     12          -2.150       -3.480       -2.839       -2.556
     11          -2.195       -3.480       -2.845       -2.562
     10          -2.285       -3.480       -2.851       -2.567
      9          -2.168       -3.480       -2.857       -2.572
      8          -2.072       -3.480       -2.862       -2.577
      7          -2.035       -3.480       -2.868       -2.582
      6          -1.961       -3.480       -2.873       -2.587
      5          -1.882       -3.480       -2.878       -2.592
      4          -1.669       -3.480       -2.883       -2.596
      3          -1.565       -3.480       -2.888       -2.600
      2          -1.522       -3.480       -2.892       -2.604
      1          -1.562       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 5 with RMSE = .0706503
Min SIC  = -5.238657 at lag 1 with RMSE =  .071547
Min MAIC = -5.253071 at lag 1 with RMSE =  .071547
```

US-Switzerland: dfgls lnuschir

```
DF-GLS test for unit root
Variable: lnuschir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -2.041       -3.480       -2.814       -2.533
     15          -1.950       -3.480       -2.820       -2.539
     14          -1.802       -3.480       -2.827       -2.545
```

13	-1.965	-3.480	-2.833	-2.551
12	-1.864	-3.480	-2.839	-2.556
11	-1.821	-3.480	-2.845	-2.562
10	-1.945	-3.480	-2.851	-2.567
9	-1.694	-3.480	-2.857	-2.572
8	-1.669	-3.480	-2.862	-2.577
7	-1.781	-3.480	-2.868	-2.582
6	-1.706	-3.480	-2.873	-2.587
5	-1.772	-3.480	-2.878	-2.592
4	-1.779	-3.480	-2.883	-2.596
3	-1.816	-3.480	-2.888	-2.600
2	-1.834	-3.480	-2.892	-2.604
1	-1.981	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 10 with RMSE = .1462008
Min SIC  = -3.776759 at lag  1 with RMSE = .1486067
Min MAIC =  -3.78356 at lag  2 with RMSE = .1482361
```

Euro Area-Switzerland: dfgls lneuchir

```
DF-GLS test for unit root
Variable: lneuchir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-2.330	-3.480	-2.814	-2.533
15	-2.351	-3.480	-2.820	-2.539
14	-2.293	-3.480	-2.827	-2.545
13	-2.661	-3.480	-2.833	-2.551
12	-2.485	-3.480	-2.839	-2.556
11	-2.391	-3.480	-2.845	-2.562
10	-2.795	-3.480	-2.851	-2.567
9	-2.291	-3.480	-2.857	-2.572
8	-2.118	-3.480	-2.862	-2.577
7	-2.165	-3.480	-2.868	-2.582
6	-2.230	-3.480	-2.873	-2.587
5	-2.450	-3.480	-2.878	-2.592
4	-2.441	-3.480	-2.883	-2.596
3	-2.620	-3.480	-2.888	-2.600
2	-2.650	-3.480	-2.892	-2.604
1	-2.940	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 10 with RMSE = .1329611
Min SIC  = -3.962099 at lag  1 with RMSE = .1354542
Min MAIC = -3.895272 at lag  2 with RMSE = .1352793
```

<u>Interest Rate Differential in first differences:</u>

UK-Canada: dfgls D.lnukcair

```
DF-GLS test for unit root
Variable: D.lnukcair
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
```

[lags]	DF-GLS tau	1%	5%	10%
16	-3.731	-3.480	-2.813	-2.533
15	-3.880	-3.480	-2.820	-2.539
14	-3.880	-3.480	-2.827	-2.545
13	-4.099	-3.480	-2.833	-2.551
12	-4.058	-3.480	-2.839	-2.556
11	-4.160	-3.480	-2.845	-2.562
10	-4.245	-3.480	-2.851	-2.567
9	-4.593	-3.480	-2.857	-2.572
8	-4.480	-3.480	-2.863	-2.577
7	-5.626	-3.480	-2.868	-2.582
6	-6.359	-3.480	-2.873	-2.587
5	-6.952	-3.480	-2.878	-2.592
4	-7.595	-3.480	-2.883	-2.596
3	-8.585	-3.480	-2.888	-2.600
2	-9.501	-3.480	-2.892	-2.604
1	-10.418	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 8 with RMSE = .050036
Min SIC = -5.920876 at lag 1 with RMSE = .0508661
Min MAIC = -5.244909 at lag 8 with RMSE = .050036

UK-Australia: dfgls D.lnukauir

DF-GLS test for unit root
Variable: D.lnukauir
Lag selection: Schwert criterion Maximum lag = 16

[lags]	DF-GLS tau	-------- Critical value ---------		
		1%	5%	10%
16	-1.834	-3.480	-2.813	-2.533
15	-1.974	-3.480	-2.820	-2.539
14	-1.951	-3.480	-2.827	-2.545
13	-2.136	-3.480	-2.833	-2.551
12	-2.185	-3.480	-2.839	-2.556
11	-2.296	-3.480	-2.845	-2.562
10	-2.307	-3.480	-2.851	-2.567
9	-2.376	-3.480	-2.857	-2.572
8	-2.425	-3.480	-2.863	-2.577
7	-2.579	-3.480	-2.868	-2.582
6	-2.953	-3.480	-2.873	-2.587
5	-3.248	-3.480	-2.878	-2.592
4	-3.779	-3.480	-2.883	-2.596
3	-4.249	-3.480	-2.888	-2.600
2	-5.468	-3.480	-2.892	-2.604
1	-7.380	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 3 with RMSE = .0409542
Min SIC = -6.234709 at lag 3 with RMSE = .0426984
Min MAIC = -6.24407 at lag 16 with RMSE = .0409542

UK-New Zealand: dfgls D.lnuknzir

DF-GLS test for unit root
Variable: D.lnuknzir

```
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau          1%            5%            10%
--------------------------------------------------------------
     16          -2.310       -3.480        -2.813        -2.533
     15          -2.675       -3.480        -2.820        -2.539
     14          -2.523       -3.480        -2.827        -2.545
     13          -2.704       -3.480        -2.833        -2.551
     12          -2.751       -3.480        -2.839        -2.556
     11          -3.015       -3.480        -2.845        -2.562
     10          -3.119       -3.480        -2.851        -2.567
      9          -3.299       -3.480        -2.857        -2.572
      8          -3.689       -3.480        -2.863        -2.577
      7          -3.618       -3.480        -2.868        -2.582
      6          -4.526       -3.480        -2.873        -2.587
      5          -4.839       -3.480        -2.878        -2.592
      4          -5.654       -3.480        -2.883        -2.596
      3          -6.096       -3.480        -2.888        -2.600
      2          -7.273       -3.480        -2.892        -2.604
      1          -9.103       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0402342
Min SIC  = -6.270201 at lag  1 with RMSE = .0427143
Min MAIC = -6.198773 at lag 16 with RMSE = .0402342
```

UK-Sweden: dfgls D.lnukseir

```
DF-GLS test for unit root
Variable: D.lnukseir
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau          1%            5%            10%
--------------------------------------------------------------
     16          -1.745       -3.480        -2.813        -2.533
     15          -1.946       -3.480        -2.820        -2.539
     14          -1.919       -3.480        -2.827        -2.545
     13          -2.244       -3.480        -2.833        -2.551
     12          -2.533       -3.480        -2.839        -2.556
     11          -2.641       -3.480        -2.845        -2.562
     10          -2.900       -3.480        -2.851        -2.567
      9          -3.400       -3.480        -2.857        -2.572
      8          -3.296       -3.480        -2.863        -2.577
      7          -3.655       -3.480        -2.868        -2.582
      6          -3.666       -3.480        -2.873        -2.587
      5          -3.997       -3.480        -2.878        -2.592
      4          -4.021       -3.480        -2.883        -2.596
      3          -5.180       -3.480        -2.888        -2.600
      2          -6.195       -3.480        -2.892        -2.604
      1          -9.106       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 4 with RMSE = .0490803
Min SIC  = -5.855378 at lag  4 with RMSE = .0511502
```

```
Min MAIC = -5.864147 at lag 16 with RMSE = .0490803
```

Canada-Australia: dfgls D.lncaauir

```
DF-GLS test for unit root
Variable: D.lncaauir
Lag selection: Schwert criterion          Maximum lag   =  16

                                    -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
----------------------------------------------------------------
     16          -2.616       -3.480        -2.813        -2.533
     15          -2.703       -3.480        -2.820        -2.539
     14          -2.766       -3.480        -2.827        -2.545
     13          -3.146       -3.480        -2.833        -2.551
     12          -3.438       -3.480        -2.839        -2.556
     11          -3.546       -3.480        -2.845        -2.562
     10          -3.612       -3.480        -2.851        -2.567
      9          -3.762       -3.480        -2.857        -2.572
      8          -4.026       -3.480        -2.863        -2.577
      7          -4.492       -3.480        -2.868        -2.582
      6          -4.869       -3.480        -2.873        -2.587
      5          -5.276       -3.480        -2.878        -2.592
      4          -5.492       -3.480        -2.883        -2.596
      3          -6.092       -3.480        -2.888        -2.600
      2          -6.460       -3.480        -2.892        -2.604
      1          -6.940       -3.480        -2.897        -2.608
----------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0370828
Min SIC  = -6.506429 at lag  1 with RMSE = .0379558
Min MAIC = -6.370063 at lag 14 with RMSE = .0370828
```

Canada-New Zealand: dfgls D.lncanzir

```
DF-GLS test for unit root
Variable: D.lncanzir
Lag selection: Schwert criterion          Maximum lag   =  16

                                    -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
----------------------------------------------------------------
     16          -3.361       -3.480        -2.813        -2.533
     15          -3.422       -3.480        -2.820        -2.539
     14          -3.701       -3.480        -2.827        -2.545
     13          -4.213       -3.480        -2.833        -2.551
     12          -4.198       -3.480        -2.839        -2.556
     11          -4.274       -3.480        -2.845        -2.562
     10          -4.100       -3.480        -2.851        -2.567
      9          -4.395       -3.480        -2.857        -2.572
      8          -4.230       -3.480        -2.863        -2.577
      7          -5.342       -3.480        -2.868        -2.582
      6          -6.021       -3.480        -2.873        -2.587
      5          -6.206       -3.480        -2.878        -2.592
      4          -6.537       -3.480        -2.883        -2.596
      3          -7.610       -3.480        -2.888        -2.600
      2          -7.692       -3.480        -2.892        -2.604
      1          -8.238       -3.480        -2.897        -2.608
```

```
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0408904
Min SIC  = -6.288924 at lag  1 with RMSE = .0423164
Min MAIC = -5.927412 at lag 15 with RMSE = .0408183
```

Canada-Sweden: dfgls D.lncaseir

```
DF-GLS test for unit root
Variable: D.lncaseir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -2.163       -3.480       -2.813       -2.533
     15          -2.213       -3.480       -2.820       -2.539
     14          -2.692       -3.480       -2.827       -2.545
     13          -3.250       -3.480       -2.833       -2.551
     12          -3.524       -3.480       -2.839       -2.556
     11          -3.798       -3.480       -2.845       -2.562
     10          -4.169       -3.480       -2.851       -2.567
      9          -4.466       -3.480       -2.857       -2.572
      8          -4.192       -3.480       -2.863       -2.577
      7          -5.178       -3.480       -2.868       -2.582
      6          -5.849       -3.480       -2.873       -2.587
      5          -6.394       -3.480       -2.878       -2.592
      4          -7.131       -3.480       -2.883       -2.596
      3          -7.277       -3.480       -2.888       -2.600
      2          -7.262       -3.480       -2.892       -2.604
      1          -8.851       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0559894
Min SIC  = -5.632051 at lag  1 with RMSE = .0587687
Min MAIC = -5.493377 at lag 15 with RMSE = .0559894
```

Australia-New Zealand: dfgls D.lnaunzir

```
DF-GLS test for unit root
Variable: D.lnaunzir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -2.944       -3.480       -2.813       -2.533
     15          -3.304       -3.480       -2.820       -2.539
     14          -3.358       -3.480       -2.827       -2.545
     13          -3.798       -3.480       -2.833       -2.551
     12          -3.854       -3.480       -2.839       -2.556
     11          -3.938       -3.480       -2.845       -2.562
     10          -3.971       -3.480       -2.851       -2.567
      9          -4.290       -3.480       -2.857       -2.572
      8          -4.766       -3.480       -2.863       -2.577
      7          -5.039       -3.480       -2.868       -2.582
      6          -5.441       -3.480       -2.873       -2.587
```

5	-5.874	-3.480	-2.878	-2.592
4	-5.933	-3.480	-2.883	-2.596
3	-6.653	-3.480	-2.888	-2.600
2	-6.884	-3.480	-2.892	-2.604
1	-9.274	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0321984
Min SIC  = -6.779209 at lag  2 with RMSE = .0328178
Min MAIC = -6.502598 at lag 16 with RMSE = .0321984
```

Australia-Sweden: dfgls D.lnauseir

```
DF-GLS test for unit root
Variable: D.lnauseir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.067	-3.480	-2.813	-2.533
15	-3.129	-3.480	-2.820	-2.539
14	-3.500	-3.480	-2.827	-2.545
13	-4.071	-3.480	-2.833	-2.551
12	-3.729	-3.480	-2.839	-2.556
11	-3.659	-3.480	-2.845	-2.562
10	-3.848	-3.480	-2.851	-2.567
9	-4.127	-3.480	-2.857	-2.572
8	-4.328	-3.480	-2.863	-2.577
7	-4.846	-3.480	-2.868	-2.582
6	-4.973	-3.480	-2.873	-2.587
5	-5.193	-3.480	-2.878	-2.592
4	-5.650	-3.480	-2.883	-2.596
3	-6.433	-3.480	-2.888	-2.600
2	-7.455	-3.480	-2.892	-2.604
1	-9.793	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0485785
Min SIC  = -5.953282 at lag  2 with RMSE = .0495972
Min MAIC = -5.598413 at lag 15 with RMSE = .0483918
```

New Zealand-Sweden: dfgls D.lnnzseir

```
DF-GLS test for unit root
Variable: D.lnnzseir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.012	-3.480	-2.813	-2.533
15	-3.098	-3.480	-2.820	-2.539
14	-3.507	-3.480	-2.827	-2.545
13	-4.224	-3.480	-2.833	-2.551
12	-4.263	-3.480	-2.839	-2.556
11	-4.106	-3.480	-2.845	-2.562
10	-4.415	-3.480	-2.851	-2.567
9	-4.722	-3.480	-2.857	-2.572

```
      8          -4.753        -3.480        -2.863        -2.577
      7          -5.209        -3.480        -2.868        -2.582
      6          -5.657        -3.480        -2.873        -2.587
      5          -6.194        -3.480        -2.878        -2.592
      4          -6.494        -3.480        -2.883        -2.596
      3          -7.059        -3.480        -2.888        -2.600
      2          -7.683        -3.480        -2.892        -2.604
      1          -9.155        -3.480        -2.897        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0500963
Min SIC  =  -5.91651 at lag  1 with RMSE = .0509773
Min MAIC =  -5.50565 at lag 15 with RMSE = .0499064
```

US-Euro Area: dfgls D.lnuseuir

```
DF-GLS test for unit root
Variable: D.lnuseuir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -3.690        -3.480        -2.813        -2.533
     15          -3.550        -3.480        -2.820        -2.539
     14          -3.341        -3.480        -2.827        -2.545
     13          -3.681        -3.480        -2.833        -2.551
     12          -4.109        -3.480        -2.839        -2.556
     11          -4.151        -3.480        -2.845        -2.562
     10          -4.190        -3.480        -2.851        -2.567
      9          -4.140        -3.480        -2.857        -2.572
      8          -4.523        -3.480        -2.863        -2.577
      7          -4.953        -3.480        -2.868        -2.582
      6          -5.258        -3.480        -2.873        -2.587
      5          -5.746        -3.480        -2.878        -2.592
      4          -6.364        -3.480        -2.883        -2.596
      3          -7.826        -3.480        -2.888        -2.600
      2          -9.437        -3.480        -2.892        -2.604
      1         -11.596        -3.480        -2.897        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  4 with RMSE = .0711416
Min SIC  = -5.229681 at lag  1 with RMSE = .0718654
Min MAIC =  -4.60888 at lag 4 with RMSE = .0705253
```

US-Switzerland: dfgls D.lnuschir

```
DF-GLS test for unit root
Variable: D.lnuschir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -3.001        -3.480        -2.813        -2.533
     15          -3.326        -3.480        -2.820        -2.539
     14          -3.648        -3.480        -2.827        -2.545
     13          -4.131        -3.480        -2.833        -2.551
```

12	-3.967	-3.480	-2.839	-2.556
11	-4.378	-3.480	-2.845	-2.562
10	-4.722	-3.480	-2.851	-2.567
9	-4.652	-3.480	-2.857	-2.572
8	-5.724	-3.480	-2.863	-2.577
7	-6.294	-3.480	-2.868	-2.582
6	-6.421	-3.480	-2.873	-2.587
5	-7.400	-3.480	-2.878	-2.592
4	-7.967	-3.480	-2.883	-2.596
3	-9.076	-3.480	-2.888	-2.600
2	-10.517	-3.480	-2.892	-2.604
1	-13.197	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  9 with RMSE = .1483751
Min SIC  =  -3.74866 at lag  1 with RMSE = .1507022
Min MAIC = -2.828025 at lag 16 with RMSE = .1461658
```

Euro Area-Switzerland: dfgls D.lneuchir

```
DF-GLS test for unit root
Variable: D.lneuchir
Lag selection: Schwert criterion          Maximum lag  =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.512	-3.480	-2.813	-2.533
15	-3.928	-3.480	-2.820	-2.539
14	-4.109	-3.480	-2.827	-2.545
13	-4.399	-3.480	-2.833	-2.551
12	-4.146	-3.480	-2.839	-2.556
11	-4.550	-3.480	-2.845	-2.562
10	-4.935	-3.480	-2.851	-2.567
9	-4.629	-3.480	-2.857	-2.572
8	-5.662	-3.480	-2.863	-2.577
7	-6.518	-3.480	-2.868	-2.582
6	-7.106	-3.480	-2.873	-2.587
5	-7.805	-3.480	-2.878	-2.592
4	-8.236	-3.480	-2.883	-2.596
3	-9.538	-3.480	-2.888	-2.600
2	-10.770	-3.480	-2.892	-2.604
1	-13.635	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 10 with RMSE = .1373634
Min SIC  =  -3.89149 at lag  1 with RMSE = .1403151
Min MAIC = -2.363104 at lag 16 with RMSE = .1358335
```

Interest Rate in levels:

UK: dfgls lnukir

```
DF-GLS test for unit root
Variable: lnukir
Lag selection: Schwert criterion          Maximum lag  =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%

```
------------------------------------------------------------------------------
     16          -2.113        -3.480        -2.814        -2.533
     15          -2.279        -3.480        -2.820        -2.539
     14          -2.293        -3.480        -2.827        -2.545
     13          -2.431        -3.480        -2.833        -2.551
     12          -2.404        -3.480        -2.839        -2.556
     11          -2.463        -3.480        -2.845        -2.562
     10          -2.609        -3.480        -2.851        -2.567
      9          -2.610        -3.480        -2.857        -2.572
      8          -2.703        -3.480        -2.862        -2.577
      7          -2.670        -3.480        -2.868        -2.582
      6          -2.516        -3.480        -2.873        -2.587
      5          -2.581        -3.480        -2.878        -2.592
      4          -2.586        -3.480        -2.883        -2.596
      3          -2.255        -3.480        -2.888        -2.600
      2          -2.193        -3.480        -2.892        -2.604
      1          -1.878        -3.480        -2.896        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE =  .032777
Min SIC  = -6.759583 at lag 2 with RMSE = .0331438
Min MAIC = -6.770385 at lag 2 with RMSE = .0331438
```

Canada: dfgls lncair

```
DF-GLS test for unit root
Variable: lncair
Lag selection: Schwert criterion           Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau              1%            5%           10%
------------------------------------------------------------------------------
     16          -2.666        -3.480        -2.814        -2.533
     15          -2.857        -3.480        -2.820        -2.539
     14          -2.837        -3.480        -2.827        -2.545
     13          -2.006        -3.480        -2.833        -2.551
     12          -3.006        -3.480        -2.839        -2.556
     11          -2.884        -3.480        -2.845        -2.562
     10          -2.833        -3.480        -2.851        -2.567
      9          -3.273        -3.480        -2.857        -2.572
      8          -3.686        -3.480        -2.862        -2.577
      7          -3.429        -3.480        -2.868        -2.582
      6          -3.519        -3.480        -2.873        -2.587
      5          -3.123        -3.480        -2.878        -2.592
      4          -2.837        -3.480        -2.883        -2.596
      3          -2.121        -3.480        -2.888        -2.600
      2          -2.126        -3.480        -2.892        -2.604
      1          -2.092        -3.480        -2.896        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0401289
Min SIC  = -6.322782 at lag 1 with RMSE =  .041608
Min MAIC = -6.291843 at lag 1 with RMSE =  .041608
```

Australia: dfgls lnauir

```
DF-GLS test for unit root
Variable: lnauir
Lag selection: Schwert criterion           Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
16	-0.880	-3.480	-2.814	-2.533
15	-1.106	-3.480	-2.820	-2.539
14	-1.011	-3.480	-2.827	-2.545
13	-1.275	-3.480	-2.833	-2.551
12	-1.207	-3.480	-2.839	-2.556
11	-1.235	-3.480	-2.845	-2.562
10	-1.374	-3.480	-2.851	-2.567
9	-1.417	-3.480	-2.857	-2.572
8	-1.390	-3.480	-2.862	-2.577
7	-1.471	-3.480	-2.868	-2.582
6	-1.353	-3.480	-2.873	-2.587
5	-1.310	-3.480	-2.878	-2.592
4	-1.092	-3.480	-2.883	-2.596
3	-1.393	-3.480	-2.888	-2.600
2	-0.998	-3.480	-2.892	-2.604
1	-1.038	-3.480	-2.896	-2.608

(Columns 1%, 5%, 10%: -------- Critical value ---------)

```
Opt lag (Ng-Perron seq t) = 16 with RMSE = .0303632
Min SIC  = -6.877186 at lag  1 with RMSE = .0315347
Min MAIC = -6.910918 at lag  4 with RMSE = .0310489
```

New Zealand: dfgls lnnzir

```
DF-GLS test for unit root
Variable: lnnzir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
16	-1.620	-3.480	-2.814	-2.533
15	-1.825	-3.480	-2.820	-2.539
14	-1.872	-3.480	-2.827	-2.545
13	-2.019	-3.480	-2.833	-2.551
12	-1.905	-3.480	-2.839	-2.556
11	-2.090	-3.480	-2.845	-2.562
10	-2.122	-3.480	-2.851	-2.567
9	-2.311	-3.480	-2.857	-2.572
8	-2.358	-3.480	-2.862	-2.577
7	-2.298	-3.480	-2.868	-2.582
6	-2.178	-3.480	-2.873	-2.587
5	-2.248	-3.480	-2.878	-2.592
4	-2.006	-3.480	-2.883	-2.596
3	-2.205	-3.480	-2.888	-2.600
2	-2.050	-3.480	-2.892	-2.604
1	-2.049	-3.480	-2.896	-2.608

(Columns 1%, 5%, 10%: -------- Critical value ---------)

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0328549
Min SIC  = -6.795164 at lag 1 with RMSE = .0328549
Min MAIC = -6.798157 at lag 1 with RMSE = .0328549
```

Sweden: dfgls lnseir

```
DF-GLS test for unit root
Variable: lnseir
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%             5%            10%
-------------------------------------------------------------------
     16          -3.508        -3.480         -2.814         -2.533
     15          -3.506        -3.480         -2.820         -2.539
     14          -3.434        -3.480         -2.827         -2.545
     13          -3.457        -3.480         -2.833         -2.551
     12          -3.877        -3.480         -2.839         -2.556
     11          -3.643        -3.480         -2.845         -2.562
     10          -3.490        -3.480         -2.851         -2.567
      9          -3.559        -3.480         -2.857         -2.572
      8          -3.412        -3.480         -2.862         -2.577
      7          -3.235        -3.480         -2.868         -2.582
      6          -3.223        -3.480         -2.873         -2.587
      5          -3.181        -3.480         -2.878         -2.592
      4          -3.094        -3.480         -2.883         -2.596
      3          -3.054        -3.480         -2.888         -2.600
      2          -2.683        -3.480         -2.892         -2.604
      1          -2.428        -3.480         -2.896         -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0441529
Min SIC  = -6.174034 at lag 1 with RMSE = .0448205
Min MAIC = -6.166419 at lag 1 with RMSE = .0448205
```

US: dfgls lnusir

```
DF-GLS test for unit root
Variable: lnusir
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%             5%            10%
-------------------------------------------------------------------
     16          -2.889        -3.480         -2.814         -2.533
     15          -3.153        -3.480         -2.820         -2.539
     14          -3.089        -3.480         -2.827         -2.545
     13          -2.946        -3.480         -2.833         -2.551
     12          -2.904        -3.480         -2.839         -2.556
     11          -2.758        -3.480         -2.845         -2.562
     10          -2.953        -3.480         -2.851         -2.567
      9          -2.581        -3.480         -2.857         -2.572
      8          -2.384        -3.480         -2.862         -2.577
      7          -2.281        -3.480         -2.868         -2.582
      6          -2.281        -3.480         -2.873         -2.587
      5          -2.131        -3.480         -2.878         -2.592
      4          -1.901        -3.480         -2.883         -2.596
      3          -1.704        -3.480         -2.888         -2.600
      2          -1.665        -3.480         -2.892         -2.604
      1          -1.557        -3.480         -2.896         -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0617311
Min SIC  = -5.465329 at lag  1 with RMSE = .0638807
```

```
Min MAIC = -5.479846 at lag  1 with RMSE = .0638807
```

Euro Area: dfgls lneuir

```
DF-GLS test for unit root
Variable: lneuir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.049	-3.480	-2.814	-2.533
15	-2.134	-3.480	-2.820	-2.539
14	-2.612	-3.480	-2.827	-2.545
13	-2.516	-3.480	-2.833	-2.551
12	-2.683	-3.480	-2.839	-2.556
11	-2.698	-3.480	-2.845	-2.562
10	-2.530	-3.480	-2.851	-2.567
9	-2.633	-3.480	-2.857	-2.572
8	-2.737	-3.480	-2.862	-2.577
7	-3.063	-3.480	-2.868	-2.582
6	-2.894	-3.480	-2.873	-2.587
5	-2.881	-3.480	-2.878	-2.592
4	-2.772	-3.480	-2.883	-2.596
3	-2.614	-3.480	-2.888	-2.600
2	-2.173	-3.480	-2.892	-2.604
1	-2.149	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0326322
Min SIC  =  -6.71034 at lag  1 with RMSE = .0342783
Min MAIC = -6.717681 at lag  3 with RMSE = .0336822
```

Switzerland: dfgls lnchir

```
DF-GLS test for unit root
Variable: lnchir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.578	-3.480	-2.814	-2.533
15	-2.507	-3.480	-2.820	-2.539
14	-2.393	-3.480	-2.827	-2.545
13	-2.636	-3.480	-2.833	-2.551
12	-2.506	-3.480	-2.839	-2.556
11	-2.416	-3.480	-2.845	-2.562
10	-2.672	-3.480	-2.851	-2.567
9	-2.312	-3.480	-2.857	-2.572
8	-2.230	-3.480	-2.862	-2.577
7	-2.254	-3.480	-2.868	-2.582
6	-2.213	-3.480	-2.873	-2.587
5	-2.345	-3.480	-2.878	-2.592
4	-2.352	-3.480	-2.883	-2.596
3	-2.396	-3.480	-2.888	-2.600
2	-2.382	-3.480	-2.892	-2.604

1	-2.558	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 10 with RMSE = .1376626
Min SIC = -3.897215 at lag 1 with RMSE = .1399206
Min MAIC = -3.886818 at lag 2 with RMSE = .1396802

Interest Rate in first differences:

UK: dfgls D.lnukir

DF-GLS test for unit root
Variable: D.lnukir
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.070	-3.480	-2.813	-2.533
15	-2.132	-3.480	-2.820	-2.539
14	-2.098	-3.480	-2.827	-2.545
13	-2.177	-3.480	-2.833	-2.551
12	-2.162	-3.480	-2.839	-2.556
11	-2.286	-3.480	-2.845	-2.562
10	-2.347	-3.480	-2.851	-2.567
9	-2.327	-3.480	-2.857	-2.572
8	-2.458	-3.480	-2.863	-2.577
7	-2.486	-3.480	-2.868	-2.582
6	-2.685	-3.480	-2.873	-2.587
5	-3.021	-3.480	-2.878	-2.592
4	-3.133	-3.480	-2.883	-2.596
3	-3.325	-3.480	-2.888	-2.600
2	-4.087	-3.480	-2.892	-2.604
1	-4.678	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 1 with RMSE = .0338998
Min SIC = -6.682777 at lag 1 with RMSE = .0341283
Min MAIC = -6.67145 at lag 7 with RMSE = .0338532

Canada: dfgls D.lncair

DF-GLS test for unit root
Variable: D.lncair
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.982	-3.480	-2.813	-2.533
15	-2.919	-3.480	-2.820	-2.539
14	-2.867	-3.480	-2.827	-2.545
13	-2.941	-3.480	-2.833	-2.551
12	-2.892	-3.480	-2.839	-2.556
11	-2.995	-3.480	-2.845	-2.562
10	-3.180	-3.480	-2.851	-2.567
9	-3.300	-3.480	-2.857	-2.572
8	-3.036	-3.480	-2.863	-2.577
7	-3.745	-3.480	-2.868	-2.582

```
     6          -4.179       -3.480       -2.873       -2.587
     5          -4.277       -3.480       -2.878       -2.592
     4          -5.069       -3.480       -2.883       -2.596
     3          -6.052       -3.480       -2.888       -2.600
     2          -6.090       -3.480       -2.892       -2.604
     1          -6.613       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0416419
Min SIC  = -6.234793 at lag 1 with RMSE = .0434773
Min MAIC = -6.183612 at lag 8 with RMSE = .0418327
```

Australia: dfgls D.lnauir

```
DF-GLS test for unit root
Variable: D.lnauir
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16          -4.385       -3.480       -2.813       -2.533
    15          -4.820       -3.480       -2.820       -2.539
    14          -4.388       -3.480       -2.827       -2.545
    13          -4.895       -3.480       -2.833       -2.551
    12          -4.452       -3.480       -2.839       -2.556
    11          -4.785       -3.480       -2.845       -2.562
    10          -4.889       -3.480       -2.851       -2.567
     9          -4.731       -3.480       -2.857       -2.572
     8          -4.914       -3.480       -2.863       -2.577
     7          -5.249       -3.480       -2.868       -2.582
     6          -5.303       -3.480       -2.873       -2.587
     5          -5.761       -3.480       -2.878       -2.592
     4          -6.142       -3.480       -2.883       -2.596
     3          -7.079       -3.480       -2.888       -2.600
     2          -6.799       -3.480       -2.892       -2.604
     1          -8.629       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0302633
Min SIC  =  -6.88154 at lag  1 with RMSE = .0314647
Min MAIC = -6.456302 at lag  2 with RMSE = .0311879
```

New Zealand: dfgls D.lnnzir

```
DF-GLS test for unit root
Variable: D.lnnzir
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16          -3.414       -3.480       -2.813       -2.533
    15          -3.712       -3.480       -2.820       -2.539
    14          -3.576       -3.480       -2.827       -2.545
    13          -3.730       -3.480       -2.833       -2.551
    12          -3.661       -3.480       -2.839       -2.556
    11          -4.102       -3.480       -2.845       -2.562
```

10	-3.979	-3.480	-2.851	-2.567
9	-4.230	-3.480	-2.857	-2.572
8	-4.093	-3.480	-2.863	-2.577
7	-4.260	-3.480	-2.868	-2.582
6	-4.578	-3.480	-2.873	-2.587
5	-4.972	-3.480	-2.878	-2.592
4	-5.188	-3.480	-2.883	-2.596
3	-6.115	-3.480	-2.888	-2.600
2	-6.246	-3.480	-2.892	-2.604
1	-7.246	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 4 with RMSE = .0332496
Min SIC  =  -6.74938 at lag 1 with RMSE = .0336141
Min MAIC =  -6.52353 at lag 7 with RMSE = .0331853
```

Sweden: dfgls D.lnseir

```
DF-GLS test for unit root
Variable: D.lnseir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-3.623	-3.480	-2.813	-2.533
15	-3.744	-3.480	-2.820	-2.539
14	-3.826	-3.480	-2.827	-2.545
13	-4.000	-3.480	-2.833	-2.551
12	-4.077	-3.480	-2.839	-2.556
11	-3.714	-3.480	-2.845	-2.562
10	-4.000	-3.480	-2.851	-2.567
9	-4.259	-3.480	-2.857	-2.572
8	-4.281	-3.480	-2.863	-2.577
7	-4.582	-3.480	-2.868	-2.582
6	-4.997	-3.480	-2.873	-2.587
5	-5.221	-3.480	-2.878	-2.592
4	-5.533	-3.480	-2.883	-2.596
3	-5.998	-3.480	-2.888	-2.600
2	-6.471	-3.480	-2.892	-2.604
1	-8.074	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 12 with RMSE = .0446817
Min SIC  = -6.141915 at lag  1 with RMSE =  .045544
Min MAIC = -5.840229 at lag 11 with RMSE = .0449833
```

US: dfgls D.lnusir

```
DF-GLS test for unit root
Variable: D.lnusir
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-3.321	-3.480	-2.813	-2.533
15	-3.259	-3.480	-2.820	-2.539
14	-2.986	-3.480	-2.827	-2.545

```
     13          -3.073        -3.480        -2.833        -2.551
     12          -3.270        -3.480        -2.839        -2.556
     11          -3.363        -3.480        -2.845        -2.562
     10          -3.635        -3.480        -2.851        -2.567
      9          -3.420        -3.480        -2.857        -2.572
      8          -4.068        -3.480        -2.863        -2.577
      7          -4.628        -3.480        -2.868        -2.582
      6          -4.985        -3.480        -2.873        -2.587
      5          -5.169        -3.480        -2.878        -2.592
      4          -5.765        -3.480        -2.883        -2.596
      3          -6.832        -3.480        -2.888        -2.600
      2          -8.350        -3.480        -2.892        -2.604
      1          -9.745        -3.480        -2.897        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0621189
Min SIC  =  -5.45556 at lag  1 with RMSE = .0641905
Min MAIC = -5.174042 at lag  9 with RMSE = .0626926
```

Euro Area: dfgls D.lneuir

```
DF-GLS test for unit root
Variable: D.lneuir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
---------------------------------------------------------------
     16          -4.867        -3.480        -2.813        -2.533
     15          -4.845        -3.480        -2.820        -2.539
     14          -4.870        -3.480        -2.827        -2.545
     13          -4.187        -3.480        -2.833        -2.551
     12          -4.449        -3.480        -2.839        -2.556
     11          -4.315        -3.480        -2.845        -2.562
     10          -4.401        -3.480        -2.851        -2.567
      9          -4.832        -3.480        -2.857        -2.572
      8          -4.860        -3.480        -2.863        -2.577
      7          -4.848        -3.480        -2.868        -2.582
      6          -4.424        -3.480        -2.873        -2.587
      5          -4.906        -3.480        -2.878        -2.592
      4          -5.158        -3.480        -2.883        -2.596
      3          -5.553        -3.480        -2.888        -2.600
      2          -6.197        -3.480        -2.892        -2.604
      1          -8.137        -3.480        -2.897        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE = .0330564
Min SIC  = -6.701141 at lag  2 with RMSE = .0341242
Min MAIC =  -6.43845 at lag  6 with RMSE = .0340243
```

Switzerland: dfgls D.lnchir

```
DF-GLS test for unit root
Variable: D.lnchir
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
```

16	-3.528	-3.480	-2.813	-2.533
15	-3.912	-3.480	-2.820	-2.539
14	-4.148	-3.480	-2.827	-2.545
13	-4.504	-3.480	-2.833	-2.551
12	-4.242	-3.480	-2.839	-2.556
11	-4.626	-3.480	-2.845	-2.562
10	-5.017	-3.480	-2.851	-2.567
9	-4.719	-3.480	-2.857	-2.572
8	-5.752	-3.480	-2.863	-2.577
7	-6.407	-3.480	-2.868	-2.582
6	-6.891	-3.480	-2.873	-2.587
5	-7.747	-3.480	-2.878	-2.592
4	-8.120	-3.480	-2.883	-2.596
3	-9.186	-3.480	-2.888	-2.600
2	-10.574	-3.480	-2.892	-2.604
1	-13.407	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 10 with RMSE =  .139498
Min SIC  = -3.867329 at lag  1 with RMSE = .1420205
Min MAIC = -2.385376 at lag 16 with RMSE = .1379944
```

Inflation Rates in levels:

UK: dfgls lnukinf

```
DF-GLS test for unit root
Variable: lnukinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
16	-2.595	-3.480	-2.814	-2.533
15	-2.600	-3.480	-2.820	-2.539
14	-2.476	-3.480	-2.827	-2.545
13	-3.548	-3.480	-2.833	-2.551
12	-3.560	-3.480	-2.839	-2.556
11	-3.424	-3.480	-2.845	-2.562
10	-3.234	-3.480	-2.851	-2.567
9	-3.088	-3.480	-2.857	-2.572
8	-2.913	-3.480	-2.862	-2.577
7	-2.840	-3.480	-2.868	-2.582
6	-2.778	-3.480	-2.873	-2.587
5	-2.742	-3.480	-2.878	-2.592
4	-2.759	-3.480	-2.883	-2.596
3	-2.645	-3.480	-2.888	-2.600
2	-2.434	-3.480	-2.892	-2.604
1	-2.442	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 12 with RMSE = .0707526
Min SIC  = -5.157247 at lag  1 with RMSE = .0745194
Min MAIC = -5.163487 at lag 12 with RMSE = .0707526
```

Canada: dfgls lncainf

```
DF-GLS test for unit root
```

```
Variable: lncainf
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau             1%             5%            10%
--------------------------------------------------------------------
    16           -4.153         -3.480         -2.814         -2.533
    15           -4.237         -3.480         -2.820         -2.539
    14           -4.352         -3.480         -2.827         -2.545
    13           -4.053         -3.480         -2.833         -2.551
    12           -4.549         -3.480         -2.839         -2.556
    11           -5.540         -3.480         -2.845         -2.562
    10           -5.286         -3.480         -2.851         -2.567
     9           -5.279         -3.480         -2.857         -2.572
     8           -5.119         -3.480         -2.862         -2.577
     7           -5.011         -3.480         -2.868         -2.582
     6           -5.172         -3.480         -2.873         -2.587
     5           -5.253         -3.480         -2.878         -2.592
     4           -5.263         -3.480         -2.883         -2.596
     3           -6.008         -3.480         -2.888         -2.600
     2           -6.405         -3.480         -2.892         -2.604
     1           -5.520         -3.480         -2.896         -2.608
--------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE =  .245909
Min SIC  = -2.675203 at lag  2 with RMSE = .2554546
Min MAIC = -2.471579 at lag  1 with RMSE = .2609073
```

Australia: dfgls lnauinf

```
DF-GLS test for unit root
Variable: lnauinf
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau             1%             5%            10%
--------------------------------------------------------------------
    16           -3.184         -3.480         -2.814         -2.533
    15           -3.167         -3.480         -2.820         -2.539
    14           -3.770         -3.480         -2.827         -2.545
    13           -3.761         -3.480         -2.833         -2.551
    12           -3.752         -3.480         -2.839         -2.556
    11           -3.251         -3.480         -2.845         -2.562
    10           -3.235         -3.480         -2.851         -2.567
     9           -3.219         -3.480         -2.857         -2.572
     8           -3.527         -3.480         -2.862         -2.577
     7           -3.510         -3.480         -2.868         -2.582
     6           -2.493         -3.480         -2.873         -2.587
     5           -2.415         -3.480         -2.878         -2.592
     4           -2.379         -3.480         -2.883         -2.596
     3           -2.344         -3.480         -2.888         -2.600
     2           -2.321         -3.480         -2.892         -2.604
     1           -2.300         -3.480         -2.896         -2.608
--------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 15 with RMSE = .1467797
Min SIC  = -3.692009 at lag  1 with RMSE = .1550392
Min MAIC = -3.702361 at lag 15 with RMSE = .1467797
```

New Zealand: dfgls lnnzinf

DF-GLS test for unit root
Variable: lnnzinf
Lag selection: Schwert criterion Maximum lag = 16

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
16	-2.599	-3.480	-2.814	-2.533
15	-2.574	-3.480	-2.820	-2.539
14	-2.525	-3.480	-2.827	-2.545
13	-2.504	-3.480	-2.833	-2.551
12	-2.483	-3.480	-2.839	-2.556
11	-3.919	-3.480	-2.845	-2.562
10	-3.831	-3.480	-2.851	-2.567
9	-3.749	-3.480	-2.857	-2.572
8	-3.869	-3.480	-2.862	-2.577
7	-3.785	-3.480	-2.868	-2.582
6	-3.706	-3.480	-2.873	-2.587
5	-3.931	-3.480	-2.878	-2.592
4	-3.843	-3.480	-2.883	-2.596
3	-3.761	-3.480	-2.888	-2.600
2	-2.824	-3.480	-2.892	-2.604
1	-2.793	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 11 with RMSE = .1211473
Min SIC = -3.986551 at lag 11 with RMSE = .1211473
Min MAIC = -4.080644 at lag 11 with RMSE = .1211473

Sweden: dfgls lnseinf

DF-GLS test for unit root
Variable: lnseinf
Lag selection: Schwert criterion Maximum lag = 16

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
16	-2.445	-3.480	-2.814	-2.533
15	-2.428	-3.480	-2.820	-2.539
14	-2.502	-3.480	-2.827	-2.545
13	-2.792	-3.480	-2.833	-2.551
12	-2.573	-3.480	-2.839	-2.556
11	-3.348	-3.480	-2.845	-2.562
10	-3.247	-3.480	-2.851	-2.567
9	-3.181	-3.480	-2.857	-2.572
8	-2.944	-3.480	-2.862	-2.577
7	-3.148	-3.480	-2.868	-2.582
6	-3.171	-3.480	-2.873	-2.587
5	-3.046	-3.480	-2.878	-2.592
4	-3.285	-3.480	-2.883	-2.596
3	-3.092	-3.480	-2.888	-2.600
2	-3.245	-3.480	-2.892	-2.604
1	-3.497	-3.480	-2.896	-2.608

```
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .1841265
Min SIC  = -3.260549 at lag  1 with RMSE = .1923676
Min MAIC = -3.250004 at lag 14 with RMSE = .1825733
```

US: dfgls lnusinf

```
DF-GLS test for unit root
Variable: lnusinf
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%            10%
-------------------------------------------------------------
     16          -4.159        -3.480        -2.814        -2.533
     15          -3.999        -3.480        -2.820        -2.539
     14          -3.718        -3.480        -2.827        -2.545
     13          -3.193        -3.480        -2.833        -2.551
     12          -3.167        -3.480        -2.839        -2.556
     11          -4.730        -3.480        -2.845        -2.562
     10          -4.778        -3.480        -2.851        -2.567
      9          -4.721        -3.480        -2.857        -2.572
      8          -4.933        -3.480        -2.862        -2.577
      7          -5.131        -3.480        -2.868        -2.582
      6          -4.898        -3.480        -2.873        -2.587
      5          -4.725        -3.480        -2.878        -2.592
      4          -4.956        -3.480        -2.883        -2.596
      3          -4.840        -3.480        -2.888        -2.600
      2          -5.327        -3.480        -2.892        -2.604
      1          -5.008        -3.480        -2.896        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .0801793
Min SIC  = -4.809402 at lag  1 with RMSE = .0886753
Min MAIC = -4.778558 at lag 12 with RMSE = .0817639
```

Euro Area: dfgls lneuinf

```
DF-GLS test for unit root
Variable: lneuinf
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%            10%
-------------------------------------------------------------
     16          -3.333        -3.480        -2.814        -2.533
     15          -3.056        -3.480        -2.820        -2.539
     14          -2.894        -3.480        -2.827        -2.545
     13          -2.759        -3.480        -2.833        -2.551
     12          -3.010        -3.480        -2.839        -2.556
     11          -3.554        -3.480        -2.845        -2.562
     10          -3.271        -3.480        -2.851        -2.567
      9          -3.403        -3.480        -2.857        -2.572
      8          -3.630        -3.480        -2.862        -2.577
      7          -3.543        -3.480        -2.868        -2.582
      6          -3.306        -3.480        -2.873        -2.587
      5          -3.332        -3.480        -2.878        -2.592
      4          -3.149        -3.480        -2.883        -2.596
```

```
       3          -3.208        -3.480        -2.888        -2.600
       2          -3.442        -3.480        -2.892        -2.604
       1          -2.680        -3.480        -2.896        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 16 with RMSE = .1463204
Min SIC  = -3.716634 at lag  2 with RMSE = .1517644
Min MAIC = -3.680054 at lag  3 with RMSE = .1516413
```

Switzerland: dfgls lnchinf

```
DF-GLS test for unit root
Variable: lnchinf
Lag selection: Schwert criterion            Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------
     16          -3.582        -3.480        -2.814        -2.533
     15          -3.358        -3.480        -2.820        -2.539
     14          -3.427        -3.480        -2.827        -2.545
     13          -3.399        -3.480        -2.833        -2.551
     12          -3.396        -3.480        -2.839        -2.556
     11          -4.010        -3.480        -2.845        -2.562
     10          -3.986        -3.480        -2.851        -2.567
      9          -3.821        -3.480        -2.857        -2.572
      8          -3.931        -3.480        -2.862        -2.577
      7          -4.561        -3.480        -2.868        -2.582
      6          -4.156        -3.480        -2.873        -2.587
      5          -4.122        -3.480        -2.878        -2.592
      4          -4.630        -3.480        -2.883        -2.596
      3          -4.021        -3.480        -2.888        -2.600
      2          -4.424        -3.480        -2.892        -2.604
      1          -3.768        -3.480        -2.896        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 12 with RMSE = .1974164
Min SIC  = -3.095993 at lag  2 with RMSE = .2069857
Min MAIC = -3.030178 at lag 12 with RMSE = .1974164
```

Inflation Rates in first differences:

UK: dfgls D.lnukinf

```
DF-GLS test for unit root
Variable: D.lnukinf
Lag selection: Schwert criterion            Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------
     16          -3.506        -3.480        -2.813        -2.533
     15          -3.818        -3.480        -2.820        -2.539
     14          -3.999        -3.480        -2.827        -2.545
     13          -4.440        -3.480        -2.833        -2.551
     12          -4.569        -3.480        -2.839        -2.556
     11          -4.834        -3.480        -2.845        -2.562
     10          -3.727        -3.480        -2.851        -2.567
      9          -4.108        -3.480        -2.857        -2.572
```

```
      8         -4.511        -3.480        -2.863        -2.577
      7         -5.059        -3.480        -2.868        -2.582
      6         -5.510        -3.480        -2.873        -2.587
      5         -6.041        -3.480        -2.878        -2.592
      4         -6.665        -3.480        -2.883        -2.596
      3         -7.323        -3.480        -2.888        -2.600
      2         -8.652        -3.480        -2.892        -2.604
      1        -11.406        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 11 with RMSE = .0727566
Min SIC  = -5.099454 at lag  1 with RMSE = .0767005
Min MAIC = -4.533314 at lag 10 with RMSE = .0755961
```

Canada: dfgls D.lncainf

```
DF-GLS test for unit root
Variable: D.lncainf
Lag selection: Schwert criterion           Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16         -4.342        -3.480        -2.813        -2.533
     15         -4.772        -3.480        -2.820        -2.539
     14         -5.034        -3.480        -2.827        -2.545
     13         -5.291        -3.480        -2.833        -2.551
     12         -6.243        -3.480        -2.839        -2.556
     11         -6.144        -3.480        -2.845        -2.562
     10         -5.412        -3.480        -2.851        -2.567
      9         -5.930        -3.480        -2.857        -2.572
      8         -6.291        -3.480        -2.863        -2.577
      7         -6.936        -3.480        -2.868        -2.582
      6         -7.736        -3.480        -2.873        -2.587
      5         -8.299        -3.480        -2.878        -2.592
      4         -9.133        -3.480        -2.883        -2.596
      3        -10.536        -3.480        -2.888        -2.600
      2        -10.651        -3.480        -2.892        -2.604
      1        -11.521        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 13 with RMSE = .2618862
Min SIC  = -2.551577 at lag  1 with RMSE = .2741971
Min MAIC = -.7395594 at lag  1 with RMSE = .2741971
```

Australia: dfgls D.lnauinf

```
DF-GLS test for unit root
Variable: D.lnauinf
Lag selection: Schwert criterion           Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16         -4.293        -3.480        -2.813        -2.533
     15         -4.454        -3.480        -2.820        -2.539
     14         -4.630        -3.480        -2.827        -2.545
     13         -5.780        -3.480        -2.833        -2.551
     12         -6.206        -3.480        -2.839        -2.556
```

```
     11          -6.726        -3.480        -2.845        -2.562
     10          -5.540        -3.480        -2.851        -2.567
      9          -5.894        -3.480        -2.857        -2.572
      8          -6.318        -3.480        -2.863        -2.577
      7          -5.748        -3.480        -2.868        -2.582
      6          -6.173        -3.480        -2.873        -2.587
      5          -6.698        -3.480        -2.878        -2.592
      4          -7.536        -3.480        -2.883        -2.596
      3          -8.552        -3.480        -2.888        -2.600
      2         -10.093        -3.480        -2.892        -2.604
      1         -12.451        -3.480        -2.897        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE = .1485469
Min SIC  = -3.668087 at lag  1 with RMSE = .1568974
Min MAIC = -1.933539 at lag  7 with RMSE = .1568351
```

New Zealand: dfgls D.lnnzinf

```
DF-GLS test for unit root
Variable: D.lnnzinf
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -5.531        -3.480        -2.813        -2.533
     15          -5.843        -3.480        -2.820        -2.539
     14          -6.213        -3.480        -2.827        -2.545
     13          -6.729        -3.480        -2.833        -2.551
     12          -7.305        -3.480        -2.839        -2.556
     11          -8.055        -3.480        -2.845        -2.562
     10          -5.290        -3.480        -2.851        -2.567
      9          -5.558        -3.480        -2.857        -2.572
      8          -5.868        -3.480        -2.863        -2.577
      7          -5.894        -3.480        -2.868        -2.582
      6          -6.272        -3.480        -2.873        -2.587
      5          -6.730        -3.480        -2.878        -2.592
      4          -6.652        -3.480        -2.883        -2.596
      3          -7.189        -3.480        -2.888        -2.600
      2          -7.875        -3.480        -2.892        -2.604
      1         -12.579        -3.480        -2.897        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 11 with RMSE = .1225393
Min SIC  = -3.981211 at lag 11 with RMSE = .1225393
Min MAIC = -2.786395 at lag  2 with RMSE = .1366752
```

Sweden: dfgls D.lnseinf

```
DF-GLS test for unit root
Variable: D.lnseinf
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------
     16          -4.806        -3.480        -2.813        -2.533
     15          -5.039        -3.480        -2.820        -2.539
```

14	-5.401	-3.480	-2.827	-2.545
13	-5.606	-3.480	-2.833	-2.551
12	-5.350	-3.480	-2.839	-2.556
11	-6.205	-3.480	-2.845	-2.562
10	-5.056	-3.480	-2.851	-2.567
9	-5.442	-3.480	-2.857	-2.572
8	-5.850	-3.480	-2.863	-2.577
7	-6.775	-3.480	-2.868	-2.582
6	-6.829	-3.480	-2.873	-2.587
5	-7.345	-3.480	-2.878	-2.592
4	-8.479	-3.480	-2.883	-2.596
3	-8.815	-3.480	-2.888	-2.600
2	-11.037	-3.480	-2.892	-2.604
1	-13.041	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 11 with RMSE =  .188472
Min SIC  = -3.216032 at lag  1 with RMSE = .1966881
Min MAIC = -1.354543 at lag 10 with RMSE = .1943017
```

US: dfgls D.lnusinf

```
DF-GLS test for unit root
Variable: D.lnusinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	-------- Critical value ---------		
		1%	5%	10%
16	-5.317	-3.480	-2.813	-2.533
15	-5.263	-3.480	-2.820	-2.539
14	-5.636	-3.480	-2.827	-2.545
13	-6.339	-3.480	-2.833	-2.551
12	-8.022	-3.480	-2.839	-2.556
11	-9.040	-3.480	-2.845	-2.562
10	-6.384	-3.480	-2.851	-2.567
9	-6.556	-3.480	-2.857	-2.572
8	-6.925	-3.480	-2.863	-2.577
7	-6.917	-3.480	-2.868	-2.582
6	-6.919	-3.480	-2.873	-2.587
5	-7.642	-3.480	-2.878	-2.592
4	-8.526	-3.480	-2.883	-2.596
3	-8.826	-3.480	-2.888	-2.600
2	-10.058	-3.480	-2.892	-2.604
1	-10.208	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 13 with RMSE = .0826768
Min SIC  = -4.749226 at lag 11 with RMSE = .0834648
Min MAIC = -3.753003 at lag  1 with RMSE = .0922673
```

Euro Area: dfgls D.lneuinf

```
DF-GLS test for unit root
Variable: D.lneuinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	-------- Critical value ---------		
		1%	5%	10%

16	-4.034	-3.480	-2.813	-2.533
15	-3.907	-3.480	-2.820	-2.539
14	-4.438	-3.480	-2.827	-2.545
13	-4.934	-3.480	-2.833	-2.551
12	-5.521	-3.480	-2.839	-2.556
11	-5.426	-3.480	-2.845	-2.562
10	-4.797	-3.480	-2.851	-2.567
9	-5.534	-3.480	-2.857	-2.572
8	-5.654	-3.480	-2.863	-2.577
7	-5.589	-3.480	-2.868	-2.582
6	-6.029	-3.480	-2.873	-2.587
5	-6.908	-3.480	-2.878	-2.592
4	-7.461	-3.480	-2.883	-2.596
3	-8.849	-3.480	-2.888	-2.600
2	-10.061	-3.480	-2.892	-2.604
1	-11.089	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 11 with RMSE = .1516479
Min SIC  = -3.687565 at lag  1 with RMSE = .1553768
Min MAIC = -1.966161 at lag  7 with RMSE = .1544602
```

Switzerland: dfgls D.lnchinf

```
DF-GLS test for unit root
Variable: D.lnchinf
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-5.172	-3.480	-2.813	-2.533
15	-5.022	-3.480	-2.820	-2.539
14	-5.609	-3.480	-2.827	-2.545
13	-5.776	-3.480	-2.833	-2.551
12	-6.147	-3.480	-2.839	-2.556
11	-6.557	-3.480	-2.845	-2.562
10	-5.822	-3.480	-2.851	-2.567
9	-6.128	-3.480	-2.857	-2.572
8	-6.786	-3.480	-2.863	-2.577
7	-7.024	-3.480	-2.868	-2.582
6	-6.330	-3.480	-2.873	-2.587
5	-7.391	-3.480	-2.878	-2.592
4	-8.077	-3.480	-2.883	-2.596
3	-7.687	-3.480	-2.888	-2.600
2	-9.918	-3.480	-2.892	-2.604
1	-10.213	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 11 with RMSE = .2025789
Min SIC  = -3.047364 at lag  1 with RMSE = .2139952
Min MAIC = -1.916582 at lag  3 with RMSE = .2111145
```

Output Gap in levels:

UK: dfgls lnukoutgap

```
DF-GLS test for unit root
Variable: lnukoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-----------------------------------------------------------------
     16          -2.199        -3.480        -2.814        -2.533
     15          -2.232        -3.480        -2.820        -2.539
     14          -2.299        -3.480        -2.827        -2.545
     13          -2.074        -3.480        -2.833        -2.551
     12          -1.992        -3.480        -2.839        -2.556
     11          -1.988        -3.480        -2.845        -2.562
     10          -1.986        -3.480        -2.851        -2.567
      9          -1.992        -3.480        -2.857        -2.572
      8          -2.001        -3.480        -2.862        -2.577
      7          -2.056        -3.480        -2.868        -2.582
      6          -2.468        -3.480        -2.873        -2.587
      5          -2.677        -3.480        -2.878        -2.592
      4          -2.081        -3.480        -2.883        -2.596
      3          -1.014        -3.480        -2.888        -2.600
      2          -0.596        -3.480        -2.892        -2.604
      1         -11.528        -3.480        -2.896        -2.608
-----------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE = 1.58e-06
Min SIC  = -26.55544 at lag  7 with RMSE = 1.59e-06
Min MAIC = -26.61569 at lag  7 with RMSE = 1.59e-06
```

Canada: dfgls lncaoutgap

```
DF-GLS test for unit root
Variable: lncaoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-----------------------------------------------------------------
     16          -2.513        -3.480        -2.814        -2.533
     15          -2.575        -3.480        -2.820        -2.539
     14          -2.386        -3.480        -2.827        -2.545
     13          -2.196        -3.480        -2.833        -2.551
     12          -2.587        -3.480        -2.839        -2.556
     11          -2.382        -3.480        -2.845        -2.562
     10          -2.195        -3.480        -2.851        -2.567
      9          -2.274        -3.480        -2.857        -2.572
      8          -2.127        -3.480        -2.862        -2.577
      7          -2.076        -3.480        -2.868        -2.582
      6          -2.765        -3.480        -2.873        -2.587
      5          -2.786        -3.480        -2.878        -2.592
      4          -1.805        -3.480        -2.883        -2.596
      3          -0.906        -3.480        -2.888        -2.600
      2          -0.424        -3.480        -2.892        -2.604
      1         -11.063        -3.480        -2.896        -2.608
-----------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 4 with RMSE = 1.72e-06
Min SIC  = -26.35067 at lag  7 with RMSE = 1.76e-06
```

```
Min MAIC = -26.41056 at lag 13 with RMSE = 1.72e-06
```

Australia: dfgls lnauoutgap

```
DF-GLS test for unit root
Variable: lnauoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------
     16          -0.361         -3.480        -2.814        -2.533
     15          -0.365         -3.480        -2.820        -2.539
     14          -0.410         -3.480        -2.827        -2.545
     13          -0.337         -3.480        -2.833        -2.551
     12          -0.289         -3.480        -2.839        -2.556
     11          -0.255         -3.480        -2.845        -2.562
     10          -0.471         -3.480        -2.851        -2.567
      9          -0.339         -3.480        -2.857        -2.572
      8          -0.268         -3.480        -2.862        -2.577
      7          -0.251         -3.480        -2.868        -2.582
      6          -0.454         -3.480        -2.873        -2.587
      5          -0.677         -3.480        -2.878        -2.592
      4          -0.316         -3.480        -2.883        -2.596
      3           0.250         -3.480        -2.888        -2.600
      2           1.118         -3.480        -2.892        -2.604
      1          -6.106         -3.480        -2.896        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 10 with RMSE = 1.85e-06
Min SIC  = -26.24665 at lag  7 with RMSE = 1.86e-06
Min MAIC = -26.34687 at lag  7 with RMSE = 1.86e-06
```

New Zealand: dfgls lnnzoutgap

```
DF-GLS test for unit root
Variable: lnnzoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------
     16          -0.539         -3.480        -2.814        -2.533
     15          -0.385         -3.480        -2.820        -2.539
     14          -1.299         -3.480        -2.827        -2.545
     13          -1.343         -3.480        -2.833        -2.551
     12          -1.154         -3.480        -2.839        -2.556
     11          -1.295         -3.480        -2.845        -2.562
     10          -1.571         -3.480        -2.851        -2.567
      9          -1.784         -3.480        -2.857        -2.572
      8          -1.932         -3.480        -2.862        -2.577
      7          -1.063         -3.480        -2.868        -2.582
      6          -0.832         -3.480        -2.873        -2.587
      5          -0.430         -3.480        -2.878        -2.592
      4           0.074         -3.480        -2.883        -2.596
      3           0.502         -3.480        -2.888        -2.600
      2           0.328         -3.480        -2.892        -2.604
```

```
      1         -10.994       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 11 with RMSE = 8.53e-07
Min SIC  = -27.73111 at lag 11 with RMSE = 8.53e-07
Min MAIC = -27.87892 at lag 13 with RMSE = 8.48e-07
```

Sweden: dfgls lnseoutgap

```
DF-GLS test for unit root
Variable: lnseoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------
     16          -1.928       -3.480       -2.814       -2.533
     15          -2.020       -3.480       -2.820       -2.539
     14          -1.982       -3.480       -2.827       -2.545
     13          -1.836       -3.480       -2.833       -2.551
     12          -1.863       -3.480       -2.839       -2.556
     11          -1.743       -3.480       -2.845       -2.562
     10          -1.789       -3.480       -2.851       -2.567
      9          -1.748       -3.480       -2.857       -2.572
      8          -1.887       -3.480       -2.862       -2.577
      7          -1.841       -3.480       -2.868       -2.582
      6          -1.076       -3.480       -2.873       -2.587
      5          -1.316       -3.480       -2.878       -2.592
      4          -1.854       -3.480       -2.883       -2.596
      3          -0.743       -3.480       -2.888       -2.600
      2          -0.124       -3.480       -2.892       -2.604
      1         -15.042       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 5 with RMSE = 1.71e-06
Min SIC  = -26.45421 at lag 5 with RMSE = 1.71e-06
Min MAIC = -26.48859 at lag 7 with RMSE = 1.70e-06
```

US: dfgls lnusoutgap

```
DF-GLS test for unit root
Variable: lnusoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
------------------------------------------------------------------
     16          -0.512       -3.480       -2.814       -2.533
     15          -0.617       -3.480       -2.820       -2.539
     14          -0.591       -3.480       -2.827       -2.545
     13          -0.674       -3.480       -2.833       -2.551
     12          -0.432       -3.480       -2.839       -2.556
     11          -0.440       -3.480       -2.845       -2.562
     10          -1.389       -3.480       -2.851       -2.567
      9          -1.305       -3.480       -2.857       -2.572
      8          -1.299       -3.480       -2.862       -2.577
      7          -1.334       -3.480       -2.868       -2.582
      6          -1.718       -3.480       -2.873       -2.587
      5          -1.411       -3.480       -2.878       -2.592
```

```
      4          -0.657       -3.480       -2.883       -2.596
      3           0.201       -3.480       -2.888       -2.600
      2           0.277       -3.480       -2.892       -2.604
      1         -12.163       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 13 with RMSE = 2.50e-06
Min SIC  = -25.63706 at lag  7 with RMSE = 2.52e-06
Min MAIC = -25.71944 at lag  7 with RMSE = 2.52e-06
```

Euro Area: dfgls lneuoutgap

```
DF-GLS test for unit root
Variable: lneuoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -0.518       -3.480       -2.814       -2.533
     15          -0.581       -3.480       -2.820       -2.539
     14          -0.612       -3.480       -2.827       -2.545
     13          -0.564       -3.480       -2.833       -2.551
     12          -0.607       -3.480       -2.839       -2.556
     11          -0.592       -3.480       -2.845       -2.562
     10          -0.577       -3.480       -2.851       -2.567
      9          -0.618       -3.480       -2.857       -2.572
      8          -0.711       -3.480       -2.862       -2.577
      7          -0.970       -3.480       -2.868       -2.582
      6          -1.138       -3.480       -2.873       -2.587
      5          -0.840       -3.480       -2.878       -2.592
      4          -0.302       -3.480       -2.883       -2.596
      3           0.189       -3.480       -2.888       -2.600
      2           0.193       -3.480       -2.892       -2.604
      1          -7.565       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 9 with RMSE = 2.04e-06
Min SIC  = -26.02966 at lag 8 with RMSE = 2.05e-06
Min MAIC = -26.14768 at lag 9 with RMSE = 2.04e-06
```

Switzerland: dfgls lnchoutgap

```
DF-GLS test for unit root
Variable: lnchoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -1.616       -3.480       -2.814       -2.533
     15          -1.604       -3.480       -2.820       -2.539
     14          -1.886       -3.480       -2.827       -2.545
     13          -1.849       -3.480       -2.833       -2.551
     12          -1.956       -3.480       -2.839       -2.556
     11          -1.924       -3.480       -2.845       -2.562
     10          -1.761       -3.480       -2.851       -2.567
      9          -1.657       -3.480       -2.857       -2.572
      8          -1.709       -3.480       -2.862       -2.577
```

```
     7         -1.789        -3.480        -2.868        -2.582
     6         -2.040        -3.480        -2.873        -2.587
     5         -2.121        -3.480        -2.878        -2.592
     4         -1.740        -3.480        -2.883        -2.596
     3         -0.777        -3.480        -2.888        -2.600
     2         -0.415        -3.480        -2.892        -2.604
     1        -14.627        -3.480        -2.896        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 5 with RMSE = 1.52e-06
Min SIC  = -26.61222 at lag  5 with RMSE = 1.58e-06
Min MAIC = -26.66525 at lag  7 with RMSE = 1.56e-06
```

Output Gap in first differences:

UK: dfgls D.lnukoutgap

```
DF-GLS test for unit root
Variable: D.lnukoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16         -1.095        -3.480        -2.813        -2.533
    15         -1.157        -3.480        -2.820        -2.539
    14         -1.130        -3.480        -2.827        -2.545
    13         -0.932        -3.480        -2.833        -2.551
    12         -0.271        -3.480        -2.839        -2.556
    11         -0.361        -3.480        -2.845        -2.562
    10         -0.392        -3.480        -2.851        -2.567
     9         -0.416        -3.480        -2.857        -2.572
     8         -0.428        -3.480        -2.863        -2.577
     7         -0.418        -3.480        -2.868        -2.582
     6         -0.384        -3.480        -2.873        -2.587
     5         -0.073        -3.480        -2.878        -2.592
     4         -0.958        -3.480        -2.883        -2.596
     3         -1.302        -3.480        -2.888        -2.600
     2         -2.982        -3.480        -2.892        -2.604
     1         -5.658        -3.480        -2.897        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 13 with RMSE = 1.60e-06
Min SIC  = -26.55337 at lag  6 with RMSE = 1.61e-06
Min MAIC = -26.62823 at lag  6 with RMSE = 1.61e-06
```

Canada: dfgls D.lncaoutgap

```
DF-GLS test for unit root
Variable: D.lncaoutgap
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16         -0.640        -3.480        -2.813        -2.533
    15         -0.546        -3.480        -2.820        -2.539
    14         -0.494        -3.480        -2.827        -2.545
    13         -0.606        -3.480        -2.833        -2.551
```

12	-0.906	-3.480	-2.839	-2.556
11	-0.470	-3.480	-2.845	-2.562
10	-0.586	-3.480	-2.851	-2.567
9	-0.709	-3.480	-2.857	-2.572
8	-0.641	-3.480	-2.863	-2.577
7	-0.727	-3.480	-2.868	-2.582
6	-0.751	-3.480	-2.873	-2.587
5	-0.366	-3.480	-2.878	-2.592
4	-0.337	-3.480	-2.883	-2.596
3	-0.894	-3.480	-2.888	-2.600
2	-2.539	-3.480	-2.892	-2.604
1	-6.092	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 12 with RMSE = 1.74e-06
Min SIC  = -26.34713 at lag  6 with RMSE = 1.78e-06
Min MAIC = -26.44157 at lag 13 with RMSE = 1.74e-06
```

Australia: dfgls D.lnauoutgap

```
DF-GLS test for unit root
Variable: D.lnauoutgap
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-1.854	-3.480	-2.813	-2.533
15	-1.882	-3.480	-2.820	-2.539
14	-1.884	-3.480	-2.827	-2.545
13	-1.788	-3.480	-2.833	-2.551
12	-1.979	-3.480	-2.839	-2.556
11	-1.086	-3.480	-2.845	-2.562
10	-1.173	-3.480	-2.851	-2.567
9	-1.939	-3.480	-2.857	-2.572
8	-1.992	-3.480	-2.863	-2.577
7	-2.153	-3.480	-2.868	-2.582
6	-2.196	-3.480	-2.873	-2.587
5	-1.783	-3.480	-2.878	-2.592
4	-1.392	-3.480	-2.883	-2.596
3	-1.269	-3.480	-2.888	-2.600
2	-1.885	-3.480	-2.892	-2.604
1	-1.237	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 9 with RMSE = 1.83e-06
Min SIC  = -26.28539 at lag 6 with RMSE = 1.84e-06
Min MAIC = -26.26246 at lag 4 with RMSE = 1.89e-06
```

New Zealand: dfgls D.lnnzoutgap

```
DF-GLS test for unit root
Variable: D.lnnzoutgap
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.501	-3.480	-2.813	-2.533

15	-2.626	-3.480	-2.820	-2.539
14	-2.806	-3.480	-2.827	-2.545
13	-2.920	-3.480	-2.833	-2.551
12	-2.863	-3.480	-2.839	-2.556
11	-2.072	-3.480	-2.845	-2.562
10	-2.351	-3.480	-2.851	-2.567
9	-2.557	-3.480	-2.857	-2.572
8	-2.297	-3.480	-2.863	-2.577
7	-2.130	-3.480	-2.868	-2.582
6	-2.008	-3.480	-2.873	-2.587
5	-2.322	-3.480	-2.878	-2.592
4	-3.468	-3.480	-2.883	-2.596
3	-6.885	-3.480	-2.888	-2.600
2	-12.967	-3.480	-2.892	-2.604
1	-12.505	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 10 with RMSE = 8.47e-07
Min SIC  =  -27.7634 at lag 10 with RMSE = 8.47e-07
Min MAIC = -27.77075 at lag  6 with RMSE = 8.83e-07
```

Sweden: dfgls D.lnseoutgap

```
DF-GLS test for unit root
Variable: D.lnseoutgap
Lag selection: Schwert criterion           Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.261	-3.480	-2.813	-2.533
15	-1.306	-3.480	-2.820	-2.539
14	-1.240	-3.480	-2.827	-2.545
13	-1.278	-3.480	-2.833	-2.551
12	-1.404	-3.480	-2.839	-2.556
11	-1.392	-3.480	-2.845	-2.562
10	-1.525	-3.480	-2.851	-2.567
9	-1.492	-3.480	-2.857	-2.572
8	-1.540	-3.480	-2.863	-2.577
7	-1.418	-3.480	-2.868	-2.582
6	-1.466	-3.480	-2.873	-2.587
5	-1.300	-3.480	-2.878	-2.592
4	-1.734	-3.480	-2.883	-2.596
3	-1.871	-3.480	-2.888	-2.600
2	-3.441	-3.480	-2.892	-2.604
1	-6.469	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 4 with RMSE = 1.72e-06
Min SIC  = -26.44722 at lag 4 with RMSE = 1.73e-06
Min MAIC = -26.50151 at lag 4 with RMSE = 1.73e-06
```

US: dfgls D.lnusoutgap

```
DF-GLS test for unit root
Variable: D.lnusoutgap
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
```

[lags]	DF-GLS tau	1%	5%	10%
16	-1.346	-3.480	-2.813	-2.533
15	-1.308	-3.480	-2.820	-2.539
14	-1.178	-3.480	-2.827	-2.545
13	-1.223	-3.480	-2.833	-2.551
12	-1.227	-3.480	-2.839	-2.556
11	-1.481	-3.480	-2.845	-2.562
10	-1.481	-3.480	-2.851	-2.567
9	-1.571	-3.480	-2.857	-2.572
8	-1.727	-3.480	-2.863	-2.577
7	-1.760	-3.480	-2.868	-2.582
6	-1.619	-3.480	-2.873	-2.587
5	-1.243	-3.480	-2.878	-2.592
4	-1.684	-3.480	-2.883	-2.596
3	-3.160	-3.480	-2.888	-2.600
2	-6.965	-3.480	-2.892	-2.604
1	-8.522	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 6 with RMSE = 2.52e-06
Min SIC = -25.65183 at lag 6 with RMSE = 2.52e-06
Min MAIC = -25.70984 at lag 6 with RMSE = 2.52e-06

Euro Area: dfgls D.lneuoutgap

DF-GLS test for unit root
Variable: D.lneuoutgap
Lag selection: Schwert criterion Maximum lag = 16

[lags]	DF-GLS tau	-------- Critical value ---------		
		1%	5%	10%
16	-2.940	-3.480	-2.813	-2.533
15	-3.018	-3.480	-2.820	-2.539
14	-2.901	-3.480	-2.827	-2.545
13	-2.851	-3.480	-2.833	-2.551
12	-3.002	-3.480	-2.839	-2.556
11	-2.916	-3.480	-2.845	-2.562
10	-2.996	-3.480	-2.851	-2.567
9	-3.071	-3.480	-2.857	-2.572
8	-2.679	-3.480	-2.863	-2.577
7	-2.744	-3.480	-2.868	-2.582
6	-2.174	-3.480	-2.873	-2.587
5	-1.906	-3.480	-2.878	-2.592
4	-2.500	-3.480	-2.883	-2.596
3	-4.420	-3.480	-2.888	-2.600
2	-8.082	-3.480	-2.892	-2.604
1	-8.801	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 8 with RMSE = 2.03e-06
Min SIC = -26.05223 at lag 7 with RMSE = 2.05e-06
Min MAIC = -26.07069 at lag 7 with RMSE = 2.05e-06

Switzerland: dfgls D.lnchoutgap

```
DF-GLS test for unit root
Variable: D.lnchoutgap
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
		-------- Critical value ---------		
16	-1.427	-3.480	-2.813	-2.533
15	-1.338	-3.480	-2.820	-2.539
14	-1.370	-3.480	-2.827	-2.545
13	-1.082	-3.480	-2.833	-2.551
12	-1.121	-3.480	-2.839	-2.556
11	-1.023	-3.480	-2.845	-2.562
10	-1.062	-3.480	-2.851	-2.567
9	-1.244	-3.480	-2.857	-2.572
8	-1.388	-3.480	-2.863	-2.577
7	-1.345	-3.480	-2.868	-2.582
6	-1.272	-3.480	-2.873	-2.587
5	-1.054	-3.480	-2.878	-2.592
4	-1.891	-3.480	-2.883	-2.596
3	-1.431	-3.480	-2.888	-2.600
2	-3.917	-3.480	-2.892	-2.604
1	-7.568	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 4 with RMSE = 1.54e-06
Min SIC  = -26.60721 at lag  4 with RMSE = 1.59e-06
Min MAIC = -26.67588 at lag  6 with RMSE = 1.57e-06
```

Real Exchange Rate in levels:

UK: dfgls lnukrer

```
DF-GLS test for unit root
Variable: lnukrer
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1%	5%	10%
		-------- Critical value ---------		
16	-1.591	-3.480	-2.814	-2.533
15	-1.618	-3.480	-2.820	-2.539
14	-1.820	-3.480	-2.827	-2.545
13	-1.803	-3.480	-2.833	-2.551
12	-1.816	-3.480	-2.839	-2.556
11	-1.693	-3.480	-2.845	-2.562
10	-1.677	-3.480	-2.851	-2.567
9	-1.657	-3.480	-2.857	-2.572
8	-1.509	-3.480	-2.862	-2.577
7	-1.464	-3.480	-2.868	-2.582
6	-1.392	-3.480	-2.873	-2.587
5	-1.390	-3.480	-2.878	-2.592
4	-1.414	-3.480	-2.883	-2.596
3	-1.481	-3.480	-2.888	-2.600
2	-1.357	-3.480	-2.892	-2.604
1	-1.322	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 15 with RMSE = .0149924
Min SIC  = -8.328795 at lag  1 with RMSE = .0152608
Min MAIC = -8.347589 at lag  1 with RMSE = .0152608
```

Canada: dfgls lncarer

```
DF-GLS test for unit root
Variable: lncarer
Lag selection: Schwert criterion           Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.293	-3.480	-2.814	-2.533
15	-1.330	-3.480	-2.820	-2.539
14	-1.343	-3.480	-2.827	-2.545
13	-1.452	-3.480	-2.833	-2.551
12	-1.503	-3.480	-2.839	-2.556
11	-1.586	-3.480	-2.845	-2.562
10	-1.461	-3.480	-2.851	-2.567
9	-1.336	-3.480	-2.857	-2.572
8	-1.380	-3.480	-2.862	-2.577
7	-1.450	-3.480	-2.868	-2.582
6	-1.545	-3.480	-2.873	-2.587
5	-1.625	-3.480	-2.878	-2.592
4	-1.654	-3.480	-2.883	-2.596
3	-1.507	-3.480	-2.888	-2.600
2	-1.565	-3.480	-2.892	-2.604
1	-1.638	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 4 with RMSE = .0154325
Min SIC  = -8.294805 at lag 1 with RMSE = .0155223
Min MAIC = -8.307666 at lag 1 with RMSE = .0155223
```

Australia: dfgls lnaurer

```
DF-GLS test for unit root
Variable: lnaurer
Lag selection: Schwert criterion           Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.832	-3.480	-2.814	-2.533
15	-1.948	-3.480	-2.820	-2.539
14	-1.932	-3.480	-2.827	-2.545
13	-1.885	-3.480	-2.833	-2.551
12	-1.906	-3.480	-2.839	-2.556
11	-2.189	-3.480	-2.845	-2.562
10	-2.099	-3.480	-2.851	-2.567
9	-2.042	-3.480	-2.857	-2.572
8	-2.044	-3.480	-2.862	-2.577
7	-2.345	-3.480	-2.868	-2.582
6	-2.204	-3.480	-2.873	-2.587
5	-2.224	-3.480	-2.878	-2.592
4	-2.253	-3.480	-2.883	-2.596

```
      3          -2.225       -3.480       -2.888       -2.600
      2          -2.233       -3.480       -2.892       -2.604
      1          -2.561       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 12 with RMSE = .0203894
Min SIC  =  -7.70249 at lag  1 with RMSE = .0208726
Min MAIC =  -7.70727 at lag  2 with RMSE = .0207285
```

New Zealand: dfgls lnnzrer

```
DF-GLS test for unit root
Variable: lnnzrer
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
------------------------------------------------------------------
     16          -2.546       -3.480       -2.814       -2.533
     15          -2.648       -3.480       -2.820       -2.539
     14          -2.759       -3.480       -2.827       -2.545
     13          -2.793       -3.480       -2.833       -2.551
     12          -2.572       -3.480       -2.839       -2.556
     11          -2.468       -3.480       -2.845       -2.562
     10          -2.572       -3.480       -2.851       -2.567
      9          -2.561       -3.480       -2.857       -2.572
      8          -2.608       -3.480       -2.862       -2.577
      7          -2.538       -3.480       -2.868       -2.582
      6          -2.427       -3.480       -2.873       -2.587
      5          -2.294       -3.480       -2.878       -2.592
      4          -2.237       -3.480       -2.883       -2.596
      3          -2.482       -3.480       -2.888       -2.600
      2          -2.563       -3.480       -2.892       -2.604
      1          -2.497       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0180866
Min SIC  = -7.989025 at lag 1 with RMSE = .0180866
Min MAIC = -7.979074 at lag 1 with RMSE = .0180866
```

Sweden: dfgls lnserer

```
DF-GLS test for unit root
Variable: lnserer
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
------------------------------------------------------------------
     16          -2.597       -3.480       -2.814       -2.533
     15          -2.546       -3.480       -2.820       -2.539
     14          -2.593       -3.480       -2.827       -2.545
     13          -2.943       -3.480       -2.833       -2.551
     12          -2.984       -3.480       -2.839       -2.556
     11          -2.966       -3.480       -2.845       -2.562
     10          -2.911       -3.480       -2.851       -2.567
      9          -2.660       -3.480       -2.857       -2.572
      8          -2.904       -3.480       -2.862       -2.577
```

```
       7         -3.102        -3.480        -2.868        -2.582
       6         -3.043        -3.480        -2.873        -2.587
       5         -2.937        -3.480        -2.878        -2.592
       4         -2.769        -3.480        -2.883        -2.596
       3         -2.893        -3.480        -2.888        -2.600
       2         -2.641        -3.480        -2.892        -2.604
       1         -2.925        -3.480        -2.896        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 14 with RMSE = .0124606
Min SIC  = -8.670933 at lag  1 with RMSE = .0128612
Min MAIC = -8.656946 at lag  2 with RMSE = .0128078
```

US: dfgls lnusrer

```
DF-GLS test for unit root
Variable: lnusrer
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
      16         -1.718        -3.480        -2.814        -2.533
      15         -1.627        -3.480        -2.820        -2.539
      14         -1.650        -3.480        -2.827        -2.545
      13         -1.619        -3.480        -2.833        -2.551
      12         -1.637        -3.480        -2.839        -2.556
      11         -1.824        -3.480        -2.845        -2.562
      10         -1.848        -3.480        -2.851        -2.567
       9         -1.709        -3.480        -2.857        -2.572
       8         -1.744        -3.480        -2.862        -2.577
       7         -1.693        -3.480        -2.868        -2.582
       6         -1.925        -3.480        -2.873        -2.587
       5         -1.876        -3.480        -2.878        -2.592
       4         -1.987        -3.480        -2.883        -2.596
       3         -1.797        -3.480        -2.888        -2.600
       2         -1.748        -3.480        -2.892        -2.604
       1         -1.934        -3.480        -2.896        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 12 with RMSE = .0137565
Min SIC  =  -8.48195 at lag  1 with RMSE = .0141358
Min MAIC = -8.494423 at lag  2 with RMSE = .0140755
```

Euro Area: dfgls lneurer

```
DF-GLS test for unit root
Variable: lneurer
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
      16         -1.923        -3.480        -2.814        -2.533
      15         -1.826        -3.480        -2.820        -2.539
      14         -1.881        -3.480        -2.827        -2.545
      13         -1.952        -3.480        -2.833        -2.551
```

12	-2.148	-3.480	-2.839	-2.556
11	-2.113	-3.480	-2.845	-2.562
10	-2.270	-3.480	-2.851	-2.567
9	-2.212	-3.480	-2.857	-2.572
8	-2.236	-3.480	-2.862	-2.577
7	-2.128	-3.480	-2.868	-2.582
6	-2.038	-3.480	-2.873	-2.587
5	-1.962	-3.480	-2.878	-2.592
4	-1.884	-3.480	-2.883	-2.596
3	-1.917	-3.480	-2.888	-2.600
2	-1.835	-3.480	-2.892	-2.604
1	-2.010	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0127864
Min SIC  = -8.682598 at lag 1 with RMSE = .0127864
Min MAIC = -8.691962 at lag 2 with RMSE = .0127388
```

Switzerland: dfgls lnchrer

```
DF-GLS test for unit root
Variable: lnchrer
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.987	-3.480	-2.814	-2.533
15	-1.965	-3.480	-2.820	-2.539
14	-1.962	-3.480	-2.827	-2.545
13	-2.028	-3.480	-2.833	-2.551
12	-2.055	-3.480	-2.839	-2.556
11	-2.112	-3.480	-2.845	-2.562
10	-2.010	-3.480	-2.851	-2.567
9	-1.907	-3.480	-2.857	-2.572
8	-1.963	-3.480	-2.862	-2.577
7	-1.812	-3.480	-2.868	-2.582
6	-1.749	-3.480	-2.873	-2.587
5	-1.655	-3.480	-2.878	-2.592
4	-1.706	-3.480	-2.883	-2.596
3	-1.941	-3.480	-2.888	-2.600
2	-1.873	-3.480	-2.892	-2.604
1	-1.896	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 4 with RMSE = .0125888
Min SIC  = -8.695909 at lag 1 with RMSE = .0127016
Min MAIC = -8.705527 at lag 4 with RMSE = .0125888
```

Real Exchange Rate in first differences:

UK: dfgls D.lnukrer

```
DF-GLS test for unit root
Variable: D.lnukrer
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%

```
----------------------------------------------------------------
     16          -1.655        -3.480        -2.813        -2.533
     15          -1.659        -3.480        -2.820        -2.539
     14          -1.654        -3.480        -2.827        -2.545
     13          -1.663        -3.480        -2.833        -2.551
     12          -1.671        -3.480        -2.839        -2.556
     11          -1.684        -3.480        -2.845        -2.562
     10          -1.734        -3.480        -2.851        -2.567
      9          -1.785        -3.480        -2.857        -2.572
      8          -1.859        -3.480        -2.863        -2.577
      7          -2.021        -3.480        -2.868        -2.582
      6          -2.188        -3.480        -2.873        -2.587
      5          -2.464        -3.480        -2.878        -2.592
      4          -2.774        -3.480        -2.883        -2.596
      3          -3.178        -3.480        -2.888        -2.600
      2          -3.653        -3.480        -2.892        -2.604
      1          -4.991        -3.480        -2.897        -2.608
----------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0155567
Min SIC  = -8.139531 at lag  8 with RMSE = .0157439
Min MAIC = -8.231619 at lag 1 with RMSE = .0155567
```

Canada: dfgls D.lncarer

```
DF-GLS test for unit root
Variable: D.lncarer
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
----------------------------------------------------------------
     16          -3.395        -3.480        -2.813        -2.533
     15          -3.443        -3.480        -2.820        -2.539
     14          -3.544        -3.480        -2.827        -2.545
     13          -3.696        -3.480        -2.833        -2.551
     12          -3.670        -3.480        -2.839        -2.556
     11          -3.751        -3.480        -2.845        -2.562
     10          -3.773        -3.480        -2.851        -2.567
      9          -4.246        -3.480        -2.857        -2.572
      8          -4.945        -3.480        -2.863        -2.577
      7          -5.284        -3.480        -2.868        -2.582
      6          -5.595        -3.480        -2.873        -2.587
      5          -5.855        -3.480        -2.878        -2.592
      4          -6.184        -3.480        -2.883        -2.596
      3          -6.797        -3.480        -2.888        -2.600
      2          -8.654        -3.480        -2.892        -2.604
      1         -10.172        -3.480        -2.897        -2.608
----------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 10 with RMSE = .0156142
Min SIC  = -8.226733 at lag  1 with RMSE =  .016059
Min MAIC = -7.849221 at lag 10 with RMSE = .0156142
```

Australia: dfgls D.lnaurer

```
DF-GLS test for unit root
Variable: D.lnaurer
Lag selection: Schwert criterion           Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.459	-3.480	-2.813	-2.533
15	-3.508	-3.480	-2.820	-2.539
14	-3.531	-3.480	-2.827	-2.545
13	-3.766	-3.480	-2.833	-2.551
12	-4.108	-3.480	-2.839	-2.556
11	-4.375	-3.480	-2.845	-2.562
10	-4.127	-3.480	-2.851	-2.567
9	-4.581	-3.480	-2.857	-2.572
8	-5.080	-3.480	-2.863	-2.577
7	-5.576	-3.480	-2.868	-2.582
6	-5.367	-3.480	-2.873	-2.587
5	-6.246	-3.480	-2.878	-2.592
4	-6.908	-3.480	-2.883	-2.596
3	-7.745	-3.480	-2.888	-2.600
2	-9.185	-3.480	-2.892	-2.604
1	-11.342	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .0214406
Min SIC  = -7.648702 at lag  1 with RMSE = .0214406
Min MAIC = -7.049472 at lag 14 with RMSE = .0209588
```

New Zealand: dfgls D.lnnzrer

```
DF-GLS test for unit root
Variable: D.lnnzrer
Lag selection: Schwert criterion          Maximum lag  =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-4.190	-3.480	-2.813	-2.533
15	-4.322	-3.480	-2.820	-2.539
14	-4.276	-3.480	-2.827	-2.545
13	-4.216	-3.480	-2.833	-2.551
12	-4.272	-3.480	-2.839	-2.556
11	-4.778	-3.480	-2.845	-2.562
10	-5.180	-3.480	-2.851	-2.567
9	-5.185	-3.480	-2.857	-2.572
8	-5.448	-3.480	-2.863	-2.577
7	-5.615	-3.480	-2.868	-2.582
6	-6.101	-3.480	-2.873	-2.587
5	-6.839	-3.480	-2.878	-2.592
4	-7.938	-3.480	-2.883	-2.596
3	-9.201	-3.480	-2.888	-2.600
2	-9.434	-3.480	-2.892	-2.604
1	-10.653	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  3 with RMSE = .0182413
Min SIC  = -7.960438 at lag  1 with RMSE = .0183461
Min MAIC = -6.923371 at lag 12 with RMSE = .0181046
```

Sweden: dfgls D.lnserer

```
DF-GLS test for unit root
Variable: D.lnserer
Lag selection: Schwert criterion          Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------
     16          -2.268        -3.480        -2.813        -2.533
     15          -2.353        -3.480        -2.820        -2.539
     14          -2.541        -3.480        -2.827        -2.545
     13          -2.640        -3.480        -2.833        -2.551
     12          -2.533        -3.480        -2.839        -2.556
     11          -2.659        -3.480        -2.845        -2.562
     10          -2.861        -3.480        -2.851        -2.567
      9          -3.043        -3.480        -2.857        -2.572
      8          -3.589        -3.480        -2.863        -2.577
      7          -3.589        -3.480        -2.868        -2.582
      6          -3.677        -3.480        -2.873        -2.587
      5          -4.070        -3.480        -2.878        -2.592
      4          -4.607        -3.480        -2.883        -2.596
      3          -5.724        -3.480        -2.888        -2.600
      2          -6.511        -3.480        -2.892        -2.604
      1          -9.084        -3.480        -2.897        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .0130861
Min SIC  = -8.538404 at lag  2 with RMSE = .0136177
Min MAIC = -8.489359 at lag 16 with RMSE = .0129523
```

US: dfgls D.lnusrer

```
DF-GLS test for unit root
Variable: D.lnusrer
Lag selection: Schwert criterion          Maximum lag   =  16

                               -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------
     16          -3.555        -3.480        -2.813        -2.533
     15          -3.994        -3.480        -2.820        -2.539
     14          -4.386        -3.480        -2.827        -2.545
     13          -4.529        -3.480        -2.833        -2.551
     12          -4.842        -3.480        -2.839        -2.556
     11          -5.051        -3.480        -2.845        -2.562
     10          -4.769        -3.480        -2.851        -2.567
      9          -4.937        -3.480        -2.857        -2.572
      8          -5.650        -3.480        -2.863        -2.577
      7          -5.917        -3.480        -2.868        -2.582
      6          -6.593        -3.480        -2.873        -2.587
      5          -6.280        -3.480        -2.878        -2.592
      4          -6.992        -3.480        -2.883        -2.596
      3          -7.202        -3.480        -2.888        -2.600
      2          -8.973        -3.480        -2.892        -2.604
      1         -10.944        -3.480        -2.897        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 11 with RMSE =  .013927
```

```
Min SIC  =  -8.46639 at lag  1 with RMSE = .0142455
Min MAIC =  -7.71904 at lag 16 with RMSE = .0138395
```

Euro Area: dfgls D.lneurer

```
DF-GLS test for unit root
Variable: D.lneurer
Lag selection: Schwert criterion          Maximum lag   =  16

                                -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
-------------------------------------------------------------------
     16          -3.365         -3.480        -2.813        -2.533
     15          -3.638         -3.480        -2.820        -2.539
     14          -4.021         -3.480        -2.827        -2.545
     13          -4.118         -3.480        -2.833        -2.551
     12          -4.176         -3.480        -2.839        -2.556
     11          -3.974         -3.480        -2.845        -2.562
     10          -4.234         -3.480        -2.851        -2.567
      9          -4.134         -3.480        -2.857        -2.572
      8          -4.453         -3.480        -2.863        -2.577
      7          -4.620         -3.480        -2.868        -2.582
      6          -5.152         -3.480        -2.873        -2.587
      5          -5.797         -3.480        -2.878        -2.592
      4          -6.595         -3.480        -2.883        -2.596
      3          -7.714         -3.480        -2.888        -2.600
      2          -8.684         -3.480        -2.892        -2.604
      1         -11.045         -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE =  .013068
Min SIC  = -8.638992 at lag  1 with RMSE = .0130676
Min MAIC = -8.136335 at lag  9 with RMSE =  .012887
```

Switzerland: dfgls D.lnchrer

```
DF-GLS test for unit root
Variable: D.lnchrer
Lag selection: Schwert criterion          Maximum lag   =  16

                                -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
-------------------------------------------------------------------
     16          -3.387         -3.480        -2.813        -2.533
     15          -3.481         -3.480        -2.820        -2.539
     14          -3.638         -3.480        -2.827        -2.545
     13          -3.776         -3.480        -2.833        -2.551
     12          -3.807         -3.480        -2.839        -2.556
     11          -3.902         -3.480        -2.845        -2.562
     10          -3.964         -3.480        -2.851        -2.567
      9          -4.316         -3.480        -2.857        -2.572
      8          -4.760         -3.480        -2.863        -2.577
      7          -4.887         -3.480        -2.868        -2.582
      6          -5.714         -3.480        -2.873        -2.587
      5          -6.523         -3.480        -2.878        -2.592
      4          -7.777         -3.480        -2.883        -2.596
      3          -8.753         -3.480        -2.888        -2.600
```

```
      2          -8.882       -3.480       -2.892       -2.604
      1         -11.254       -3.480       -2.897       -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  7 with RMSE = .0127429
Min SIC  = -8.648119 at lag  1 with RMSE = .0130082
Min MAIC = -8.055847 at lag 16 with RMSE = .0126564
```

KPSS Test for Stationarity:

Nominal Exchange Rate in levels:

UK-Canada: kpss lngbpcad

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpcad is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.95
    1            1.5
    2           1.01
    3           .767
    4           .621
    5           .524
    6           .454
    7           .403
    8           .362
    9            .33
   10           .304
   11           .282
   12           .263
   13           .247
   14           .234
   15           .221
   16           .219
```

UK-Australia: kpss lngbpaud

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.59
    1           1.81
    2           1.22
    3            .92
    4           .741
    5           .622
    6           .537
    7           .473
```

```
    8           .424
    9           .384
   10           .352
   11           .325
   12           .302
   13           .283
   14           .266
   15           .252
   16           .239
```

UK-New Zealand: kpss lngbpnzd

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           4.01
    1           2.02
    2           1.36
    3           1.03
    4           .829
    5           .696
    6           .601
    7            .53
    8           .475
    9           .431
   10           .395
   11           .365
   12            .34
   13           .319
   14             .3
   15           .284
   16            .27
```

UK-Sweden: kpss lngbpsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            3.5
    1           1.77
    2           1.19
    3           .904
    4            .73
    5           .614
    6           .531
    7           .469
    8           .421
```

```
    9           .383
   10           .352
   11           .326
   12           .304
   13           .285
   14           .269
   15           .255
   16           .242
```

Canada-Australia: kpss lncadaud

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncadaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.26
    1           1.15
    2            .78
    3           .595
    4           .485
    5           .411
    6           .359
    7           .319
    8           .289
    9           .265
   10           .245
   11           .228
   12           .214
   13           .202
   14           .192
   15           .183
   16           .177
```

Canada-New Zealand: kpss lncadnzd

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncadnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.39
    1           1.21
    2           .818
    3           .622
    4           .505
    5           .427
    6           .371
    7           .329
    8           .297
    9           .271
```

```
   10           .249
   11           .232
   12           .217
   13           .204
   14           .193
   15           .183
   16           .177
```

Canada-Sweden: kpss lncadsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncadsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .948
    1           .847
    2           .833
    3           .756
    4           .721
    5           .718
    6           .658
    7           .642
    8           .613
    9           .521
   10           .513
   11           .407
   12           .401
   13           .369
   14           .331
   15           .299
   16           .272
```

Australia-New Zealand: kpss lnaudnzd

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaudnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.24
    1           1.14
    2           .776
    3           .593
    4           .484
    5            .41
    6           .357
    7           .317
    8           .285
    9           .259
   10           .238
```

```
   11           .221
   12           .206
   13           .193
   14           .183
   15           .181
   16           .165
```

Australia-Sweden: kpss lnaudsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaudsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.81
    1          .939
    2          .647
    3          .499
    4           .41
    5           .35
    6          .308
    7          .277
    8          .252
    9          .233
   10          .218
   11          .206
   12          .195
   13          .187
   14          .179
   15          .173
   16          .167
```

New Zealand-Sweden: kpss lnnzdsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzdsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          2.26
    1          1.17
    2          .805
    3          .622
    4          .513
    5          .441
    6          .389
    7          .351
    8          .321
    9          .298
   10          .279
```

```
   11          .264
   12          .251
   13           .24
   14          .231
   15          .222
   16          .215
```

US-Euro Area: kpss lnusdeur

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusdeur is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          3.05
    1          1.54
    2          1.03
    3          .781
    4          .631
    5           .53
    6          .458
    7          .405
    8          .363
    9           .33
   10          .302
   11           .28
   12          .261
   13          .244
   14           .23
   15          .218
   16          .207
```

US-Switzerland: kpss lnusdchf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusdchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          2.89
    1          1.46
    2          .984
    3          .745
    4          .601
    5          .506
    6          .437
    7          .386
    8          .346
    9          .314
   10          .288
```

```
   11            .266
   12            .248
   13            .232
   14            .219
   15            .207
   16            .197
```

Euro Area-Switzerland: kpss lneurchf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneurchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           4.62
    1           2.33
    2           1.56
    3           1.18
    4           .951
    5           .798
    6           .689
    7           .607
    8           .544
    9           .493
   10           .452
   11           .417
   12           .388
   13           .364
   14           .342
   15           .323
   16           .307
```

Nominal Exchange Rate in first differences:

UK-Canada: kpss D.lngbpcad

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lngbpcad is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0982
    1          .0881
    2          .0863
    3          .0845
    4          .0817
    5          .0801
    6           .079
    7          .0796
```

```
    8          .0811
    9          .0833
   10          .0858
   11          .0871
   12          .0878
   13          .0886
   14            .09
   15          .0908
   16          .0908
```

UK-Australia: kpss D.lngbpaud

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lngbpaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0912
    1          .0799
    2          .0828
    3          .0852
    4          .0858
    5          .0848
    6           .082
    7          .0793
    8          .0783
    9           .078
   10          .0781
   11          .0773
   12          .0766
   13          .0768
   14          .0768
   15           .077
   16          .0774
```

UK-New Zealand: kpss D.lngbpnzd

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lngbpnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .083
    1          .0718
    2          .0696
    3          .0684
    4          .0683
    5          .0681
    6          .0664
    7          .0647
```

```
    8          .0635
    9          .0622
   10          .0616
   11          .0613
   12           .061
   13          .0609
   14           .061
   15          .0615
   16          .0621
```

UK-Sweden: kpss D.lngbpsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lngbpsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0752
    1          .0664
    2          .0665
    3          .0674
    4          .0671
    5          .0655
    6          .0628
    7            .06
    8          .0585
    9          .0582
   10          .0582
   11          .0577
   12          .0573
   13           .057
   14          .0571
   15          .0579
   16          .0584
```

Canada-Australia: kpss D.lncadaud

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncadaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0554
    1          .0452
    2          .0436
    3          .0424
    4          .0424
    5          .0427
    6           .043
    7          .0436
```

```
    8          .045
    9         .0467
   10         .0483
   11         .0495
   12         .0507
   13         .0522
   14         .0532
   15         .0533
   16         .0535
```

Canada-New Zealand: kpss D.lncadnzd

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncadnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .0986
    1         .0814
    2         .0739
    3         .0688
    4         .0682
    5          .069
    6         .0695
    7         .0708
    8         .0715
    9         .0718
   10         .0718
   11         .0719
   12         .0717
   13         .0709
   14         .0705
   15         .0701
   16         .0696
```

Canada-Sweden: kpss D.lncadsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncadsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .0349
    1         .0299
    2         .0294
    3         .0293
    4         .0285
    5         .0275
    6         .0274
    7         .0277
    8         .0279
```

```
    9          .0283
   10           .029
   11          .0296
   12          .0302
   13          .0308
   14          .0319
   15          .0329
   16          .0337
```

Australia-New Zealand: kpss D.lnaudnzd

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaudnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0576
    1          .0467
    2           .045
    3           .046
    4          .0496
    5          .0554
    6          .0615
    7          .0664
    8          .0693
    9          .0708
   10          .0698
   11          .0689
   12          .0694
   13          .0706
   14          .0726
   15          .0739
   16          .0744
```

Australia-Sweden: kpss D.lnaudsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaudsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0273
    1          .0239
    2           .026
    3          .0284
    4          .0289
    5          .0286
    6          .0288
    7          .0288
    8          .0288
    9           .029
```

```
   10          .0294
   11          .0296
   12          .0303
   13          .0315
   14          .0333
   15          .0352
   16          .0373
```

New Zealand-Sweden: kpss D.lnnzdsek

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzdsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0428
    1          .0356
    2          .0351
    3          .0353
    4          .0356
    5          .0362
    6          .0369
    7          .0373
    8          .0375
    9          .0378
   10          .0384
   11          .0394
   12           .041
   13          .0429
   14          .0452
   15          .0482
   16          .0512
```

US-Euro Area: kpss D.lnusdeur

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusdeur is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .101
    1          .0786
    2          .0738
    3          .0719
    4            .07
    5          .0683
    6          .0668
    7          .0666
    8          .0664
    9          .0666
   10          .0666
```

```
   11          .0669
   12          .0676
   13          .0686
   14          .0698
   15           .071
   16          .0716
```

US-Switzerland: kpss D.lnusdchf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusdchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0725
    1          .0622
    2           .061
    3          .0612
    4          .0617
    5          .0627
    6          .0633
    7          .0647
    8          .0648
    9          .0644
   10           .063
   11          .0621
   12          .0621
   13          .0623
   14          .0629
   15          .0635
   16          .0635
```

Euro Area-Switzerland: kpss D.lneurchf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneurchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0995
    1          .0832
    2          .0789
    3          .0751
    4          .0751
    5          .0751
    6           .074
    7          .0725
    8          .0707
    9            .07
   10          .0698
   11          .0691
```

```
   12          .0685
   13          .0683
   14          .0681
   15          .0679
   16          .0677
```

Inflation Differential in levels:

UK-Canada: kpss lnukcainf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukcainf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.21
    1          .652
    2          .556
    3          .436
    4          .402
    5          .363
    6          .335
    7          .314
    8          .297
    9          .284
   10          .273
   11          .264
   12          .257
   13          .215
   14          .195
   15          .184
   16          .176
```

UK-Australia: kpss lnukauinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukauinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.42
    1          .743
    2          .551
    3          .493
    4          .422
    5          .375
    6          .341
    7          .315
    8          .296
    9          .281
   10          .267
```

```
   11           .257
   12           .248
   13           .240
   14           .234
   15           .188
   16           .183
```

UK-New Zealand: kpss lnuknzinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuknzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.39
    1          .721
    2          .696
    3          .682
    4          .527
    5          .514
    6          .439
    7          .416
    8          .399
    9          .385
   10          .374
   11          .366
   12          .359
   13          .253
   14          .249
   15          .245
   16          .241
```

UK-Sweden: kpss lnukseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.04
    1          .847
    2          .779
    3          .594
    4          .542
    5          .508
    6          .484
    7          .466
    8          .451
    9          .414
   10          .331
   11          .324
```

```
   12           .318
   13           .313
   14           .209
   15           .205
   16           .202
```

Canada-Australia: kpss lncaauinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncaauinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .743
    1           .515
    2           .499
    3           .441
    4           .406
    5           .382
    6           .364
    7           .351
    8           .314
    9           .232
   10           .225
   11           .219
   12           .215
   13           .211
   14           .208
   15           .205
   16           .203
```

Canada-New Zealand: kpss lncanzinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncanzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .815
    1           .744
    2           .509
    3           .445
    4           .406
    5           .418
    6           .362
    7           .348
    8           .337
    9           .329
   10           .322
   11           .317
   12           .213
```

```
   13           .209
   14           .206
   15           .204
   16           .201
```

Canada-Sweden: kpss lncaseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncaseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           1.24
    1           .685
    2           .493
    3           .395
    4           .333
    5            .29
    6           .258
    7           .235
    8           .216
    9           .201
   10           .189
   11           .178
   12            .17
   13           .163
   14           .156
   15            .15
   16           .145
```

Australia-New Zealand: kpss lnaunzinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaunzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .604
    1           .516
    2           .419
    3           .417
    4           .341
    5           .322
    6           .308
    7           .297
    8           .289
    9           .283
   10           .278
   11           .274
   12           .271
   13           .269
```

```
   14           .267
   15           .265
   16           .263
```

Australia-Sweden: kpss lnauseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnauseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.53
    1          .817
    2          .574
    3          .451
    4          .377
    5          .328
    6          .294
    7          .268
    8          .249
    9          .234
   10          .222
   11          .212
   12          .205
   13          .198
   14          .193
   15          .189
   16          .186
```

New Zealand-Sweden: kpss lnnzseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.33
    1            .7
    2          .488
    3          .382
    4          .319
    5          .278
    6          .249
    7          .228
    8          .212
    9            .2
   10          .191
   11          .184
   12          .179
   13          .174
   14          .171
```

```
   15           .168
   16           .166
```

US-Euro Area: kpss lnuseuinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuseuinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.14
    1           .612
    2           .525
    3           .432
    4           .376
    5           .339
    6           .313
    7           .294
    8           .279
    9           .267
   10           .257
   11           .249
   12           .243
   13           .237
   14           .232
   15           .228
   16           .224
```

US-Switzerland: kpss lnuschinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuschinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .508
    1           .465
    2           .383
    3           .342
    4           .318
    5           .302
    6           .294
    7           .284
    8           .275
    9           .272
   10           .269
   11           .266
   12           .264
   13           .262
   14           .261
   15           .198
```

```
   16          .188
```

Euro Area-Switzerland: kpss lneuchinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneuchinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .422
    1           .413
    2           .355
    3           .322
    4           .303
    5           .290
    6           .282
    7           .276
    8           .272
    9           .269
   10           .267
   11           .265
   12           .264
   13           .263
   14           .263
   15           .262
   16           .262
```

<u>Inflation Differential in first differences:</u>

UK-Canada: kpss D.lnukcainf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukcainf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0102
    1          .0125
    2          .0121
    3          .0129
    4          .0145
    5          .0158
    6          .0171
    7          .0185
    8          .0196
    9          .0206
   10          .0212
   11          .0215
   12          .0232
   13           .025
   14          .0271
   15          .0294
```

```
   16          .0308
```

UK-Australia: kpss D.lnukauinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukauinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0326
    1          .0319
    2          .0357
    3          .0385
    4          .0393
    5          .0399
    6          .0402
    7            .04
    8          .0399
    9           .041
   10          .0413
   11          .0411
   12          .0426
   13          .0439
   14          .0448
   15           .045
   16          .0451
```

UK-New Zealand: kpss D.lnuknzinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuknzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0263
    1          .0271
    2          .0297
    3          .0276
    4          .0267
    5          .0261
    6          .0262
    7          .0261
    8           .026
    9          .0266
   10          .0267
   11          .0267
   12          .0285
   13          .0304
   14          .0323
   15          .0348
   16          .0373
```

UK-Sweden: kpss D.lnukseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .016
    1          .0162
    2          .0182
    3          .0195
    4          .0199
    5          .0213
    6          .0219
    7          .0221
    8          .0227
    9          .0233
   10          .0234
   11          .0235
   12          .0249
   13          .0259
   14           .027
   15           .028
```

16 .0291

Canada-Australia: kpss D.lncaauinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncaauinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0105
    1          .0124
    2          .0133
    3          .0151
    4          .0176
    5          .0193
    6          .0213
    7          .0232
    8          .0243
    9          .0256
   10          .0262
   11          .0261
   12          .0282
   13          .0305
   14          .0324
   15          .0341
   16          .0345
```

Canada-New Zealand: kpss D.lncanzinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncanzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0116
    1          .0133
    2          .0134
    3          .0142
    4          .0155
    5          .0165
    6          .0179
    7          .0192
    8          .0202
    9           .021
   10          .0213
   11          .0213
   12          .0229
   13           .025
   14          .0273
   15          .0298
   16          .0322
```

Canada-Sweden: kpss D.lncaseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncaseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0074
    1         .00776
    2         .00921
    3          .0114
    4          .0136
    5           .015
    6          .0164
    7          .0175
    8          .0185
    9          .0201
   10          .0209
   11          .0213
   12           .024
   13          .0268
   14          .0293
   15           .032
   16          .0335
```

Australia-New Zealand: kpss D.lnaunzinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaunzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0211
    1          .0211
    2          .0212
    3          .0222
    4          .0228
    5          .0233
    6          .0237
    7           .024
    8          .0243
    9          .0243
   10          .0243
   11          .0242
   12          .0252
   13          .0261
   14          .0269
   15          .0279
   16          .0288
```

Australia-Sweden: kpss D.lnauseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnauseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .019
    1          .0191
    2          .0199
    3          .0213
    4          .0227
    5          .0236
    6          .0241
    7          .0249
    8          .0256
    9          .0264
   10          .0269
   11          .0272
   12           .029
   13          .0307
   14          .0328
   15          .0348
   16          .0366
```

New Zealand-Sweden: kpss D.lnnzseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0181
    1           .017
    2          .0172
    3          .0176
    4           .018
    5          .0181
    6          .0181
    7          .0186
    8           .019
    9          .0196
   10          .0201
   11          .0206
   12          .0223
   13          .0243
   14          .0269
   15          .0295
   16          .0323
```

US-Euro Area: kpss D.lnuseuinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuseuinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0286
    1            .04
    2          .0381
    3          .0408
    4          .0421
    5          .0427
    6          .0437
    7          .0441
    8          .0449
    9          .0461
   10          .0478
   11          .0491
   12          .0524
   13          .0555
   14          .0587
   15          .0612
   16          .0622
```

US-Switzerland: kpss D.lnuschinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuschinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0228
    1          .0222
    2          .0207
    3          .0207
    4          .0198
    5            .02
    6          .0203
    7          .0206
    8          .0213
    9          .0221
   10          .0228
   11          .0236
   12          .0249
   13          .0261
   14          .0271
   15          .0283
   16          .0293
```

Euro Area-Switzerland: kpss D.lneuchinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneuchinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0156
    1          .0159
    2          .0139
    3          .0138
    4          .0133
    5          .0133
    6          .0132
    7          .0135
    8          .0141
    9           .015
   10           .016
   11          .0171
   12          .0188
   13          .0203
   14          .0219
   15          .0233
   16          .0246
```

Interest Rate Differential in levels:

UK-Canada: kpss lnukcair

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukcair is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.57
    1           1.81
    2           1.23
    3           .938
    4           .763
    5           .647
    6           .564
    7           .501
    8           .453
    9           .415
   10           .383
   11           .357
   12           .335
   13           .317
   14           .301
   15           .287
   16           .275
```

UK-Australia: kpss lnukauir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.07
    1           1.55
    2           1.04
    3           .786
    4           .633
    5           .532
    6            .46
    7           .406
    8           .364
    9           .331
   10           .304
   11           .282
   12           .263
   13           .247
   14           .233
   15           .221
   16           .211
```

UK-New Zealand: kpss lnuknzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuknzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          2.56
    1           1.3
    2          .874
    3          .664
    4          .537
    5          .454
    6          .394
    7          .349
    8          .314
    9          .287
   10          .264
   11          .246
   12           .23
   13          .217
   14          .205
   15          .195
   16          .186
```

UK-Sweden: kpss lnukseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.94
    1          .977
    2          .756
    3          .596
    4            .5
    5          .436
    6          .391
    7          .357
    8          .331
    9           .31
   10          .293
   11          .278
   12          .266
   13          .256
   14          .247
   15           .24
   16          .233
```

Canada-Australia: kpss lncaauir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncaauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          4.68
    1          2.36
    2          1.58
    3           1.2
    4          .967
    5          .813
    6          .703
    7          .621
    8          .558
    9          .507
   10          .465
   11          .431
   12          .402
   13          .377
   14          .356
   15          .337
   16           .32
```

Canada-New Zealand: kpss lncanzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncanzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          3.75
    1          1.89
    2          1.27
    3          .964
    4          .779
    5          .656
    6          .569
    7          .503
    8          .452
    9          .412
   10          .379
   11          .352
   12          .329
   13           .31
   14          .293
   15          .279
   16          .266
```

Canada-Sweden: kpss lncaseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncaseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          2.35
    1          1.19
    2          .802
    3          .609
    4          .493
    5          .417
    6          .362
    7          .321
    8           .29
    9          .265
   10          .244
   11          .227
   12          .213
   13            .2
   14           .19
   15           .18
   16          .179
```

Australia-New Zealand: kpss lnaunzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaunzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.75
    1          .884
    2          .696
    3          .553
    4          .467
    5           .41
    6           .37
    7          .339
    8          .316
    9          .297
   10          .282
   11          .269
   12          .259
   13           .25
   14          .242
   15          .235
   16          .229
```

Australia-Sweden: kpss lnauseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnauseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           1.37
    1           .897
    2           .673
    3           .561
    4           .494
    5            .45
    6           .318
    7           .295
    8           .277
    9           .263
   10           .252
   11           .243
   12           .235
   13           .229
   14           .224
   15           .219
   16           .215
```

New Zealand-Sweden: kpss lnnzseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .954
    1           .784
    2           .727
    3           .649
    4           .402
    5           .371
    6           .349
    7           .333
    8            .32
    9            .31
   10           .202
   11           .195
   12           .189
   13           .185
   14           .181
   15           .177
   16           .174
```

US-Euro Area: kpss lnuseuir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuseuir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.91
    1           1.97
    2           1.32
    3           .994
    4           .799
    5            .67
    6           .577
    7           .508
    8           .455
    9           .412
   10           .377
   11           .348
   12           .323
   13           .303
   14           .285
   15           .269
   16           .255
```

US-Switzerland: kpss lnuschir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuschir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.96
    1           2.01
    2           1.35
    3           1.02
    4           .826
    5           .694
    6             .6
    7           .529
    8           .474
    9            .43
   10           .394
   11           .364
   12           .339
   13           .317
   14           .298
   15           .282
   16           .268
```

Euro Area-Switzerland: kpss lneuchir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneuchir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.11
    1          .985
    2          .806
    3          .615
    4           .56
    5          .424
    6          .397
    7          .378
    8          .362
    9           .35
   10           .34
   11          .232
   12          .225
   13          .219
   14          .214
   15           .21
   16          .207
```

Interest Rate Differential in first differences:

UK-Canada: kpss D.lnukcair

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukcair is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .0663
    1         .0513
    2         .0464
    3          .045
    4          .045
    5         .0454
    6         .0458
    7         .0459
    8         .0459
    9         .0452
   10         .0446
   11         .0441
   12         .0439
   13         .0439
   14         .0442
   15         .0446
   16         .0452
```

UK-Australia: kpss D.lnukauir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .104
    1           .089
    2           .071
    3            .06
    4           .049
    5            .04
    6           .033
    7           .028
    8           .022
    9           .018
   10           .014
   11           .012
   12           .009
   13           .008
   14           .007
   15           .005
   16           .004
```

UK-New Zealand: kpss D.lnuknzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuknzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            .14
    1           .104
    2          .0955
    3          .0932
    4          .0911
    5          .0899
    6          .0895
    7            .09
    8          .0898
    9          .0901
   10          .0907
   11          .0917
   12          .0928
   13          .0939
   14           .095
   15          .0962
   16           .098
```

UK-Sweden: kpss D.lnukseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .167
    1           .131
    2           .121
    3           .112
    4           .103
    5          .0948
    6          .0891
    7          .0851
    8          .0822
    9          .0798
   10          .0781
   11          .0765
   12          .0748
   13          .0734
   14          .0721
   15          .0704
   16          .0688
```

Canada-Australia: kpss D.lncaauir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncaauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .107
    1          .0709
    2          .0581
    3          .0522
    4          .0492
    5          .0476
    6          .0468
    7          .0464
    8          .0464
    9          .0465
   10          .0467
   11           .047
   12          .0473
   13          .0479
   14          .0486
   15          .0492
   16          .0495
```

Canada-New Zealand: kpss D.lncanzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncanzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0751
    1          .0554
    2          .0467
    3           .042
    4          .0394
    5          .0379
    6          .0373
    7           .037
    8          .0366
    9           .036
   10          .0355
   11          .0349
   12          .0345
   13          .0343
   14          .0344
   15          .0345
   16          .0346
```

Canada-Sweden: kpss D.lncaseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncaseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .151
    1           .112
    2          .0966
    3           .087
    4          .0821
    5          .0805
    6          .0801
    7          .0801
    8            .08
    9          .0792
   10          .0787
   11          .0781
   12          .0775
   13          .0773
   14          .0771
   15          .0766
   16          .0755
```

Australia-New Zealand: kpss D.lnaunzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaunzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0717
    1          .0541
    2          .0492
    3          .0459
    4          .0438
    5           .042
    6          .0411
    7          .0406
    8          .0404
    9          .0406
   10          .0408
   11          .0409
   12           .041
   13          .0412
   14          .0417
   15           .042
   16          .0423
```

Australia-Sweden: kpss D.lnauseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnauseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0987
    1          .0973
    2          .0969
    3          .0951
    4          .0937
    5          .0927
    6          .0918
    7          .0912
    8          .0910
    9          .0810
   10          .0787
   11          .0754
   12          .0725
   13          .0701
   14          .0683
   15          .0667
   16          .0649
```

New Zealand-Sweden: kpss D.lnnzseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0992
    1          .0952
    2          .0913
    3          .0818
    4          .0809
    5          .0803
    6          .0792
    7          .0761
    8          .0735
    9          .0711
   10          .0691
   11          .0673
   12          .0657
   13          .0645
   14          .0636
   15          .0625
   16          .0612
```

US-Euro Area: kpss D.lnuseuir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuseuir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0949
    1          .0915
    2          .0914
    3          .0913
    4          .0903
    5          .0842
    6          .0811
    7          .0801
    8          .0710
    9          .0702
   10          .0698
   11          .0694
   12          .0624
   13          .0604
   14          .0584
   15          .0562
   16          .0545
```

US-Switzerland: kpss D.lnuschir

```
Maxlag = 16 chosen by Schwert criterion
```

```
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuschir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0712
    1          .0703
    2          .0739
    3          .0765
    4          .0787
    5          .0804
    6          .0826
    7          .0834
    8          .0853
    9          .0868
   10          .0856
   11          .0856
   12          .0856
   13           .085
   14          .0856
   15          .0854
   16          .0849
```

Euro Area-Switzerland: kpss D.lneuchir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneuchir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0162
    1          .0171
    2          .0187
    3          .0197
    4           .021
    5           .022
    6          .0234
    7          .0248
    8           .026
    9          .0266
   10          .0262
   11          .0268
   12          .0273
   13          .0275
   14          .0285
   15          .0292
   16          .0301
```

Interest Rate in levels:

UK: kpss lnukir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.64
    1           1.33
    2           .888
    3           .671
    4           .541
    5           .455
    6           .393
    7           .348
    8           .312
    9           .284
   10           .262
   11           .243
   12           .227
   13           .214
   14           .202
   15           .192
   16           .183
```

Canada: kpss lncair

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncair is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0              1
    1           .507
    2           .442
    3            .36
    4           .311
    5           .279
    6           .256
    7           .239
    8           .226
    9           .216
   10           .208
   11           .201
   12           .195
   13           .190
   14           .187
   15           .183
```

```
   16           .180
```

Australia: kpss lnauir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           4.9
    1          2.49
    2          1.68
    3          1.28
    4          1.04
    5           .88
    6          .767
    7          .683
    8          .618
    9          .567
   10          .525
   11          .491
   12          .462
   13          .437
   14          .416
   15          .398
   16          .382
```

New Zealand: kpss lnnzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          2.94
    1          1.49
    2             1
    3          .764
    4           .62
    5          .525
    6          .458
    7          .408
    8          .369
    9          .339
   10          .315
   11          .294
   12          .278
   13          .263
   14          .251
   15           .24
```

```
   16           .231
```

Sweden: kpss lnseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.55
    1          .779
    2          .524
    3          .398
    4          .322
    5          .272
    6          .237
    7           .21
    8           .19
    9          .174
   10          .161
   11          .151
   12          .142
   13          .135
   14          .129
   15          .123
   16          .119
```

US: kpss lnusir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.79
    1          .899
    2          .603
    3          .455
    4          .367
    5          .308
    6          .266
    7          .235
    8           .21
    9          .191
   10          .175
   11          .162
   12          .151
   13          .142
   14          .134
   15          .127
   16          .121
```

Euro Area: kpss lneuir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneuir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           4.09
    1           2.06
    2           1.38
    3           1.04
    4           .842
    5           .708
    6           .613
    7           .543
    8           .488
    9           .445
   10           .409
   11            .38
   12           .356
   13           .335
   14           .318
   15           .302
   16           .289
```

Switzerland: kpss lnchir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnchir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.41
    1           1.74
    2           1.18
    3           .899
    4           .729
    5           .616
    6           .535
    7           .474
    8           .426
    9           .388
   10           .357
   11           .332
   12            .31
   13           .291
   14           .275
   15           .262
   16           .249
```

Interest Rate in first differences:

UK: kpss D.lnukir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0911
    1          .0907
    2           .081
    3          .0773
    4           .068
    5          .0615
    6          .0568
    7          .0533
    8          .0505
    9          .0482
   10          .0465
   11          .0451
   12          .0441
   13          .0433
   14          .0427
   15          .0424
   16          .0422
```

Canada: kpss D.lncair

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncair is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .103
    1          .0657
    2          .0525
    3           .046
    4          .0426
    5          .0405
    6          .0388
    7          .0374
    8          .0361
    9          .0348
   10          .0338
   11           .033
   12          .0324
   13           .032
   14          .0318
   15          .0316
```

```
   16          .0316
```

Australia: kpss D.lnauir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .123
    1           .113
    2          .0918
    3          .0797
    4          .0729
    5          .0685
    6          .0653
    7          .0629
    8          .0612
    9          .0599
   10          .0589
   11          .0583
   12          .0581
   13          .0581
   14          .0585
   15           .059
   16          .0598
```

New Zealand: kpss D.lnnzir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .097
    1          .0821
    2          .0666
    3          .0587
    4          .0539
    5          .0504
    6           .048
    7          .0462
    8          .0449
    9           .044
   10          .0434
   11          .0432
   12          .0433
   13          .0435
   14           .044
   15          .0447
   16          .0455
```

Sweden: kpss D.lnseir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .095
    1          .0928
    2          .0754
    3           .065
    4          .0583
    5          .0538
    6          .0505
    7          .0481
    8          .0462
    9          .0446
   10          .0433
   11          .0423
   12          .0413
   13          .0406
   14          .0402
   15          .0398
   16          .0396
```

US: kpss D.lnusir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .139
    1           .134
    2           .124
    3           .114
    4           .105
    5          .0971
    6          .0903
    7          .0851
    8          .0808
    9          .0771
   10          .0734
   11          .0703
   12          .0677
   13          .0654
   14          .0633
   15          .0614
   16          .0599
```

Euro Area: kpss D.lneuir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneuir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .131
    1          .0858
    2          .0691
    3           .059
    4          .0521
    5          .0473
    6          .0438
    7          .0411
    8          .0391
    9          .0377
   10          .0366
   11          .0359
   12          .0352
   13          .0348
   14          .0346
   15          .0345
   16          .0347
```

Switzerland: kpss D.lnchir

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnchir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0338
    1           .034
    2           .036
    3          .0371
    4          .0381
    5           .039
    6          .0404
    7          .0414
    8          .0422
    9          .0426
   10          .0417
   11          .0419
   12           .042
   13          .0416
   14          .0421
   15          .0423
   16          .0425
```

Inflation Gap in levels:

UK: kpss lnukinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           1.42
    1           .724
    2           .491
    3           .375
    4           .305
    5           .259
    6           .226
    7           .201
    8           .183
    9           .167
   10           .155
   11           .145
   12           .137
   13            .13
   14           .124
   15           .119
   16           .114
```

Canada: kpss lncainf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncainf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .519
    1           .485
    2           .403
    3           .364
    4           .341
    5           .226
    6           .215
    7           .208
    8           .202
    9           .198
   10           .195
   11           .193
   12           .191
   13           .190
   14           .180
   15           .178
   16           .175
```

Australia: kpss lnauinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnauinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.65
    1          .858
    2           .59
    3          .456
    4          .375
    5          .322
    6          .284
    7          .256
    8          .235
    9          .218
   10          .205
   11          .194
   12          .185
   13          .177
   14          .171
   15          .165
   16           .16
```

New Zealand: kpss lnnzinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          1.59
    1          .815
    2          .555
    3          .424
    4          .347
    5          .296
    6           .26
    7          .234
    8          .214
    9          .198
   10          .186
   11          .176
   12          .167
   13          .161
   14          .155
   15           .15
   16          .146
```

Sweden: kpss lnseinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .54
    1          .483
    2          .397
    3          .353
    4          .327
    5          .311
    6          .297
    7          .288
    8          .281
    9          .276
   10          .272
   11          .268
   12          .266
   13          .263
   14          .262
   15          .260
   16          .259
```

US: kpss lnusinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .329
    1          .271
    2          .219
    3          .193
    4          .178
    5          .168
    6          .162
    7          .157
    8          .153
    9          .151
   10          .149
   11          .147
   12          .146
   13          .146
   14          .145
   15          .144
   16          .143
```

Euro Area: kpss lneuinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneuinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .865
    1           .654
    2           .512
    3           .442
    4           .399
    5           .371
    6           .352
    7           .337
    8           .326
    9           .217
   10           .211
   11           .204
   12           .199
   13           .195
   14           .192
   15           .189
   16           .186
```

Switzerland: kpss lnchinf

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnchinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .544
    1           .482
    2           .394
    3           .351
    4           .325
    5           .309
    6           .297
    7           .288
    8           .282
    9           .277
   10           .273
   11           .271
   12           .268
   13           .167
   14           .165
   15           .164
   16           .163
```

<u>Inflation Gap in first differences:</u>

UK: kpss D.lnukinfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0558
    1          .0512
    2          .0506
    3          .0492
    4          .0477
    5          .0468
    6          .0461
    7          .0455
    8          .0449
    9          .0442
   10          .0434
   11          .0424
   12          .0429
   13          .0435
   14          .0443
   15           .045
   16          .0458
```

Canada: kpss D.lncainfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncainf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .00911
    1          .0102
    2          .0098
    3          .0102
    4          .0112
    5          .0121
    6          .0132
    7          .0142
    8          .0151
    9          .0158
   10          .0164
   11          .0169
   12          .0184
   13          .0202
   14           .022
   15           .024
   16          .0254
```

Australia: kpss D.lnauinfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnauinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0243
    1          .0243
    2          .0244
    3          .0242
    4          .0241
    5           .024
    6          .0239
    7          .0238
    8          .0238
    9          .0243
   10          .0247
   11          .0251
   12          .0263
   13          .0274
   14          .0285
   15          .0292
   16            .03
```

New Zealand: kpss D.lnnzinfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0284
    1          .0284
    2          .0284
    3          .0252
    4          .0236
    5          .0227
    6          .0221
    7          .0216
    8          .0213
    9          .0213
   10          .0213
   11          .0213
   12          .0223
   13          .0234
   14          .0243
   15          .0258
```

```
   16          .0273
```

Sweden: kpss D.lnseinfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnseinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0204
    1           .019
    2          .0196
    3          .0207
    4           .021
    5          .0218
    6          .0223
    7          .0227
    8          .0235
    9          .0239
   10          .0241
   11          .0242
   12          .0255
   13          .0266
   14          .0279
   15          .0293
   16          .0307
```

US: kpss D.lnusinfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0201
    1          .0154
    2          .0135
    3          .0131
    4          .0131
    5          .0134
    6          .0137
    7          .0141
    8          .0144
    9           .015
   10          .0156
   11          .0162
   12          .0177
   13          .0196
```

```
   14          .0216
   15          .0233
   16          .0245
```

Euro Area: kpss D.lneuinfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneuinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0296
    1           .038
    2          .0346
    3          .0359
    4          .0361
    5          .0363
    6          .0366
    7          .0363
    8          .0363
    9          .0366
   10          .0373
   11          .0375
   12           .039
   13          .0403
   14          .0418
   15          .0428
   16          .0433
```

Switzerland: kpss D.lnchinfgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnchinf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0251
    1          .0227
    2          .0202
    3          .0198
    4          .0189
    5           .019
    6           .019
    7          .0191
    8          .0195
    9          .0202
   10          .0208
```

```
   11          .0214
   12          .0225
   13          .0236
   14          .0248
   15          .0261
   16          .0273
```

<u>Output Gap in levels:</u>

UK: kpss lnukoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.86
    1           2.18
    2           1.47
    3           1.11
    4           .892
    5           .749
    6           .646
    7           .569
    8            .51
    9           .462
   10           .423
   11           .391
   12           .364
   13            .34
   14            .32
   15           .303
   16           .287
```

Canada: kpss lncaoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncaoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.65
    1           1.69
    2           1.14
    3           .863
    4           .697
    5           .587
    6           .508
    7           .449
    8           .403
    9           .366
```

```
   10           .336
   11           .311
   12            .29
   13           .272
   14           .257
   15           .243
   16           .231
```

Australia: kpss lnauoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnauoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.66
    1           2.22
    2           1.49
    3           1.13
    4            .91
    5           .764
    6            .66
    7           .582
    8           .522
    9           .474
   10           .434
   11           .401
   12           .374
   13            .35
   14            .33
   15           .312
   16           .296
```

New Zealand: kpss lnnzoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.99
    1           2.94
    2           1.97
    3           1.48
    4           1.19
    5           .991
    6           .852
    7           .748
    8           .666
    9           .602
```

```
   10           .549
   11           .505
   12           .467
   13           .435
   14           .408
   15           .384
   16           .363
```

Sweden: kpss lnseoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnseoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.58
    1           2.03
    2           1.35
    3           1.02
    4           .817
    5           .683
    6           .587
    7           .515
    8            .46
    9           .415
   10           .379
   11           .349
   12           .323
   13           .301
   14           .283
   15           .266
   16           .252
```

US: kpss lnusoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.84
    1            1.5
    2           1.01
    3           .765
    4           .618
    5            .52
    6            .45
    7           .398
    8           .357
    9           .325
   10           .298
```

```
   11           .276
   12           .258
   13           .242
   14           .229
   15           .217
   16           .206
```

Euro Area: kpss lneuoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneuoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           6.08
    1           3.27
    2           2.19
    3           1.65
    4           1.32
    5            1.1
    6            .95
    7           .834
    8           .744
    9           .672
   10           .613
   11           .564
   12           .523
   13           .487
   14           .457
   15            .43
   16           .407
```

Switzerland: kpss lnchoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnchoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           5.03
    1            2.3
    2           1.54
    3           1.16
    4           .934
    5           .782
    6           .673
    7           .592
    8           .529
    9           .479
   10           .438
   11           .403
```

```
   12          .375
   13           .35
   14          .329
   15           .31
   16          .293
```

Output Gap in first differences:

UK: kpss D.lnukoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          5.86
    1          3.18
    2          2.12
    3          1.59
    4          1.28
    5          1.07
    6          .918
    7          .805
    8          .718
    9          .649
   10          .592
   11          .545
   12          .506
   13          .472
   14          .443
   15          .417
   16          .395
```

Canada: kpss D.lncaoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncaoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          4.89
    1          2.95
    2          1.98
    3          1.49
    4           1.2
    5          1.01
    6          .869
    7          .766
    8          .685
    9          .621
   10          .569
```

```
   11           .526
   12           .489
   13           .458
   14           .431
   15           .408
   16           .387
```

Australia: kpss D.lnauoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnauoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           1.42
    1           1.14
    2           .764
    3           .575
    4           .462
    5           .387
    6           .333
    7           .293
    8           .262
    9           .237
   10           .217
   11           .201
   12           .187
   13           .175
   14           .164
   15           .155
   16           .148
```

New Zealand: kpss D.lnnzoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.07
    1           1.62
    2           1.08
    3            .81
    4           .649
    5           .542
    6           .465
    7           .408
    8           .364
    9           .328
   10           .299
   11           .275
```

```
   12           .255
   13           .238
   14           .223
   15            .21
   16           .198
```

Sweden: kpss D.lnseoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnseoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.66
    1           .958
    2           .642
    3           .484
    4            .39
    5           .327
    6           .282
    7           .248
    8           .222
    9           .201
   10           .185
   11            .17
   12           .159
   13           .149
   14            .14
   15           .132
   16           .126
```

US: kpss D.lnusoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.72
    1           2.32
    2           1.55
    3           1.17
    4           .939
    5           .786
    6           .677
    7           .596
    8           .533
    9           .483
   10           .442
   11           .408
   12           .379
```

```
   13           .355
   14           .334
   15           .316
   16             .3
```

Euro Area: kpss D.lneuoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneuoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           2.07
    1              1
    2            .67
    3           .504
    4           .404
    5           .338
    6           .291
    7           .256
    8           .228
    9           .207
   10           .189
   11           .174
   12           .162
   13           .151
   14           .142
   15           .134
   16           .128
```

Switzerland: kpss D.lnchoutgap

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnchoutgap is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           4.21
    1           2.14
    2           1.44
    3           1.08
    4           .869
    5           .728
    6           .627
    7           .552
    8           .493
    9           .447
   10           .409
   11           .377
   12            .35
```

```
   13           .328
   14           .308
   15           .291
   16           .276
```

Real Exchange Rate in levels:

UK: kpss lnukrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           4.32
    1           2.18
    2           1.46
    3           1.11
    4           .892
    5            .75
    6           .648
    7           .572
    8           .512
    9           .465
   10           .426
   11           .394
   12           .367
   13           .344
   14           .324
   15           .307
   16           .291
```

Canada: kpss lncarer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncarer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           4.47
    1           2.25
    2           1.51
    3           1.14
    4            .92
    5           .773
    6           .667
    7           .588
    8           .526
    9           .477
   10           .437
   11           .404
```

12	.375
13	.351
14	.33
15	.311
16	.295

Australia: kpss lnaurer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaurer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

Lag order	Test statistic
0	2.76
1	1.4
2	.946
3	.719
4	.583
5	.492
6	.428
7	.379
8	.341
9	.311
10	.286
11	.266
12	.249
13	.234
14	.221
15	.21
16	.2

New Zealand: kpss lnnzrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

Lag order	Test statistic
0	1.25
1	.634
2	.428
3	.326
4	.264
5	.223
6	.194
7	.172
8	.155
9	.142
10	.131
11	.122
12	.114

```
   13           .108
   14           .102
   15          .0971
   16          .0928
```

Sweden: kpss lnserer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnserer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           1.56
    1           .792
    2           .537
    3            .41
    4           .334
    5           .283
    6           .247
    7            .22
    8           .199
    9           .183
   10            .17
   11           .159
   12           .149
   13           .141
   14           .135
   15           .129
   16           .124
```

US: kpss lnusrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           3.56
    1           1.79
    2            1.2
    3           .906
    4            .73
    5           .612
    6           .529
    7           .466
    8           .417
    9           .378
   10           .347
   11            .32
   12           .298
```

```
   13           .279
   14           .262
   15           .247
   16           .235
```

Euro Area: kpss lneurer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneurer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          2.32
    1          1.17
    2           .789
    3           .598
    4           .483
    5           .406
    6           .352
    7           .311
    8           .279
    9           .254
   10           .233
   11           .216
   12           .202
   13           .189
   14           .179
   15           .169
   16           .161
```

Switzerland: kpss lnchrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnchrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          4.81
    1          2.43
    2          1.63
    3          1.23
    4           .994
    5           .835
    6           .721
    7           .635
    8           .569
    9           .516
   10           .472
```

```
   11           .436
   12           .406
   13            .38
   14           .357
   15           .337
   16            .32
```

Real Exchange Rate in first differences:

UK: kpss D.lnukrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0758
    1          .0667
    2          .0636
    3          .0604
    4          .0589
    5          .0585
    6          .0582
    7          .0578
    8          .0571
    9          .0559
   10          .0548
   11          .0538
   12          .0527
   13          .0517
   14          .0508
   15          .0505
   16          .0504
```

Canada: kpss D.lncarer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncarer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            .17
    1           .136
    2           .126
    3           .123
    4            .12
    5           .117
    6           .116
    7           .117
    8           .119
    9           .122
```

```
   10           .123
   11           .122
   12           .122
   13           .122
   14           .124
   15           .125
   16           .126
```

Australia: kpss D.lnaurer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaurer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0642
    1          .0508
    2          .0489
    3           .049
    4          .0493
    5          .0497
    6          .0503
    7          .0506
    8          .0517
    9          .0531
   10          .0543
   11          .0549
   12           .056
   13          .0577
   14          .0591
   15          .0603
   16          .0617
```

New Zealand: kpss D.lnnzrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0648
    1          .0525
    2          .0477
    3          .0459
    4          .0464
    5           .047
    6          .0472
    7          .0469
    8          .0463
    9          .0459
   10          .0456
```

```
   11          .0457
   12          .0458
   13          .0456
   14          .0453
   15          .0452
   16          .0453
```

Sweden: kpss D.lnserer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnserer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0482
    1          .0391
    2          .0379
    3           .037
    4          .0365
    5          .0359
    6          .0352
    7          .0347
    8          .0346
    9           .035
   10          .0354
   11          .0355
   12          .0357
   13           .036
   14          .0367
   15          .0376
   16          .0385
```

US: kpss D.lnusrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .134
    1          .0989
    2          .0898
    3           .086
    4          .0822
    5          .0796
    6          .0779
    7          .0779
    8          .0785
    9          .0793
   10          .0795
```

```
   11          .0796
   12          .0803
   13          .0815
   14          .0826
   15          .0836
   16          .0843
```

Euro Area: kpss D.lneurer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneurer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0991
    1          .0779
    2          .0736
    3          .0715
    4          .0704
    5          .0691
    6          .0674
    7          .0657
    8          .0638
    9          .0623
   10          .0611
   11          .0605
   12          .0601
   13          .0603
   14          .0608
   15          .0615
   16           .062
```

Switzerland: kpss D.lnchrer

```
Maxlag = 16 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnchrer is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0715
    1           .064
    2          .0624
    3          .0607
    4          .0621
    5          .0642
    6          .0651
    7          .0655
    8          .0644
    9          .0636
```

10	.0626
11	.0614
12	.0608
13	.0605
14	.0604
15	.0605
16	.0606

Johansen Cointegration Tests

UK – Canada:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend (restricted)
Series: LNGBPCAD LNUKCAIR LNUKCAINF
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.105134	58.44377	42.91525	0.0189
At most 1	0.036321	21.45370	25.87211	0.3049
At most 2	0.027056	9.133751	12.51798	0.2905

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.105134	36.99007	25.82321	0.0231
At most 1	0.036321	12.31995	19.38704	0.5082
At most 2	0.027056	9.133751	12.51798	0.2905

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPCAD	LNUKCAIR	LNUKCAINF	@TREND(93M02)
-7.906589	-1.545071	2.581788	0.006348
-0.107214	-4.383474	-0.113945	-0.011322
10.19270	2.051506	0.277960	-0.008973

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPCAD)	0.000312	-0.002651	-0.002393
D(LNUKCAIR)	-0.003368	0.008173	-0.004297
D(LNUKCAINF)	-0.082197	-0.004061	0.000675

1 Cointegrating Equation(s): Log likelihood 1357.041

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPCAD	LNUKCAIR	LNUKCAINF	@TREND(93M02)
1.000000	0.195416	-0.326536	-0.000803
	(0.09094)	(0.04573)	(0.00029)

Adjustment coefficients (standard error in parentheses)

D(LNGBPCAD)	-0.002471
	(0.00884)
D(LNUKCAIR)	0.026631
	(0.02244)
D(LNUKCAINF)	0.649897
	(0.10560)

2 Cointegrating Equation(s): Log likelihood 1363.201

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPCAD	LNUKCAIR	LNUKCAINF	@TREND(93M02)
1.000000	0.000000	-0.333209	-0.001314
		(0.05409)	(0.00025)
0.000000	1.000000	0.034144	0.002615
		(0.14624)	(0.00069)

Adjustment coefficients (standard error in parentheses)

D(LNGBPCAD)	-0.002187	0.011138
	(0.00876)	(0.00515)
D(LNUKCAIR)	0.025755	-0.030624
	(0.02216)	(0.01302)
D(LNUKCAINF)	0.650333	0.144800
	(0.10560)	(0.06207)

UK – Australia:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNGBPAUD LNUKAUIR LNUKAUINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.038003	39.98052	29.79707	0.0240
At most 1	0.013978	7.156174	15.49471	0.0808
At most 2	0.007515	2.496957	3.841465	0.9260

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.038003	22.82435	21.13162	0.0015
At most 1	0.013978	4.659217	14.26460	0.1681
At most 2	0.007515	2.496957	3.841465	0.1565

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPAUD	LNUKAUIR	LNUKAUINF
-4.372148	-1.100211	2.937855
7.584714	0.992413	-0.159400
-8.614396	-4.659407	1.267608

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPAUD)	-0.001390	-0.001659	0.001643
D(LNUKAUIR)	-0.001651	0.004561	0.000456
D(LNUKAUINF)	-0.025884	-0.003193	-0.004895

1 Cointegrating Equation(s): Log likelihood 1552.922

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPAUD	LNUKAUIR	LNUKAUINF
1.000000	0.251641	-0.671948
	(0.15365)	(0.16001)

Adjustment coefficients (standard error in parentheses)

D(LNGBPAUD)	0.006076
	(0.00604)
D(LNUKAUIR)	0.007217
	(0.00978)
D(LNUKAUINF)	0.113170
	(0.03548)

2 Cointegrating Equation(s): Log likelihood 1555.252

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPAUD	LNUKAUIR	LNUKAUINF
1.000000	0.000000	0.684054
		(0.36263)
0.000000	1.000000	-5.388640
		(1.82841)

Adjustment coefficients (standard error in parentheses)

D(LNGBPAUD)	-0.006506	-0.000117
	(0.01207)	(0.00204)
D(LNUKAUIR)	0.041814	0.006343
	(0.01945)	(0.00329)
D(LNUKAUINF)	0.088950	0.025309
	(0.07103)	(0.01202)

UK – New Zealand:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend (restricted)
Series: LNGBPNZD LNUKNZIR LNUKNZINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.056882	55.99402	42.91525	0.0380
At most 1	0.014041	8.609288	25.87211	0.6693
At most 2	0.011800	3.928934	12.51798	0.2834

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.056882	29.38474	25.82321	0.0360
At most 1	0.014041	4.680354	19.38704	0.5519
At most 2	0.011800	3.928934	12.51798	0.2834

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPNZD	LNUKNZIR	LNUKNZINF	@TREND(93M 02)
-2.033482	0.159620	2.980884	0.002979
8.051674	3.436464	-0.637719	-0.007327
4.066085	-2.201052	0.045290	-0.006993

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPNZD)	-0.001375	-0.002272	-0.001415
D(LNUKNZIR)	-0.001046	-0.001474	0.004353
D(LNUKNZINF)	-0.032345	0.005461	-0.000981

1 Cointegrating Equation(s): Log likelihood 1538.959

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPNZD	LNUKNZIR	LNUKNZINF	@TREND(93M 02)
1.000000	-0.078496	-1.465901	-0.001465
	(0.46498)	(0.31564)	(0.00161)

Adjustment coefficients (standard error in parentheses)

D(LNGBPNZD)	0.002795
	(0.00272)
D(LNUKNZIR)	0.002127
	(0.00482)
D(LNUKNZINF)	0.065774
	(0.01597)

2 Cointegrating Equation(s): Log likelihood 1541.299

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPNZD	LNUKNZIR	LNUKNZINF	@TREND(93M 02)
1.000000	0.000000	-1.250484	-0.001379
		(0.26746)	(0.00100)
0.000000	1.000000	2.744323	0.001099
		(0.70303)	(0.00264)

Adjustment coefficients (standard error in parentheses)

D(LNGBPNZD)	-0.015496	-0.008026
	(0.01107)	(0.00459)
D(LNUKNZIR)	-0.009743	-0.005233
	(0.01966)	(0.00814)
D(LNUKNZINF)	0.109743	0.013603

(0.06517)	(0.02700)

UK – Sweden:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNGBPSEK LNUKSEIR LNUKSEINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.062094	30.89340	29.79707	0.0373
At most 1	0.015736	9.674602	15.49471	0.3066
At most 2 *	0.013278	4.424619	3.841465	0.0354

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.062094	21.21880	21.13162	0.0486
At most 1	0.015736	5.249982	14.26460	0.7100
At most 2 *	0.013278	4.424619	3.841465	0.0354

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPSEK	LNUKSEIR	LNUKSEINF
-5.223583	-0.084378	2.684746
3.302102	3.122325	-0.328126
-10.05789	-0.715193	-0.318624

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPSEK)	-0.000701	-0.000571	0.002132
D(LNUKSEIR)	-0.001610	-0.005189	-0.002933
D(LNUKSEINF)	-0.044260	0.004520	-0.001198

1 Cointegrating Equation(s): Log likelihood 1485.869

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPSEK	LNUKSEIR	LNUKSEINF
1.000000	0.016153	-0.513966
	(0.11788)	(0.10572)

Adjustment coefficients (standard error in parentheses)

D(LNGBPSEK)	0.003664
	(0.00565)
D(LNUKSEIR)	0.008409
	(0.01437)
D(LNUKSEINF)	0.231198

	(0.05165)	

2 Cointegrating Equation(s): Log likelihood 1488.494

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPSEK	LNUKSEIR	LNUKSEINF
1.000000	0.000000	-0.521172
		(0.10745)
0.000000	1.000000	0.446090
		(0.38246)

Adjustment coefficients (standard error in parentheses)

D(LNGBPSEK)	0.001778	-0.001724
	(0.00668)	(0.00337)
D(LNUKSEIR)	-0.008727	-0.016067
	(0.01690)	(0.00854)
D(LNUKSEINF)	0.246124	0.017848
	(0.06109)	(0.03088)

Canada – Australia:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNCADAUD LNCAAUIR LNCAAUINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.099730	51.16850	29.79707	0.0047
At most 1	0.041199	16.39335	15.49471	0.3884
At most 2	0.007427	4.467440	3.841465	0.8716

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.099730	34.77514	21.13162	0.0025
At most 1	0.041199	13.92591	14.26460	0.2333
At most 2	0.007427	4.467440	3.841465	0.8716

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNCADAUD	LNCAAUIR	LNCAAUINF
-2.454827	-0.619672	2.765066
-12.49881	1.028761	-0.247143
-7.575811	-2.781150	0.157884

Unrestricted Adjustment Coefficients (alpha):

D(LNCADAUD)	-0.001476	0.001633	0.001352
D(LNCAAUIR)	0.005124	-0.006873	0.001060
D(LNCAAUINF)	-0.083612	-0.032694	0.001048

1 Cointegrating Equation(s): Log likelihood 1400.914

Normalized cointegrating coefficients (standard error in parentheses)

LNCADAUD	LNCAAUIR	LNCAAUINF
1.000000	0.252430	-1.126379
	(0.20329)	(0.18979)

Adjustment coefficients (standard error in parentheses)

D(LNCADAUD)	0.003624
	(0.00251)
D(LNCAAUIR)	-0.012579
	(0.00540)
D(LNCAAUINF)	0.205254
	(0.04118)

2 Cointegrating Equation(s): Log likelihood 1407.877

Normalized cointegrating coefficients (standard error in parentheses)

LNCADAUD	LNCAAUIR	LNCAAUINF
1.000000	0.000000	-0.262054
		(0.06254)
0.000000	1.000000	-3.424023
		(0.57272)

Adjustment coefficients (standard error in parentheses)

D(LNCADAUD)	-0.016787	0.002595
	(0.01295)	(0.00122)
D(LNCAAUIR)	0.073324	-0.010246
	(0.02759)	(0.00260)
D(LNCAAUINF)	0.613894	0.018178
	(0.21239)	(0.02002)

Canada – New Zealand:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNCADNZD LNCANZIR LNCANZINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.067266	37.67347	29.79707	0.0118
At most 1	0.038699	14.62410	15.49471	0.1329
At most 2	0.004703	1.560398	3.841465	0.1000

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.067266	23.04937	21.13162	0.0333
At most 1	0.038699	13.06371	14.26460	0.2232
At most 2	0.004703	1.560398	3.841465	0.1000

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNCADNZD	LNCAAUIR	LNCANZINF
-0.955165	-0.151876	2.206170
8.609384	-1.629881	0.127175
-5.037982	-2.391428	0.261982

Unrestricted Adjustment Coefficients (alpha):

D(LNCADNZD)	-0.001655	-0.001871	0.001233
D(LNCAAUIR)	0.002221	0.007014	0.001048
D(LNCANZINF)	-0.068633	0.022868	-0.002450

1 Cointegrating Equation(s): Log likelihood 1357.870

Normalized cointegrating coefficients (standard error in parentheses)

LNCADNZD	LNCAAUIR	LNCANZINF
1.000000	0.159005	-2.309727
	(0.63329)	(0.48459)

Adjustment coefficients (standard error in parentheses)

D(LNCADNZD)	0.001581
	(0.00114)
D(LNCAAUIR)	-0.002121
	(0.00213)
D(LNCANZINF)	0.065556
	(0.01518)

2 Cointegrating Equation(s): Log likelihood 1364.402

Normalized cointegrating coefficients (standard error in parentheses)

LNCADNZD	LNCAAUIR	LNCANZINF
1.000000	0.000000	-1.248611
		(0.26062)
0.000000	1.000000	-6.673462
		(1.38105)

Adjustment coefficients (standard error in parentheses)

D(LNCADNZD)	-0.014523	0.003300
	(0.01030)	(0.00195)
D(LNCAAUIR)	0.058269	-0.011770
	(0.01899)	(0.00359)
D(LNCANZINF)	0.262434	-0.026848
	(0.13725)	(0.02594)

Canada – Sweden:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNCADSEK LNCASEIR LNCASEINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.070677	40.02700	29.79707	0.0135
At most 1	0.032812	15.76490	15.49471	0.1800
At most 2	0.014165	4.722051	3.841465	0.3150

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.070677	24.26210	21.13162	0.0047
At most 1	0.032812	11.04284	14.26460	0.3751
At most 2	0.014165	4.722051	3.841465	0.8910

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNCADSEK	LNCASEIR	LNCASEINF
-0.603511	0.285802	2.700051
10.83763	0.026488	0.039731
-5.057596	-2.575513	0.811109

Unrestricted Adjustment Coefficients (alpha):

D(LNCADSEK)	-0.003259	-0.002307	0.001234
D(LNCASEIR)	-0.000370	0.008104	0.004467
D(LNCASEINF)	-0.056031	0.020917	-0.010124

1 Cointegrating Equation(s): Log likelihood 1290.188

Normalized cointegrating coefficients (standard error in parentheses)

LNCADSEK	LNCASEIR	LNCASEINF
1.000000	-0.473566	-4.473909
	(0.79225)	(0.93969)

Adjustment coefficients (standard error in parentheses)

D(LNCADSEK)	0.001967
	(0.00069)
D(LNCASEIR)	0.000223
	(0.00198)
D(LNCASEINF)	0.033815
	(0.00843)

2 Cointegrating Equation(s):	Log likelihood	1295.710	

Normalized cointegrating coefficients (standard error in parentheses)

LNCADSEK	LNCASEIR	LNCASEINF
1.000000	0.000000	-0.019324
		(0.07746)
0.000000	1.000000	9.406463
		(1.96490)

Adjustment coefficients (standard error in parentheses)

D(LNCADSEK)	-0.023034	-0.000993
	(0.01225)	(0.00032)
D(LNCASEIR)	0.088046	0.000109
	(0.03527)	(0.00093)
D(LNCASEINF)	0.260510	-0.015460
	(0.15108)	(0.00400)

Australia – New Zealand:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNAUDNZD LNAUNZIR LNAUNZINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.052403	34.25809	29.79707	0.0245
At most 1	0.035218	13.44181	15.49471	0.2624
At most 2	0.013725	3.574362	3.841465	0.6578

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.052403	27.81628	21.13162	0.0399
At most 1	0.035218	11.86745	14.26460	0.2080
At most 2	0.013725	4.574362	3.841465	0.6578

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNAUDNZD	LNAUNZIR	LNAUNZINF
8.824935	3.108994	2.185538
13.44781	5.112952	-1.679724
-9.261552	2.958686	-0.440388

Unrestricted Adjustment Coefficients (alpha):

D(LNAUDNZD)	0.000187	-0.001724	0.001531
D(LNAUNZIR)	-0.005812	-0.002976	-0.001916
D(LNAUNZINF)	-0.024948	0.018057	0.008608

1 Cointegrating Equation(s): Log likelihood 1692.003

Normalized cointegrating coefficients (standard error in parentheses)

LNAUDNZD	LNAUNZIR	LNAUNZINF
1.000000	0.352297	0.247655
	(0.15026)	(0.07554)

Adjustment coefficients (standard error in parentheses)

D(LNAUDNZD)	0.001652
	(0.00793)
D(LNAUNZIR)	-0.051293
	(0.01666)
D(LNAUNZINF)	-0.220167
	(0.07979)

2 Cointegrating Equation(s): Log likelihood 1697.937

Normalized cointegrating coefficients (standard error in parentheses)

LNAUDNZD	LNAUNZIR	LNAUNZINF
1.000000	0.000000	4.950258
		(1.25668)
0.000000	1.000000	-13.34842
		(3.40157)

Adjustment coefficients (standard error in parentheses)

D(LNAUDNZD)	-0.021533	-0.008233
	(0.01437)	(0.00534)
D(LNAUNZIR)	-0.091309	-0.033285
	(0.03025)	(0.01125)
D(LNAUNZINF)	0.022663	0.014762
	(0.14451)	(0.05376)

Australia – Sweden:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNAUDSEK LNAUSEIR LNAUSEINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.076972	40.50804	29.79707	0.0220
At most 1	0.029615	13.99648	15.49471	0.2546
At most 2	0.012148	3.045761	3.841465	0.6729

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**

None *	0.076972	26.51156	21.13162	0.0079
At most 1	0.029615	9.950715	14.26460	0.2152
At most 2	0.012148	3.045761	3.841465	0.4430

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNAUDSEK	LNAUSEIR	LNAUSEINF
2.028988	0.239490	2.125820
11.88219	0.383047	-0.351786
-8.630209	-3.079320	0.806983

Unrestricted Adjustment Coefficients (alpha):

D(LNAUDSEK)	-0.002678	-0.002013	0.001682
D(LNAUSEIR)	0.002583	0.006991	0.002641
D(LNAUSEINF)	-0.060842	0.013267	-0.007111

1 Cointegrating Equation(s): Log likelihood 1357.045

Normalized cointegrating coefficients (standard error in parentheses)

LNAUDSEK	LNAUSEIR	LNAUSEINF
1.000000	0.118034	1.047724
	(0.21731)	(0.21609)

Adjustment coefficients (standard error in parentheses)

D(LNAUDSEK)	-0.005434
	(0.00243)
D(LNAUSEIR)	0.005241
	(0.00547)
D(LNAUSEINF)	-0.123448
	(0.02660)

2 Cointegrating Equation(s): Log likelihood 1362.021

Normalized cointegrating coefficients (standard error in parentheses)

LNAUDSEK	LNAUSEIR	LNAUSEINF
1.000000	0.000000	-0.434397
		(0.11388)
0.000000	1.000000	12.55671
		(2.55251)

Adjustment coefficients (standard error in parentheses)

D(LNAUDSEK)	-0.029350	-0.001412
	(0.01439)	(0.00054)
D(LNAUSEIR)	0.088305	0.003296
	(0.03215)	(0.00120)
D(LNAUSEINF)	0.034197	-0.009489
	(0.15780)	(0.00591)

New Zealand – Sweden:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNNZDSEK LNNZSEIR LNNZSEINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.069563	35.17649	29.79707	0.0388
At most 1	0.021771	11.31106	15.49471	0.2482
At most 2	0.012087	3.025227	3.841465	0.6560

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.069563	23.86543	21.13162	0.0201
At most 1	0.021771	7.285835	14.26460	0.4559
At most 2	0.012087	2.025227	3.841465	0.6448

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNNZDSEK	LNNZSEIR	LNNZSEINF
-2.097453	-0.284356	2.137277
-8.563852	-0.165029	-0.242833
-7.235602	-3.144734	0.192611

Unrestricted Adjustment Coefficients (alpha):

D(LNNZDSEK)	-0.000532	0.002967	0.001147
D(LNNZSEIR)	-0.000744	-0.004362	0.004613
D(LNNZSEINF)	-0.058866	-0.001046	-0.003743

1 Cointegrating Equation(s): Log likelihood 1333.382

Normalized cointegrating coefficients (standard error in parentheses)

LNNZDSEK	LNNZSEIR	LNNZSEINF
1.000000	0.135572	-1.018987
	(0.22511)	(0.20897)

Adjustment coefficients (standard error in parentheses)

D(LNNZDSEK)	0.001115
	(0.00268)
D(LNNZSEIR)	0.001561
	(0.00606)
D(LNNZSEINF)	0.123470
	(0.02569)

2 Cointegrating Equation(s): Log likelihood 1337.024

Normalized cointegrating coefficients (standard error in parentheses)

LNNZDSEK	LNNZSEIR	LNNZSEINF
1.000000	0.000000	0.201894
		(0.11422)
0.000000	1.000000	-9.005406
		(1.96123)

Adjustment coefficients (standard error in parentheses)

D(LNNZDSEK)	-0.024295	-0.000338
	(0.01116)	(0.00042)
D(LNNZSEIR)	0.038914	0.000931
	(0.02536)	(0.00095)
D(LNNZSEINF)	0.132430	0.016912
	(0.10799)	(0.00403)

US – Euro Area:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNUSDEUR LNUSEUIR LNUSEUINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.046269	31.30547	29.79707	0.0465
At most 1	0.011469	5.624783	15.49471	0.5256
At most 2	0.005443	1.806590	3.841465	0.0999

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.046269	25.68068	21.13162	0.0237
At most 1	0.011469	3.818193	14.26460	0.6005
At most 2	0.005443	1.806590	3.841465	0.9109

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNUSDEUR	LNUSEUIR	LNUSEUINF
3.198150	-0.914415	3.906288
6.011343	1.671877	-1.044806
4.923340	-0.567679	-1.908181

Unrestricted Adjustment Coefficients (alpha):

D(LNUSDEUR)	-0.003977	-0.000959	0.000264
D(LNUSEUIR)	0.005877	-0.003283	0.004215
D(LNUSEUINF)	-0.008681	0.008860	0.006053

1 Cointegrating Equation(s): Log likelihood 1456.177

Normalized cointegrating coefficients (standard error in parentheses)

LNUSDEUR	LNUSEUIR	LNUSEUINF
1.000000	-0.285920	1.221421
	(0.15312)	(0.35522)

Adjustment coefficients (standard error in parentheses)

D(LNUSDEUR)	-0.012718
	(0.00368)
D(LNUSEUIR)	0.018794
	(0.01259)
D(LNUSEUINF)	-0.027763
	(0.02209)

2 Cointegrating Equation(s):	Log likelihood	1458.087

Normalized cointegrating coefficients (standard error in parentheses)

LNUSDEUR	LNUSEUIR	LNUSEUINF
1.000000	0.000000	0.514161
		(0.23164)
0.000000	1.000000	-2.473630
		(0.82031)

Adjustment coefficients (standard error in parentheses)

D(LNUSDEUR)	-0.018480	0.002034
	(0.00782)	(0.00219)
D(LNUSEUIR)	-0.000944	-0.010863
	(0.02678)	(0.00750)
D(LNUSEUINF)	0.025499	0.022751
	(0.04692)	(0.01313)

US – Switzerland:

Sample (adjusted): 1993M01 2020M12
Trend assumption: Linear deterministic trend
Series: LNUSDCHF LNUSCHIR LNUSCHINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.076144	34.05469	29.79707	0.0152
At most 1	0.019621	7.839919	15.49471	0.4826
At most 2	0.003862	1.280803	3.841465	0.2577

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.076144	26.21477	21.13162	0.0088
At most 1	0.019621	6.559116	14.26460	0.5425
At most 2	0.003862	1.280803	3.841465	0.2577

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNUSDCHF	LNUSCHIR	LNUSCHINF
-3.049161	-0.064289	2.439361
-2.609028	1.370016	-0.235518
-4.385110	-0.359707	-0.088507

Unrestricted Adjustment Coefficients (alpha):

D(LNUSDCHF)	-0.000201	-0.000711	0.001406
D(LNUSCHIR)	-0.003636	-0.019988	-0.001505
D(LNUSCHINF)	-0.047530	0.004230	0.000269

1 Cointegrating Equation(s): Log likelihood 1067.110

Normalized cointegrating coefficients (standard error in parentheses)

LNUSDCHF	LNUSCHIR	LNUSCHINF
1.000000	0.021084	-0.800011
	(0.08887)	(0.14118)

Adjustment coefficients (standard error in parentheses)

D(LNUSDCHF)	0.000614
	(0.00397)
D(LNUSCHIR)	0.011088
	(0.02488)
D(LNUSCHINF)	0.144925
	(0.02883)

2 Cointegrating Equation(s): Log likelihood 1070.390

Normalized cointegrating coefficients (standard error in parentheses)

LNUSDCHF	LNUSCHIR	LNUSCHINF
1.000000	0.000000	-0.765644
		(0.13185)
0.000000	1.000000	-1.629985
		(0.64339)

Adjustment coefficients (standard error in parentheses)

D(LNUSDCHF)	0.002470	-0.000961
	(0.00523)	(0.00179)
D(LNUSCHIR)	0.063238	-0.027151
	(0.03244)	(0.01109)
D(LNUSCHINF)	0.133890	0.008850
	(0.03793)	(0.01296)

Euro Area – Switzerland:

Date: 01/01/21 Time: 17:43
Sample (adjusted): 1993M06 2020M12
Included observations: 331 after adjustments
Trend assumption: Linear deterministic trend
Series: LNEURCHF LNEUCHIR LNEUCHINF
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.096275	47.86204	29.79707	0.0065
At most 1	0.041857	14.35502	15.49471	0.4059
At most 2	0.000610	0.202125	3.841465	0.8809

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.096275	33.50702	21.13162	0.0006
At most 1	0.041857	14.15290	14.26460	0.0921
At most 2	0.000610	0.202125	3.841465	0.6530

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNEURCHF	LNEUCHIR	LNEUCHINF
-2.605405	0.918931	2.418356
-2.270591	3.800689	-0.693537
-6.968162	0.336150	0.238719

Unrestricted Adjustment Coefficients (alpha):

D(LNEURCHF)	-0.001786	-0.001487	0.000206
D(LNEUCHIR)	-0.022661	-0.020113	-0.001337
D(LNEUCHINF)	-0.046938	0.028419	-4.63E-05

1 Cointegrating Equation(s): Log likelihood 1280.642

Normalized cointegrating coefficients (standard error in parentheses)

LNEURCHF	LNEUCHIR	LNEUCHINF
1.000000	-0.352702	-0.928207
	(0.23304)	(0.15785)

Adjustment coefficients (standard error in parentheses)

D(LNEURCHF)	0.004653
	(0.00180)
D(LNEUCHIR)	0.059041
	(0.01931)
D(LNEUCHINF)	0.122294
	(0.02926)

2 Cointegrating Equation(s): Log likelihood 1287.719

Normalized cointegrating coefficients (standard error in parentheses)

LNEURCHF	LNEUCHIR	LNEUCHINF
1.000000	0.000000	-1.257544
		(0.20914)
0.000000	1.000000	-0.933753
		(0.23986)

Adjustment coefficients (standard error in parentheses)

D(LNEURCHF)	0.008029	-0.007293

	(0.00238)	(0.00269)
D(LNEUCHIR)	0.104709	-0.097267
	(0.02532)	(0.02864)
D(LNEUCHINF)	0.057765	0.064880
	(0.03842)	(0.04347)

Linear Vector Error Correction Model Results

UK-Canada: vec lngbpcad lnukcainf lnukcair, lag(2)

```
Vector error-correction model

Sample: 1993m4 thru 2020m12                      Number of obs     =        333
                                                 AIC               =   -7.98262
Log likelihood =  1355.106                       HQIC              =  -7.864057
Det(Sigma_ml)  =  5.86e-08                       SBIC              =  -7.685287

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lngbpcad           8     .020372   0.0263   8.765763   0.3624
D_lnukcainf          8     .245376   0.1516   58.06506   0.0000
D_lnukcair           8     .051882   0.1060    38.5417   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lngbpcad   |
        _ce1 |
         L1. |    .005434   .0061858     0.88   0.380      -.00669     .017558
             |
    lngbpcad |
         LD. |   .1191373   .0574335     2.07   0.038     .0065697    .2317048
        L2D. |  -.0380033   .0561776    -0.68   0.499    -.1481094    .0721028
             |
   lnukcainf |
         LD. |   .0060422   .0046049     1.31   0.189    -.0029832    .0150676
        L2D. |   -.002542    .004508    -0.56   0.573    -.0113775    .0062935
             |
    lnukcair |
         LD. |  -.0132562   .0223802    -0.59   0.554    -.0571206    .0306082
        L2D. |   .0070871    .022448     0.32   0.752    -.0369101    .0510843
             |
       _cons |   .0001853   .0011167     0.17   0.868    -.0020035     .002374
-------------+----------------------------------------------------------------
D_lnukcainf  |
        _ce1 |
         L1. |   .4281923   .0745076     5.75   0.000     .2821601    .5742245
             |
    lngbpcad |
         LD. |  -1.302592   .6917801    -1.88   0.060    -2.658456    .0532725
        L2D. |   .2354309   .6766536     0.35   0.728    -1.090786    1.561648
             |
   lnukcainf |
         LD. |  -.0830142   .0554653    -1.50   0.134    -.1917242    .0256957
        L2D. |   .1753386   .0542983     3.23   0.001     .0689158    .2817613
             |
    lnukcair |
         LD. |   .2173054   .2695672     0.81   0.420    -.3110366    .7456474
        L2D. |    .008803   .2703834     0.03   0.974    -.5211387    .5387447
             |
       _cons |   9.31e-06    .013451     0.00   0.999    -.0263542    .0263728
-------------+----------------------------------------------------------------
D_lnukcair   |
```

```
        _ce1 |
         L1. |   .0087102   .0157538     0.55   0.580    -.0221667    .0395871
             |
    lngbpcad |
         LD. |  -.0469135   .1462692    -0.32   0.748    -.3335959     .239769
        L2D. |   -.082848   .1430709    -0.58   0.563    -.3632618    .1975659
             |
   lnukcainf |
         LD. |  -.0148025   .0117275    -1.26   0.207     -.037788     .008183
        L2D. |  -.0228588   .0114808    -1.99   0.046    -.0453607   -.0003569
             |
    lnukcair |
         LD. |   .2966665    .056997     5.20   0.000     .1849544    .4083786
        L2D. |  -.0133478   .0571696    -0.23   0.815    -.1253981    .0987026
             |
       _cons |  -.0005731   .0028441    -0.20   0.840    -.0061474    .0050011
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                   2   54.57244   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lngbpcad |          1          .        .       .            .           .
   lnukcainf |  -.4347975   .0688778    -6.31   0.000    -.5697954   -.2997996
    lnukcair |   .4101995   .1014006     4.05   0.000      .211458     .608941
       _cons |   .7191163          .        .       .            .           .
------------------------------------------------------------------------------
```

UK-Australia: vec lngbpaud lnukauinf lnukauir, lag(2)

```
Vector error-correction model

Sample: 1993m4 thru 2020m12                     Number of obs     =        333
                                                AIC               =  -9.159589
Log likelihood =  1551.072                      HQIC              =  -9.041026
Det(Sigma_ml)  =  1.81e-08                      SBIC              =  -8.862256

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lngbpaud            8     .025326   0.0507   17.34576   0.0267
D_lnukauinf           8     .147254   0.1920   77.20916   0.0000
D_lnukauir            8     .040714   0.1415   53.57294   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lngbpaud   |
        _ce1 |
         L1. |   .0074998   .0070806     1.06   0.290     -.006378    .0213776
             |
    lngbpaud |
         LD. |   .1282277   .0600972     2.13   0.033     .0104394     .246016
        L2D. |  -.1579333   .0598405    -2.64   0.008    -.2752186    -.040648
             |
   lnukauinf |
         LD. |   .0034281   .0087112     0.39   0.694    -.0136457    .0205018
        L2D. |  -.0040819   .0086523    -0.47   0.637    -.0210402    .0128763
             |
    lnukauir |
         LD. |  -.0393256    .037132    -1.06   0.290     -.112103    .0334519
        L2D. |   .0116357   .0366058     0.32   0.751    -.0601103    .0833818
             |
       _cons |   .0006195   .0013963     0.44   0.657    -.0021173    .0033563
-------------+----------------------------------------------------------------
D_lnukauinf  |
        _ce1 |
```

```
         L1. |   .1467264   .0411697     3.56   0.000     .0660353    .2274176
             |
    lngbpaud |
         LD. |   .6211179     .34943     1.78   0.075    -.0637523    1.305988
        L2D. |   .7970662   .3479376     2.29   0.022     .1151211    1.479011
             |
   lnukauinf |
         LD. |   .0343626   .0506508     0.68   0.498    -.0649112    .1336363
        L2D. |  -.1293785   .0503083    -2.57   0.010    -.2279809   -.0307761
             |
    lnukauir |
         LD. |  -.4188225   .2159009    -1.94   0.052    -.8419805    .0043355
        L2D. |   1.275967   .2128413     5.99   0.000      .858806    1.693128
             |
       _cons |  -.0000357   .0081189    -0.00   0.996    -.0159485    .0158771
-------------+----------------------------------------------------------------
D_lnukauir   |
        _ce1 |
         L1. |   .0092968   .0113829     0.82   0.414    -.0130132    .0316068
             |
    lngbpaud |
         LD. |  -.2016643   .0966126    -2.09   0.037    -.3910216    -.012307
        L2D. |   .0104027      .0962     0.11   0.914    -.1781458    .1989512
             |
   lnukauinf |
         LD. |  -.0042968   .0140043    -0.31   0.759    -.0317446    .0231511
        L2D. |   .0279453   .0139095     2.01   0.045      .000683    .0552075
             |
    lnukauir |
         LD. |   .3110452   .0596937     5.21   0.000     .1940478    .4280427
        L2D. |  -.0485593   .0588477    -0.83   0.409    -.1638987      .06678
             |
       _cons |   .0000637   .0022448     0.03   0.977     -.004336    .0044633
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                 2   24.72474   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lngbpaud |          1          .        .       .            .           .
   lnukauinf |  -.5601037    .119028    -4.71   0.000    -.7933943   -.3268131
    lnukauir |   .2539191   .1175537     2.16   0.031     .0235182    .4843201
       _cons |    .764062          .        .       .            .           .
------------------------------------------------------------------------------
```

UK-New Zealand: vec lngbpnzd lnuknzinf lnuknzir, lag(1)

```
Vector error-correction model

Sample: 1993m3 thru 2020m12                     Number of obs     =        334
                                                AIC               =  -9.032656
Log likelihood =  1525.454                      HQIC              =  -8.955314
Det(Sigma_ml)  =  2.17e-08                      SBIC              =  -8.838676

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lngbpnzd           5     .024346   0.0323   10.97414   0.0519
D_lnuknzinf          5     .148546   0.0477   16.46956   0.0056
D_lnuknzir           5     .043227   0.1266    47.6814   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lngbpnzd   |
```

```
        _ce1 |
         L1. |   .0031187   .0034978     0.89   0.373    -.0037368    .0099742
             |
    lngbpnzd |
         LD. |   .1368841   .0563619     2.43   0.015     .0264168    .2473514
             |
   lnuknzinf |
         LD. |   .0022519   .0090221     0.25   0.803    -.0154311    .0199349
             |
    lnuknzir |
         LD. |  -.0301347   .0304202    -0.99   0.322    -.0897572    .0294879
             |
       _cons |   .0010694   .0013397     0.80   0.425    -.0015563    .0036951
-------------+----------------------------------------------------------------
D_lnuknzinf  |
        _ce1 |
         L1. |   .0845713   .0213413     3.96   0.000     .0427432    .1263994
             |
    lngbpnzd |
         LD. |   .0228457   .3438859     0.07   0.947    -.6511584    .6968497
             |
   lnuknzinf |
         LD. |   .0102916   .0550474     0.19   0.852    -.0975994    .1181826
             |
    lnuknzir |
         LD. |  -.0950819   .1856058    -0.51   0.608    -.4588626    .2686988
             |
       _cons |  -.0000385   .0081737    -0.00   0.996    -.0160587    .0159817
-------------+----------------------------------------------------------------
D_lnuknzir   |
        _ce1 |
         L1. |  -.0018266   .0062102    -0.29   0.769    -.0139985    .0103452
             |
    lngbpnzd |
         LD. |  -.1030679   .1000699    -1.03   0.303    -.2992012    .0930654
             |
   lnuknzinf |
         LD. |  -.0082943   .0160187    -0.52   0.605    -.0396903    .0231017
             |
    lnuknzir |
         LD. |   .3325069   .0540108     6.16   0.000     .2266477    .4383661
             |
       _cons |   .0000418   .0023785     0.02   0.986      -.00462    .0047036
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                  2   19.98246   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lngbpnzd |          1          .        .       .            .           .
   lnuknzinf |  -1.039951   .2445874    -4.25   0.000    -1.519333   -.5605681
    lnuknzir |   .3543965   .2809483     1.26   0.007     -.196252     .905045
       _cons |   1.066661          .        .       .            .           .
------------------------------------------------------------------------------
```

UK-Sweden: vec lngbpsek lnukseinf lnukseir, lag(3)

```
Vector error-correction model

Sample: 1993m5 thru 2020m12                     Number of obs     =        332
                                                AIC               =  -8.733042
Log likelihood =  1484.685                      HQIC              =  -8.573066
Det(Sigma_ml)  =  2.62e-08                      SBIC              =  -8.331898

Equation           Parms      RMSE     R-sq      chi2     P>chi2
```

```
----------------------------------------------------------------
D_lngbpsek           11     .019694   0.0669   22.99761   0.0177
D_lnukseinf          11     .179959   0.1164   42.27324   0.0000
D_lnukseir           11     .050089   0.1440   53.98734   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lngbpsek   |
         _ce1 |
          L1. |   .0045621   .0049769     0.92   0.359    -.0051925    .0143166
             |
    lngbpsek |
          LD. |   .1253348   .0584804     2.14   0.032     .0107154    .2399542
         L2D. |  -.0808243   .0575778    -1.40   0.160    -.1936747    .0320262
         L3D. |  -.0262654   .0574967    -0.46   0.648    -.1389568    .0864261
             |
   lnukseinf |
          LD. |   .0038636   .0060332     0.64   0.522    -.0079611    .0156884
         L2D. |   .0064487   .0059176     1.09   0.276    -.0051495    .0180469
         L3D. |  -.0071462   .0059576    -1.20   0.230    -.0188229    .0045304
             |
    lnukseir |
          LD. |  -.0474153   .0224147    -2.12   0.034    -.0913473   -.0034833
         L2D. |   .0454526   .0230668     1.97   0.049     .0002424    .0906628
         L3D. |  -.0463172   .0222088    -2.09   0.037    -.0898457   -.0027886
             |
       _cons |   .0000546   .0010815     0.05   0.960    -.0020651    .0021743
-------------+----------------------------------------------------------------
D_lnukseinf  |
         _ce1 |
          L1. |   .1936388   .0454779     4.26   0.000     .1045038    .2827739
             |
    lngbpsek |
          LD. |   .1724748   .5343805     0.32   0.747    -.8748918    1.219841
         L2D. |  -.2674839   .5261332    -0.51   0.611    -1.298686    .7637182
         L3D. |  -.9550468   .5253922    -1.82   0.069    -1.984797     .074703
             |
   lnukseinf |
          LD. |   .0315187   .0551296     0.57   0.568    -.0765334    .1395707
         L2D. |  -.0910666   .0540735    -1.68   0.092    -.1970487    .0149154
         L3D. |    .035672   .0544392     0.66   0.512    -.0710268    .1423708
             |
    lnukseir |
          LD. |  -.2166701   .2048206    -1.06   0.290    -.6181111    .1847709
         L2D. |  -.1357065   .2107796    -0.64   0.520     -.548827     .277414
         L3D. |   .4915985   .2029395     2.42   0.015     .0938444    .8893525
             |
       _cons |  -.0000234   .0098825    -0.00   0.998    -.0193927    .0193458
-------------+----------------------------------------------------------------
D_lnukseir   |
         _ce1 |
          L1. |   .0126191   .0126582     1.00   0.319    -.0121904    .0374287
             |
    lngbpsek |
          LD. |  -.2203063   .1487378    -1.48   0.139    -.5118271    .0712144
         L2D. |   .1998032   .1464423     1.36   0.172    -.0872184    .4868248
         L3D. |   .2620182    .146236     1.79   0.073    -.0245991    .5486356
             |
   lnukseinf |
          LD. |  -.0014804   .0153446    -0.10   0.923    -.0315553    .0285945
         L2D. |   .0191077   .0150506     1.27   0.204     -.010391    .0486064
         L3D. |  -.0019142   .0151524    -0.13   0.899    -.0316124     .027784
             |
    lnukseir |
          LD. |   .2899202   .0570091     5.09   0.000     .1781844    .4016561
         L2D. |  -.1024745   .0586677    -1.75   0.081    -.2174611    .0125122
         L3D. |   .2172851   .0564855     3.85   0.000     .1065754    .3279947
             |
       _cons |   .0003397   .0027507     0.12   0.902    -.0050514    .0057309
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
```

```
_ce1                 2   22.12168   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lngbpsek |          1          .        .       .            .           .
   lnukseinf |  -.5541119   .1178705    -4.70   0.000    -.7851339   -.3230899
    lnukseir |  -.5546799   .1334572    -4.41   0.000    -.3162513    .2068914
       _cons |   2.497555          .        .       .            .           .
------------------------------------------------------------------------------
```

Canada-Australia: vec lncadaud lncaauinf lncaauir, lag(1)

```
Vector error-correction model

Sample: 1993m3 thru 2020m12                     Number of obs     =        334
                                                AIC               =  -8.243935
Log likelihood =  1393.737                      HQIC              =  -8.166593
Det(Sigma_ml)  =  4.77e-08                      SBIC              =  -8.049955

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lncadaud           5     .018953   0.0844   30.32001   0.0000
D_lncaauinf          5     .304473   0.1321   50.08039   0.0000
D_lncaauir           5     .039893   0.2816   128.9704   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lncadaud   |
        _ce1 |
         L1. |   .0023056   .0007813     2.95   0.003     .0007742    .0038369
             |
    lncadaud |
         LD. |   .1796739   .0555369     3.24   0.001     .0708236    .2885242
             |
   lncaauinf |
         LD. |   .0023385    .003409     0.69   0.493     -.004343    .0090199
             |
    lncaauir |
         LD. |   -.024107   .0235519    -1.02   0.306    -.0702678    .0220538
             |
       _cons |   .0003985    .001038     0.38   0.701     -.001636    .0024329
-------------+----------------------------------------------------------------
D_lncaauinf  |
        _ce1 |
         L1. |    .077562   .0125516     6.18   0.000     .0529614    .1021626
             |
    lncadaud |
         LD. |   .2370821    .892166     0.27   0.790    -1.511531    1.985695
             |
   lncaauinf |
         LD. |   -.058526    .054763    -1.07   0.285    -.1658595    .0488074
             |
    lncaauir |
         LD. |   .9381165   .3783461     2.48   0.013     .1965718    1.679661
             |
       _cons |  -6.33e-06   .0166748    -0.00   1.000    -.0326884    .0326758
-------------+----------------------------------------------------------------
D_lncaauir   |
        _ce1 |
         L1. |  -.0033795   .0016445    -2.06   0.040    -.0066028   -.0001563
             |
    lncadaud |
         LD. |  -.0846647   .1168937    -0.72   0.469    -.3137722    .1444427
             |
   lncaauinf |
         LD. |  -.0072858   .0071752    -1.02   0.310    -.0213489    .0067773
             |
```

```
    lncaauir |
         LD. |   .4855053   .0495718     9.79   0.000     .3883463    .5826642
             |
       _cons |   .0001265   .0021848     0.06   0.954    -.0041556    .0044086
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                  2   53.24802   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lncadaud |          1          .        .       .            .           .
   lncaauinf |  -2.974248   .4091215    -7.27   0.000    -3.776112   -2.172385
    lncaauir |   .6300149   .5207808     1.21   0.226    -.3906968    1.650727
       _cons |  -.3553533          .        .       .            .           .
------------------------------------------------------------------------------
```

Canada-New Zealand: vec lncadnzd lncanzinf lncanzir, lag(1)

```
Vector error-correction model

Sample: 1993m3 thru 2020m12                     Number of obs     =        334
                                                AIC               =  -7.770604
Log likelihood =  1314.691                      HQIC              =  -7.693261
Det(Sigma_ml)  =  7.65e-08                      SBIC              =  -7.576624

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lncadnzd            5     .021896   0.0597   20.87806   0.0009
D_lncanzinf           5     .290407   0.0897   32.43052   0.0000
D_lncanzir            5     .045342   0.1340   50.92317   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lncadnzd   |
        _ce1 |
         L1. |   .0041386    .001962     2.11   0.035      .000293    .0079841
             |
    lncadnzd |
         LD. |   .1906075   .0549318     3.47   0.001     .0829431    .2982719
             |
   lncanzinf |
         LD. |   .0029255   .0041432     0.71   0.480    -.0051951    .0110461
             |
    lncanzir |
         LD. |  -.0003655   .0252545    -0.01   0.988    -.0498634    .0491323
             |
       _cons |   .0008695   .0011996     0.72   0.469    -.0014817    .0032207
-------------+----------------------------------------------------------------
D_lncanzinf  |
        _ce1 |
         L1. |    .133588   .0260229     5.13   0.000     .0825841    .1845919
             |
    lncadnzd |
         LD. |   -.953848   .7285674    -1.31   0.190    -2.381814    .4741179
             |
   lncanzinf |
         LD. |   -.054291   .0549524    -0.99   0.323    -.1619957    .0534137
             |
    lncanzir |
         LD. |   .2679506    .334953     0.80   0.424    -.3885453    .9244465
             |
       _cons |  -.0000225   .0159107    -0.00   0.999    -.0312069    .0311619
-------------+----------------------------------------------------------------
```

```
D_lncanzir   |
         _ce1 |
          L1. |  -.0017755    .004063    -0.44   0.662    -.0097389    .0061879
              |
     lncadnzd |
          LD. |  -.0845204   .1137534    -0.74   0.457    -.3074729    .1384321
              |
    lncanzinf |
          LD. |  -.0070765   .0085799    -0.82   0.409    -.0238927    .0097398
              |
     lncanzir |
          LD. |   .3580439   .0522972     6.85   0.000     .2555433    .4605446
              |
        _cons |   .0003349   .0024842     0.13   0.893     -.004534    .0052038
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                   2   33.09966   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lncadnzd |          1          .        .       .            .           .
   lncanzinf |  -1.178871   .2052443    -5.74   0.000    -1.581143   -.7765996
    lncanzir |   .2943774   .3598711     0.82   0.413     -.410957    .9997119
       _cons |   .2476185          .        .       .            .           .
------------------------------------------------------------------------------
```

Canada-Sweden: vec lncadsek lncaseinf lncaseir, lag(1)

```
Vector error-correction model

Sample: 1993m3 thru 2020m12                     Number of obs     =        334
                                                AIC               =  -7.535589
Log likelihood =  1275.443                      HQIC              =  -7.458247
Det(Sigma_ml)  =  9.68e-08                      SBIC              =  -7.341609

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lncadsek            5     .020771   0.0649   22.8439   0.0004
D_lncaseinf           5     .260472   0.0977   35.63196  0.0000
D_lncaseir            5     .060102   0.1239   46.50869  0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lncadsek   |
        _ce1 |
         L1. |   .0021245   .0006147     3.46   0.001     .0009198    .0033292
             |
    lncadsek |
         LD. |   .1316066   .0542547     2.43   0.015     .0252694    .2379438
             |
   lncaseinf |
         LD. |   .0049416   .0044481     1.11   0.267    -.0037765    .0136597
             |
    lncaseir |
         LD. |  -.0093412   .0181967    -0.51   0.608     -.045006    .0263236
             |
       _cons |  -.0002512   .0011372    -0.22   0.825      -.00248    .0019776
-------------+----------------------------------------------------------------
D_lncaseinf  |
        _ce1 |
         L1. |   .0439577   .0077078     5.70   0.000     .0288508    .0590646
             |
    lncadsek |
```

```
         LD. |   .3008934   .6803558     0.44   0.658    -1.032579    1.634366
             |
   lncaseinf |
         LD. |   .0453646   .0557792     0.81   0.416    -.0639607    .1546899
             |
    lncaseir |
         LD. |   .0368703   .2281867     0.16   0.872    -.4103673     .484108
             |
       _cons |   .0000136   .0142599     0.00   0.999    -.0279354    .0279625
-------------+----------------------------------------------------------------
D_lncaseir   |
        _ce1 |
         L1. |  -.0000928   .0017785    -0.05   0.958    -.0035786     .003393
             |
    lncadsek |
         LD. |   .0092341   .1569869     0.06   0.953    -.2984545    .3169227
             |
   lncaseinf |
         LD. |  -.0091607   .0128706    -0.71   0.477    -.0343866    .0160653
             |
    lncaseir |
         LD. |   .3551837   .0526523     6.75   0.000      .251987    .4583803
             |
       _cons |   .0006702   .0032904     0.20   0.839    -.0057788    .0071192
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                 2   45.21593   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lncadsek |          1          .        .       .            .           .
   lncaseinf |  -4.397915   .6582885    -6.68   0.000    -5.688137   -3.107693
    lncaseir |    .222457   .0316103     4.35   0.025    -1.015476     1.46039
       _cons |   1.092312          .        .       .            .           .
------------------------------------------------------------------------------
```

Australia-New Zealand: vec lnaudnzd lnaunzinf lnaunzir, lag(2)

```
Vector error-correction model

Sample: 1993m4 thru 2020m12                     Number of obs     =        333
                                                AIC               =  -9.993714
Log likelihood =  1689.953                      HQIC              =  -9.875151
Det(Sigma_ml)  =  7.84e-09                      SBIC              =  -9.696381

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnaudnzd           8     .016498   0.0810   28.63371   0.0004
D_lnaunzinf          8     .164151   0.0534    18.3171   0.0190
D_lnaunzir           8     .034502   0.1603   62.05186   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnaudnzd   |
        _ce1 |
         L1. |  -.0181557   .0111418    -1.63   0.103    -.0399933    .0036819
             |
    lnaudnzd |
         LD. |   .2654192   .0557893     4.76   0.000     .1560742    .3747642
        L2D. |  -.0777114   .0564117    -1.38   0.168    -.1882764    .0328535
             |
   lnaunzinf |
         LD. |  -.0011307    .005397    -0.21   0.834    -.0117085    .0094471
```

```
         L2D. |   .0060318   .0053488     1.13   0.259    -.0044516    .0165152
              |
     lnaunzir |
          LD. |   .0158132   .0263827     0.60   0.549    -.0358961    .0675224
         L2D. |   .0244583   .0262713     0.93   0.352    -.0270325     .075949
              |
        _cons |   .0006254   .0009061     0.69   0.490    -.0011505    .0024013
-------------+----------------------------------------------------------------
D_lnaunzinf  |
         _ce1 |
          L1. |  -.2889228   .1108595    -2.61   0.009    -.5062034   -.0716422
              |
     lnaudnzd |
          LD. |  -.6444603   .5550947    -1.16   0.246    -1.732426    .4435053
         L2D. |   1.191516   .5612878     2.12   0.034     .0914124     2.29162
              |
    lnaunzinf |
          LD. |    .008276   .0536988     0.15   0.878    -.0969717    .1135238
         L2D. |    .011162   .0532193     0.21   0.834    -.0931458    .1154699
              |
     lnaunzir |
          LD. |   .3734031   .2625042     1.42   0.155    -.1410957     .887902
         L2D. |   .4896829   .2613953     1.87   0.061    -.0226424    1.002008
              |
        _cons |  -.0001694   .0090156    -0.02   0.985    -.0178396    .0175008
-------------+----------------------------------------------------------------
D_lnaunzir   |
         _ce1 |
          L1. |  -.0675654   .0233008    -2.90   0.004    -.1132341   -.0218967
              |
     lnaudnzd |
          LD. |   -.284498   .1166715    -2.44   0.015    -.5131698   -.0558261
         L2D. |   .0817319   .1179731     0.69   0.488    -.1494912     .312955
              |
    lnaunzinf |
          LD. |   .0130648   .0112866     1.16   0.247    -.0090565    .0351861
         L2D. |   .0189513   .0111858     1.69   0.090    -.0029724     .040875
              |
     lnaunzir |
          LD. |   .3184661   .0551739     5.77   0.000     .2103272     .426605
         L2D. |  -.0664857   .0549408    -1.21   0.226    -.1741678    .0411964
              |
        _cons |   .0005565   .0018949     0.29   0.769    -.0031575    .0042704
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                  2   20.58852   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lnaudnzd |          1          .        .       .            .           .
   lnaunzinf |   .1418175   .0473341     3.00   0.003     .0490443    .2345907
    lnaunzir |   .2602648   .0976834     2.66   0.008     .0688089    .4517208
       _cons |   .1525543          .        .       .            .           .
------------------------------------------------------------------------------
```

Australia-Sweden: vec lnaudsek lnauseinf lnauseir, lag(3)

```
Vector error-correction model

Sample: 1993m5 thru 2020m12                     Number of obs     =        332
                                                AIC               =  -7.964432
Log likelihood =  1357.096                      HQIC              =  -7.804456
Det(Sigma_ml)  =  5.65e-08                      SBIC              =  -7.563288

Equation           Parms      RMSE     R-sq      chi2     P>chi2
```

D_lnaudsek	11	.021722	0.1056	37.91506	0.0001
D_lnauseinf	11	.238821	0.1445	54.21651	0.0000
D_lnauseir	11	.049155	0.1414	52.86754	0.0000

	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
D_lnaudsek						
_ce1						
L1.	-.0046995	.0018415	-2.55	0.011	-.0083089	-.0010902
lnaudsek						
LD.	.1499037	.056329	2.66	0.008	.0395009	.2603066
L2D.	-.2235371	.0546121	-4.09	0.000	-.3305749	-.1164994
L3D.	-.0322807	.0554142	-0.58	0.560	-.1408906	.0763291
lnauseinf						
LD.	-.0014837	.0049296	-0.30	0.763	-.0111455	.008178
L2D.	.0032137	.0048247	0.67	0.505	-.0062427	.01267
L3D.	.0055616	.0048136	1.16	0.248	-.003873	.0149961
lnauseir						
LD.	.0032017	.0247738	0.13	0.897	-.045354	.0517574
L2D.	-.0011023	.0252593	-0.04	0.965	-.0506095	.0484049
L3D.	-.0295759	.0246731	-1.20	0.231	-.0779343	.0187825
_cons	-.0007304	.0011956	-0.61	0.541	-.0030738	.001613
D_lnauseinf						
_ce1						
L1.	-.1049255	.0202468	-5.18	0.000	-.1446085	-.0652425
lnaudsek						
LD.	1.076436	.6193093	1.74	0.082	-.1373884	2.290259
L2D.	.6612353	.6004324	1.10	0.271	-.5155906	1.838061
L3D.	.0626443	.6092515	0.10	0.918	-1.131467	1.256755
lnauseinf						
LD.	.0238345	.0541979	0.44	0.660	-.0823915	.1300605
L2D.	-.0039308	.0530457	-0.07	0.941	-.1078984	.1000368
L3D.	-.0138637	.0529235	-0.26	0.793	-.1175919	.0898645
lnauseir						
LD.	.2024073	.2723753	0.74	0.457	-.3314384	.7362531
L2D.	.427709	.2777128	1.54	0.124	-.1165982	.9720161
L3D.	1.097902	.2712684	4.05	0.000	.5662254	1.629578
_cons	.0000566	.0131452	0.00	0.997	-.0257075	.0258208
D_lnauseir						
_ce1						
L1.	.0036807	.0041673	0.88	0.377	-.004487	.0118484
lnaudsek						
LD.	.0491797	.127469	0.39	0.700	-.200655	.2990144
L2D.	-.1523282	.1235837	-1.23	0.218	-.3945477	.0898914
L3D.	.2448479	.1253989	1.95	0.051	-.0009294	.4906252
lnauseinf						
LD.	-.0067324	.0111553	-0.60	0.546	-.0285963	.0151315
L2D.	.0132628	.0109181	1.21	0.224	-.0081363	.0346619
L3D.	.0028617	.010893	0.26	0.793	-.0184881	.0242115
lnauseir						
LD.	.2772847	.0560615	4.95	0.000	.1674062	.3871633
L2D.	.0191969	.0571601	0.34	0.737	-.0928348	.1312287
L3D.	.1527114	.0558337	2.74	0.006	.0432794	.2621434
_cons	.0006823	.0027056	0.25	0.801	-.0046206	.0059852

Cointegrating equations

Equation	Parms	chi2	P>chi2

```
_ce1                 2   32.84104   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lnaudsek |          1          .        .       .            .           .
  lnauseinf  |   1.307718    .242827     5.39   0.000     .8317863    1.783651
    lnauseir |   .1607774   .0537184     3.63   0.026    -.3365016    .6580563
       _cons |   1.608018          .        .       .            .           .
------------------------------------------------------------------------------
```

New Zealand-Sweden: vec lnnzdsek lnnzseinf lnnzseir, lag(1)

```
Vector error-correction model

Sample: 1993m3 thru 2020m12                     Number of obs     =        334
                                                AIC               =  -7.836496
Log likelihood =  1325.695                      HQIC              =  -7.759153
Det(Sigma_ml)  =  7.16e-08                      SBIC              =  -7.642516

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnnzdsek           5     .023349   0.0467   16.10637   0.0065
D_lnnzseinf          5      .22467   0.0766   27.29854   0.0000
D_lnnzseir           5     .052509   0.1428    54.7944   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnnzdsek   |
        _ce1 |
         L1. |   .0000118   .0042704     0.00   0.998     -.008358    .0083816
             |
    lnnzdsek |
         LD. |   .2010421    .054192     3.71   0.000     .0948278    .3072564
             |
   lnnzseinf |
         LD. |  -.0049985   .0056229    -0.89   0.374    -.0160193    .0060222
             |
    lnnzseir |
         LD. |  -.0063626    .022981    -0.28   0.782    -.0514046    .0386794
             |
       _cons |   -.000955   .0012821    -0.74   0.456    -.0034679    .0015579
-------------+----------------------------------------------------------------
D_lnnzseinf  |
        _ce1 |
         L1. |   .2047547    .041091     4.98   0.000     .1242178    .2852916
             |
    lnnzdsek |
         LD. |    .101022   .5214526     0.19   0.846    -.9210062     1.12305
             |
   lnnzseinf |
         LD. |   .1163621   .0541057     2.15   0.032     .0103169    .2224073
             |
    lnnzseir |
         LD. |  -.1970694   .2211311    -0.89   0.373    -.6304783    .2363396
             |
       _cons |   3.92e-06   .0123369     0.00   1.000    -.0241759    .0241838
-------------+----------------------------------------------------------------
D_lnnzseir   |
        _ce1 |
         L1. |  -.0032762   .0096037    -0.34   0.733    -.0220991    .0155467
             |
    lnnzdsek |
         LD. |   -.171797   .1218728    -1.41   0.159    -.4106633    .0670694
             |
   lnnzseinf |
         LD. |  -.0197148   .0126455    -1.56   0.119    -.0444994    .0050699
             |
```

```
    lnnzseir |
         LD. |   .3493894   .0516823     6.76   0.000     .2480939    .4506848
             |
       _cons |   .0002418   .0028834     0.08   0.933    -.0054095    .0058931
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                 2   25.63803   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lnnzdsek |          1          .        .       .            .           .
   lnnzseinf |  -.5710207   .1162045    -4.91   0.000    -.7987773   -.3432641
    lnnzseir |   .3274071   .1347835     1.69   0.012    -.0367637    .4915779
       _cons |   1.452046          .        .       .            .           .
------------------------------------------------------------------------------
```

US-Euro Area: vec lnusdeur lnuseuinf lnuseuir, lag(2)

```
Vector error-correction model

Sample: 1993m4 thru 2020m12                     Number of obs     =        333
                                                AIC               =  -8.578944
Log likelihood =  1454.394                      HQIC              =  -8.460381
Det(Sigma_ml)  =  3.23e-08                      SBIC              =  -8.281612

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnusdeur           8     .020877   0.1323   49.55379   0.0000
D_lnuseuinf          8     .126707   0.1667   65.03378   0.0000
D_lnuseuir           8     .071398   0.0727   25.48546   0.0013
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnusdeur   |
        _ce1 |
         L1. |  -.0087562    .002582    -3.39   0.001    -.0138169   -.0036955
             |
    lnusdeur |
         LD. |   .2993049   .0551891     5.42   0.000     .1911362    .4074736
        L2D. |  -.1273418   .0564858    -2.25   0.024     -.238052   -.0166317
             |
   lnuseuinf |
         LD. |   .0061522   .0097934     0.63   0.530    -.0130424    .0253469
        L2D. |    .011021   .0093641     1.18   0.239    -.0073322    .0293743
             |
    lnuseuir |
         LD. |  -.0123007   .0161808    -0.76   0.447    -.0440146    .0194131
        L2D. |   -.011752    .016107    -0.73   0.466    -.0433211     .019817
             |
       _cons |  -.0005259   .0011717    -0.45   0.654    -.0028225    .0017706
-------------+----------------------------------------------------------------
D_lnuseuinf  |
        _ce1 |
         L1. |  -.0296933   .0156707    -1.89   0.058    -.0604074    .0010208
             |
    lnusdeur |
         LD. |   1.106329   .3349506     3.30   0.001     .4498375     1.76282
        L2D. |   .7444857   .3428204     2.17   0.030       .07257    1.416401
             |
   lnuseuinf |
         LD. |  -.2708348   .0594373    -4.56   0.000    -.3873298   -.1543399
        L2D. |    .116699    .056832     2.05   0.040     .0053103    .2280876
```

```
             |
    lnuseuir |
         LD. |   .0339176   .0982038     0.35   0.730    -.1585582    .2263935
        L2D. |   .0480568   .0977554     0.49   0.623    -.1435402    .2396539
             |
       _cons |   .0026898   .0071113     0.38   0.705    -.0112482    .0166277
-------------+----------------------------------------------------------------
D_lnuseuir   |
        _ce1 |
         L1. |    .013717   .0088303     1.55   0.120      -.00359     .031024
             |
    lnusdeur |
         LD. |  -.3404595   .1887406    -1.80   0.071    -.7103842    .0294652
        L2D. |   .3954884   .1931751     2.05   0.041     .0168722    .7741047
             |
   lnuseuinf |
         LD. |   -.047384   .0334922    -1.41   0.157    -.1130275    .0182595
        L2D. |  -.0171005   .0320241    -0.53   0.593    -.0798666    .0456656
             |
    lnuseuir |
         LD. |   .2118138   .0553366     3.83   0.000     .1033559    .3202716
        L2D. |  -.0327379    .055084    -0.59   0.552    -.1407005    .0752247
             |
       _cons |   .0054869   .0040071     1.37   0.171     -.002367    .0133407
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                 2   14.29352   0.0008
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lnusdeur |          1          .        .       .            .           .
   lnuseuinf |   1.663294   .4403339     3.78   0.000     .8002549    2.526332
    lnuseuir |   -.379621   .2044075    -1.86   0.043    -.7802524    .0210103
       _cons |  -1.324053          .        .       .            .           .
------------------------------------------------------------------------------
```

US-Switzerland: vec lnusdchf lnuschinf lnuschir, lag(2)

```
Vector error-correction model

Sample: 1993m4 thru 2020m12                     Number of obs     =        333
                                                AIC               =  -6.199769
Log likelihood =  1058.262                      HQIC              =  -6.081206
Det(Sigma_ml)  =  3.49e-07                      SBIC              =  -5.902437

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnusdchf           8     .023526   0.0544   18.71256   0.0165
D_lnuschinf          8     .177754   0.0848   30.09591   0.0002
D_lnuschir           8     .147227   0.0174   5.753222   0.0049
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnusdchf   |
        _ce1 |
         L1. |   .0000337   .0036634     0.01   0.993    -.0071465    .0072138
             |
    lnusdchf |
         LD. |   .1775981   .0552384     3.22   0.001      .069333    .2858633
        L2D. |  -.0752088   .0552272    -1.36   0.173    -.1834522    .0330346
             |
   lnuschinf |
         LD. |   -.002996   .0072282    -0.41   0.679     -.017163    .0111711
```

```
        L2D. |   -.011886    .007212    -1.65   0.099    -.0260213    .0022492
             |
    lnuschir |
         LD. |  -.0083325   .0088887    -0.94   0.349     -.025754    .0090889
        L2D. |  -.0137358   .0089387    -1.54   0.124    -.0312553    .0037837
             |
       _cons |   .0016431   .0013033     1.26   0.207    -.0009113    .0041976
-------------+----------------------------------------------------------------
D_lnuschinf  |
        _ce1 |
         L1. |   .1294359   .0276791     4.68   0.000     .0751858    .1836859
             |
    lnusdchf |
         LD. |   .0862786   .4173579     0.21   0.836    -.7317278    .9042849
        L2D. |  -.1042058   .4172739    -0.25   0.803    -.9220475     .713636
             |
   lnuschinf |
         LD. |   .0641582   .0546136     1.17   0.240    -.0428824    .1711988
        L2D. |   .1489296   .0544907     2.73   0.006     .0421298    .2557294
             |
    lnuschir |
         LD. |  -.1425049   .0671589    -2.12   0.034     -.274134   -.0108758
        L2D. |   .0178835   .0675369     0.26   0.791    -.1144864    .1502534
             |
       _cons |   .0001914   .0098472     0.02   0.984    -.0191088    .0194916
-------------+----------------------------------------------------------------
D_lnuschir   |
        _ce1 |
         L1. |  -.0035375   .0229255    -0.15   0.877    -.0484707    .0413956
             |
    lnusdchf |
         LD. |  -.4795192   .3456807    -1.39   0.165    -1.157041    .1980025
        L2D. |   .2909609   .3456112     0.84   0.400    -.3864245    .9683463
             |
   lnuschinf |
         LD. |  -.0259726   .0452342    -0.57   0.566      -.11463    .0626849
        L2D. |  -.0287234   .0451324    -0.64   0.525    -.1171813    .0597346
             |
    lnuschir |
         LD. |   .0182133    .055625     0.33   0.743    -.0908098    .1272363
        L2D. |  -.0923227   .0559381    -1.65   0.099    -.2019594     .017314
             |
       _cons |   .0070199   .0081561     0.86   0.389    -.0089656    .0230055
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                   2   26.87576   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
_ce1         |
    lnusdchf |          1          .        .       .            .           .
   lnuschinf |  -.8087882   .1569611    -5.15   0.000    -1.116426   -.5011502
    lnuschir |   .0748324   .1023936     0.73   0.465    -.1258553    .2755201
       _cons |   .9771984          .        .       .            .           .
------------------------------------------------------------------------------
```

Euro Area-Switzerland: vec lneurchf lneuchinf lneuchir, lag(2)

```
Vector error-correction model

Sample: 1993m4 thru 2020m12                     Number of obs     =        333
                                                AIC               =  -7.481216
Log likelihood =  1271.622                      HQIC              =  -7.362652
Det(Sigma_ml)  =  9.68e-08                      SBIC              =  -7.183883

Equation           Parms      RMSE     R-sq      chi2     P>chi2
```

```
----------------------------------------------------------------
D_lneurchf          8     .012709   0.0714   24.98815   0.0016
D_lneuchinf         8     .205658   0.1668   65.06964   0.0000
D_lneuchir          8     .135463   0.0376   12.70188   0.0025
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lneurchf   |
        _ce1 |
         L1. |   .0023692   .0013301     1.78   0.075    -.0002377    .0049762
             |
    lneurchf |
         LD. |   .1699056   .0599483     2.83   0.005     .0524091     .287402
        L2D. |  -.0580477   .0596291    -0.97   0.330    -.1749185    .0588232
             |
   lneuchinf |
         LD. |  -.0027215   .0032859    -0.83   0.408    -.0091617    .0037188
        L2D. |   .0025764   .0032448     0.79   0.427    -.0037832    .0089361
             |
    lneuchir |
         LD. |   .0038038    .005637     0.67   0.500    -.0072444    .0148521
        L2D. |   .0037941    .005637     0.67   0.501    -.0072543    .0148424
             |
       _cons |   .0013714    .000707     1.94   0.052    -.0000142    .0027571
-------------+----------------------------------------------------------------
D_lneuchinf  |
        _ce1 |
         L1. |   .1098535   .0215242     5.10   0.000     .0676668    .1520402
             |
    lneurchf |
         LD. |   .5502571   .9701203     0.57   0.571    -1.351144    2.451658
        L2D. |   .6350937   .9649551     0.66   0.510    -1.256184    2.526371
             |
   lneuchinf |
         LD. |   .0467146   .0531744     0.88   0.380    -.0575053    .1509345
        L2D. |   .3046767    .052509     5.80   0.000      .201761    .4075923
             |
    lneuchir |
         LD. |   .1377526    .091221     1.51   0.131    -.0410373    .3165424
        L2D. |   .1880136   .0912215     2.06   0.039     .0092228    .3668045
             |
       _cons |   .0000593   .0114407     0.01   0.996     -.022364    .0224826
-------------+----------------------------------------------------------------
D_lneuchir   |
        _ce1 |
         L1. |   .0223658   .0141776     1.58   0.115    -.0054219    .0501534
             |
    lneurchf |
         LD. |   .5656748   .6390019     0.89   0.376    -.6867459    1.818095
        L2D. |   .6532464   .6355996     1.03   0.304     -.592506    1.898999
             |
   lneuchinf |
         LD. |  -.0441994   .0350251    -1.26   0.207    -.1128472    .0244485
        L2D. |  -.0153209   .0345868    -0.44   0.658    -.0831097    .0524679
             |
    lneuchir |
         LD. |  -.1073854   .0600857    -1.79   0.074    -.2251513    .0103804
        L2D. |   -.136843   .0600861    -2.28   0.023    -.2546095   -.0190765
             |
       _cons |  -.0004366   .0075358    -0.06   0.954    -.0152065    .0143332
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                   2   37.87794   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed
------------------------------------------------------------------------------
        beta | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
```

```
_ce1         |
    lneurchf |          1          .        .       .            .           .
   lneuchinf |  -1.200782   .1976998    -6.07   0.000    -1.588266   -.8132971
    lneuchir |   .0723039   .0304265     0.24   0.812    -.5240454    .6686532
       _cons |   .6972963          .        .       .            .           .
------------------------------------------------------------------------------
```

White Test for Heteroscedasticity

UK-Canada:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
279.4050	84	0.0000

UK-Australia:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
242.2250	84	0.0000

UK-New Zealand:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
268.0980	84	0.0000

UK-Sweden:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.

269.9987	84	0.0000

Canada-Australia:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
254.1224	84	0.0000

Canada-New Zealand:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
287.7004	84	0.0000

Canada-Sweden:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
278.6485	84	0.0000

Australia-New Zealand:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
274.2998	84	0.0000

Australia-Sweden:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
265.5050	84	0.0000

New Zealand-Sweden:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
281.9267	84	0.0000

US-Euro Area:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
271.6532	84	0.0000

US-Switzerland:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
268.6588	84	0.0000

Euro Area-Switzerland:

VEC Residual Heteroskedasticity Tests (Levels and Squares)
Sample: 1993M01 2020M12

Joint test:

Chi-sq	df	Prob.
275.02545	84	0.0000

Breusch-Godfrey LM Test for Serial Correlation

UK-Canada:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	12.09506	9	0.2080	1.348278	(9, 778.9)	0.2080
2	3.117432	18	0.9665	0.345670	(18, 897.1)	0.9665

*Edgeworth expansion corrected likelihood ratio statistic.

UK-Australia:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	8.470448	9	0.4875	0.942041	(9, 778.9)	0.4875
2	10.16523	9	0.2640	1.128143	(9, 778.9)	0.2640

*Edgeworth expansion corrected likelihood ratio statistic.

UK-New Zealand:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	15.34429	9	0.1733	1.663934	(9, 788.7)	0.1733

*Edgeworth expansion corrected likelihood ratio statistic.

UK-Sweden:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	6.579395	9	0.6808	0.730840	(9, 769.2)	0.6808
2	26.41054	18	0.0907	1.475817	(18, 885.8)	0.0908
3	9.350362	27	0.3223	1.046585	(27, 906.0)	0.3223

*Edgeworth expansion corrected likelihood ratio statistic.

Canada-Australia:

VEC Residual Serial Correlation LM Tests

Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	17.13159	9	0.0655	1.097079	(9, 793.5)	0.0655

*Edgeworth expansion corrected likelihood ratio statistic.

Canada-New Zealand:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	8.947199	9	0.4053	0.986104	(9, 788.7)	0.4053

*Edgeworth expansion corrected likelihood ratio statistic.

Canada-Sweden:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	15.09164	9	0.1711	1.674328	(9, 788.7)	0.1711

*Edgeworth expansion corrected likelihood ratio statistic.

Australia-New Zealand:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	11.85695	9	0.2215	1.321534	(9, 778.9)	0.2215
2	13.42796	9	0.1328	1.493370	(9, 778.9)	0.1328

*Edgeworth expansion corrected likelihood ratio statistic.

Australia-Sweden:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	8.650973	9	0.4701	0.962242	(9, 769.2)	0.4701
2	8.180292	9	0.5161	0.909611	(9, 769.2)	0.5161
3	9.181474	9	0.3530	1.020008	(9, 769.2)	0.3530

*Edgeworth expansion corrected likelihood ratio statistic.

New Zealand-Sweden:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	10.45020	9	0.2004	1.161762	(9, 788.7)	0.2004

*Edgeworth expansion corrected likelihood ratio statistic.

US-Euro Area:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	3.567041	9	0.9375	0.395466	(9, 778.9)	0.9375
2	8.161247	9	0.5313	0.905771	(9, 778.9)	0.5313

*Edgeworth expansion corrected likelihood ratio statistic.

US-Switzerland:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	13.66117	9	0.1349	1.524387	(9, 778.9)	0.1349
2	11.74794	9	0.1919	1.305721	(9, 778.9)	0.1919

*Edgeworth expansion corrected likelihood ratio statistic.

Euro Area-Switzerland:

VEC Residual Serial Correlation LM Tests
Sample: 1993M01 2020M12

Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	11.71188	9	0.2301	1.305243	(9, 778.9)	0.2301
2	13.74647	9	0.1306	1.525243	(9, 778.9)	0.1306

*Edgeworth expansion corrected likelihood ratio statistic.

Wald test for weak exogeneity

UK-Canada:

Wald Test:

Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	0.95655	(1, 332)	0.5998

UK-Australia:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	47.67831	(1, 332)	0.0000

UK-New Zealand:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	0.26701	(1, 332)	0.8550

UK-Sweden:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	5.95324	(1, 332)	0.0135

Canada-Australia:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	3.94797	(1, 332)	0.0441

Canada-New Zealand:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	1.05631	(1, 332)	0.2634

Canada-Sweden:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	0.12589	(1, 332)	0.9011

Australia-New Zealand:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	4.11352	(1, 332)	0.0229

Australia-Sweden:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	103.0232	(1, 332)	0.0000

New Zealand-Sweden:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	0.710938	(1, 332)	0.6425

US-Euro Area:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	8.70938	(1, 332)	0.0004

US-Switzerland:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	1.333488	(1, 332)	0.3340

Euro Area-Switzerland:

Wald Test:
Null Hypothesis: C(1)=0

Test Statistic	Value	df	Probability
F-statistic	4.22796	(1, 332)	0.0357

Gregory-Hansen test for cointegration with regime shifts

UK-Canada: ghansen lngbpcad lnukcainf lnukcair, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs    =       336
Lags  =  2  chosen by Akaike criterion             Maximum Lags     =         4

             Test       Breakpoint   Date        Asymptotic Critical Values
           Statistic                            1%            5%           10%
-------------------------------------------------------------------------------
   ADF       -4.91           199      2009m7      -5.97       -5.50        -5.23
   Zt        -4.76           203      2009m11     -5.97       -5.50        -5.23
   Za       -42.30           203      2009m11    -68.21      -58.33       -52.85
-------------------------------------------------------------------------------
```

UK-Australia: ghansen lngbpaud lnukauinf lnukauir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs    =       336
Lags  =  2  chosen by Akaike criterion             Maximum Lags     =         4

             Test       Breakpoint   Date        Asymptotic Critical Values
           Statistic                            1%            5%           10%
-------------------------------------------------------------------------------
   ADF       -3.35           196      2009m4     -5.97        -5.50        -5.23
   Zt        -5.69           103      2001m7     -5.97        -5.50        -5.23
   Za       -56.38           103      2001m7    -68.21       -58.33       -52.85
-------------------------------------------------------------------------------
```

UK-New Zealand: ghansen lngbpnzd lnuknzinf lnuknzir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime and Trend                  Number of obs    =       336
Lags  =  1  chosen by                          Maximum Lags    =         1

             Test       Breakpoint   Date        Asymptotic Critical Values
           Statistic                            1%            5%           10%
-------------------------------------------------------------------------------
   ADF       -5.07            56      1997m8      -6.45       -5.96        -5.72
   Zt        -5.71            60      1997m12     -6.45       -5.96        -5.72
   Za       -47.63            60      1997m12    -79.65      -68.43       -63.10
-------------------------------------------------------------------------------
```

UK-Sweden: ghansen lngbpsek lnukseinf lnukseir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs    =       336
Lags  =  3  chosen by Akaike criterion             Maximum Lags     =         4

             Test       Breakpoint   Date        Asymptotic Critical Values
           Statistic                            1%            5%           10%
-------------------------------------------------------------------------------
   ADF       -4.47           269      2015m5      -5.97       -5.50        -5.23
   Zt        -4.87           178      2007m10     -5.97       -5.50        -5.23
   Za       -40.70           178      2007m10    -68.21      -58.33       -52.85
-------------------------------------------------------------------------------
```

Canada-Australia: ghansen lncadaud lncaauinf lncaauir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
```

```
Model: Change in Regime and Trend                  Number of obs    =       336
Lags  =  1  chosen by user                         Maximum Lags     =         1

            Test       Breakpoint   Date        Asymptotic Critical Values
          Statistic                            1%           5%           10%
------------------------------------------------------------------------------
   ADF       -5.64          88       2000m4     -6.45       -5.96        -5.72
   Zt        -5.92          89       2000m5     -6.45       -5.96        -5.72
   Za       -56.89          89       2000m5    -79.65      -68.43       -63.10
------------------------------------------------------------------------------
```

Canada-New Zealand: ghansen lncadnzd lncanzinf lncanzir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime and Trend                  Number of obs    =       336
Lags  =  1  chosen by user                         Maximum Lags     =         1

            Test       Breakpoint   Date        Asymptotic Critical Values
          Statistic                            1%           5%           10%
------------------------------------------------------------------------------
   ADF       -4.99          67       1998m7     -6.45       -5.96        -5.72
   Zt        -5.77          68       1998m8     -6.45       -5.96        -5.72
   Za       -46.11          68       1998m8    -79.65      -68.43       -63.10
------------------------------------------------------------------------------
```

Canada-Sweden: ghansen lncadsek lncaseinf lncaseir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs    =       336
Lags  =  1  chosen by Akaike criterion             Maximum Lags     =         4

            Test       Breakpoint   Date        Asymptotic Critical Values
          Statistic                            1%           5%           10%
------------------------------------------------------------------------------
   ADF       -4.58          78       1999m6     -5.97       -5.50        -5.23
   Zt        -4.62          64       1998m4     -5.97       -5.50        -5.23
   Za       -36.62          64       1998m4    -68.21      -58.33       -52.85
------------------------------------------------------------------------------
```

Australia-New Zealand: ghansen lnaudnzd lnaunzinf lnaunzir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs    =       336
Lags  =  2  chosen by Akaike criterion             Maximum Lags     =         4

            Test       Breakpoint   Date        Asymptotic Critical Values
          Statistic                            1%           5%           10%
------------------------------------------------------------------------------
   ADF       -5.78          249      2013m9     -5.97       -5.50        -5.23
   Zt        -5.95          248      2013m8     -5.97       -5.50        -5.23
   Za       -45.30          248      2013m8    -68.21      -58.33       -52.85
------------------------------------------------------------------------------
```

Australia-Sweden: ghansen lnaudsek lnauseinf lnauseir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs    =       336
Lags  =  3  chosen by Akaike criterion             Maximum Lags     =         4

            Test       Breakpoint   Date        Asymptotic Critical Values
          Statistic                            1%           5%           10%
------------------------------------------------------------------------------
   ADF       -5.02          191      2008m11    -5.97       -5.50        -5.23
   Zt        -6.03          196      2009m4     -5.97       -5.50        -5.23
   Za       -59.69          196      2009m4    -68.21      -58.33       -52.85
------------------------------------------------------------------------------
```

New Zealand-Sweden: ghansen lnnzdsek lnnzseinf lnnzseir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs    =       336
Lags  =  1  chosen by Akaike criterion             Maximum Lags     =         4

            Test       Breakpoint   Date        Asymptotic Critical Values
          Statistic                            1%           5%           10%
```

	Test Statistic	Breakpoint	Date	1%	5%	10%
ADF	-5.12	217	2011m1	-5.97	-5.50	-5.23
Zt	-5.71	217	2011m1	-5.97	-5.50	-5.23
Za	-44.88	217	2011m1	-68.21	-58.33	-52.85

US-Euro Area: ghansen lnusdeur lnuseuinf lnuseuir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime and Trend                  Number of obs   =       336
Lags  =  2  chosen by user                         Maximum Lags    =         1
```

	Test Statistic	Breakpoint	Date	Asymptotic Critical Values 1%	5%	10%
ADF	-4.74	126	2003m6	-6.45	-5.96	-5.72
Zt	-4.92	126	2003m6	-6.45	-5.96	-5.72
Za	-48.09	126	2003m6	-79.65	-68.43	-63.10

US-Switzerland: ghansen lnusdchf lnuschinf lnuschir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime and Trend                  Number of obs   =       336
Lags  =  2  chosen by user                         Maximum Lags    =         1
```

	Test Statistic	Breakpoint	Date	Asymptotic Critical Values 1%	5%	10%
ADF	-5.44	110	2002m2	-6.45	-5.96	-5.72
Zt	-5.57	109	2002m1	-6.45	-5.96	-5.72
Za	-51.50	109	2002m1	-79.65	-68.43	-63.10

Euro Area-Switzerland: ghansen lneurchf lneuchinf lneuchir, break(regime) lagmethod(aic)

```
Gregory-Hansen Test for Cointegration with Regime Shifts
Model: Change in Regime                            Number of obs   =       336
Lags  =  2  chosen by Akaike criterion             Maximum Lags    =         4
```

	Test Statistic	Breakpoint	Date	Asymptotic Critical Values 1%	5%	10%
ADF	-4.88	212	2010m8	-5.97	-5.50	-5.23
Zt	-4.95	213	2010m9	-5.97	-5.50	-5.23
Za	-41.34	213	2010m9	-68.21	-58.33	-52.85

Classical Taylor Rule

UK: gmm (ukir - {b1}*f3.ukinfgap - {b2}*f3.ukoutgap - {b0}), instruments (L.ukinfgap L.ukoutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
```

	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
/b1	.4713253	.0745873	6.32	0.000	.3251369	.6175137
/b2	-1.72520	.0769401	-22.42	0.000	-1.876003	-1.574397
/b0	30.9229	1.393249	22.19	0.000	28.19218	33.65362

```
------------------------------------------------------------------------------
```

Canada: gmm (cair - {b1}*f3.cainfgap - {b2}*f3.caoutgap - {b0}), instruments (L.cainfgap L.caoutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .8948613   .1199382     7.46   0.000     .6597867    1.129936
         /b2 |   -1.09601   .0566103   -19.36   0.000     -1.206966  -0.985054
         /b0 |   19.59695    1.02386    19.14   0.000     17.59022    21.60368
------------------------------------------------------------------------------
```

Australia: gmm (auir - {b1}*f3.auinfgap - {b2}*f3.auoutgap - {b0}), instruments (L.auinfgap L.auoutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   1.004588   .0796857    12.61   0.000     .8484069    1.160769
         /b2 |  -1.065021   .0405201   -26.28   0.000    -1.144440   -0.985602
         /b0 |   15.97376   .6070759    26.31   0.000     14.78391    17.16361
------------------------------------------------------------------------------
```

New Zealand: gmm (nzir - {b1}*f3.nzinfgap - {b2}*f3.nzoutgap - {b0}), instruments (L.nzinfgap L.nzoutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .9691414    .093431    10.37   0.000     .7860199    1.152263
         /b2 |  -4.175041    .135465   -30.82   0.000    -4.440552    -3.90953
         /b0 |   11.77758   .3786814    31.10   0.000     11.03538    12.51978
------------------------------------------------------------------------------
```

Sweden: gmm (seir - {b1}*f3.seinfgap - {b2}*f3.seoutgap - {b0}), instruments (L.seinfgap L.seoutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .7424132   .0396212    18.74   0.000     .6647571    .8200693
         /b2 |   -8.49601   .3048442   -27.87   0.000    -9.093505   -7.898515
         /b0 |   31.17981   1.117354    27.91   0.000     28.98983    33.36978
------------------------------------------------------------------------------
```

US: gmm (usir - {b1}*f3.usinfgap - {b2}*f3.usoutgap - {b0}), instruments (L.usinfgap L.usoutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   1.087019   .1482772     7.33   0.000     .7964007    1.377637
         /b2 |  -6.027021   .8155644    -7.39   0.000    -7.625527   -4.428515
         /b0 |   9.348726   1.515934     6.17   0.000      6.37755     12.3199
------------------------------------------------------------------------------
```

Euro-Area: gmm (euir - {b1}*f3.euinfgap - {b2}*f3.euoutgap - {b0}), instruments (L.euinfgap L.euoutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   1.000304   .1101233     9.08   0.000     .7844663    1.216142
         /b2 |  -3.076101   .1511597   -20.35   0.000    -3.372374   -2.779828
         /b0 |   29.88538   1.570677    19.03   0.000     26.80691    32.96385
------------------------------------------------------------------------------
```

Switzerland: gmm (chir - {b1}*f3.chinfgap - {b2}*f3.choutgap - {b0}), instruments (L.chinfgap L.choutgap)

```
GMM estimation
Number of parameters =   3
Number of moments    =   3
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   1.281412   .0471042    27.20   0.000     1.189089    1.373734
         /b2 |  -1.395139   .1306309   -10.68   0.000   -1.6511755  -1.1391024
         /b0 |   8.370619   .7726706    10.83   0.000     6.856212    9.885025
------------------------------------------------------------------------------
```

Extended Taylor Rule

UK: gmm (ukir - {b1}*f3.ukinfgap - {b2}*f3.ukoutgap - {b3}*ukrer - {b0}), instruments (L.ukinfgap L.ukoutgap L.ukrer)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .7327942   .0440279    16.64   0.000      .646501    .8190873
         /b2 |   -1.13256   .0514098   -22.03   0.000    -1.233323   -1.031797
         /b3 |   .1105348   .0048324    22.87   0.000     .1010635    .1200061
         /b0 |   8.139638   1.161483     7.01   0.000     5.863174     10.4161
```

```
--------------------------------------------------------------------------------
```

Canada: gmm (cair - {b1}*f3.cainfgap - {b2}*f3.caoutgap - {b3}*carer - {b0}), instruments (L.cainfgap L.caoutgap L.carer)

```
GMM estimation
umber of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .9756793   .1203498     8.11   0.000      .739798    1.211561
         /b2 |  -1.050501   .5678383   -18.50   0.000    -2.163464    0.062462
         /b3 |  -.0302691   .0082676    -3.66   0.000    -.0464733   -.0140648
         /b0 |   21.34601   1.033973    20.64   0.000     19.31946    23.37256
------------------------------------------------------------------------------
```

αAustralia: gmm (auir - {b1}*f3.auinfgap - {b2}*f3.auoutgap - {b3}*aurer - {b0}), instruments (L.auinfgap L.auoutgap L.aurer)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .9830448   .0639302    15.38   0.000      .857744    1.108346
         /b2 |  -1.135113   .0371802   -30.53   0.000    -1.207986   -1.062240
         /b3 |     .05573   .0071089     7.84   0.000     .0417968    .0696632
         /b0 |   11.96117   .7587825    15.76   0.000     10.47399    13.44836
------------------------------------------------------------------------------
```

New Zealand: gmm (nzir - {b1}*f3.nzinfgap - {b2}*f3.nzoutgap - {b3}*nzrer - {b0}), instruments (L.nzinfgap L.nzoutgap L.nzrer)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .9672196   .0868905    11.13   0.000     .7969174    1.137522
         /b2 |  -5.455064   .1510679   -36.11   0.000    -5.751157   -5.158971
         /b3 |   .1016424   .0064055    15.87   0.000     .0890878     .114197
         /b0 |   4.185129   .5768243     7.26   0.000     3.054574    5.315684
------------------------------------------------------------------------------
```

Sweden: gmm (seir - {b1}*f3.seinfgap - {b2}*f3.seoutgap - {b3}*serer - {b0}), instruments (L.seinfgap L.seoutgap L.serer)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .5853709   .0512878    11.41   0.000     .4848488    .6858931
         /b2 |  -7.236423   .2182933   -33.15   0.000    -7.664278   -6.808568
         /b3 |   .0898046   .0176566     5.09   0.000     .0551984    .1244109
         /b0 |   17.86105   2.143784     8.33   0.000     13.65932    22.06279
------------------------------------------------------------------------------
```

US: gmm (usir - {b1}*f3.usinfgap - {b2}*f3.usoutgap - {b3}*usrer - {b0}), instruments (L.usinfgap L.usoutgap L.usrer)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
```

	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
/b1	1.236454	.1475152	8.38	0.000	.9473298	1.525579
/b2	-4.897524	.7375789	-6.64	0.000	-6.343179	-3.451869
/b3	.059082	.0080017	7.38	0.000	.043399	.074765
/b0	.6261279	1.751475	0.36	0.721	-2.8067	4.058956

Euro-Area: gmm (euir - {b1}*f3.euinfgap - {b2}*f3.euoutgap - {b3}*eurer - {b0}), instruments (L.euinfgap L.euoutgap L.eurer)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
```

	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
/b1	.92125	.0964789	9.55	0.000	.7321548	1.110345
/b2	-3.116823	.1391438	-22.40	0.000	-3.389545	-2.844101
/b3	.0500965	.0086785	5.77	0.000	.0330869	.067106
/b0	25.61488	1.835707	13.95	0.000	22.01696	29.2128

Switzerland: gmm (chir - {b1}*f3.chinfgap - {b2}*f3.choutgap - {b3}*chrer - {b0}), instruments (L.chinfgap L.choutgap L.chrer)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        332
GMM weight matrix:     Robust
```

	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
/b1	1.290336	.0475723	27.12	0.000	1.197096	1.383576
/b2	-1.161534	.2487224	-4.67	0.000	-1.649030	-0.674038
/b3	.0077235	.0110165	0.70	0.483	-.0138684	.0293154
/b0	8.867397	1.069938	8.29	0.000	6.770358	10.96444

Taylor Rule with Interest Rate Smoothing

UK: gmm (ukir - {b1}*f3.ukinfgap - {b2}*f3.ukoutgap - {b3}*L.ukir - {b0}), instruments (L.ukinfgap L.ukoutgap L2.ukir)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
```

	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
/b1	-.0235677	.0126721	-1.86	0.063	-.0484045	.0012692
/b2	-1.000702	1.853151	-0.54	0.592	-4.632878	2.631474
/b3	.9886123	.0067097	147.34	0.000	.9754616	1.001763
/b0	.2267617	.3362733	0.67	0.500	-.4323218	.8858451

```
------------------------------------------------------------------------------
```

Canada: gmm (cair - {b1}*f3.cainfgap - {b2}*f3.caoutgap - {b3}*L.cair - {b0}), instruments (L.cainfgap L.caoutgap L2.cair)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |  -.0413306     .03173    -1.30   0.193    -.1035203    .0208591
         /b2 |  -2.457325   2.233931    -1.10   0.269    -6.835830    1.921180
         /b3 |   .9731925   .0125219    77.72   0.000       .94865    .9977349
         /b0 |   .5398204   .4159047     1.30   0.194    -.2753377    1.354979
------------------------------------------------------------------------------
```

Australia: gmm (auir - {b1}*f3.auinfgap - {b2}*f3.auoutgap - {b3}*L.auir - {b0}), instruments (L.auinfgap L.auoutgap L2.auir)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |  -.0272955   .0162507    -1.68   0.093    -.0591462    .0045552
         /b2 |  -1.177562   1.529301    -0.77   0.442    -4.174991    1.819867
         /b3 |   .9771113   .0119849    81.53   0.000     .9536213    1.000601
         /b0 |   .2884248   .2304496     1.25   0.211    -.1632482    .7400977
------------------------------------------------------------------------------
```

New Zealand: gmm (nzir - {b1}*f3.nzinfgap - {b2}*f3.nzoutgap - {b3}*L.nzir - {b0}), instruments (L.nzinfgap L.nzoutgap L2.nzir)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |  -.0223447    .022326    -1.00   0.317    -.0661029    .0214134
         /b2 |  -1.126045   .6153251    -1.83   0.067    -2.332082    0.079992
         /b3 |   .9732302   .0123672    78.69   0.000     .9489909    .9974696
         /b0 |   .3810518   .1752204     2.17   0.030      .037626    .7244775
------------------------------------------------------------------------------
```

Sweden: gmm (seir - {b1}*f3.seinfgap - {b2}*f3.seoutgap - {b3}*L.seir - {b0}), instruments (L.seinfgap L.seoutgap L2.seir)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .0721106   .0774288     0.93   0.352    -.0796471    .2238683
         /b2 |  -8.330715   6.508371    -1.28   0.201    -21.08712    4.425692
         /b3 |   .8922632   .0907808     9.83   0.000      .714336     1.07019
         /b0 |   3.060288   2.391604     1.28   0.201     -1.62717    7.747746
------------------------------------------------------------------------------
```

US: gmm (usir - {b1}*f3.usinfgap - {b2}*f3.usoutgap - {b3}*L.usir - {b0}), instruments (L.usinfgap L.usoutgap L2.usir)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |   .0227386   .0260597     0.87   0.383    -.0283375    .0738147
         /b2 |   -9.59912    11.8507    -0.81   0.418    -32.82649    13.62825
         /b3 |   .9761939   .0071342   136.83   0.000     .9622111    .9901768
         /b0 |   .1381299   .2101848     0.66   0.511    -.2738247    .5500845
------------------------------------------------------------------------------
```

Euro-Area: gmm (euir - {b1}*f3.euinfgap - {b2}*f3.euoutgap - {b3}*L.euir - {b0}), instruments (L.euinfgap L.euoutgap L2.euir)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |    .037218    .018321     2.03   0.042     .0013096    .0731264
         /b2 |   -6.84818    5.61326    -1.22   0.221    -17.85016    4.153809
         /b3 |   .9712566   .0152893    63.53   0.000       .94129    1.001223
         /b0 |   .6339696    .548052     1.16   0.247    -.4401926    1.708132
------------------------------------------------------------------------------
```

Switzerland: gmm (chir - {b1}*f3.chinfgap - {b2}*f3.choutgap - {b3}*L.chir - {b0}), instruments (L.chinfgap L.choutgap L2.chir)

```
GMM estimation
Number of parameters =   4
Number of moments    =   4
Initial weight matrix: Unadjusted                 Number of obs   =        331
GMM weight matrix:     Robust
------------------------------------------------------------------------------
             |               Robust
             | Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         /b1 |    .057428   .0216519     2.65   0.008     .0149911    .0998648
         /b2 |   -5.90785    3.30047    -1.79   0.074    -12.37677    0.561071
         /b3 |   .9461796   .0160971    58.78   0.000     .9146298    .9777294
         /b0 |   .3460079   .2015719     1.72   0.086    -.0490657    .7410814
------------------------------------------------------------------------------
```

Sup-Wald Test

UK-Canada: ukca <- tsDyn::TVECM.SeoTest(ukca, 2, trim = 0.15, nboot=1000, plot = FALSE)

```
p-value = 0.000000
```

UK-Australia: ukau <- tsDyn::TVECM.SeoTest(ukau, 2, trim = 0.15, nboot=1000, plot = FALSE)

```
p-value = 0.000000
```

UK-New Zealand: uknz <- tsDyn::TVECM.SeoTest(uknz, 1, trim = 0.15, nboot=1000, plot = FALSE)

```
p-value = 0.000000
```

UK-Sweden: ukse <- tsDyn::TVECM.SeoTest(ukse, 3, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

Canada-Australia: caau <- tsDyn::TVECM.SeoTest(caau, 1, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

Canada-New Zealand: canz <- tsDyn::TVECM.SeoTest(canz, 1, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

Canada-Sweden: case <- tsDyn::TVECM.SeoTest(case, 1, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

Australia-New Zealand: aunz <- tsDyn::TVECM.SeoTest(aunz, 2, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

Australia-Sweden: ause <- tsDyn::TVECM.SeoTest(ause, 3, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

New Zealand-Sweden: nzse <- tsDyn::TVECM.SeoTest(nzse, 1, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

US-Euro Area: useu <- tsDyn::TVECM.SeoTest(useu, 2, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

US-Switzerland: usch <- tsDyn::TVECM.SeoTest(usch, 2, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

Euro Area-Switzerland: euch <- tsDyn::TVECM.SeoTest(euch, 2, trim = 0.15, nboot=1000, plot = FALSE)
```
p-value = 0.000000
```

Bai-Perron Threshold Test

UK-Canada with UK Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: UKTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig.
level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey

-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds:			2
Threshold Test	**F-statistic**	**Scaled F-statistic**	**Critical Value****
0 vs. 1 *	3.332616	36.65877	27.03
1 vs. 2	2.630400	22.93440	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

UK-Canada with Canada Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: CATRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds:			1
Threshold Test	**F-statistic**	**Scaled F-statistic**	**Critical Value****
0 vs. 1 *	6.345614	69.80175	27.03
1 vs. 2	1.580410	17.38451	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

UK-Australia with UK Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: UKTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds:			1
Threshold Test	**F-statistic**	**Scaled F-statistic**	**Critical Value****
0 vs. 1 *	2.910061	27.71067	27.03
1 vs. 2	2.819299	28.01229	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

UK-Australia with Australia Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: AUTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds:	1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.370777	37.07854	27.03
1 vs. 2	1.785906	17.64496	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

UK-New Zealand with UK Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: UKTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds:	1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.372316	39.93477	27.03
0 vs. 2	2.031541	22.34695	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

UK-New Zealand with New Zealand Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: NZTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds:	1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	5.257796	58.77877	27.03
1 vs. 2	1.371720	15.08892	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

UK-Sweden with UK Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: UKTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds:	1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	4.448412	47.77165	27.03
1 vs. 2	1.584728	17.43201	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

UK-Sweden with Sweden Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: SETRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.146532	34.61186	27.03
1 vs. 2	2.342581	25.76839	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Canada-Australia with Canada Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: CATRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.562341	39.68115	27.03
1 vs. 2	2.328329	25.61162	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Canada-Australia with Australia Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: AUTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**

0 vs. 1 *	3.451613	37.96774	27.03
1 vs. 2	1.935768	21.29345	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Canada-New Zealand with Canada Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: CATRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	4.075887	44.83475	27.03
1 vs. 2	0.949927	10.44920	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Canada-New Zealand with New Zealand Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: NZTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.444065	37.88471	27.03
1 vs. 2	0.890785	9.798637	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Canada-Sweden with Canada Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: CATRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	2.908000	31.98800	27.03
1 vs. 2	1.589582	17.48540	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Canada-Sweden with Sweden Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: SETRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	2.942554	32.36809	27.03
1 vs. 2	1.953423	21.48766	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Australia-New Zealand with Australia Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: AUTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	8.785205	96.63725	27.03
1 vs. 2	2.078126	22.85939	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Australia-New Zealand with New Zealand Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: NZTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	4.126755	43.66121	27.03
1 vs. 2	2.242043	24.66248	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Australia-Sweden with Australia Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: AUTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.377321	37.03435	27.03
1 vs. 2	2.339677	25.73645	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Australia-Sweden with Sweden Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: SETRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	4.646338	51.10971	27.03
1 vs. 2	1.829279	20.12206	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

New Zealand-Sweden with New Zealand Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: NZTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.932416	41.06629	27.03
1 vs. 2	1.278233	14.06056	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

New Zealand-Sweden with Sweden Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: SETRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.066105	33.72715	27.03
1 vs. 2	1.329848	14.62833	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

US-Euro Area with US Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: USTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.189965	34.20154	27.03
1 vs. 2	2.261813	24.87995	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

US-Euro Area with Euro-Area Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: EUTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	2.519526	27.19528	27.03
1 vs. 2	2.043213	22.47534	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

US-Switzerland with US Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds

Threshold variable: USTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	4.527852	49.80637	27.03
1 vs. 2 *	2.436236	26.79859	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

US-Switzerland with Switzerland Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: CHTRF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	5.634294	61.97723	27.03
1 vs. 2	1.838014	20.21815	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Euro Area-Switzerland with Euro-Area Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: EUTRXF3
Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey -West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	2.977841	32.75625	27.03
1 vs. 2	2.099051	23.08956	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Euro Area-Switzerland with Switzerland Taylor Rule:

Bai-Perron tests of L+1 vs. L sequentially determined thresholds
Threshold variable: CHTRF3

Threshold test options: Trimming 0.15, Max. thresholds 5, Sig. level 0.05
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth) assuming common data distribution

Sequential F-statistic determined thresholds: 1

Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	2.736986	29.24195	27.03
1 vs. 2	2.361609	25.97770	29.24

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Nonlinear Threshold Vector Error Correction Model

UK-Canada:

UK Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKCAINF) C D(LNGBPCAD(-1)) D(LNUKCAINF(-1)) D(LNUKCAIR(-1)) D(LNGBPCAD(-2)) D(LNUKCAINF(-2)) D(LNUKCAIR(-2)) D(LNGBPCAD(-3)) D(LNUKCAINF(-3)) D(LNUKCAIR(-3)) UKCAR2(-1) @THRESH UKTRXF3

Dependent Variable: D(LNUKCAINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: UKTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UKTRXF3 < -0.78064601 -- 86 obs				
C	-0.006913	0.032533	-0.212491	0.8319
D(LNGBPCAD(-1))	-2.095978	2.193868	-0.955380	0.3401
D(LNUKCAINF(-1))	0.017928	0.071060	0.252295	0.8010
D(LNUKCAIR(-1))	-1.073660	1.854384	-0.578984	0.5630
D(LNGBPCAD(-2))	1.208466	1.604810	0.753027	0.4520
D(LNUKCAINF(-2))	0.266756	0.068891	3.872134	0.0001
D(LNUKCAIR(-2))	5.395403	3.876214	1.391926	0.1650
D(LNGBPCAD(-3))	-0.834008	2.384098	-0.349821	0.7267
D(LNUKCAINF(-3))	0.113571	0.085156	1.333678	0.1833
D(LNUKCAIR(-3))	-3.403025	2.320056	-1.466786	0.1435
UKCAR2(-1)	-0.314316	0.057599	-5.456961	0.0000
-0.78064601 <= UKTRXF3 -- 243 obs				
C	0.005245	0.010187	0.514897	0.6070
D(LNGBPCAD(-1))	0.078813	0.562708	0.140060	0.8887
D(LNUKCAINF(-1))	-0.001050	0.078869	-0.013319	0.9894
D(LNUKCAIR(-1))	0.348373	0.355031	0.981247	0.3272
D(LNGBPCAD(-2))	-0.303882	0.572399	-0.530891	0.5959
D(LNUKCAINF(-2))	-0.046617	0.059378	-0.785076	0.4330
D(LNUKCAIR(-2))	-0.549401	0.528681	-1.039192	0.2995

D(LNGBPCAD(-3))	-0.298997	0.426708	-0.700706	0.4840
D(LNUKCAINF(-3))	0.089403	0.080469	1.111023	0.2674
D(LNUKCAIR(-3))	0.199465	0.285863	0.697764	0.4859
UKCAR2(-1)	-0.111735	0.031971	-3.494907	0.0005

R-squared	0.321935	Mean dependent var	-0.000420
Adjusted R-squared	0.275553	S.D. dependent var	0.264130
S.E. of regression	0.224812	Akaike info criterion	-0.082572
Sum squared resid	15.51598	Schwarz criterion	0.171268
Log likelihood	35.58308	Hannan-Quinn criter.	0.018692
F-statistic	6.940900	Durbin-Watson stat	2.023748
Prob(F-statistic)	0.000000		

Canada Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKCAINF) C D(LNGBPCAD(-1)) D(LNUKCAINF(-1)) D(LNUKCAIR(-1)) D(LNGBPCAD(-2)) D(LNUKCAINF(-2)) D(LNUKCAIR(-2)) D(LNGBPCAD(-3)) D(LNUKCAINF(-3)) D(LNUKCAIR(-3)) UKCAR2(-1) @THRESH CATRXF3

Dependent Variable: D(LNUKCAINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: CATRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CATRXF3 < -0.69768271 -- 110 obs				
C	-0.089426	0.013931	-6.419305	0.0000
D(LNGBPCAD(-1))	-0.874378	0.901526	-0.969887	0.3329
D(LNUKCAINF(-1))	-0.017987	0.048338	-0.372103	0.7101
D(LNUKCAIR(-1))	0.012101	0.519920	0.023275	0.9814
D(LNGBPCAD(-2))	0.041958	0.539562	0.077764	0.9381
D(LNUKCAINF(-2))	0.267631	0.086544	3.092446	0.0022
D(LNUKCAIR(-2))	0.634939	0.731751	0.867698	0.3862
D(LNGBPCAD(-3))	-0.481603	0.832586	-0.578442	0.5634
D(LNUKCAINF(-3))	-0.019789	0.035919	-0.550921	0.5821
D(LNUKCAIR(-3))	-0.454931	0.477067	-0.953600	0.3410
UKCAR2(-1)	-0.408261	0.036380	-11.22227	0.0000
-0.69768271 <= CATRXF3 -- 219 obs				
C	0.020594	0.014126	1.457886	0.1459
D(LNGBPCAD(-1))	-0.909924	1.298160	-0.700933	0.4839
D(LNUKCAINF(-1))	0.036350	0.103873	0.349946	0.7266
D(LNUKCAIR(-1))	0.468647	0.327319	1.431775	0.1532
D(LNGBPCAD(-2))	0.271118	1.096923	0.247162	0.8049
D(LNUKCAINF(-2))	0.040409	0.099480	0.406200	0.6849
D(LNUKCAIR(-2))	-0.181690	0.835339	-0.217504	0.8280
D(LNGBPCAD(-3))	-0.264101	0.553483	-0.477161	0.6336
D(LNUKCAINF(-3))	0.245134	0.141833	1.728330	0.0849
D(LNUKCAIR(-3))	0.168175	0.357136	0.470898	0.6380
UKCAR2(-1)	-0.064856	0.051283	-1.264676	0.2069

R-squared	0.297918	Mean dependent var	-0.000420
Adjusted R-squared	0.249893	S.D. dependent var	0.264130
S.E. of regression	0.228759	Akaike info criterion	-0.047765
Sum squared resid	16.06555	Schwarz criterion	0.206075
Log likelihood	29.85727	Hannan-Quinn criter.	0.053499
F-statistic	6.203365	Durbin-Watson stat	1.981415
Prob(F-statistic)	0.000000		

UK-Australia:

UK Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKAUINF) C D(LNGBPAUD(-1)) D(LNUKAUINF(-1)) D(LNUKAUIR(-1)) D(LNGBPAUD(-2)) D(LNUKAUINF(-2)) D(LNUKAUIR(-2)) D(LNGBPAUD(-3)) D(LNUKAUINF(-3)) D(LNUKAUIR(-3)) UKAUR2(-1) @THRESH UKTRXF3

Dependent Variable: D(LNUKAUINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: UKTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UKTRXF3 < 1.246699 -- 276 obs				
C	0.004305	0.006785	0.634485	0.5262
D(LNGBPAUD(-1))	0.700329	0.225174	3.110165	0.0020
D(LNUKAUINF(-1))	-0.003764	0.054998	-0.068435	0.9455
D(LNUKAUIR(-1))	0.544647	0.233428	2.333257	0.0203
D(LNGBPAUD(-2))	0.291514	0.324491	0.898373	0.3697
D(LNUKAUINF(-2))	-0.103440	0.050004	-2.068652	0.0394
D(LNUKAUIR(-2))	0.080296	0.238960	0.336022	0.7371
D(LNGBPAUD(-3))	0.059597	0.327405	0.182027	0.8557
D(LNUKAUINF(-3))	0.133634	0.058221	2.295297	0.0224
D(LNUKAUIR(-3))	-0.347527	0.192631	-1.804107	0.0722
UKAUR2(-1)	-0.078447	0.030039	-2.611464	0.0095
1.246699 <= UKTRXF3 -- 53 obs				
C	-0.066624	0.022731	-2.930907	0.0036
D(LNGBPAUD(-1))	3.129149	1.165153	2.685613	0.0076
D(LNUKAUINF(-1))	-0.042777	0.092152	-0.464200	0.6428
D(LNUKAUIR(-1))	-1.284911	0.349951	-3.671688	0.0003
D(LNGBPAUD(-2))	-1.320567	1.109266	-1.190487	0.2348
D(LNUKAUINF(-2))	0.013391	0.120593	0.111047	0.9117
D(LNUKAUIR(-2))	2.594932	0.566891	4.577479	0.0000
D(LNGBPAUD(-3))	0.540806	1.241126	0.435739	0.6633
D(LNUKAUINF(-3))	0.005166	0.163370	0.031622	0.9748
D(LNUKAUIR(-3))	1.532083	0.470536	3.256035	0.0013
UKAUR2(-1)	-0.068690	0.044233	-1.552906	0.1215

R-squared	0.432695	Mean dependent var	-0.001497
Adjusted R-squared	0.393890	S.D. dependent var	0.162441
S.E. of regression	0.126465	Akaike info criterion	-1.233166
Sum squared resid	4.910008	Schwarz criterion	-0.979327
Log likelihood	224.8559	Hannan-Quinn criter.	-1.131903
F-statistic	11.15026	Durbin-Watson stat	2.021794
Prob(F-statistic)	0.000000		

Australia Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKAUINF) C D(LNGBPAUD(-1)) D(LNUKAUINF(-1)) D(LNUKAUIR(-1)) D(LNGBPAUD(-2)) D(LNUKAUINF(-2)) D(LNUKAUIR(-2)) D(LNGBPAUD(-3)) D(LNUKAUINF(-3)) D(LNUKAUIR(-3)) UKAUR2(-1) @THRESH AUTRXF3

Dependent Variable: D(LNUKAUINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: AUTRXF3

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AUTRXF3 < -0.4828483 -- 105 obs				
C	-0.024693	0.012399	-1.991548	0.0473
D(LNGBPAUD(-1))	0.180568	0.507622	0.355713	0.7223
D(LNUKAUINF(-1))	0.125823	0.087560	1.436989	0.1517
D(LNUKAUIR(-1))	-0.996528	0.646579	-1.541231	0.1243
D(LNGBPAUD(-2))	1.950707	0.554641	3.517061	0.0005
D(LNUKAUINF(-2))	-0.168771	0.046381	-3.638759	0.0003
D(LNUKAUIR(-2))	2.304174	0.702919	3.278006	0.0012
D(LNGBPAUD(-3))	-0.558877	0.592218	-0.943702	0.3461
D(LNUKAUINF(-3))	-0.149131	0.106111	-1.405429	0.1609
D(LNUKAUIR(-3))	0.022693	0.318477	0.071253	0.9432
UKAUR2(-1)	-0.076169	0.047833	-1.592407	0.1123
-0.4828483 <= AUTRXF3 -- 224 obs				
C	0.006364	0.008264	0.770032	0.4419
D(LNGBPAUD(-1))	0.950256	0.444707	2.136815	0.0334
D(LNUKAUINF(-1))	0.050634	0.064740	0.782112	0.4348
D(LNUKAUIR(-1))	0.031529	0.353999	0.089066	0.9291
D(LNGBPAUD(-2))	-0.066335	0.475933	-0.139379	0.8892
D(LNUKAUINF(-2))	-0.076654	0.053333	-1.437266	0.1517
D(LNUKAUIR(-2))	0.098625	0.290540	0.339454	0.7345
D(LNGBPAUD(-3))	0.499367	0.345150	1.446812	0.1490
D(LNUKAUINF(-3))	0.303148	0.097388	3.112791	0.0020
D(LNUKAUIR(-3))	-0.060786	0.223489	-0.271988	0.7858
UKAUR2(-1)	-0.074212	0.035874	-2.068646	0.0394

R-squared	0.362335	Mean dependent var	-0.001497
Adjusted R-squared	0.318716	S.D. dependent var	0.162441
S.E. of regression	0.134079	Akaike info criterion	-1.116249
Sum squared resid	5.518980	Schwarz criterion	-0.862409
Log likelihood	205.6230	Hannan-Quinn criter.	-1.014985
F-statistic	8.306842	Durbin-Watson stat	2.072950
Prob(F-statistic)	0.000000		

UK-New Zealand:

UK Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKNZINF) C D(LNGBPNZD(-1)) D(LNUKNZINF(-1)) D(LNUKNZIR(-1)) D(LNGBPNZD(-2)) D(LNUKNZINF(-2)) D(LNUKNZIR(-2)) D(LNGBPNZD(-3)) D(LNUKNZINF(-3)) D(LNUKNZIR(-3)) UKNZR2(-1) @THRESH UKTRXF3

Dependent Variable: D(LNUKNZINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: UKTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UKTRXF3 < 0.6557796 -- 234 obs				
C	0.003286	0.007430	0.442191	0.6587
D(LNGBPNZD(-1))	-0.455179	0.348879	-1.304690	0.1930
D(LNUKNZINF(-1))	0.015490	0.036301	0.426700	0.6699

D(LNUKNZIR(-1))	0.030918	0.223065	0.138607	0.8899
D(LNGBPNZD(-2))	0.393796	0.378414	1.040647	0.2989
D(LNUKNZINF(-2))	-0.052739	0.038656	-1.364317	0.1735
D(LNUKNZIR(-2))	0.020306	0.272625	0.074484	0.9407
D(LNGBPNZD(-3))	0.394280	0.425761	0.926059	0.3551
D(LNUKNZINF(-3))	0.302306	0.098161	3.079704	0.0023
D(LNUKNZIR(-3))	-0.135452	0.180749	-0.749393	0.4542
UKNZR2(-1)	-0.061440	0.032141	-1.911548	0.0569
0.6557796 <= UKTRXF3 -- 95 obs				
C	-0.035753	0.025887	-1.381095	0.1683
D(LNGBPNZD(-1))	0.077233	0.817802	0.094440	0.9248
D(LNUKNZINF(-1))	0.012876	0.127342	0.101110	0.9195
D(LNUKNZIR(-1))	-0.417257	0.322877	-1.292307	0.1972
D(LNGBPNZD(-2))	0.769194	1.041225	0.738740	0.4606
D(LNUKNZINF(-2))	-0.125149	0.042626	-2.935980	0.0036
D(LNUKNZIR(-2))	0.298645	0.462078	0.646308	0.5186
D(LNGBPNZD(-3))	0.145094	0.575495	0.252121	0.8011
D(LNUKNZINF(-3))	0.165723	0.107982	1.534727	0.1259
D(LNUKNZIR(-3))	0.567080	0.284595	1.992583	0.0472
UKNZR2(-1)	-0.209162	0.143334	-1.459261	0.1455

R-squared	0.202984	Mean dependent var	-0.002835
Adjusted R-squared	0.148465	S.D. dependent var	0.151356
S.E. of regression	0.139670	Akaike info criterion	-1.034543
Sum squared resid	5.988845	Schwarz criterion	-0.780704
Log likelihood	192.1824	Hannan-Quinn criter.	-0.933280
F-statistic	3.723175	Durbin-Watson stat	1.940080
Prob(F-statistic)	0.000000		

New Zealand Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKNZINF) C D(LNGBPNZD(-1)) D(LNUKNZINF(-1)) D(LNUKNZIR(-1)) D(LNGBPNZD(-2)) D(LNUKNZINF(-2)) D(LNUKNZIR(-2)) D(LNGBPNZD(-3)) D(LNUKNZINF(-3)) D(LNUKNZIR(-3)) UKNZR2(-1) @THRESH NZTRXF3

Dependent Variable: D(LNUKNZINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: NZTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NZTRXF3 < 0.2724425 -- 195 obs				
C	0.000478	0.011926	0.040089	0.9680
D(LNGBPNZD(-1))	-0.222930	0.568294	-0.392279	0.6951
D(LNUKNZINF(-1))	0.045127	0.039934	1.130039	0.2593
D(LNUKNZIR(-1))	0.044162	0.306543	0.144065	0.8855
D(LNGBPNZD(-2))	0.617943	0.612998	1.008066	0.3142
D(LNUKNZINF(-2))	0.002639	0.058893	0.044814	0.9643
D(LNUKNZIR(-2))	0.074515	0.344181	0.216500	0.8287
D(LNGBPNZD(-3))	0.398525	0.451360	0.882942	0.3780
D(LNUKNZINF(-3))	0.251896	0.107338	2.346747	0.0196
D(LNUKNZIR(-3))	0.105713	0.179517	0.588878	0.5564
UKNZR2(-1)	-0.177821	0.058667	-3.031033	0.0026
0.2724425 <= NZTRXF3 -- 134 obs				
C	-0.006971	0.008626	-0.808149	0.4196
D(LNGBPNZD(-1))	-0.113734	0.280558	-0.405385	0.6855

D(LNUKNZINF(-1))	-0.005842	0.084149	-0.069429	0.9447
D(LNUKNZIR(-1))	-0.452915	0.210679	-2.149787	0.0324
D(LNGBPNZD(-2))	0.744809	0.513222	1.451243	0.1477
D(LNUKNZINF(-2))	-0.126711	0.061342	-2.065668	0.0397
D(LNUKNZIR(-2))	0.428945	0.283323	1.513979	0.1311
D(LNGBPNZD(-3))	0.466502	0.347793	1.341324	0.1808
D(LNUKNZINF(-3))	0.320073	0.110946	2.884941	0.0042
D(LNUKNZIR(-3))	0.382622	0.339792	1.126047	0.2610
UKNZR2(-1)	0.015558	0.033641	0.462473	0.6441

R-squared	0.193039	Mean dependent var	-0.002835
Adjusted R-squared	0.137840	S.D. dependent var	0.151356
S.E. of regression	0.140538	Akaike info criterion	-1.022143
Sum squared resid	6.063570	Schwarz criterion	-0.768304
Log likelihood	190.1426	Hannan-Quinn criter.	-0.920879
F-statistic	3.497133	Durbin-Watson stat	1.958306
Prob(F-statistic)	0.000001		

UK-Sweden:

UK Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKSEINF) C D(LNGBPSEK(-1)) D(LNUKSEINF(-1)) D(LNUKSEIR(-1)) D(LNGBPSEK(-2)) D(LNUKSEINF(-2)) D(LNUKSEIR(-2)) D(LNGBPSEK(-3)) D(LNUKSEINF(-3)) D(LNUKSEIR(-3)) UKSER2(-1) @THRESH UKTRXF3

Dependent Variable: D(LNUKSEINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: UKTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UKTRXF3 < -1.2101391 -- 52 obs				
C	0.041780	0.033199	1.258454	0.2092
D(LNGBPSEK(-1))	2.143055	1.777521	1.205642	0.2289
D(LNUKSEINF(-1))	0.085800	0.123114	0.696910	0.4864
D(LNUKSEIR(-1))	-1.228724	0.885294	-1.387928	0.1662
D(LNGBPSEK(-2))	-1.849656	1.268143	-1.458555	0.1457
D(LNUKSEINF(-2))	-0.142427	0.064582	-2.205356	0.0282
D(LNUKSEIR(-2))	-1.211593	1.210198	-1.001153	0.3175
D(LNGBPSEK(-3))	-2.274760	2.540650	-0.895346	0.3713
D(LNUKSEINF(-3))	0.130943	0.103020	1.271042	0.2047
D(LNUKSEIR(-3))	2.425697	1.565548	1.549424	0.1223
UKSER2(-1)	-0.213119	0.081118	-2.627261	0.0090
-1.2101391 <= UKTRXF3 -- 277 obs				
C	-0.001026	0.008929	-0.114913	0.9086
D(LNGBPSEK(-1))	-0.409693	0.414019	-0.989549	0.3232
D(LNUKSEINF(-1))	-0.071776	0.060354	-1.189241	0.2353
D(LNUKSEIR(-1))	-0.105927	0.180291	-0.587530	0.5573
D(LNGBPSEK(-2))	0.402194	0.463298	0.868112	0.3860
D(LNUKSEINF(-2))	0.046457	0.063149	0.735666	0.4625
D(LNUKSEIR(-2))	-0.031731	0.135999	-0.233322	0.8157
D(LNGBPSEK(-3))	0.157264	0.394607	0.398532	0.6905
D(LNUKSEINF(-3))	0.113125	0.076693	1.475048	0.1412
D(LNUKSEIR(-3))	0.304633	0.178274	1.708790	0.0885

UKSER2(-1)	-0.066903	0.032936	-2.031324	0.0431

R-squared	0.270661	Mean dependent var	0.001070
Adjusted R-squared	0.220771	S.D. dependent var	0.189033
S.E. of regression	0.166867	Akaike info criterion	-0.678712
Sum squared resid	8.548278	Schwarz criterion	-0.424872
Log likelihood	133.6482	Hannan-Quinn criter.	-0.577448
F-statistic	5.425193	Durbin-Watson stat	1.986108
Prob(F-statistic)	0.000000		

Sweden Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUKSEINF) C D(LNGBPSEK(-1)) D(LNUKSEINF(-1)) D(LNUKSEIR(-1)) D(LNGBPSEK(-2)) D(LNUKSEINF(-2)) D(LNUKSEIR(-2)) D(LNGBPSEK(-3)) D(LNUKSEINF(-3)) D(LNUKSEIR(-3)) UKSER2(-1) @THRESH SETRFX3

Dependent Variable: D(LNUKSEINF)
Sample (adjusted): 1993M05 2020M09
Threshold variable: SETRFX3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SETRFX3 < -0.91020671 -- 67 obs				
C	-0.023029	0.018951	-1.215195	0.2252
D(LNGBPSEK(-1))	1.879866	1.727304	1.088324	0.2773
D(LNUKSEINF(-1))	0.026689	0.051555	0.517684	0.6051
D(LNUKSEIR(-1))	-0.712446	0.663080	-1.074450	0.2835
D(LNGBPSEK(-2))	-1.663685	0.934106	-1.781046	0.0759
D(LNUKSEINF(-2))	-0.156063	0.072540	-2.151391	0.0322
D(LNUKSEIR(-2))	-2.482476	1.545435	-1.606328	0.1092
D(LNGBPSEK(-3))	-1.932587	1.695497	-1.139835	0.2552
D(LNUKSEINF(-3))	0.070287	0.086275	0.814685	0.4159
D(LNUKSEIR(-3))	3.076438	1.456714	2.111903	0.0355
UKSER2(-1)	-0.220306	0.043364	-5.080395	0.0000
-0.91020671 <= SETRFX3 -- 262 obs				
C	0.016007	0.009438	1.695931	0.0909
D(LNGBPSEK(-1))	-0.326459	0.457777	-0.713139	0.4763
D(LNUKSEINF(-1))	-0.096429	0.077658	-1.241715	0.2153
D(LNUKSEIR(-1))	-0.133967	0.178184	-0.751847	0.4527
D(LNGBPSEK(-2))	0.428586	0.491000	0.872884	0.3834
D(LNUKSEINF(-2))	-0.005554	0.086371	-0.064308	0.9488
D(LNUKSEIR(-2))	0.010116	0.125204	0.080796	0.9357
D(LNGBPSEK(-3))	0.225753	0.417218	0.541091	0.5888
D(LNUKSEINF(-3))	0.051499	0.077225	0.666868	0.5054
D(LNUKSEIR(-3))	0.226242	0.182062	1.242663	0.2149
UKSER2(-1)	-0.013222	0.032727	-0.404023	0.6865

R-squared	0.317817	Mean dependent var	0.001070
Adjusted R-squared	0.271153	S.D. dependent var	0.189033
S.E. of regression	0.161382	Akaike info criterion	-0.745553
Sum squared resid	7.995580	Schwarz criterion	-0.491714
Log likelihood	144.6435	Hannan-Quinn criter.	-0.644289
F-statistic	6.810762	Durbin-Watson stat	2.073118
Prob(F-statistic)	0.000000		

Canada-Australia:

Canada Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNCAAUINF) C D(LNCADAUD(-1)) D(LNCAAUINF(-1)) D(LNCAAUIR(-1)) D(LNCADAUD(-2)) D(LNCAAUINF(-2)) D(LNCAAUIR(-2)) D(LNCADAUD(-3)) D(LNCAAUINF(-3)) D(LNCAAUIR(-3)) CAAUR2(-1) @THRESH CATRXF3

Dependent Variable: D(LNCAAUINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: CATRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CATRXF3 < -0.45822191 -- 130 obs				
C	0.053961	0.020413	2.643435	0.0086
D(LNCADAUD(-1))	-1.891224	1.449453	-1.304784	0.1929
D(LNCAAUINF(-1))	0.055122	0.078786	0.699635	0.4847
D(LNCAAUIR(-1))	-0.587811	0.840639	-0.699243	0.4849
D(LNCADAUD(-2))	1.121487	1.475679	0.759980	0.4478
D(LNCAAUINF(-2))	0.213391	0.137515	1.551764	0.1217
D(LNCAAUIR(-2))	3.447648	2.553173	1.350339	0.1779
D(LNCADAUD(-3))	-2.606475	2.561882	-1.017406	0.3098
D(LNCAAUINF(-3))	0.044550	0.077090	0.577900	0.5638
D(LNCAAUIR(-3))	-1.029281	1.009697	-1.019397	0.3088
CAAUR2(-1)	-0.410030	0.095235	-4.305448	0.0000
-0.45822191 <= CATRXF3 -- 199 obs				
C	-0.023403	0.019167	-1.220973	0.2230
D(LNCADAUD(-1))	1.321169	1.069206	1.235655	0.2175
D(LNCAAUINF(-1))	-0.026734	0.063052	-0.424006	0.6719
D(LNCAAUIR(-1))	1.208816	0.873323	1.384157	0.1673
D(LNCADAUD(-2))	-0.270915	1.054096	-0.257012	0.7973
D(LNCAAUINF(-2))	-0.126354	0.075971	-1.663197	0.0973
D(LNCAAUIR(-2))	-0.915252	1.001745	-0.913658	0.3616
D(LNCADAUD(-3))	0.075435	1.233697	0.061145	0.9513
D(LNCAAUINF(-3))	-0.069901	0.133552	-0.523401	0.6011
D(LNCAAUIR(-3))	0.664991	0.594086	1.119353	0.2639
CAAUR2(-1)	-0.152376	0.054977	-2.771621	0.0059

R-squared	0.237497	Mean dependent var	-0.001077
Adjusted R-squared	0.185339	S.D. dependent var	0.324734
S.E. of regression	0.293101	Akaike info criterion	0.447928
Sum squared resid	26.37376	Schwarz criterion	0.701767
Log likelihood	-51.68409	Hannan-Quinn criter.	0.549192
F-statistic	4.553394	Durbin-Watson stat	2.030638
Prob(F-statistic)	0.000000		

Australia Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNCAAUINF) C D(LNCADAUD(-1)) D(LNCAAUINF(-1)) D(LNCAAUIR(-1)) D(LNCADAUD(-2)) D(LNCAAUINF(-2)) D(LNCAAUIR(-2)) D(LNCADAUD(-3)) D(LNCAAUINF(-3)) D(LNCAAUIR(-3)) CAAUR2(-1) @THRESH AUTRXF3

Dependent Variable: D(LNCAAUINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: AUTRXF3

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AUTRXF3 < -0.32138061 -- 118 obs				
C	-0.020567	0.026342	-0.780781	0.4355
D(LNCADAUD(-1))	0.842386	1.508522	0.558418	0.5770
D(LNCAAUINF(-1))	-0.229963	0.079133	-2.906028	0.0039
D(LNCAAUIR(-1))	0.351893	1.066948	0.329812	0.7418
D(LNCADAUD(-2))	1.002591	1.196240	0.838119	0.4026
D(LNCAAUINF(-2))	0.029217	0.108600	0.269037	0.7881
D(LNCAAUIR(-2))	-0.663979	1.195516	-0.555391	0.5790
D(LNCADAUD(-3))	-2.063106	1.545865	-1.334596	0.1830
D(LNCAAUINF(-3))	-0.218529	0.100592	-2.172429	0.0306
D(LNCAAUIR(-3))	0.084748	0.779294	0.108750	0.9135
CAAUR2(-1)	-0.237045	0.098879	-2.397315	0.0171
-0.32138061 <= AUTRXF3 -- 211 obs				
C	0.000496	0.021545	0.023027	0.9816
D(LNCADAUD(-1))	-0.167331	1.280149	-0.130712	0.8961
D(LNCAAUINF(-1))	0.002831	0.117499	0.024090	0.9808
D(LNCAAUIR(-1))	0.670446	0.361222	1.856051	0.0644
D(LNCADAUD(-2))	1.039357	1.330350	0.781266	0.4352
D(LNCAAUINF(-2))	-0.024009	0.088373	-0.271680	0.7861
D(LNCAAUIR(-2))	1.718341	1.238104	1.387881	0.1662
D(LNCADAUD(-3))	0.474151	1.421899	0.333463	0.7390
D(LNCAAUINF(-3))	0.321029	0.168267	1.907849	0.0573
D(LNCAAUIR(-3))	-0.619239	0.580458	-1.066812	0.2869
CAAUR2(-1)	-0.219550	0.056369	-3.894868	0.0001

R-squared	0.249384	Mean dependent var	-0.001077
Adjusted R-squared	0.198039	S.D. dependent var	0.324734
S.E. of regression	0.290807	Akaike info criterion	0.432215
Sum squared resid	25.96260	Schwarz criterion	0.686055
Log likelihood	-49.09936	Hannan-Quinn criter.	0.533479
F-statistic	4.857023	Durbin-Watson stat	1.992196
Prob(F-statistic)	0.000000		

Canada-New Zealand:

Canada Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNCANZINF) C D(LNCADNZD(-1)) D(LNCANZINF(-1)) D(LNCANZIR(-1)) D(LNCADNZD(-2)) D(LNCANZINF(-2)) D(LNCANZIR(-2)) D(LNCADNZD(-3)) D(LNCANZINF(-3)) D(LNCANZIR(-3)) CANZR2(-1) @THRESH CATRXF3

Dependent Variable: D(LNCANZINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: CATRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CATRXF3 < -0.65144721 -- 115 obs				
C	0.063766	0.021534	2.961216	0.0033

D(LNCADNZD(-1))	-0.351560	1.148648	-0.306064	0.7598
D(LNCANZINF(-1))	0.015927	0.058495	0.272280	0.7856
D(LNCANZIR(-1))	0.188917	0.451405	0.418508	0.6759
D(LNCADNZD(-2))	0.256033	0.668111	0.383220	0.7018
D(LNCANZINF(-2))	0.202198	0.109111	1.853143	0.0648
D(LNCANZIR(-2))	1.132340	0.581592	1.946967	0.0525
D(LNCADNZD(-3))	-1.246972	1.223537	-1.019153	0.3089
D(LNCANZINF(-3))	-0.072240	0.063558	-1.136597	0.2566
D(LNCANZIR(-3))	-0.675640	0.577619	-1.169698	0.2430
CANZR2(-1)	-0.343661	0.057577	-5.968763	0.0000
-0.65144721 <= CATRXF3 -- 214 obs				
C	-0.028280	0.021853	-1.294092	0.1966
D(LNCADNZD(-1))	-1.022362	1.076827	-0.949421	0.3432
D(LNCANZINF(-1))	0.076303	0.076467	0.997856	0.3191
D(LNCANZIR(-1))	0.461991	0.395235	1.168905	0.2433
D(LNCADNZD(-2))	1.655149	1.040254	1.591101	0.1126
D(LNCANZINF(-2))	-0.084830	0.077139	-1.099713	0.2723
D(LNCANZIR(-2))	-0.502068	0.770391	-0.651705	0.5151
D(LNCADNZD(-3))	-0.040406	1.184413	-0.034115	0.9728
D(LNCANZINF(-3))	0.171955	0.110641	1.554167	0.1212
D(LNCANZIR(-3))	1.211433	0.441456	2.744173	0.0064
CANZR2(-1)	-0.053524	0.052111	-1.027111	0.3052

R-squared	0.260559	Mean dependent var	-0.002415
Adjusted R-squared	0.209979	S.D. dependent var	0.304581
S.E. of regression	0.270721	Akaike info criterion	0.289073
Sum squared resid	22.50000	Schwarz criterion	0.542913
Log likelihood	-25.55258	Hannan-Quinn criter.	0.390337
F-statistic	5.151364	Durbin-Watson stat	1.991176
Prob(F-statistic)	0.000000		

New Zealand Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNCANZINF) C D(LNCADNZD(-1)) D(LNCANZINF(-1)) D(LNCANZIR(-1)) D(LNCADNZD(-2)) D(LNCANZINF(-2)) D(LNCANZIR(-2)) D(LNCADNZD(-3)) D(LNCANZINF(-3)) D(LNCANZIR(-3)) CANZR2(-1) @THRESH NZTRXF3

Dependent Variable: D(LNCANZINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: NZTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NZTRXF3 < -0.87757371 -- 69 obs				
C	0.005439	0.026863	0.202486	0.8397
D(LNCADNZD(-1))	-1.630948	1.323843	-1.231980	0.2189
D(LNCANZINF(-1))	0.018406	0.081007	0.227215	0.8204
D(LNCANZIR(-1))	-0.971034	0.784853	-1.237218	0.2170
D(LNCADNZD(-2))	-1.069051	1.080553	-0.989356	0.3233
D(LNCANZINF(-2))	0.235783	0.105425	2.236498	0.0260
D(LNCANZIR(-2))	0.906080	0.746283	1.214124	0.2256
D(LNCADNZD(-3))	-1.217518	1.894055	-0.642811	0.5208
D(LNCANZINF(-3))	-0.040743	0.053234	-0.765353	0.4446
D(LNCANZIR(-3))	-0.310297	0.780451	-0.397587	0.6912
CANZR2(-1)	-0.376074	0.072615	-5.178993	0.0000
-0.87757371 <= NZTRXF3 -- 260 obs				

C	-0.014504	0.017767	-0.816327	0.4149
D(LNCADNZD(-1))	-0.842810	0.967498	-0.871124	0.3844
D(LNCANZINF(-1))	0.119034	0.065995	1.803691	0.0723
D(LNCANZIR(-1))	0.566657	0.387766	1.461338	0.1449
D(LNCADNZD(-2))	1.232116	0.826004	1.491658	0.1368
D(LNCANZINF(-2))	-0.101639	0.067667	-1.502051	0.1341
D(LNCANZIR(-2))	-0.701581	0.797592	-0.879625	0.3798
D(LNCADNZD(-3))	-0.168868	0.959123	-0.176065	0.8604
D(LNCANZINF(-3))	0.155714	0.112209	1.387709	0.1662
D(LNCANZIR(-3))	0.866825	0.480061	1.805657	0.0720
CANZR2(-1)	-0.055547	0.050035	-1.110152	0.2678

R-squared	0.249032	Mean dependent var	-0.002415
Adjusted R-squared	0.197663	S.D. dependent var	0.304581
S.E. of regression	0.272823	Akaike info criterion	0.304542
Sum squared resid	22.85075	Schwarz criterion	0.558382
Log likelihood	-28.09714	Hannan-Quinn criter.	0.405806
F-statistic	4.847899	Durbin-Watson stat	2.017448
Prob(F-statistic)	0.000000		

<u>Canada-Sweden:</u>

Canada Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNCASEINF) C D(LNCADSEK(-1)) D(LNCASEINF(-1)) D(LNCASEIR(-1)) D(LNCADSEK(-2)) D(LNCASEINF(-2)) D(LNCASEIR(-2)) D(LNCADSEK(-3)) D(LNCASEINF(-3)) D(LNCASEIR(-3)) CASER2(-1) @THRESH CATRXF3

Dependent Variable: D(LNCASEINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: CATRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CATRXF3 < -1.504499 -- 49 obs				
C	0.111379	0.048478	2.297526	0.0223
D(LNCADSEK(-1))	1.144945	1.044409	1.096261	0.2738
D(LNCASEINF(-1))	0.272671	0.085816	3.177389	0.0016
D(LNCASEIR(-1))	-0.190674	0.765832	-0.248976	0.8035
D(LNCADSEK(-2))	2.457471	2.058746	1.193674	0.2335
D(LNCASEINF(-2))	-0.075025	0.073735	-1.017498	0.3097
D(LNCASEIR(-2))	0.657914	0.816595	0.805680	0.4211
D(LNCADSEK(-3))	-4.429387	2.735351	-1.619312	0.1064
D(LNCASEINF(-3))	-0.179233	0.144377	-1.241422	0.2154
D(LNCASEIR(-3))	-0.033033	0.967446	-0.034145	0.9728
CASER2(-1)	-0.325332	0.118317	-2.749669	0.0063
-1.504499 <= CATRXF3 -- 280 obs				
C	-0.010200	0.015186	-0.671621	0.5023
D(LNCADSEK(-1))	0.360952	0.720584	0.500916	0.6168
D(LNCASEINF(-1))	-0.184903	0.091764	-2.014976	0.0448
D(LNCASEIR(-1))	-0.036981	0.390434	-0.094718	0.9246
D(LNCADSEK(-2))	-1.237487	0.564569	-2.191914	0.0291
D(LNCASEINF(-2))	-0.094848	0.087275	-1.086768	0.2780
D(LNCASEIR(-2))	0.231075	0.405518	0.569828	0.5692
D(LNCADSEK(-3))	0.096749	0.592782	0.163211	0.8705
D(LNCASEINF(-3))	0.135030	0.103562	1.303857	0.1933

D(LNCASEIR(-3))	0.595777	0.323368	1.842409	0.0664
CASER2(-1)	-0.144974	0.050872	-2.849798	0.0047

R-squared	0.304165	Mean dependent var	0.001490
Adjusted R-squared	0.256567	S.D. dependent var	0.273798
S.E. of regression	0.236076	Akaike info criterion	0.015201
Sum squared resid	17.10965	Schwarz criterion	0.269040
Log likelihood	19.49951	Hannan-Quinn criter.	0.116464
F-statistic	6.390308	Durbin-Watson stat	2.007322
Prob(F-statistic)	0.000000		

Sweden Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNCASEINF) C D(LNCADSEK(-1)) D(LNCASEINF(-1)) D(LNCASEIR(-1)) D(LNCADSEK(-2)) D(LNCASEINF(-2)) D(LNCASEIR(-2)) D(LNCADSEK(-3)) D(LNCASEINF(-3)) D(LNCASEIR(-3)) CASER2(-1) @THRESH SETRXF3

Dependent Variable: D(LNCASEINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: SETRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SETRXF3 < -0.1494568 -- 58 obs				
C	0.044565	0.044996	0.990421	0.3227
D(LNCADSEK(-1))	0.867840	1.122948	0.772823	0.4402
D(LNCASEINF(-1))	0.194843	0.088846	2.193035	0.0291
D(LNCASEIR(-1))	-0.599830	0.402841	-1.489000	0.1375
D(LNCADSEK(-2))	4.260507	2.519727	1.690861	0.0919
D(LNCASEINF(-2))	-0.128380	0.058969	-2.177063	0.0302
D(LNCASEIR(-2))	0.353190	0.434905	0.812109	0.4174
D(LNCADSEK(-3))	-1.738405	1.808549	-0.961215	0.3372
D(LNCASEINF(-3))	-0.249039	0.129420	-1.924278	0.0552
D(LNCASEIR(-3))	0.648819	0.744256	0.871769	0.3840
CASER2(-1)	-0.206983	0.093007	-2.225449	0.0268
-0.1494568 <= SETRXF3 -- 271 obs				
C	-0.001501	0.014212	-0.105630	0.9159
D(LNCADSEK(-1))	0.508981	0.750429	0.678253	0.4981
D(LNCASEINF(-1))	-0.215095	0.083178	-2.585955	0.0102
D(LNCASEIR(-1))	0.144844	0.437876	0.330788	0.7410
D(LNCADSEK(-2))	-1.134629	0.524606	-2.162820	0.0313
D(LNCASEINF(-2))	-0.109315	0.083452	-1.309914	0.1912
D(LNCASEIR(-2))	0.247806	0.461830	0.536575	0.5920
D(LNCADSEK(-3))	-0.118699	0.609137	-0.194864	0.8456
D(LNCASEINF(-3))	0.181503	0.101119	1.794955	0.0736
D(LNCASEIR(-3))	0.515755	0.325393	1.585020	0.1140
CASER2(-1)	-0.129171	0.051007	-2.532420	0.0118

R-squared	0.300529	Mean dependent var	0.001490
Adjusted R-squared	0.252683	S.D. dependent var	0.273798
S.E. of regression	0.236692	Akaike info criterion	0.020412
Sum squared resid	17.19905	Schwarz criterion	0.274252
Log likelihood	18.64225	Hannan-Quinn criter.	0.121676
F-statistic	6.281107	Durbin-Watson stat	1.902941
Prob(F-statistic)	0.000000		

Australia-New Zealand:

Australia Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNAUNZINF) C D(LNAUDNZD(-1)) D(LNAUNZINF(-1)) D(LNAUNZIR(-1)) D(LNAUDNZD(-2)) D(LNAUNZINF(-2)) D(LNAUNZIR(-2)) D(LNAUDNZD(-3)) D(LNAUNZINF(-3)) D(LNAUNZIR(-3)) AUNZR2(-1) @THRESH AUTRXF3

Dependent Variable: D(LNAUNZINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: AUTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AUTRXF3 < 1.005134 -- 280 obs				
C	0.003967	0.009242	0.429286	0.6680
D(LNAUDNZD(-1))	-0.799220	0.484991	-1.647909	0.1004
D(LNAUNZINF(-1))	0.077303	0.030230	2.557190	0.0110
D(LNAUNZIR(-1))	-0.037036	0.271169	-0.136581	0.8915
D(LNAUDNZD(-2))	0.920454	0.651664	1.412466	0.1588
D(LNAUNZINF(-2))	0.058299	0.022142	2.632991	0.0089
D(LNAUNZIR(-2))	0.304842	0.349748	0.871606	0.3841
D(LNAUDNZD(-3))	-0.213000	0.580910	-0.366665	0.7141
D(LNAUNZINF(-3))	-0.131606	0.120869	-1.088831	0.2771
D(LNAUNZIR(-3))	-0.657764	0.275238	-2.389804	0.0175
AUNZR2(-1)	-0.108438	0.040050	-2.707592	0.0072
1.005134 <= AUTRXF3 -- 49 obs				
C	-0.004323	0.017759	-0.243420	0.8078
D(LNAUDNZD(-1))	0.429149	0.725887	0.591207	0.5548
D(LNAUNZINF(-1))	-0.471402	0.153951	-3.062033	0.0024
D(LNAUNZIR(-1))	1.678481	0.507754	3.305697	0.0011
D(LNAUDNZD(-2))	-1.102419	0.996076	-1.106762	0.2693
D(LNAUNZINF(-2))	-0.408679	0.162585	-2.513629	0.0125
D(LNAUNZIR(-2))	0.703754	0.613038	1.147977	0.2519
D(LNAUDNZD(-3))	1.712642	0.960586	1.782914	0.0756
D(LNAUNZINF(-3))	0.091324	0.149181	0.612167	0.5409
D(LNAUNZIR(-3))	3.117943	0.611759	5.096681	0.0000
AUNZR2(-1)	-0.002780	0.065587	-0.042382	0.9662

R-squared	0.206151	Mean dependent var	-0.001338
Adjusted R-squared	0.151848	S.D. dependent var	0.167822
S.E. of regression	0.154556	Akaike info criterion	-0.831990
Sum squared resid	7.333495	Schwarz criterion	-0.578150
Log likelihood	158.8623	Hannan-Quinn criter.	-0.730726
F-statistic	3.796345	Durbin-Watson stat	1.919740
Prob(F-statistic)	0.000000		

New Zealand Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNAUNZINF) C D(LNAUDNZD(-1)) D(LNAUNZINF(-1)) D(LNAUNZIR(-1)) D(LNAUDNZD(-2)) D(LNAUNZINF(-2)) D(LNAUNZIR(-2)) D(LNAUDNZD(-3)) D(LNAUNZINF(-3)) D(LNAUNZIR(-3)) AUNZR2(-1) @THRESH NZTRXF3

Dependent Variable: D(LNAUNZINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: NZTRXF3

HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NZTRXF3 < -0.53493551 -- 119 obs				
C	-0.024623	0.021031	-1.170821	0.2426
D(LNAUDNZD(-1))	-0.958998	1.086272	-0.882834	0.3780
D(LNAUNZINF(-1))	0.100539	0.069244	1.451959	0.1475
D(LNAUNZIR(-1))	-0.369162	0.363508	-1.015554	0.3106
D(LNAUDNZD(-2))	1.166353	1.248026	0.934558	0.3508
D(LNAUNZINF(-2))	0.128343	0.040514	3.167899	0.0017
D(LNAUNZIR(-2))	0.713840	0.653978	1.091535	0.2759
D(LNAUDNZD(-3))	0.717394	1.086230	0.660444	0.5095
D(LNAUNZINF(-3))	-0.240222	0.177895	-1.350355	0.1779
D(LNAUNZIR(-3))	-0.461798	0.434046	-1.063937	0.2882
AUNZR2(-1)	-0.219539	0.062750	-3.498622	0.0005
-0.53493551 <= NZTRXF3 -- 210 obs				
C	0.009260	0.008168	1.133666	0.2578
D(LNAUDNZD(-1))	0.193080	0.479448	0.402714	0.6874
D(LNAUNZINF(-1))	0.008059	0.040385	0.199563	0.8420
D(LNAUNZIR(-1))	0.751931	0.279450	2.690754	0.0075
D(LNAUDNZD(-2))	0.593236	0.538564	1.101515	0.2715
D(LNAUNZINF(-2))	0.006865	0.029781	0.230507	0.8179
D(LNAUNZIR(-2))	0.261861	0.344108	0.760983	0.4473
D(LNAUDNZD(-3))	0.204208	0.528931	0.386078	0.6997
D(LNAUNZINF(-3))	0.130291	0.102941	1.265689	0.2066
D(LNAUNZIR(-3))	-0.012624	0.291952	-0.043241	0.9655
AUNZR2(-1)	-0.019981	0.031927	-0.625822	0.5319

R-squared	0.210219	Mean dependent var	-0.001338
Adjusted R-squared	0.156195	S.D. dependent var	0.167822
S.E. of regression	0.154160	Akaike info criterion	-0.837128
Sum squared resid	7.295908	Schwarz criterion	-0.583289
Log likelihood	159.7076	Hannan-Quinn criter.	-0.735865
F-statistic	3.891219	Durbin-Watson stat	1.903790
Prob(F-statistic)	0.000000		

Australia-Sweden:

Australia Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNAUSEINF) C D(LNAUDSEK(-1)) D(LNAUSEINF(-1)) D(LNAUSEIR(-1)) D(LNAUDSEK(-2)) D(LNAUSEINF(-2)) D(LNAUSEIR(-2)) D(LNAUDSEK(-3)) D(LNAUSEINF(-3)) D(LNAUSEIR(-3)) AUSER2(-1) @THRESH AUTRXF3

Dependent Variable: D(LNAUSEINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: AUTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AUTRXF3 < -0.48611491 -- 104 obs				
C	0.060619	0.022666	2.674423	0.0079
D(LNAUDSEK(-1))	1.508122	1.060721	1.421789	0.1561
D(LNAUSEINF(-1))	-0.122791	0.118610	-1.035246	0.3014
D(LNAUSEIR(-1))	1.444425	0.784923	1.840213	0.0667

D(LNAUDSEK(-2))	1.903171	1.430996	1.329962	0.1845
D(LNAUSEINF(-2))	0.131346	0.099053	1.326014	0.1858
D(LNAUSEIR(-2))	0.697767	0.853953	0.817102	0.4145
D(LNAUDSEK(-3))	-1.376363	1.338206	-1.028513	0.3045
D(LNAUSEINF(-3))	-0.213031	0.100982	-2.109590	0.0357
D(LNAUSEIR(-3))	1.605830	0.776243	2.068720	0.0394
AUSER2(-1)	-0.100032	0.078233	-1.278641	0.2020
-0.48611491 <= AUTRXF3 -- 225 obs				
C	-0.021402	0.016644	-1.285836	0.1995
D(LNAUDSEK(-1))	0.657870	0.689990	0.953449	0.3411
D(LNAUSEINF(-1))	0.043680	0.068666	0.636124	0.5252
D(LNAUSEIR(-1))	-0.277186	0.256131	-1.082204	0.2800
D(LNAUDSEK(-2))	-0.558836	0.556838	-1.003589	0.3164
D(LNAUSEINF(-2))	-0.010092	0.152624	-0.066122	0.9473
D(LNAUSEIR(-2))	0.118279	0.261977	0.451486	0.6520
D(LNAUDSEK(-3))	0.781439	0.892942	0.875128	0.3822
D(LNAUSEINF(-3))	0.303561	0.130921	2.318652	0.0211
D(LNAUSEIR(-3))	0.608234	0.377614	1.610732	0.1083
AUSER2(-1)	-0.186623	0.047854	-3.899815	0.0001

R-squared	0.293700	Mean dependent var	0.002566
Adjusted R-squared	0.245386	S.D. dependent var	0.255394
S.E. of regression	0.221857	Akaike info criterion	-0.109038
Sum squared resid	15.11071	Schwarz criterion	0.144802
Log likelihood	39.93676	Hannan-Quinn criter.	-0.007774
F-statistic	6.079016	Durbin-Watson stat	1.920179
Prob(F-statistic)	0.000000		

Sweden Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNAUSEINF) C D(LNAUDSEK(-1)) D(LNAUSEINF(-1)) D(LNAUSEIR(-1)) D(LNAUDSEK(-2)) D(LNAUSEINF(-2)) D(LNAUSEIR(-2)) D(LNAUDSEK(-3)) D(LNAUSEINF(-3)) D(LNAUSEIR(-3)) AUSER2(-1) @THRESH SETRXF3

Dependent Variable: D(LNAUSEINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: SETRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SETRXF3 < -0.1638815 -- 52 obs				
C	-0.004031	0.041813	-0.096402	0.9233
D(LNAUDSEK(-1))	2.278704	1.436523	1.586263	0.1137
D(LNAUSEINF(-1))	0.093738	0.104790	0.894531	0.3717
D(LNAUSEIR(-1))	0.377199	0.758323	0.497413	0.6193
D(LNAUDSEK(-2))	0.061001	1.355875	0.044990	0.9641
D(LNAUSEINF(-2))	-0.336030	0.134440	-2.499486	0.0130
D(LNAUSEIR(-2))	0.035945	0.476248	0.075475	0.9399
D(LNAUDSEK(-3))	3.497415	1.460084	2.395352	0.0172
D(LNAUSEINF(-3))	0.382396	0.129306	2.957303	0.0033
D(LNAUSEIR(-3))	1.832094	0.658412	2.782596	0.0057
AUSER2(-1)	-0.310269	0.063560	-4.881523	0.0000
-0.1638815 <= SETRXF3 -- 277 obs				
C	0.020705	0.013701	1.511242	0.1318

D(LNAUDSEK(-1))	0.461343	0.586752	0.786266	0.4323
D(LNAUSEINF(-1))	-0.058833	0.057764	-1.018509	0.3092
D(LNAUSEIR(-1))	0.178497	0.307999	0.579539	0.5627
D(LNAUDSEK(-2))	0.141547	0.869128	0.162861	0.8707
D(LNAUSEINF(-2))	0.107270	0.066371	1.616210	0.1071
D(LNAUSEIR(-2))	0.322889	0.663418	0.486704	0.6268
D(LNAUDSEK(-3))	-0.529695	0.971829	-0.545049	0.5861
D(LNAUSEINF(-3))	-0.199423	0.106645	-1.869965	0.0624
D(LNAUSEIR(-3))	1.044036	0.419141	2.490894	0.0133
AUSER2(-1)	-0.066541	0.038796	-1.715149	0.0873

R-squared	0.307848	Mean dependent var	0.002566
Adjusted R-squared	0.260502	S.D. dependent var	0.255394
S.E. of regression	0.219624	Akaike info criterion	-0.129272
Sum squared resid	14.80803	Schwarz criterion	0.124567
Log likelihood	43.26531	Hannan-Quinn criter.	-0.028008
F-statistic	6.502094	Durbin-Watson stat	1.987710
Prob(F-statistic)	0.000000		

New Zealand-Sweden:

New Zealand Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNNZSEINF) C D(LNNZDSEK(-1)) D(LNNZSEINF(-1)) D(LNNZSEIR(-1)) D(LNNZDSEK(-2)) D(LNNZSEINF(-2)) D(LNNZSEIR(-2)) D(LNNZDSEK(-3)) D(LNNZSEINF(-3)) D(LNNZSEIR(-3)) NZSER2(-1) @THRESH NZTRXF3

Dependent Variable: D(LNNZSEINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: NZTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NZTRXF3 < -1.234314 -- 50 obs				
C	0.056063	0.049865	1.124305	0.2618
D(LNNZDSEK(-1))	1.000996	2.172916	0.460670	0.6454
D(LNNZSEINF(-1))	0.125319	0.138020	0.907978	0.3646
D(LNNZSEIR(-1))	0.595854	0.594467	1.002334	0.3170
D(LNNZDSEK(-2))	1.296256	1.287319	1.006942	0.3148
D(LNNZSEINF(-2))	-0.133809	0.091829	-1.457156	0.1461
D(LNNZSEIR(-2))	-0.470098	0.775715	-0.606018	0.5450
D(LNNZDSEK(-3))	-3.069593	3.060034	-1.003124	0.3166
D(LNNZSEINF(-3))	-0.149182	0.167377	-0.891294	0.3735
D(LNNZSEIR(-3))	0.769460	1.361019	0.565356	0.5722
NZSER2(-1)	-0.193579	0.092764	-2.086793	0.0377
-1.234314 <= NZTRXF3 -- 279 obs				
C	-0.000315	0.010797	-0.029150	0.9768
D(LNNZDSEK(-1))	-0.305070	0.464029	-0.657437	0.5114
D(LNNZSEINF(-1))	0.054019	0.053786	1.004338	0.3160
D(LNNZSEIR(-1))	-0.254462	0.230858	-1.102245	0.2712
D(LNNZDSEK(-2))	0.492294	0.484218	1.016678	0.3101
D(LNNZSEINF(-2))	0.149201	0.077033	1.936838	0.0537
D(LNNZSEIR(-2))	0.162689	0.238289	0.682739	0.4953
D(LNNZDSEK(-3))	0.503449	0.490886	1.025592	0.3059
D(LNNZSEINF(-3))	0.166141	0.070701	2.349918	0.0194
D(LNNZSEIR(-3))	0.569792	0.247471	2.302462	0.0220
NZSER2(-1)	-0.102338	0.034941	-2.928842	0.0037

R-squared	0.194531	Mean dependent var	0.003904
Adjusted R-squared	0.139434	S.D. dependent var	0.233874
S.E. of regression	0.216957	Akaike info criterion	-0.153708
Sum squared resid	14.45057	Schwarz criterion	0.100131
Log likelihood	47.28501	Hannan-Quinn criter.	-0.052444
F-statistic	3.530686	Durbin-Watson stat	2.003571
Prob(F-statistic)	0.000001		

Sweden Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNNZSEINF) C D(LNNZDSEK(-1)) D(LNNZSEINF(-1)) D(LNNZSEIR(-1)) D(LNNZDSEK(-2)) D(LNNZSEINF(-2)) D(LNNZSEIR(-2)) D(LNNZDSEK(-3)) D(LNNZSEINF(-3)) D(LNNZSEIR(-3)) NZSER2(-1) @THRESH SETRXF3

Dependent Variable: D(LNNZSEINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: SETRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SETRXF3 < -0.15887301 -- 53 obs				
C	0.066644	0.031282	2.130412	0.0339
D(LNNZDSEK(-1))	1.450386	1.043837	1.389476	0.1657
D(LNNZSEINF(-1))	0.464885	0.121454	3.827663	0.0002
D(LNNZSEIR(-1))	-0.499952	0.510586	-0.979173	0.3283
D(LNNZDSEK(-2))	1.505023	1.368552	1.099720	0.2723
D(LNNZSEINF(-2))	-0.118328	0.097823	-1.209613	0.2274
D(LNNZSEIR(-2))	0.031007	0.328265	0.094457	0.9248
D(LNNZDSEK(-3))	1.550299	0.868022	1.786013	0.0751
D(LNNZSEINF(-3))	0.141023	0.063161	2.232751	0.0263
D(LNNZSEIR(-3))	0.640550	0.429722	1.490616	0.1371
NZSER2(-1)	-0.276998	0.071832	-3.856175	0.0001
-0.15887301 <= SETRXF3 -- 276 obs				
C	0.017438	0.014085	1.238094	0.2166
D(LNNZDSEK(-1))	-0.575136	0.504288	-1.140490	0.2550
D(LNNZSEINF(-1))	-0.096686	0.099963	-0.967215	0.3342
D(LNNZSEIR(-1))	-0.317501	0.191877	-1.654711	0.0990
D(LNNZDSEK(-2))	0.146175	0.419059	0.348817	0.7275
D(LNNZSEINF(-2))	0.091814	0.071569	1.282875	0.2005
D(LNNZSEIR(-2))	0.040012	0.274864	0.145570	0.8844
D(LNNZDSEK(-3))	-0.433268	0.784145	-0.552535	0.5810
D(LNNZSEINF(-3))	0.082819	0.092867	0.891801	0.3732
D(LNNZSEIR(-3))	0.579800	0.323085	1.794574	0.0737
NZSER2(-1)	-0.039057	0.054513	-0.716468	0.4742

R-squared	0.238672	Mean dependent var	0.003904
Adjusted R-squared	0.186594	S.D. dependent var	0.233874
S.E. of regression	0.210928	Akaike info criterion	-0.210069
Sum squared resid	13.65866	Schwarz criterion	0.043771
Log likelihood	56.55628	Hannan-Quinn criter.	-0.108805
F-statistic	4.582986	Durbin-Watson stat	1.974075
Prob(F-statistic)	0.000000		

US-Euro Area:

US Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUSEUINF) C D(LNUSDEUR(-1)) D(LNUSEUINF(-1)) D(LNUSEUIR(-1)) D(LNUSDEUR(-2)) D(LNUSEUINF(-2)) D(LNUSEUIR(-2)) D(LNUSDEUR(-3)) D(LNUSEUINF(-3)) D(LNUSEUIR(-3)) USEUR2(-1) @THRESH USTRXF3

Dependent Variable: D(LNUSEUINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: USTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
USTRXF3 < -0.14726531 -- 160 obs				
C	-0.003635	0.008724	-0.416648	0.6772
D(LNUSDEUR(-1))	0.523000	0.388278	1.346973	0.1790
D(LNUSEUINF(-1))	-0.211907	0.102172	-2.074025	0.0389
D(LNUSEUIR(-1))	-0.089804	0.070102	-1.281052	0.2011
D(LNUSDEUR(-2))	-0.058972	0.292833	-0.201384	0.8405
D(LNUSEUINF(-2))	0.255187	0.073772	3.459108	0.0006
D(LNUSEUIR(-2))	0.005029	0.358042	0.014044	0.9888
D(LNUSDEUR(-3))	-0.351621	0.457278	-0.768943	0.4425
D(LNUSEUINF(-3))	0.172292	0.119842	1.437660	0.1515
D(LNUSEUIR(-3))	0.199554	0.304745	0.654823	0.5131
USEUR2(-1)	-0.068943	0.051301	-1.343909	0.1800
-0.14726531 <= USTRXF3 -- 169 obs				
C	0.016991	0.012080	1.406585	0.1606
D(LNUSDEUR(-1))	1.667147	0.517404	3.222134	0.0014
D(LNUSEUINF(-1))	-0.291726	0.145095	-2.010583	0.0452
D(LNUSEUIR(-1))	0.475349	0.225006	2.112609	0.0354
D(LNUSDEUR(-2))	1.523185	0.544050	2.799714	0.0054
D(LNUSEUINF(-2))	0.033316	0.107908	0.308743	0.7577
D(LNUSEUIR(-2))	0.008177	0.083786	0.097592	0.9223
D(LNUSDEUR(-3))	0.077695	0.381932	0.203427	0.8389
D(LNUSEUINF(-3))	-0.142849	0.109473	-1.304873	0.1929
D(LNUSEUIR(-3))	0.223607	0.081140	2.755825	0.0062
USEUR2(-1)	-0.077123	0.076728	-1.005147	0.3156

R-squared	0.243934	Mean dependent var	0.004478
Adjusted R-squared	0.192216	S.D. dependent var	0.138025
S.E. of regression	0.124053	Akaike info criterion	-1.271694
Sum squared resid	4.724438	Schwarz criterion	-1.017854
Log likelihood	231.1936	Hannan-Quinn criter.	-1.170430
F-statistic	4.716619	Durbin-Watson stat	1.940410
Prob(F-statistic)	0.000000		

Euro Area Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUSEUINF) C D(LNUSDEUR(-1)) D(LNUSEUINF(-1)) D(LNUSEUIR(-1)) D(LNUSDEUR(-2)) D(LNUSEUINF(-2)) D(LNUSEUIR(-2)) D(LNUSDEUR(-3)) D(LNUSEUINF(-3)) D(LNUSEUIR(-3)) USEUR2(-1) @THRESH EUTRXF3

Dependent Variable: D(LNUSEUINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: EUTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EUTRXF3 < 0.88179819 -- 268 obs				

C	-0.002679	0.008241	-0.325037	0.7454
D(LNUSDEUR(-1))	1.059945	0.311092	3.407169	0.0007
D(LNUSEUINF(-1))	-0.285440	0.126051	-2.264471	0.0242
D(LNUSEUIR(-1))	-0.110501	0.227401	-0.485933	0.6274
D(LNUSDEUR(-2))	0.342456	0.375742	0.911413	0.3628
D(LNUSEUINF(-2))	0.143091	0.089419	1.600222	0.1106
D(LNUSEUIR(-2))	0.079924	0.264857	0.301765	0.7630
D(LNUSDEUR(-3))	-0.010380	0.310038	-0.033480	0.9733
D(LNUSEUINF(-3))	-0.030285	0.095209	-0.318089	0.7506
D(LNUSEUIR(-3))	0.268114	0.251475	1.066167	0.2872
USEUR2(-1)	-0.101494	0.044679	-2.271641	0.0238
0.88179819 <= EUTRXF3 -- 61 obs				
C	0.040982	0.023635	1.733975	0.0839
D(LNUSDEUR(-1))	1.064202	0.525451	2.025311	0.0437
D(LNUSEUINF(-1))	-0.379579	0.233898	-1.622839	0.1057
D(LNUSEUIR(-1))	0.126771	0.113881	1.113185	0.2665
D(LNUSDEUR(-2))	1.706317	0.601206	2.838157	0.0048
D(LNUSEUINF(-2))	-0.346463	0.221517	-1.564048	0.1188
D(LNUSEUIR(-2))	0.045337	0.114451	0.396127	0.6923
D(LNUSDEUR(-3))	-0.022315	0.500994	-0.044541	0.9645
D(LNUSEUINF(-3))	-0.138917	0.118708	-1.170240	0.2428
D(LNUSEUIR(-3))	0.218781	0.072817	3.004541	0.0029
USEUR2(-1)	0.332927	0.179028	1.859639	0.0639

R-squared	0.248871	Mean dependent var	0.004478
Adjusted R-squared	0.197491	S.D. dependent var	0.138025
S.E. of regression	0.123647	Akaike info criterion	-1.278245
Sum squared resid	4.693587	Schwarz criterion	-1.024405
Log likelihood	232.2713	Hannan-Quinn criter.	-1.176981
F-statistic	4.843710	Durbin-Watson stat	1.966464
Prob(F-statistic)	0.000000		

US-Switzerland:

US Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUSCHINF) C D(LNUSDCHF(-1)) D(LNUSCHINF(-1)) D(LNUSCHIR(-1)) D(LNUSDCHF(-2)) D(LNUSCHINF(-2)) D(LNUSCHIR(-2)) D(LNUSDCHF(-3)) D(LNUSCHINF(-3)) D(LNUSCHIR(-3)) USCHR2(-1) @THRESH USTRXF3

Dependent Variable: D(LNUSCHINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: USTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
USTRXF3 < 0.20329709 -- 182 obs				
C	0.006106	0.011730	0.520550	0.6031
D(LNUSDCHF(-1))	0.092955	0.635491	0.146273	0.8838
D(LNUSCHINF(-1))	0.139196	0.094197	1.477711	0.1405
D(LNUSCHIR(-1))	-0.686077	0.192443	-3.565085	0.0004
D(LNUSDCHF(-2))	-0.732405	0.488274	-1.499988	0.1346
D(LNUSCHINF(-2))	0.214801	0.129036	1.664657	0.0970
D(LNUSCHIR(-2))	0.136294	0.104914	1.299097	0.1949
D(LNUSDCHF(-3))	0.559980	0.561297	0.997654	0.3192
D(LNUSCHINF(-3))	-0.078120	0.074877	-1.043319	0.2976

D(LNUSCHIR(-3))	-0.215301	0.222670	-0.966906	0.3344
USCHR2(-1)	-0.097182	0.043227	-2.248150	0.0253
0.20329709 <= USTRXF3 -- 147 obs				
C	-0.003194	0.011373	-0.280845	0.7790
D(LNUSDCHF(-1))	-0.228442	0.394277	-0.579396	0.5627
D(LNUSCHINF(-1))	-0.017655	0.131480	-0.134282	0.8933
D(LNUSCHIR(-1))	0.165338	0.060984	2.711161	0.0071
D(LNUSDCHF(-2))	0.745346	0.438315	1.700482	0.0901
D(LNUSCHINF(-2))	-0.043426	0.102993	-0.421635	0.6736
D(LNUSCHIR(-2))	-0.066446	0.062066	-1.070567	0.2852
D(LNUSDCHF(-3))	-0.107703	0.477173	-0.225710	0.8216
D(LNUSCHINF(-3))	0.109398	0.193627	0.564994	0.5725
D(LNUSCHIR(-3))	0.328465	0.057381	5.724236	0.0000
USCHR2(-1)	-0.087008	0.042008	-2.071248	0.0392

R-squared	0.271469	Mean dependent var	0.005071
Adjusted R-squared	0.221634	S.D. dependent var	0.183465
S.E. of regression	0.161862	Akaike info criterion	-0.739614
Sum squared resid	8.043212	Schwarz criterion	-0.485774
Log likelihood	143.6664	Hannan-Quinn criter.	-0.638350
F-statistic	5.447414	Durbin-Watson stat	1.983594
Prob(F-statistic)	0.000000		

Switzerland Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNUSCHINF) C D(LNUSDCHF(-1)) D(LNUSCHINF(-1)) D(LNUSCHIR(-1)) D(LNUSDCHF(-2)) D(LNUSCHINF(-2)) D(LNUSCHIR(-2)) D(LNUSDCHF(-3)) D(LNUSCHINF(-3)) D(LNUSCHIR(-3)) USCHR2(-1) @THRESH CHTRF3

Dependent Variable: D(LNUSCHINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: CHTRF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CHTRF3 < 1.075548 -- 279 obs				
C	-0.013269	0.008862	-1.497255	0.1354
D(LNUSDCHF(-1))	0.259661	0.410124	0.633128	0.5271
D(LNUSCHINF(-1))	-0.035088	0.068520	-0.512088	0.6090
D(LNUSCHIR(-1))	-0.436439	0.190312	-2.293287	0.0225
D(LNUSDCHF(-2))	0.068251	0.408290	0.167163	0.8674
D(LNUSCHINF(-2))	0.177791	0.100388	1.771027	0.0775
D(LNUSCHIR(-2))	0.010376	0.148282	0.069975	0.9443
D(LNUSDCHF(-3))	0.285503	0.398340	0.716732	0.4741
D(LNUSCHINF(-3))	-0.018841	0.062096	-0.303410	0.7618
D(LNUSCHIR(-3))	0.148546	0.205571	0.722599	0.4705
USCHR2(-1)	-0.130636	0.035677	-3.661631	0.0003
1.075548 <= CHTRF3 -- 50 obs				
C	0.092927	0.046743	1.988020	0.0477
D(LNUSDCHF(-1))	-0.474679	1.395191	-0.340225	0.7339
D(LNUSCHINF(-1))	0.046545	0.164273	0.283338	0.7771
D(LNUSCHIR(-1))	0.235366	0.031148	7.556371	0.0000
D(LNUSDCHF(-2))	0.969553	1.228052	0.789505	0.4304
D(LNUSCHINF(-2))	-0.417460	0.278662	-1.498088	0.1351
D(LNUSCHIR(-2))	-0.101448	0.060908	-1.665597	0.0968
D(LNUSDCHF(-3))	1.717758	1.603135	1.071499	0.2848
D(LNUSCHINF(-3))	-0.291607	0.254315	-1.146635	0.2524
D(LNUSCHIR(-3))	0.297830	0.073567	4.048395	0.0001

USCHR2(-1)	0.124078	0.097530	1.272209	0.2043

R-squared	0.272891	Mean dependent var	0.005071
Adjusted R-squared	0.223154	S.D. dependent var	0.183465
S.E. of regression	0.161704	Akaike info criterion	-0.741568
Sum squared resid	8.027510	Schwarz criterion	-0.487728
Log likelihood	143.9879	Hannan-Quinn criter.	-0.640304
F-statistic	5.486666	Durbin-Watson stat	2.004266
Prob(F-statistic)	0.000000		

Euro Area-Switzerland:

Euro Area Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNEUCHINF) C D(LNEURCHF(-1)) D(LNEUCHINF(-1)) D(LNEUCHIR(-1)) D(LNEURCHF(-2)) D(LNEUCHINF(-2)) D(LNEUCHIR(-2)) D(LNEURCHF(-3)) D(LNEUCHINF(-3)) D(LNEUCHIR(-3)) EUCHR2(-1) @THRESH EUTRXF3

Dependent Variable: D(LNEUCHINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: EUTRXF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EUTRXF3 < 0.6663971 -- 257 obs				
C	-0.002553	0.012082	-0.211306	0.8328
D(LNEURCHF(-1))	-0.298318	1.096519	-0.272059	0.7858
D(LNEUCHINF(-1))	-0.267828	0.091699	-2.920732	0.0038
D(LNEUCHIR(-1))	0.248492	0.126855	1.958871	0.0510
D(LNEURCHF(-2))	0.508504	1.070964	0.474810	0.6353
D(LNEUCHINF(-2))	0.247155	0.087441	2.826517	0.0050
D(LNEUCHIR(-2))	0.327333	0.110609	2.959363	0.0033
D(LNEURCHF(-3))	1.492529	1.033258	1.444488	0.1496
D(LNEUCHINF(-3))	0.102243	0.076788	1.331495	0.1840
D(LNEUCHIR(-3))	0.267861	0.092792	2.886690	0.0042
EUCHR2(-1)	-0.092899	0.042300	-2.196187	0.0288
0.6663971 <= EUTRXF3 -- 72 obs				
C	0.003563	0.019121	0.186335	0.8523
D(LNEURCHF(-1))	1.173566	1.847554	0.635200	0.5258
D(LNEUCHINF(-1))	0.341742	0.109656	3.116497	0.0020
D(LNEUCHIR(-1))	-0.513598	0.342730	-1.498550	0.1350
D(LNEURCHF(-2))	-0.402938	2.549077	-0.158072	0.8745
D(LNEUCHINF(-2))	0.058101	0.196776	0.295262	0.7680
D(LNEUCHIR(-2))	0.094665	0.586054	0.161529	0.8718
D(LNEURCHF(-3))	1.170134	2.527637	0.462936	0.6437
D(LNEUCHINF(-3))	-0.006186	0.164612	-0.037579	0.9700
D(LNEUCHIR(-3))	-0.737007	0.554882	-1.328222	0.1851
EUCHR2(-1)	-0.142046	0.091232	-1.556967	0.1205

R-squared	0.302480	Mean dependent var	0.000593
Adjusted R-squared	0.254767	S.D. dependent var	0.223383
S.E. of regression	0.192840	Akaike info criterion	-0.389385
Sum squared resid	11.41647	Schwarz criterion	-0.135545
Log likelihood	86.05386	Hannan-Quinn criter.	-0.288121
F-statistic	6.339561	Durbin-Watson stat	2.111088

Prob(F-statistic)	0.000000

Switzerland Taylor Rule Deviations:

THRESHOLD(COV=HAC, METHOD=FIXEDSEQ) D(LNEUCHINF) C D(LNEURCHF(-1)) D(LNEUCHINF(-1)) D(LNEUCHIR(-1)) D(LNEURCHF(-2)) D(LNEUCHINF(-2)) D(LNEUCHIR(-2)) D(LNEURCHF(-3)) D(LNEUCHINF(-3)) D(LNEUCHIR(-3)) EUCHR2(-1) @THRESH CHTRF3

Dependent Variable: D(LNEUCHINF)
Sample (adjusted): 1993M01 2020M12
Threshold variable: CHTRF3
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 6.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CHTRF3 < 0.6912787 -- 241 obs				
C	-0.044500	0.015534	-2.864751	0.0045
D(LNEURCHF(-1))	0.342080	0.882805	0.387492	0.6987
D(LNEUCHINF(-1))	-0.056346	0.070909	-0.794630	0.4274
D(LNEUCHIR(-1))	0.040005	0.127096	0.314760	0.7532
D(LNEURCHF(-2))	-0.102936	1.014306	-0.101484	0.9192
D(LNEUCHINF(-2))	0.236068	0.176260	1.339316	0.1815
D(LNEUCHIR(-2))	0.221039	0.162747	1.358174	0.1754
D(LNEURCHF(-3))	0.900853	0.817539	1.101908	0.2714
D(LNEUCHINF(-3))	-0.048389	0.105893	-0.456958	0.6480
D(LNEUCHIR(-3))	-0.115153	0.186251	-0.618267	0.5369
EUCHR2(-1)	-0.245628	0.052080	-4.716325	0.0000
0.6912787 <= CHTRF3 -- 88 obs				
C	0.045362	0.036169	1.254185	0.2107
D(LNEURCHF(-1))	0.562832	2.747645	0.204842	0.8378
D(LNEUCHINF(-1))	0.047962	0.135855	0.353036	0.7243
D(LNEUCHIR(-1))	0.225183	0.243560	0.924548	0.3559
D(LNEURCHF(-2))	0.275630	1.804211	0.152770	0.8787
D(LNEUCHINF(-2))	0.227107	0.158838	1.429802	0.1538
D(LNEUCHIR(-2))	0.183861	0.193921	0.948122	0.3438
D(LNEURCHF(-3))	2.068213	1.439484	1.436775	0.1518
D(LNEUCHINF(-3))	-0.006397	0.134633	-0.047514	0.9621
D(LNEUCHIR(-3))	0.166502	0.117252	1.420041	0.1566
EUCHR2(-1)	-0.067087	0.065820	-1.019256	0.3089

R-squared	0.260521	Mean dependent var	0.000593
Adjusted R-squared	0.209938	S.D. dependent var	0.223383
S.E. of regression	0.198555	Akaike info criterion	-0.330971
Sum squared resid	12.10322	Schwarz criterion	-0.077131
Log likelihood	76.44467	Hannan-Quinn criter.	-0.229707
F-statistic	5.150346	Durbin-Watson stat	2.021277
Prob(F-statistic)	0.000000		

Breusch-Godfrey Test for Serial Correlation

UK-Canada with UK Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.776533	Prob. F(3,304)	0.5097
Obs*R-squared	2.502005	Prob. Chi-Square(3)	0.4749

UK-Canada with Canada Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.726131	Prob. F(3,304)	0.7554
Obs*R-squared	5.510382	Prob. Chi-Square(3)	0.6380

UK-Australia with UK Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.316603	Prob. F(3,304)	0.1933
Obs*R-squared	1.668753	Prob. Chi-Square(3)	0.6439

UK-Australia with Australia Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	1.151783	Prob. F(3,304)	0.4888
Obs*R-squared	5.590880	Prob. Chi-Square(3)	0.1333

UK-New Zealand with UK Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	2.057425	Prob. F(3,304)	0.0624
Obs*R-squared	3.334086	Prob. Chi-Square(3)	0.3429

UK-New Zealand with New Zealand Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.716732	Prob. F(2,305)	0.8720
Obs*R-squared	2.519216	Prob. Chi-Square(2)	0.2838

UK-Sweden with UK Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.868529	Prob. F(3,304)	0.3121
Obs*R-squared	9.578021	Prob. Chi-Square(3)	0.0225

UK-Sweden with Sweden Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.359278	Prob. F(3,304)	0.1047
Obs*R-squared	2.126650	Prob. Chi-Square(3)	0.5465

Canada-Australia with Canada Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.776855	Prob. F(3,304)	0.3476
Obs*R-squared	4.726042	Prob. Chi-Square(3)	0.1930

Canada-Australia with Australia Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	1.058124	Prob. F(3,304)	0.6826
Obs*R-squared	0.835926	Prob. Chi-Square(3)	0.8409

Canada-New Zealand with Canada Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.945527	Prob. F(3,304)	0.4125
Obs*R-squared	3.041472	Prob. Chi-Square(3)	0.3853

Canada-New Zealand with New Zealand Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	1.038829	Prob. F(3,304)	0.3252
Obs*R-squared	3.338553	Prob. Chi-Square(3)	0.3423

Canada-Sweden with Canada Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.776533	Prob. F(3,304)	0.5078
Obs*R-squared	2.502005	Prob. Chi-Square(3)	0.4749

Canada-Sweden with Sweden Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.381956	Prob. F(3,304)	0.9002
Obs*R-squared	6.452780	Prob. Chi-Square(3)	0.9990

Australia-New Zealand with Australia Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	1.843594	Prob. F(3,304)	0.1392
Obs*R-squared	5.878662	Prob. Chi-Square(3)	0.1177

Australia-New Zealand with New Zealand Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.934232	Prob. F(3,304)	0.7432
Obs*R-squared	18.65811	Prob. Chi-Square(3)	0.6553

Australia-Sweden with Australia Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	2.101042	Prob. F(3,304)	0.1001
Obs*R-squared	6.682912	Prob. Chi-Square(3)	0.0827

Australia-Sweden with Sweden Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.159153	Prob. F(3,304)	0.9237
Obs*R-squared	0.515915	Prob. Chi-Square(3)	0.9154

New Zealand-Sweden with New Zealand Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.245779	Prob. F(3,304)	0.8747
Obs*R-squared	15.25016	Prob. Chi-Square(3)	0.8102

New Zealand-Sweden with Sweden Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	1.075899	Prob. F(3,304)	0.3778
Obs*R-squared	22.56918	Prob. Chi-Square(3)	0.3563

US-Euro Area with US Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.229580	Prob. F(3,304)	0.8456
Obs*R-squared	6.168465	Prob. Chi-Square(3)	0.9993

US-Euro Area with Euro-Area Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.965746	Prob. F(3,304)	0.4092
Obs*R-squared	3.105897	Prob. Chi-Square(3)	0.3756

US-Switzerland with US Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.813478	Prob. F(3,304)	0.4872
Obs*R-squared	2.620094	Prob. Chi-Square(3)	0.4540

US-Switzerland with Switzerland Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	2.056046	Prob. F(3,304)	0.1998
Obs*R-squared	5.658487	Prob. Chi-Square(3)	0.1477

Euro Area-Switzerland with Euro-Area Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.495583	Prob. F(3,304)	0.9009
Obs*R-squared	12.123656	Prob. Chi-Square(3)	0.9763

Euro Area-Switzerland with Switzerland Taylor Rule:

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.889253	Prob. F(3,304)	0.4470
Obs*R-squared	2.862031	Prob. Chi-Square(3)	0.4134

Breusch-Pagan Test for Heteroscedasticity

UK-Canada with UK Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.336220	Prob. F(21,307)	0.1497
Obs*R-squared	27.55306	Prob. Chi-Square(21)	0.1533
Scaled explained SS	32.78375	Prob. Chi-Square(21)	0.0847

UK-Canada with Canada Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.271665	Prob. F(21,307)	0.1924
Obs*R-squared	26.76020	Prob. Chi-Square(21)	0.2084

Scaled explained SS	30.39441	Prob. Chi-Square(21)	0.0752

UK-Australia with UK Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.232836	Prob. F(21,307)	0.2215
Obs*R-squared	25.58705	Prob. Chi-Square(21)	0.2226
Scaled explained SS	29.87290	Prob. Chi-Square(21)	0.0946

UK-Australia with Australia Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.897391	Prob. F(21,307)	0.5948
Obs*R-squared	19.02767	Prob. Chi-Square(21)	0.5834
Scaled explained SS	29.90404	Prob. Chi-Square(21)	0.0939

UK-New Zealand with UK Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.034652	Prob. F(21,307)	0.4208
Obs*R-squared	21.74568	Prob. Chi-Square(21)	0.4143
Scaled explained SS	22.44622	Prob. Chi-Square(21)	0.3742

UK-New Zealand with New Zealand Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.725414	Prob. F(21,307)	0.8064
Obs*R-squared	15.55356	Prob. Chi-Square(21)	0.7942
Scaled explained SS	16.26437	Prob. Chi-Square(21)	0.7546

UK-Sweden with UK Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.390631	Prob. F(21,307)	0.1202
Obs*R-squared	28.57757	Prob. Chi-Square(21)	0.1245
Scaled explained SS	27.34546	Prob. Chi-Square(21)	0.1597

UK-Sweden with Sweden Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	2.325702	Prob. F(21,307)	0.0010
Obs*R-squared	45.15592	Prob. Chi-Square(21)	0.0017
Scaled explained SS	40.72781	Prob. Chi-Square(21)	0.0061

Canada-Australia with Canada Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.917309	Prob. F(21,307)	0.5688
Obs*R-squared	19.42506	Prob. Chi-Square(21)	0.5579
Scaled explained SS	19.78608	Prob. Chi-Square(21)	0.5348

Canada-Australia with Australia Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.973516	Prob. F(21,307)	0.4962
Obs*R-squared	20.54100	Prob. Chi-Square(21)	0.4873
Scaled explained SS	21.32618	Prob. Chi-Square(21)	0.4392

Canada-New Zealand with Canada Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.752213	Prob. F(21,307)	0.7766
Obs*R-squared	16.10005	Prob. Chi-Square(21)	0.7640
Scaled explained SS	17.12184	Prob. Chi-Square(21)	0.7037

Canada-New Zealand with New Zealand Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.579971	Prob. F(21,307)	0.9309
Obs*R-squared	12.55413	Prob. Chi-Square(21)	0.9234
Scaled explained SS	13.60752	Prob. Chi-Square(21)	0.8859

Canada-Sweden with Canada Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.077744	Prob. F(21,307)	0.3709
Obs*R-squared	22.58918	Prob. Chi-Square(21)	0.3663
Scaled explained SS	18.99189	Prob. Chi-Square(21)	0.5857

Canada-Sweden with Sweden Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.278939	Prob. F(21,307)	0.9994
Obs*R-squared	6.159965	Prob. Chi-Square(21)	0.9993
Scaled explained SS	5.566717	Prob. Chi-Square(21)	0.9997

Australia-New Zealand with Australia Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.856648	Prob. F(21,307)	0.6479
Obs*R-squared	18.21160	Prob. Chi-Square(21)	0.6356

Scaled explained SS	15.25016	Prob. Chi-Square(21)	0.8102

Australia-New Zealand with New Zealand Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.319101	Prob. F(21,307)	0.9984
Obs*R-squared	7.027928	Prob. Chi-Square(21)	0.9981
Scaled explained SS	6.452780	Prob. Chi-Square(21)	0.9990

Australia-Sweden with Australia Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.459238	Prob. F(21,307)	0.9815
Obs*R-squared	10.02033	Prob. Chi-Square(21)	0.9786
Scaled explained SS	9.487784	Prob. Chi-Square(21)	0.9848

Australia-Sweden with Sweden Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.757308	Prob. F(21,307)	0.7708
Obs*R-squared	16.20374	Prob. Chi-Square(21)	0.7581
Scaled explained SS	14.50386	Prob. Chi-Square(21)	0.8470

New Zealand-Sweden with New Zealand Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.661012	Prob. F(21,307)	0.8699
Obs*R-squared	14.23248	Prob. Chi-Square(21)	0.8594
Scaled explained SS	13.08073	Prob. Chi-Square(21)	0.9058

New Zealand-Sweden with Sweden Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.693502	Prob. F(21,307)	0.8394
Obs*R-squared	14.90034	Prob. Chi-Square(21)	0.8279
Scaled explained SS	14.61048	Prob. Chi-Square(21)	0.8420

US-Euro Area with US Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.599597	Prob. F(21,307)	0.9182
Obs*R-squared	12.96222	Prob. Chi-Square(21)	0.9099
Scaled explained SS	12.96810	Prob. Chi-Square(21)	0.9097

US-Euro Area with Euro-Area Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.900375	Prob. F(21,307)	0.0108
Obs*R-squared	37.84778	Prob. Chi-Square(21)	0.0134
Scaled explained SS	115.8461	Prob. Chi-Square(21)	0.0000

US-Switzerland with US Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	8.475069	Prob. F(21,307)	0.0000
Obs*R-squared	120.7363	Prob. Chi-Square(21)	0.0000
Scaled explained SS	443.3405	Prob. Chi-Square(21)	0.0000

US-Switzerland with Switzerland Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.777328	Prob. F(21,307)	0.7473
Obs*R-squared	16.61046	Prob. Chi-Square(21)	0.7344
Scaled explained SS	28.33416	Prob. Chi-Square(21)	0.1309

Euro Area-Switzerland with Euro-Area Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.751730	Prob. F(21,307)	0.7772
Obs*R-squared	16.09021	Prob. Chi-Square(21)	0.7646
Scaled explained SS	113.2626	Prob. Chi-Square(21)	0.0000

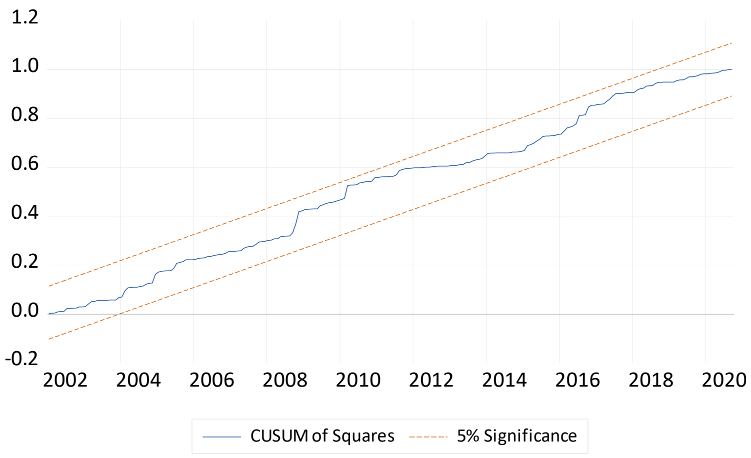
Euro Area-Switzerland with Switzerland Taylor Rule:

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

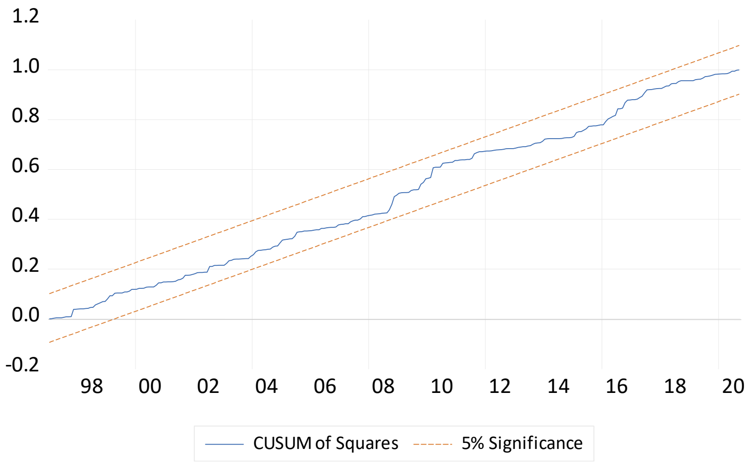
F-statistic	1.014483	Prob. F(21,307)	0.4451
Obs*R-squared	21.34929	Prob. Chi-Square(21)	0.4378
Scaled explained SS	97.68179	Prob. Chi-Square(21)	0.0000

CUSUM-SQ Test for Parameter Constancy

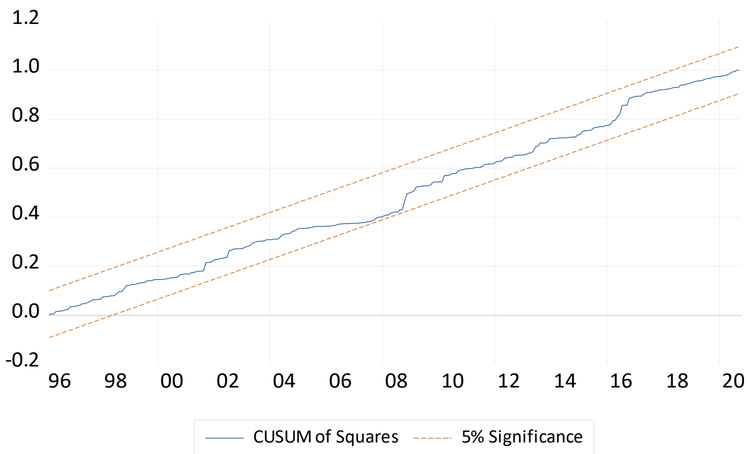
UK-Canada with UK Taylor Rule:



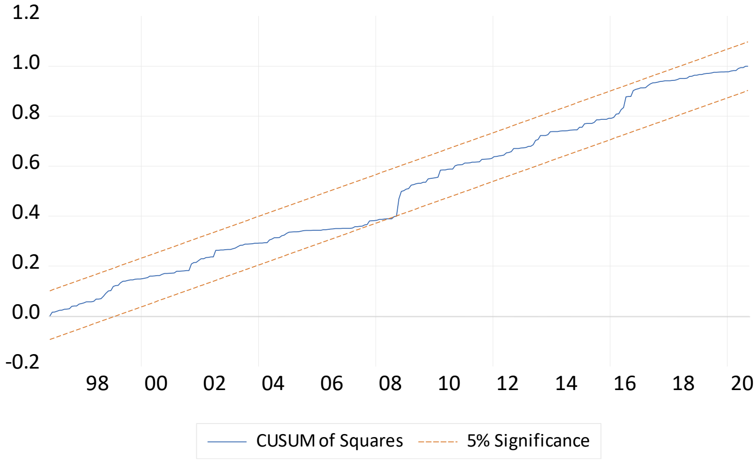
UK-Canada with Canada Taylor Rule:



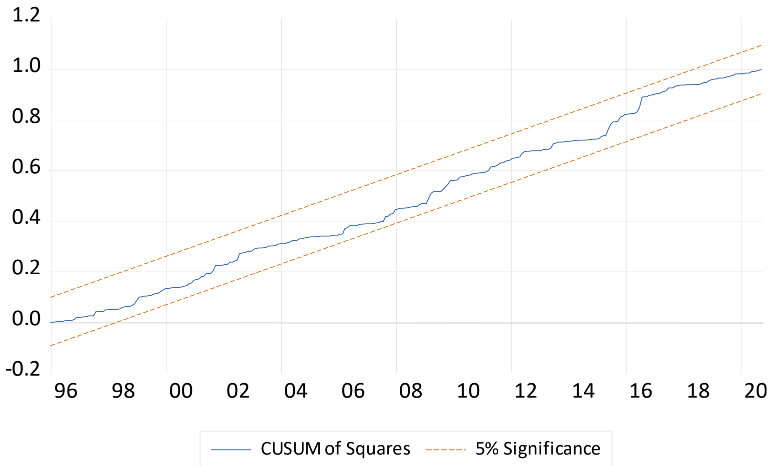
UK-Australia with UK Taylor Rule:



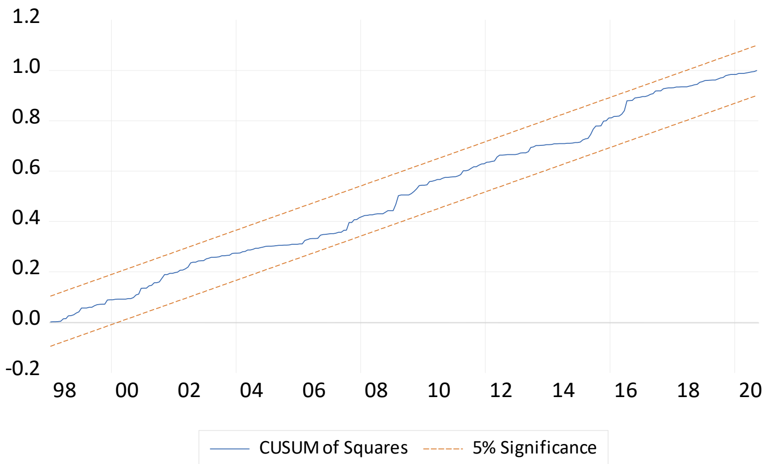
UK-Australia with Australia Taylor Rule:



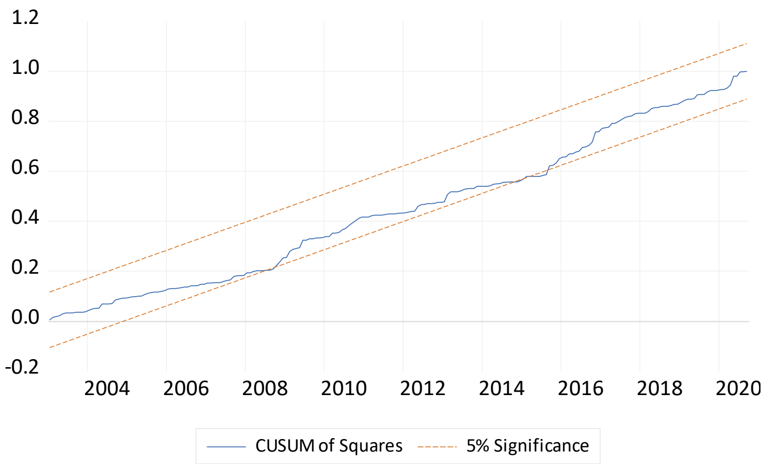
UK-New Zealand with UK Taylor Rule:



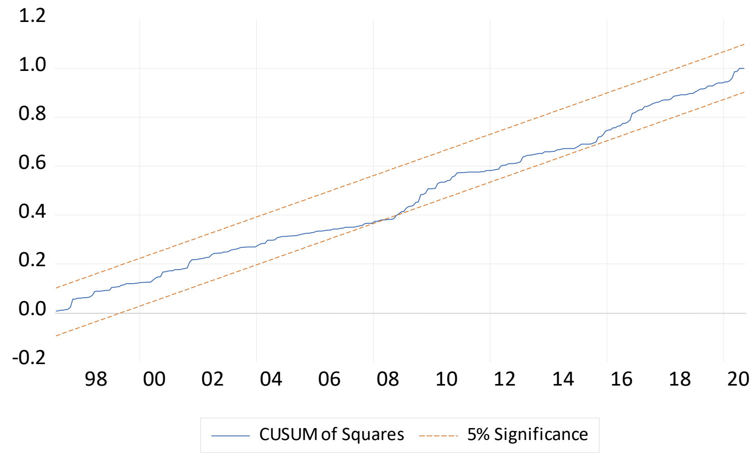
UK-New Zealand with New Zealand Taylor Rule:



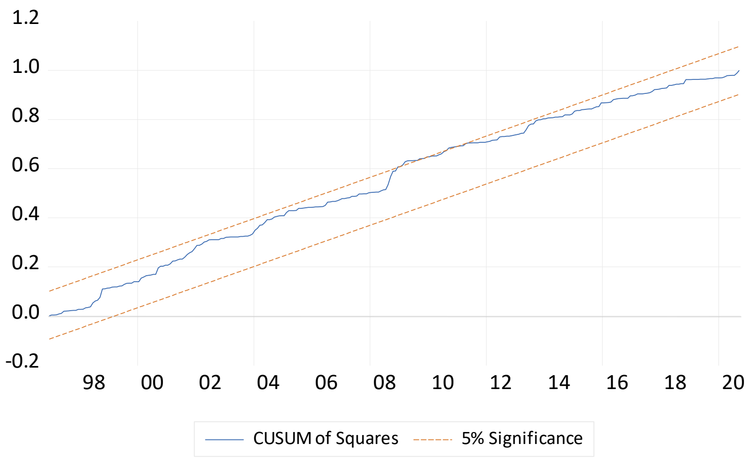
UK-Sweden with UK Taylor Rule:



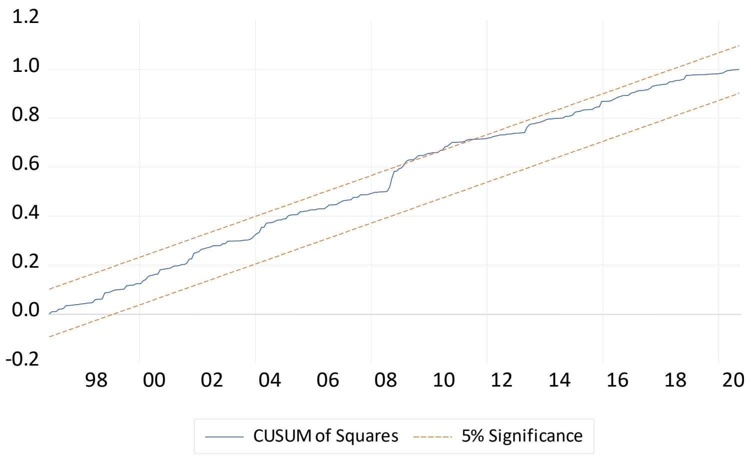
UK-Sweden with Sweden Taylor Rule:



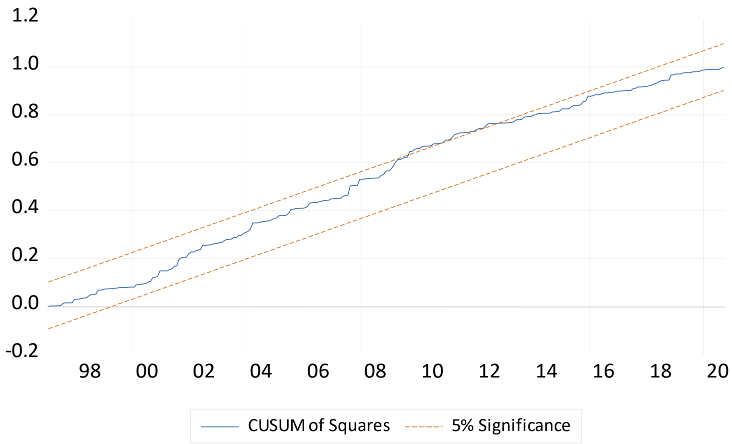
Canada-Australia with Canada Taylor Rule:



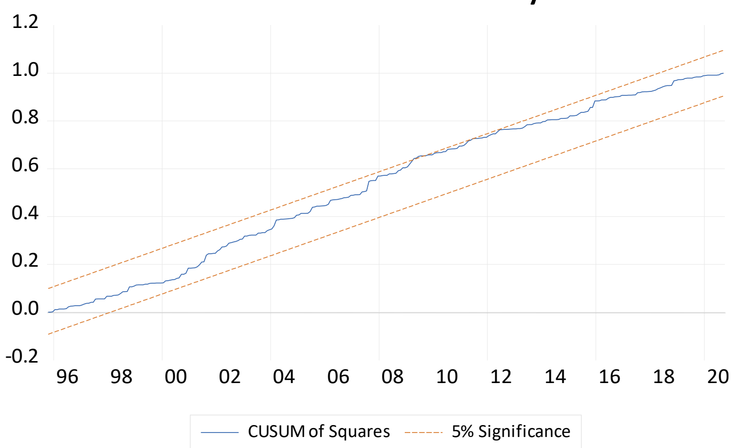
Canada-Australia with Australia Taylor Rule:



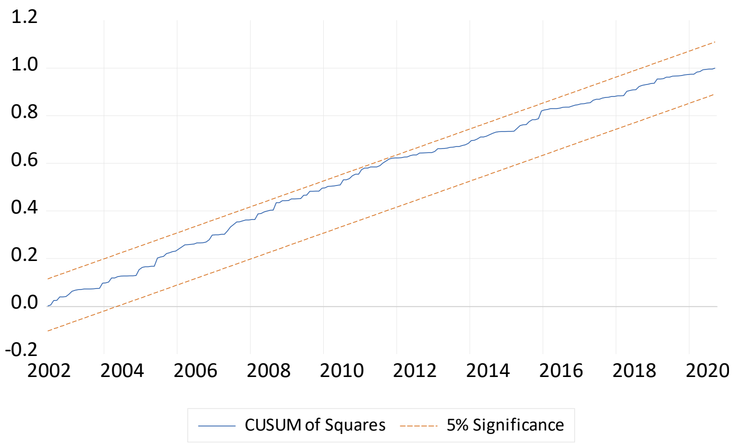
Canada-New Zealand with Canada Taylor Rule:



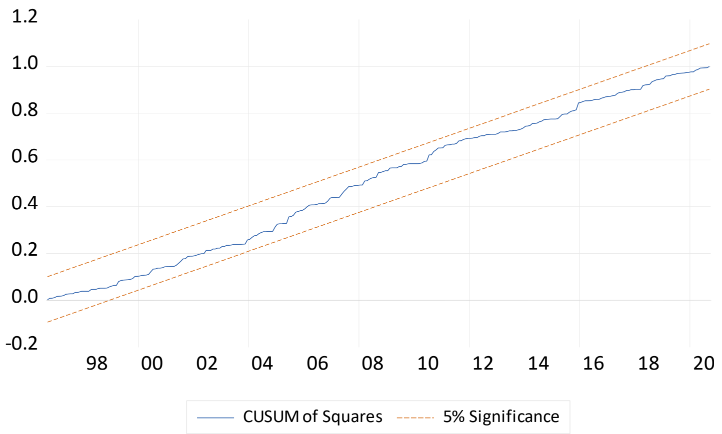
Canada-New Zealand with New Zealand Taylor Rule:



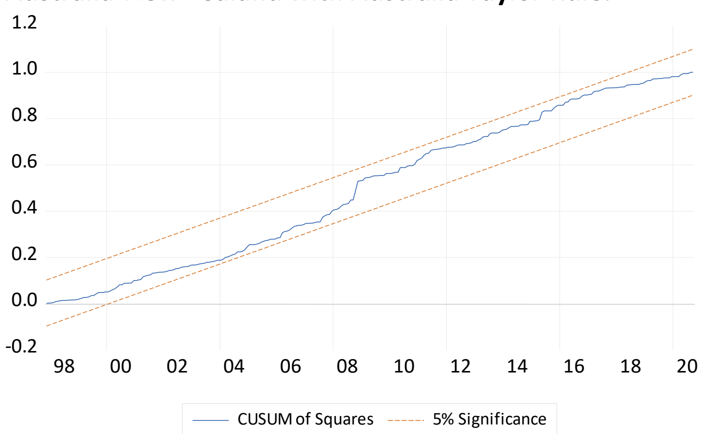
Canada-Sweden with Canada Taylor Rule:



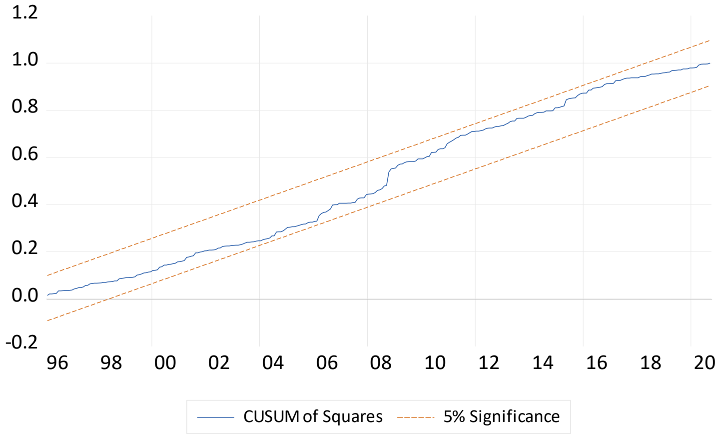
Canada-Sweden with Sweden Taylor Rule:



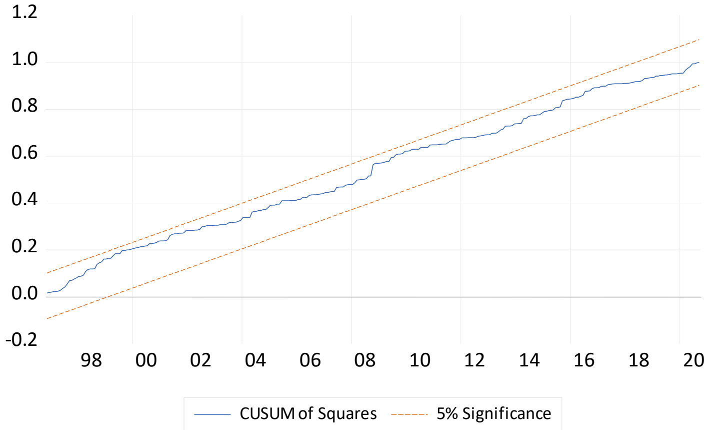
Australia-New Zealand with Australia Taylor Rule:



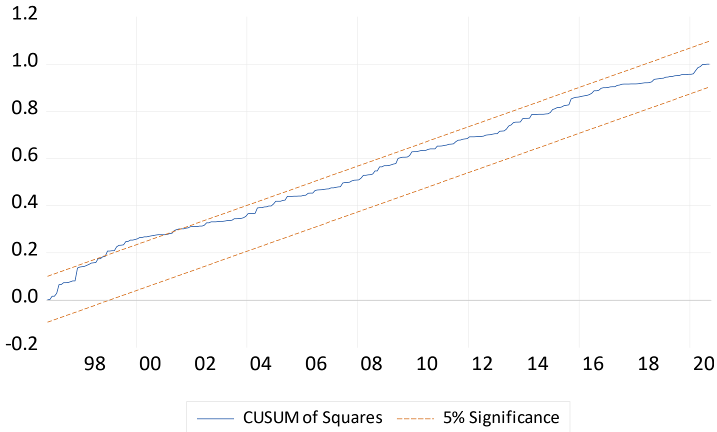
Australia-New Zealand with New Zealand Taylor Rule:



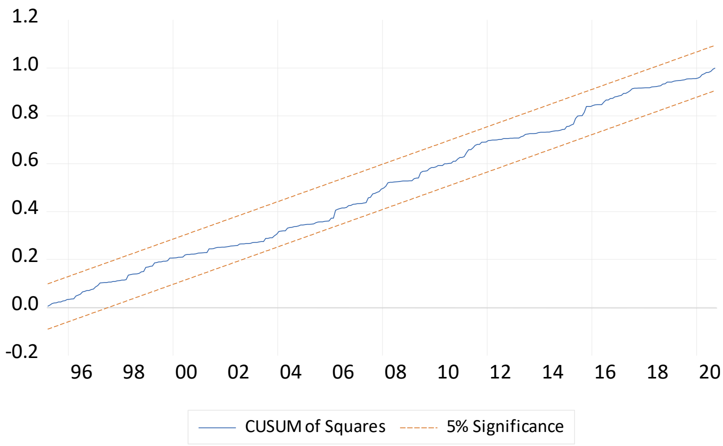
Australia-Sweden with Australia Taylor Rule:



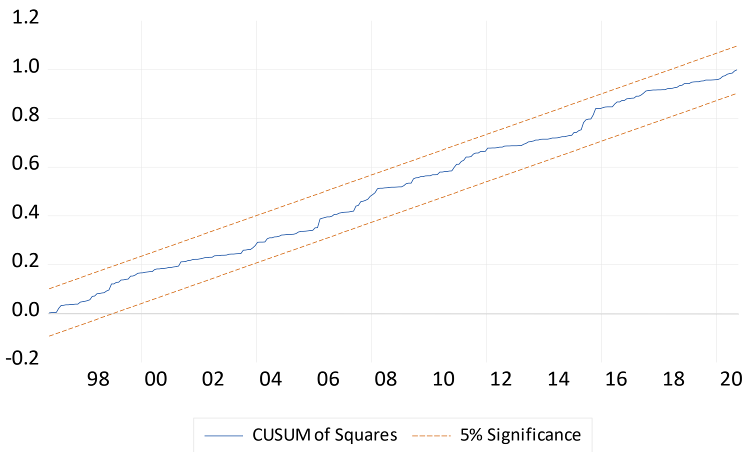
Australia-Sweden with Sweden Taylor Rule:



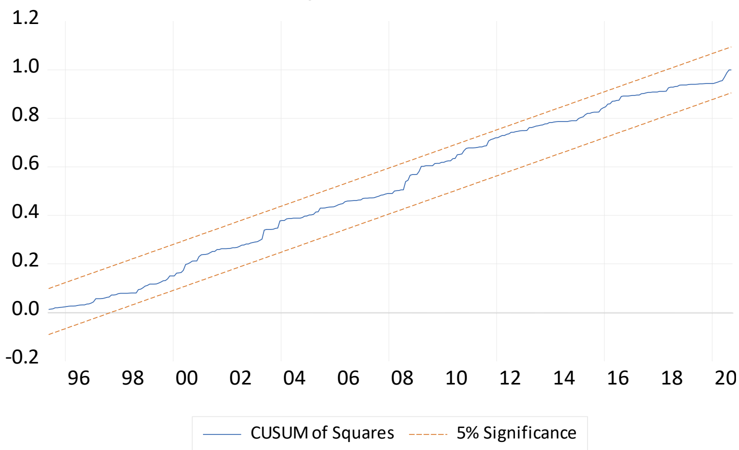
New Zealand-Sweden with New Zealand Taylor Rule:



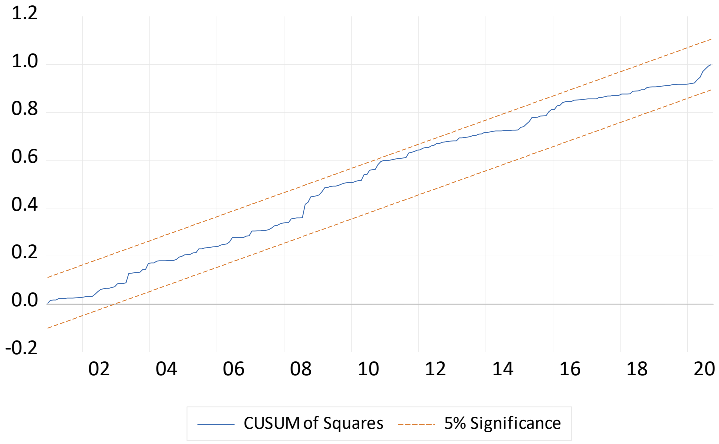
New Zealand-Sweden with Sweden Taylor Rule:



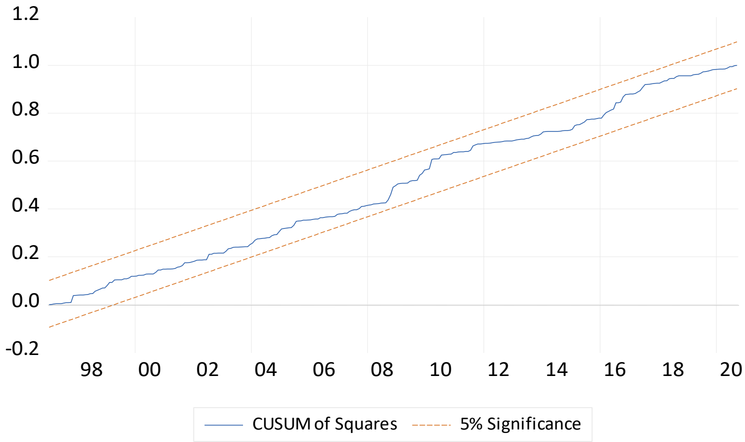
US-Euro Area with US Taylor Rule:



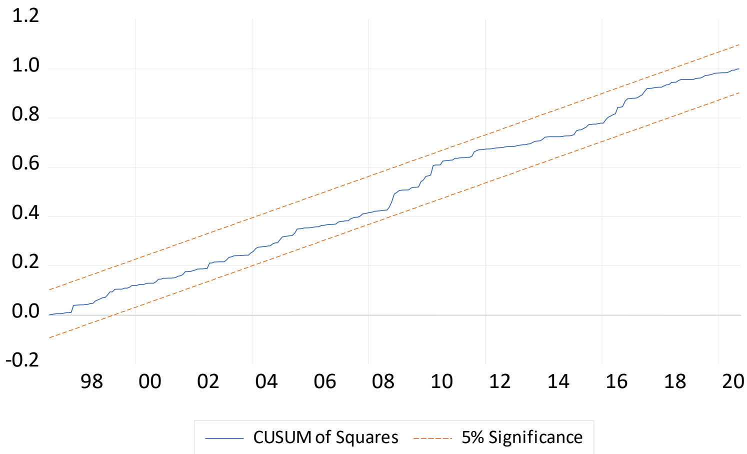
US-Euro Area with Euro-Area Taylor Rule:



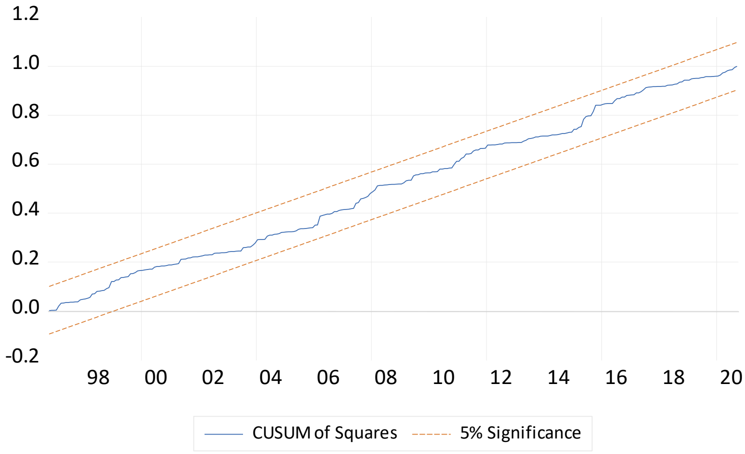
US-Switzerland with US Taylor Rule:



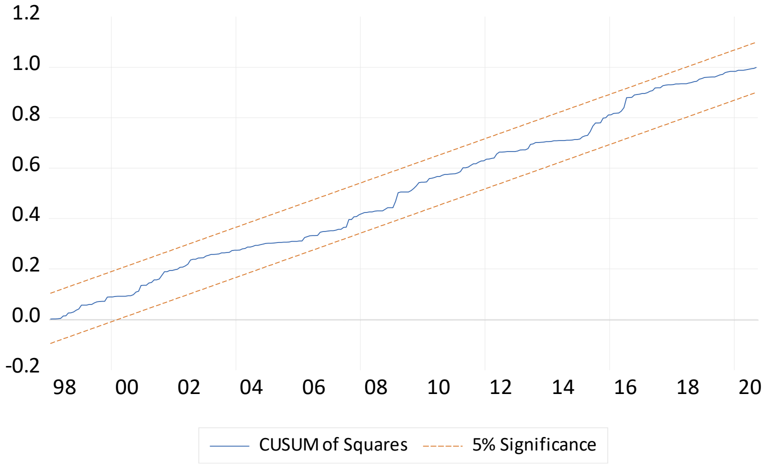
US-Switzerland with Switzerland Taylor Rule:



Euro Area-Switzerland with Euro-Area Taylor Rule:



Euro Area-Switzerland with Switzerland Taylor Rule:



Chapter 5

Data Sources

Frequency: Daily
Time Period: 1st January 2000 – 31st December 2020

The nominal exchange rate series are obtained from the Pacific Exchange Rate Service database. The interest rate series for the UK is the Bank of England Overnight London Interbank Offered Rate (LIBOR) based on British Pound and is obtained from the Federal Reserve Bank of St Louis economic database. The interest rate series for Canada is the Bank of Canada Overnight Repo Rate obtained from the Bank of Canada statistics database. The interest rate series for Australia is the Reserve Bank of Australia Interbank Overnight Cash Rate obtained from the Reserve Bank of Australia statistics database. The interest rate series for New Zealand is the Reserve Bank of New Zealand Interbank Overnight Cash Rate obtained from the Reserve Bank of New Zealand statistics database. The interest rate series for Sweden it is the Swedish Riksbank Deposit Rate obtained from the Riksbank statistics database. The interest rate series for the US is the Treasury Overnight London Interbank Offered Rate (LIBOR) based on US Dollar, and the series for Switzerland is the Swiss National Bank Overnight London Interbank Offered Rate (LIBOR) based on Swiss Franc; both series are obtained from the Federal Reserve Bank of St Louis economics database. The interest rate series for the Euro-Area are the European Central Bank EMU Convergence criteria daily interest rate series obtained from Eurostat. All exchange rate and interest rate series are transformed to their natural logarithm. Central bank announcement data are collected from the Bloomberg release calendars for individual central banks and comprise announcements of both positive and negative changes in the interest rate. The data for all 30-day interest rate series are obtained from Bloomberg. For the UK, the series is the 1-month LIBOR rate in British pound; for Canada, the series is the 1-month Canadian banker acceptances rate; for Australia and New Zealand, the series are the 30-day interbank cash rate future contracts; and for Sweden, the series is the 1-month interbank offered rate. The series for the US is the 30-day Federal funds future rate; the series for the Euro-Area is the 1-month EURIBOR rate; and the series for Switzerland is the 1-month LIBOR in Swiss franc. The series are included as the change from one day to the next and are therefore representative of daily changes in the expected interest rate over the next month.

Data Abbreviation	**Variable**
lngbpcad	Log of GBPCAD Exchange Rate
lngbpaud	Log of GBPAUD Exchange Rate
lngbpnzd	Log of GBPNZD Exchange Rate
lngbpsek	Log of GBPSEK Exchange Rate
lncadaud	Log of CADAUD Exchange Rate
lncadnzd	Log of CADNZD Exchange Rate
lncadsek	Log of CADSEK Exchange Rate
lnaudnzd	Log of AUDNZD Exchange Rate
lnaudsek	Log of AUDSEK Exchange Rate
lnnzdsek	Log of NZDSEK Exchange Rate
lnusdeur	Log of USDEUR Exchange Rate
lnusechf	Log of USDCHF Exchange Rate
lneurchf	Log of EURCHF Exchange Rate

lnukcair	Log of UK-Canada Interest Rate Differential
lnukauir	Log of UK-Australia Interest Rate Differential
lnuknzir	Log of UK-New Zealand Interest Rate Differential
lnukseir	Log of UK-Sweden Interest Rate Differential
lncaauir	Log of Canada-Australia Interest Rate Differential
lncanzir	Log of Canada-New Zealand Interest Rate Differential
lncaseir	Log of Canada-Sweden Interest Rate Differential
lnaunzir	Log of Australia-New Zealand Interest Rate Differential
lnauseir	Log of Australia-Sweden Interest Rate Differential
lnnzseir	Log of New Zealand-Sweden Interest Rate Differential
lnuseuir	Log of US-Euro Area Interest Rate Differential
lnuschir	Log of US-Switzerland Interest Rate Differential
lneuchir	Log of Euro Area-Switzerland Interest Rate Differential
ukcadp	UK-Canada Central Bank Announcements of Interest Rate Increases
ukaudp	UK-Australia Central Bank Announcements of Interest Rate Increases
uknzdp	UK-New Zealand Central Bank Announcements of Interest Rate Increases
uksedp	UK-Sweden Central Bank Announcements of Interest Rate Increases
caaudp	Canada-Australia Central Bank Announcements of Interest Rate Increases
canzdp	Canada-New Zealand Central Bank Announcements of Interest Rate Increases
casedp	Canada-Sweden Central Bank Announcements of Interest Rate Increases
aunzdp	Australia-New Zealand Central Bank Announcements of Interest Rate Increases
ausedp	Australia-Sweden Central Bank Announcements of Interest Rate Increases
nzsedp	New Zealand-Sweden Central Bank Announcements of Interest Rate Increases
useudp	US-Euro Area Central Bank Announcements of Interest Rate Increases
uschdp	US-Switzerland Central Bank Announcements of Interest Rate Increases
euchdp	Euro Area-Switzerland Central Bank Announcements of Interest Rate Increases
ukcadn	UK-Canada Central Bank Announcements of Interest Rate Decreases
ukaudn	UK-Australia Central Bank Announcements of Interest Rate Decreases
uknzdn	UK-New Zealand Central Bank Announcements of Interest Rate Decreases
uksedn	UK-Sweden Central Bank Announcements of Interest Rate Decreases
caaudn	Canada-Australia Central Bank Announcements of Interest Rate Decreases

canzdn	Canada-New Zealand Central Bank Announcements of Interest Rate Decreases
casedn	Canada-Sweden Central Bank Announcements of Interest Rate Decreases
aunzdn	Australia-New Zealand Central Bank Announcements of Interest Rate Decreases
ausedn	Australia-Sweden Central Bank Announcements of Interest Rate Decreases
nzsedn	New Zealand-Sweden Central Bank Announcements of Interest Rate Decreases
useudn	US-Euro Area Central Bank Announcements of Interest Rate Decreases
uschdn	US-Switzerland Central Bank Announcements of Interest Rate Decreases
euchdn	Euro Area-Switzerland Central Bank Announcements of Interest Rate Decreases
dukca30d	Change in UK-Canada 30-Day Interest Rate
dukau30d	Change in UK-Australia 30-Day Interest Rate
duknz30d	Change in UK-New Zealand 30-Day Interest Rate
dukse30d	Change in UK-Sweden 30-Day Interest Rate
dcaau30d	Change in Canada-Australia 30-Day Interest Rate
dcanz30d	Change in Canada-New Zealand 30-Day Interest Rate
dcase30d	Change in Canada-Sweden 30-Day Interest Rate
daunz30d	Change in Australia-New Zealand 30-Day Interest Rate
dause30d	Change in Australia-Sweden 30-Day Interest Rate
dnzse30d	Change in New Zealand-Sweden 30-Day Interest Rate
duseu30d	Change in US-Euro Area 30-Day Interest Rate
dusch30d	Change in US-Switzerland 30-Day Interest Rate
deuch30d	Change in Euro Area-Switzerland 30-Day Interest Rate

Software Codes and Outputs

Dickey-Fuller GLS Unit Root Tests:

Nominal Exchange Rate in levels:

UK-Canada: dfgls lngbpcad

```
DF-GLS test for unit root
Variable: lngbpcad
Lag selection: Schwert criterion         Maximum lag   =    35

                                 -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
--------------------------------------------------------------
     35          -1.981        -3.480        -2.835        -2.547
     34          -1.892        -3.480        -2.835        -2.547
     33          -1.920        -3.480        -2.835        -2.548
     32          -1.913        -3.480        -2.835        -2.548
     31          -1.928        -3.480        -2.835        -2.548
     30          -1.989        -3.480        -2.836        -2.548
     29          -1.995        -3.480        -2.836        -2.548
     28          -1.993        -3.480        -2.836        -2.548
```

27	-1.997	-3.480	-2.836	-2.549
26	-1.982	-3.480	-2.836	-2.549
25	-1.990	-3.480	-2.836	-2.549
24	-2.011	-3.480	-2.837	-2.549
23	-2.040	-3.480	-2.837	-2.549
22	-2.010	-3.480	-2.837	-2.549
21	-1.994	-3.480	-2.837	-2.549
20	-2.033	-3.480	-2.837	-2.550
19	-2.087	-3.480	-2.837	-2.550
18	-2.077	-3.480	-2.838	-2.550
17	-2.077	-3.480	-2.838	-2.550
16	-2.103	-3.480	-2.838	-2.550
15	-2.121	-3.480	-2.838	-2.550
14	-2.142	-3.480	-2.838	-2.551
13	-2.208	-3.480	-2.838	-2.551
12	-2.224	-3.480	-2.839	-2.551
11	-2.264	-3.480	-2.839	-2.551
10	-2.299	-3.480	-2.839	-2.551
9	-2.249	-3.480	-2.839	-2.551
8	-2.207	-3.480	-2.839	-2.551
7	-2.140	-3.480	-2.839	-2.552
6	-2.159	-3.480	-2.840	-2.552
5	-2.168	-3.480	-2.840	-2.552
4	-2.169	-3.480	-2.840	-2.552
3	-2.229	-3.480	-2.840	-2.552
2	-2.191	-3.480	-2.840	-2.552
1	-2.225	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0049413
Min SIC  =  -10.6093 at lag  1 with RMSE = .0049626
Min MAIC = -10.61077 at lag 14 with RMSE = .0049527
```

UK-Australia: dfgls lngbpaud

```
DF-GLS test for unit root
Variable: lngbpaud
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
35	-1.790	-3.480	-2.835	-2.547
34	-1.798	-3.480	-2.835	-2.547
33	-1.832	-3.480	-2.835	-2.548
32	-1.825	-3.480	-2.835	-2.548
31	-1.827	-3.480	-2.835	-2.548
30	-1.854	-3.480	-2.836	-2.548
29	-1.869	-3.480	-2.836	-2.548
28	-1.896	-3.480	-2.836	-2.548
27	-1.916	-3.480	-2.836	-2.549
26	-1.890	-3.480	-2.836	-2.549
25	-1.906	-3.480	-2.836	-2.549
24	-1.865	-3.480	-2.837	-2.549
23	-1.874	-3.480	-2.837	-2.549
22	-1.859	-3.480	-2.837	-2.549

21	-1.899	-3.480	-2.837	-2.549
20	-1.949	-3.480	-2.837	-2.550
19	-1.929	-3.480	-2.837	-2.550
18	-1.959	-3.480	-2.838	-2.550
17	-1.954	-3.480	-2.838	-2.550
16	-1.943	-3.480	-2.838	-2.550
15	-1.932	-3.480	-2.838	-2.550
14	-1.905	-3.480	-2.838	-2.551
13	-1.921	-3.480	-2.838	-2.551
12	-1.879	-3.480	-2.839	-2.551
11	-1.846	-3.480	-2.839	-2.551
10	-1.836	-3.480	-2.839	-2.551
9	-1.862	-3.480	-2.839	-2.551
8	-1.891	-3.480	-2.839	-2.551
7	-1.865	-3.480	-2.839	-2.552
6	-1.865	-3.480	-2.840	-2.552
5	-1.870	-3.480	-2.840	-2.552
4	-1.847	-3.480	-2.840	-2.552
3	-1.902	-3.480	-2.840	-2.552
2	-1.914	-3.480	-2.840	-2.552
1	-1.897	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 25 with RMSE = .0057273
Min SIC  = -10.31797 at lag  1 with RMSE = .0057408
Min MAIC = -10.31929 at lag  4 with RMSE = .0057382
```

UK-New Zealand: dfgls lngbpnzd

```
DF-GLS test for unit root
Variable: lngbpnzd
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-2.610	-3.480	-2.835	-2.547
34	-2.625	-3.480	-2.835	-2.547
33	-2.640	-3.480	-2.835	-2.548
32	-2.641	-3.480	-2.835	-2.548
31	-2.616	-3.480	-2.835	-2.548
30	-2.680	-3.480	-2.836	-2.548
29	-2.697	-3.480	-2.836	-2.548
28	-2.656	-3.480	-2.836	-2.548
27	-2.709	-3.480	-2.836	-2.549
26	-2.724	-3.480	-2.836	-2.549
25	-2.753	-3.480	-2.836	-2.549
24	-2.723	-3.480	-2.837	-2.549
23	-2.733	-3.480	-2.837	-2.549
22	-2.746	-3.480	-2.837	-2.549
21	-2.795	-3.480	-2.837	-2.549
20	-2.781	-3.480	-2.837	-2.550
19	-2.840	-3.480	-2.837	-2.550
18	-2.829	-3.480	-2.838	-2.550
17	-2.820	-3.480	-2.838	-2.550
16	-2.794	-3.480	-2.838	-2.550

15	-2.818	-3.480	-2.838	-2.550
14	-2.768	-3.480	-2.838	-2.551
13	-2.772	-3.480	-2.838	-2.551
12	-2.724	-3.480	-2.839	-2.551
11	-2.712	-3.480	-2.839	-2.551
10	-2.707	-3.480	-2.839	-2.551
9	-2.735	-3.480	-2.839	-2.551
8	-2.797	-3.480	-2.839	-2.551
7	-2.737	-3.480	-2.839	-2.552
6	-2.774	-3.480	-2.840	-2.552
5	-2.776	-3.480	-2.840	-2.552
4	-2.789	-3.480	-2.840	-2.552
3	-2.851	-3.480	-2.840	-2.552
2	-2.833	-3.480	-2.840	-2.552
1	-2.859	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 31 with RMSE = .0059483
Min SIC  = -10.24218 at lag  1 with RMSE = .0059625
Min MAIC = -10.24211 at lag  1 with RMSE = .0059625
```

UK-Sweden: dfgls lngbpsek

```
DF-GLS test for unit root
Variable: lngbpsek
Lag selection: Schwert criterion         Maximum lag   =    35
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
35	-2.314	-3.480	-2.835	-2.547
34	-2.223	-3.480	-2.835	-2.547
33	-2.210	-3.480	-2.835	-2.548
32	-2.229	-3.480	-2.835	-2.548
31	-2.285	-3.480	-2.835	-2.548
30	-2.342	-3.480	-2.836	-2.548
29	-2.361	-3.480	-2.836	-2.548
28	-2.391	-3.480	-2.836	-2.548
27	-2.440	-3.480	-2.836	-2.549
26	-2.400	-3.480	-2.836	-2.549
25	-2.380	-3.480	-2.836	-2.549
24	-2.389	-3.480	-2.837	-2.549
23	-2.363	-3.480	-2.837	-2.549
22	-2.373	-3.480	-2.837	-2.549
21	-2.368	-3.480	-2.837	-2.549
20	-2.356	-3.480	-2.837	-2.550
19	-2.455	-3.480	-2.837	-2.550
18	-2.477	-3.480	-2.838	-2.550
17	-2.485	-3.480	-2.838	-2.550
16	-2.496	-3.480	-2.838	-2.550
15	-2.448	-3.480	-2.838	-2.550
14	-2.475	-3.480	-2.838	-2.551
13	-2.543	-3.480	-2.838	-2.551
12	-2.570	-3.480	-2.839	-2.551
11	-2.557	-3.480	-2.839	-2.551
10	-2.532	-3.480	-2.839	-2.551

9	-2.533	-3.480	-2.839	-2.551
8	-2.545	-3.480	-2.839	-2.551
7	-2.529	-3.480	-2.839	-2.552
6	-2.553	-3.480	-2.840	-2.552
5	-2.571	-3.480	-2.840	-2.552
4	-2.604	-3.480	-2.840	-2.552
3	-2.656	-3.480	-2.840	-2.552
2	-2.709	-3.480	-2.840	-2.552
1	-2.749	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0050929
Min SIC  = -10.54901 at lag  1 with RMSE = .0051145
Min MAIC = -10.54946 at lag  4 with RMSE = .0051121
```

Canada-Australia: dfgls lncadaud

```
DF-GLS test for unit root
Variable: lncadaud
Lag selection: Schwert criterion         Maximum lag   =    35
```

		-------- Critical value	---------	
[lags]	DF-GLS tau	1%	5%	10%
35	-2.555	-3.480	-2.835	-2.547
34	-2.532	-3.480	-2.835	-2.547
33	-2.587	-3.480	-2.835	-2.548
32	-2.577	-3.480	-2.835	-2.548
31	-2.556	-3.480	-2.835	-2.548
30	-2.558	-3.480	-2.836	-2.548
29	-2.604	-3.480	-2.836	-2.548
28	-2.593	-3.480	-2.836	-2.548
27	-2.630	-3.480	-2.836	-2.549
26	-2.589	-3.480	-2.836	-2.549
25	-2.595	-3.480	-2.836	-2.549
24	-2.531	-3.480	-2.837	-2.549
23	-2.546	-3.480	-2.837	-2.549
22	-2.540	-3.480	-2.837	-2.549
21	-2.585	-3.480	-2.837	-2.549
20	-2.629	-3.480	-2.837	-2.550
19	-2.564	-3.480	-2.837	-2.550
18	-2.490	-3.480	-2.838	-2.550
17	-2.499	-3.480	-2.838	-2.550
16	-2.516	-3.480	-2.838	-2.550
15	-2.447	-3.480	-2.838	-2.550
14	-2.468	-3.480	-2.838	-2.551
13	-2.519	-3.480	-2.838	-2.551
12	-2.503	-3.480	-2.839	-2.551
11	-2.468	-3.480	-2.839	-2.551
10	-2.454	-3.480	-2.839	-2.551
9	-2.559	-3.480	-2.839	-2.551
8	-2.569	-3.480	-2.839	-2.551
7	-2.579	-3.480	-2.839	-2.552
6	-2.621	-3.480	-2.840	-2.552
5	-2.654	-3.480	-2.840	-2.552
4	-2.650	-3.480	-2.840	-2.552

3	-2.765	-3.480	-2.840	-2.552
2	-2.860	-3.480	-2.840	-2.552
1	-2.817	-3.480	-2.840	-2.552

Opt lag (Ng-Perron seq t) = 34 with RMSE = .0050161
Min SIC = -10.57682 at lag 1 with RMSE = .0050439
Min MAIC = -10.58072 at lag 22 with RMSE = .0050211

Canada-New Zealand: dfgls lncadnzd

DF-GLS test for unit root
Variable: lncadnzd
Lag selection: Schwert criterion Maximum lag = 35

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
35	-2.741	-3.480	-2.835	-2.547
34	-2.741	-3.480	-2.835	-2.547
33	-2.821	-3.480	-2.835	-2.548
32	-2.817	-3.480	-2.835	-2.548
31	-2.771	-3.480	-2.835	-2.548
30	-2.793	-3.480	-2.836	-2.548
29	-2.849	-3.480	-2.836	-2.548
28	-2.769	-3.480	-2.836	-2.548
27	-2.823	-3.480	-2.836	-2.549
26	-2.794	-3.480	-2.836	-2.549
25	-2.815	-3.480	-2.836	-2.549
24	-2.804	-3.480	-2.837	-2.549
23	-2.837	-3.480	-2.837	-2.549
22	-2.872	-3.480	-2.837	-2.549
21	-2.892	-3.480	-2.837	-2.549
20	-2.838	-3.480	-2.837	-2.550
19	-2.832	-3.480	-2.837	-2.550
18	-2.767	-3.480	-2.838	-2.550
17	-2.756	-3.480	-2.838	-2.550
16	-2.770	-3.480	-2.838	-2.550
15	-2.784	-3.480	-2.838	-2.550
14	-2.739	-3.480	-2.838	-2.551
13	-2.749	-3.480	-2.838	-2.551
12	-2.700	-3.480	-2.839	-2.551
11	-2.696	-3.480	-2.839	-2.551
10	-2.692	-3.480	-2.839	-2.551
9	-2.709	-3.480	-2.839	-2.551
8	-2.733	-3.480	-2.839	-2.551
7	-2.696	-3.480	-2.839	-2.552
6	-2.694	-3.480	-2.840	-2.552
5	-2.725	-3.480	-2.840	-2.552
4	-2.740	-3.480	-2.840	-2.552
3	-2.844	-3.480	-2.840	-2.552
2	-2.867	-3.480	-2.840	-2.552
1	-2.888	-3.480	-2.840	-2.552

Opt lag (Ng-Perron seq t) = 34 with RMSE = .0055755

```
Min SIC  = -10.36948 at lag  1 with RMSE = .0055948
Min MAIC = -10.37032 at lag  4 with RMSE = .0055906
```

Canada-Sweden: dfgls lncadsek

```
DF-GLS test for unit root
Variable: lncadsek
Lag selection: Schwert criterion        Maximum lag   =    35

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
---------------------------------------------------------------
     35          -2.241       -3.480       -2.835       -2.547
     34          -2.129       -3.480       -2.835       -2.547
     33          -2.139       -3.480       -2.835       -2.548
     32          -2.107       -3.480       -2.835       -2.548
     31          -2.110       -3.480       -2.835       -2.548
     30          -2.103       -3.480       -2.836       -2.548
     29          -2.188       -3.480       -2.836       -2.548
     28          -2.234       -3.480       -2.836       -2.548
     27          -2.281       -3.480       -2.836       -2.549
     26          -2.251       -3.480       -2.836       -2.549
     25          -2.276       -3.480       -2.836       -2.549
     24          -2.287       -3.480       -2.837       -2.549
     23          -2.303       -3.480       -2.837       -2.549
     22          -2.333       -3.480       -2.837       -2.549
     21          -2.257       -3.480       -2.837       -2.549
     20          -2.395       -3.480       -2.837       -2.550
     19          -2.476       -3.480       -2.837       -2.550
     18          -2.477       -3.480       -2.838       -2.550
     17          -2.465       -3.480       -2.838       -2.550
     16          -2.508       -3.480       -2.838       -2.550
     15          -2.499       -3.480       -2.838       -2.550
     14          -2.438       -3.480       -2.838       -2.551
     13          -2.515       -3.480       -2.838       -2.551
     12          -2.501       -3.480       -2.839       -2.551
     11          -2.536       -3.480       -2.839       -2.551
     10          -2.625       -3.480       -2.839       -2.551
      9          -2.648       -3.480       -2.839       -2.551
      8          -2.617       -3.480       -2.839       -2.551
      7          -2.552       -3.480       -2.839       -2.552
      6          -2.642       -3.480       -2.840       -2.552
      5          -2.718       -3.480       -2.840       -2.552
      4          -2.702       -3.480       -2.840       -2.552
      3          -2.789       -3.480       -2.840       -2.552
      2          -2.808       -3.480       -2.840       -2.552
      1          -2.815       -3.480       -2.840       -2.552
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0053758
Min SIC  = -10.44084 at lag  1 with RMSE = .0053987
Min MAIC = -10.44036 at lag 22 with RMSE = .0053826
```

Australia-New Zealand: dfgls lnaudnzd

```
DF-GLS test for unit root
Variable: lnaudnzd
Lag selection: Schwert criterion         Maximum lag  =   35

                              -------- Critical value ---------
 [lags]      DF-GLS tau          1%            5%           10%
---------------------------------------------------------------
     35          -2.524       -3.480        -2.835       -2.547
     34          -2.575       -3.480        -2.835       -2.547
     33          -2.629       -3.480        -2.835       -2.548
     32          -2.639       -3.480        -2.835       -2.548
     31          -2.616       -3.480        -2.835       -2.548
     30          -2.605       -3.480        -2.836       -2.548
     29          -2.599       -3.480        -2.836       -2.548
     28          -2.603       -3.480        -2.836       -2.548
     27          -2.620       -3.480        -2.836       -2.549
     26          -2.617       -3.480        -2.836       -2.549
     25          -2.678       -3.480        -2.836       -2.549
     24          -2.622       -3.480        -2.837       -2.549
     23          -2.620       -3.480        -2.837       -2.549
     22          -2.595       -3.480        -2.837       -2.549
     21          -2.602       -3.480        -2.837       -2.549
     20          -2.622       -3.480        -2.837       -2.550
     19          -2.638       -3.480        -2.837       -2.550
     18          -2.636       -3.480        -2.838       -2.550
     17          -2.591       -3.480        -2.838       -2.550
     16          -2.611       -3.480        -2.838       -2.550
     15          -2.603       -3.480        -2.838       -2.550
     14          -2.602       -3.480        -2.838       -2.551
     13          -2.512       -3.480        -2.838       -2.551
     12          -2.497       -3.480        -2.839       -2.551
     11          -2.506       -3.480        -2.839       -2.551
     10          -2.489       -3.480        -2.839       -2.551
      9          -2.480       -3.480        -2.839       -2.551
      8          -2.480       -3.480        -2.839       -2.551
      7          -2.420       -3.480        -2.839       -2.552
      6          -2.418       -3.480        -2.840       -2.552
      5          -2.433       -3.480        -2.840       -2.552
      4          -2.433       -3.480        -2.840       -2.552
      3          -2.501       -3.480        -2.840       -2.552
      2          -2.525       -3.480        -2.840       -2.552
      1          -2.542       -3.480        -2.840       -2.552
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 35 with RMSE =  .003976
Min SIC  = -11.04713 at lag  1 with RMSE = .0039869
Min MAIC = -11.04773 at lag  4 with RMSE = .0039852
```

Australia-Sweden: dfgls lnaudsek

```
DF-GLS test for unit root
Variable: lnaudsek
Lag selection: Schwert criterion         Maximum lag  =   35

                              -------- Critical value ---------
 [lags]      DF-GLS tau          1%            5%           10%
```

[lags]	DF-GLS tau	1%	5%	10%
35	-2.770	-3.480	-2.835	-2.547
34	-2.728	-3.480	-2.835	-2.547
33	-2.779	-3.480	-2.835	-2.548
32	-2.792	-3.480	-2.835	-2.548
31	-2.779	-3.480	-2.835	-2.548
30	-2.730	-3.480	-2.836	-2.548
29	-2.753	-3.480	-2.836	-2.548
28	-2.789	-3.480	-2.836	-2.548
27	-2.907	-3.480	-2.836	-2.549
26	-2.898	-3.480	-2.836	-2.549
25	-2.939	-3.480	-2.836	-2.549
24	-2.895	-3.480	-2.837	-2.549
23	-2.898	-3.480	-2.837	-2.549
22	-2.952	-3.480	-2.837	-2.549
21	-3.008	-3.480	-2.837	-2.549
20	-3.192	-3.480	-2.837	-2.550
19	-3.141	-3.480	-2.837	-2.550
18	-3.190	-3.480	-2.838	-2.550
17	-3.152	-3.480	-2.838	-2.550
16	-3.150	-3.480	-2.838	-2.550
15	-3.130	-3.480	-2.838	-2.550
14	-3.112	-3.480	-2.838	-2.551
13	-3.075	-3.480	-2.838	-2.551
12	-3.064	-3.480	-2.839	-2.551
11	-3.128	-3.480	-2.839	-2.551
10	-3.158	-3.480	-2.839	-2.551
9	-3.228	-3.480	-2.839	-2.551
8	-3.274	-3.480	-2.839	-2.551
7	-3.260	-3.480	-2.839	-2.552
6	-3.313	-3.480	-2.840	-2.552
5	-3.445	-3.480	-2.840	-2.552
4	-3.370	-3.480	-2.840	-2.552
3	-3.541	-3.480	-2.840	-2.552
2	-3.626	-3.480	-2.840	-2.552
1	-3.521	-3.480	-2.840	-2.552

Opt lag (Ng-Perron seq t) = 28 with RMSE = .0056169
Min SIC = -10.34797 at lag 4 with RMSE = .0056454
Min MAIC = -10.35449 at lag 28 with RMSE = .0056169

New Zealand-Sweden: dfgls lnnzdsek

DF-GLS test for unit root
Variable: lnnzdsek
Lag selection: Schwert criterion   Maximum lag   =   35

[lags]	DF-GLS tau	Critical value 1%	5%	10%
35	-2.959	-3.480	-2.835	-2.547
34	-2.989	-3.480	-2.835	-2.547
33	-2.033	-3.480	-2.835	-2.548
32	-2.119	-3.480	-2.835	-2.548
31	-2.038	-3.480	-2.835	-2.548

30	-2.926	-3.480	-2.836	-2.548
29	-2.942	-3.480	-2.836	-2.548
28	-2.896	-3.480	-2.836	-2.548
27	-2.048	-3.480	-2.836	-2.549
26	-2.963	-3.480	-2.836	-2.549
25	-2.012	-3.480	-2.836	-2.549
24	-2.042	-3.480	-2.837	-2.549
23	-2.056	-3.480	-2.837	-2.549
22	-2.128	-3.480	-2.837	-2.549
21	-2.134	-3.480	-2.837	-2.549
20	-2.234	-3.480	-2.837	-2.550
19	-2.192	-3.480	-2.837	-2.550
18	-2.195	-3.480	-2.838	-2.550
17	-2.111	-3.480	-2.838	-2.550
16	-2.078	-3.480	-2.838	-2.550
15	-2.081	-3.480	-2.838	-2.550
14	-2.003	-3.480	-2.838	-2.551
13	-2.023	-3.480	-2.838	-2.551
12	-2.076	-3.480	-2.839	-2.551
11	-2.186	-3.480	-2.839	-2.551
10	-2.206	-3.480	-2.839	-2.551
9	-2.271	-3.480	-2.839	-2.551
8	-2.316	-3.480	-2.839	-2.551
7	-2.280	-3.480	-2.839	-2.552
6	-2.322	-3.480	-2.840	-2.552
5	-2.381	-3.480	-2.840	-2.552
4	-2.355	-3.480	-2.840	-2.552
3	-2.519	-3.480	-2.840	-2.552
2	-2.589	-3.480	-2.840	-2.552
1	-2.569	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 33 with RMSE = .0059635
Min SIC  = -10.23318 at lag  1 with RMSE = .0059894
Min MAIC = -10.23094 at lag 33 with RMSE = .0059635
```

US-Euro Area: dfgls lnusdeur

```
DF-GLS test for unit root
Variable: lnusdeur
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	-------- Critical value --------- 1%	5%	10%
35	-1.532	-3.480	-2.835	-2.547
34	-1.514	-3.480	-2.835	-2.547
33	-1.527	-3.480	-2.835	-2.548
32	-1.541	-3.480	-2.835	-2.548
31	-1.553	-3.480	-2.835	-2.548
30	-1.507	-3.480	-2.836	-2.548
29	-1.507	-3.480	-2.836	-2.548
28	-1.518	-3.480	-2.836	-2.548
27	-1.506	-3.480	-2.836	-2.549
26	-1.483	-3.480	-2.836	-2.549
25	-1.489	-3.480	-2.836	-2.549

```
      24           -1.480         -3.480         -2.837         -2.549
      23           -1.485         -3.480         -2.837         -2.549
      22           -1.483         -3.480         -2.837         -2.549
      21           -1.467         -3.480         -2.837         -2.549
      20           -1.473         -3.480         -2.837         -2.550
      19           -1.463         -3.480         -2.837         -2.550
      18           -1.459         -3.480         -2.838         -2.550
      17           -1.438         -3.480         -2.838         -2.550
      16           -1.436         -3.480         -2.838         -2.550
      15           -1.411         -3.480         -2.838         -2.550
      14           -1.428         -3.480         -2.838         -2.551
      13           -1.468         -3.480         -2.838         -2.551
      12           -1.471         -3.480         -2.839         -2.551
      11           -1.467         -3.480         -2.839         -2.551
      10           -1.468         -3.480         -2.839         -2.551
       9           -1.459         -3.480         -2.839         -2.551
       8           -1.439         -3.480         -2.839         -2.551
       7           -1.459         -3.480         -2.839         -2.552
       6           -1.469         -3.480         -2.840         -2.552
       5           -1.422         -3.480         -2.840         -2.552
       4           -1.420         -3.480         -2.840         -2.552
       3           -1.459         -3.480         -2.840         -2.552
       2           -1.460         -3.480         -2.840         -2.552
       1           -1.451         -3.480         -2.840         -2.552
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 31 with RMSE = .0049539
Min SIC  = -10.60809 at lag  1 with RMSE = .0049656
Min MAIC = -10.60994 at lag  6 with RMSE = .0049615
```

US-Switzerland: dfgls lnusdchf

```
DF-GLS test for unit root
Variable: lnusdchf
Lag selection: Schwert criterion         Maximum lag   =    35

                                    -------- Critical value ---------
 [lags]       DF-GLS tau            1%             5%            10%
------------------------------------------------------------------------------
      35           -1.984         -3.480         -2.835         -2.547
      34           -1.974         -3.480         -2.835         -2.547
      33           -2.005         -3.480         -2.835         -2.548
      32           -2.062         -3.480         -2.835         -2.548
      31           -2.128         -3.480         -2.835         -2.548
      30           -2.104         -3.480         -2.836         -2.548
      29           -2.093         -3.480         -2.836         -2.548
      28           -2.161         -3.480         -2.836         -2.548
      27           -2.161         -3.480         -2.836         -2.549
      26           -2.101         -3.480         -2.836         -2.549
      25           -2.086         -3.480         -2.836         -2.549
      24           -2.034         -3.480         -2.837         -2.549
      23           -2.036         -3.480         -2.837         -2.549
      22           -2.025         -3.480         -2.837         -2.549
      21           -2.009         -3.480         -2.837         -2.549
      20           -2.086         -3.480         -2.837         -2.550
      19           -2.121         -3.480         -2.837         -2.550
```

18	-2.114	-3.480	-2.838	-2.550
17	-2.117	-3.480	-2.838	-2.550
16	-2.132	-3.480	-2.838	-2.550
15	-2.090	-3.480	-2.838	-2.550
14	-2.119	-3.480	-2.838	-2.551
13	-2.167	-3.480	-2.838	-2.551
12	-2.178	-3.480	-2.839	-2.551
11	-2.165	-3.480	-2.839	-2.551
10	-2.176	-3.480	-2.839	-2.551
9	-2.183	-3.480	-2.839	-2.551
8	-2.168	-3.480	-2.839	-2.551
7	-2.191	-3.480	-2.839	-2.552
6	-2.219	-3.480	-2.840	-2.552
5	-2.203	-3.480	-2.840	-2.552
4	-2.188	-3.480	-2.840	-2.552
3	-2.251	-3.480	-2.840	-2.552
2	-2.283	-3.480	-2.840	-2.552
1	-2.267	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 33 with RMSE = .0054977
Min SIC  =  -10.3965 at lag  1 with RMSE = .0055198
Min MAIC = -10.39749 at lag  4 with RMSE = .0055171
```

Euro Area-Switzerland: dfgls lneurchf

```
DF-GLS test for unit root
Variable: lneurchf
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-1.598	-3.480	-2.835	-2.547
34	-1.640	-3.480	-2.835	-2.547
33	-1.665	-3.480	-2.835	-2.548
32	-1.732	-3.480	-2.835	-2.548
31	-1.789	-3.480	-2.835	-2.548
30	-1.799	-3.480	-2.836	-2.548
29	-1.767	-3.480	-2.836	-2.548
28	-1.813	-3.480	-2.836	-2.548
27	-1.882	-3.480	-2.836	-2.549
26	-1.899	-3.480	-2.836	-2.549
25	-1.838	-3.480	-2.836	-2.549
24	-1.757	-3.480	-2.837	-2.549
23	-1.793	-3.480	-2.837	-2.549
22	-1.774	-3.480	-2.837	-2.549
21	-1.689	-3.480	-2.837	-2.549
20	-1.625	-3.480	-2.837	-2.550
19	-1.671	-3.480	-2.837	-2.550
18	-1.687	-3.480	-2.838	-2.550
17	-1.723	-3.480	-2.838	-2.550
16	-1.742	-3.480	-2.838	-2.550
15	-1.748	-3.480	-2.838	-2.550
14	-1.747	-3.480	-2.838	-2.551
13	-1.752	-3.480	-2.838	-2.551

12	-1.805	-3.480	-2.839	-2.551
11	-1.833	-3.480	-2.839	-2.551
10	-1.897	-3.480	-2.839	-2.551
9	-1.935	-3.480	-2.839	-2.551
8	-1.977	-3.480	-2.839	-2.551
7	-1.967	-3.480	-2.839	-2.552
6	-1.947	-3.480	-2.840	-2.552
5	-1.968	-3.480	-2.840	-2.552
4	-1.902	-3.480	-2.840	-2.552
3	-2.053	-3.480	-2.840	-2.552
2	-2.087	-3.480	-2.840	-2.552
1	-2.155	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0033117
Min SIC  = -11.39539 at lag  5 with RMSE = .0033419
Min MAIC = -11.41075 at lag 35 with RMSE = .0033117
```

Nominal Exchange Rate in first differences:

UK-Canada: dfgls D.lngbpcad

```
DF-GLS test for unit root
Variable: D.lngbpcad
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-15.229	-3.480	-2.835	-2.547
34	-15.484	-3.480	-2.835	-2.547
33	-16.432	-3.480	-2.835	-2.548
32	-16.506	-3.480	-2.835	-2.548
31	-16.865	-3.480	-2.835	-2.548
30	-17.063	-3.480	-2.836	-2.548
29	-16.890	-3.480	-2.836	-2.548
28	-17.170	-3.480	-2.836	-2.548
27	-17.521	-3.480	-2.836	-2.549
26	-17.856	-3.480	-2.836	-2.549
25	-18.372	-3.480	-2.836	-2.549
24	-18.720	-3.480	-2.837	-2.549
23	-18.968	-3.480	-2.837	-2.549
22	-19.161	-3.480	-2.837	-2.549
21	-19.929	-3.480	-2.837	-2.549
20	-20.631	-3.480	-2.837	-2.550
19	-20.827	-3.480	-2.837	-2.550
18	-20.890	-3.480	-2.838	-2.550
17	-21.625	-3.480	-2.838	-2.550
16	-22.312	-3.480	-2.838	-2.550
15	-22.792	-3.480	-2.838	-2.550
14	-23.407	-3.480	-2.838	-2.551
13	-24.053	-3.480	-2.838	-2.551
12	-24.271	-3.480	-2.839	-2.551
11	-25.072	-3.480	-2.839	-2.551
10	-25.708	-3.480	-2.839	-2.551
9	-26.465	-3.480	-2.839	-2.551
8	-28.418	-3.480	-2.839	-2.551

7	-30.647	-3.480	-2.839	-2.552
6	-33.799	-3.480	-2.840	-2.552
5	-36.293	-3.480	-2.840	-2.552
4	-39.703	-3.480	-2.840	-2.552
3	-44.538	-3.480	-2.840	-2.552
2	-50.067	-3.480	-2.840	-2.552
1	-62.562	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0049434
Min SIC  = -10.60857 at lag  1 with RMSE = .0049644
Min MAIC =  -8.73991 at lag  9 with RMSE = .0049582
```

UK-Australia: dfgls D.lngbpaud

```
DF-GLS test for unit root
Variable: D.lngbpaud
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	-------- Critical value --------- 1%	5%	10%
35	-14.309	-3.480	-2.835	-2.547
34	-14.747	-3.480	-2.835	-2.547
33	-14.944	-3.480	-2.835	-2.548
32	-14.936	-3.480	-2.835	-2.548
31	-15.259	-3.480	-2.835	-2.548
30	-15.532	-3.480	-2.836	-2.548
29	-15.602	-3.480	-2.836	-2.548
28	-15.777	-3.480	-2.836	-2.548
27	-15.857	-3.480	-2.836	-2.549
26	-16.002	-3.480	-2.836	-2.549
25	-16.546	-3.480	-2.836	-2.549
24	-16.760	-3.480	-2.837	-2.549
23	-17.501	-3.480	-2.837	-2.549
22	-17.825	-3.480	-2.837	-2.549
21	-18.410	-3.480	-2.837	-2.549
20	-18.484	-3.480	-2.837	-2.550
19	-18.472	-3.480	-2.837	-2.550
18	-19.155	-3.480	-2.838	-2.550
17	-19.369	-3.480	-2.838	-2.550
16	-19.971	-3.480	-2.838	-2.550
15	-20.692	-3.480	-2.838	-2.550
14	-21.480	-3.480	-2.838	-2.551
13	-22.551	-3.480	-2.838	-2.551
12	-23.203	-3.480	-2.839	-2.551
11	-24.714	-3.480	-2.839	-2.551
10	-26.338	-3.480	-2.839	-2.551
9	-27.862	-3.480	-2.839	-2.551
8	-29.059	-3.480	-2.839	-2.551
7	-30.392	-3.480	-2.839	-2.552
6	-33.016	-3.480	-2.840	-2.552
5	-35.772	-3.480	-2.840	-2.552
4	-39.223	-3.480	-2.840	-2.552
3	-44.737	-3.480	-2.840	-2.552
2	-50.324	-3.480	-2.840	-2.552

```
      1          -61.236       -3.480       -2.840       -2.552
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 24 with RMSE = .0057369
Min SIC  = -10.31458 at lag  1 with RMSE = .0057506
Min MAIC = -8.586536 at lag 26 with RMSE = .0057361
```

UK-New Zealand: dfgls D.lngbpnzd

```
DF-GLS test for unit root
Variable: D.lngbpnzd
Lag selection: Schwert criterion         Maximum lag  =   35

                                  -------- Critical value ---------
 [lags]       DF-GLS tau             1%             5%          10%
------------------------------------------------------------------------------
     35          -15.332       -3.480       -2.835       -2.547
     34          -15.506       -3.480       -2.835       -2.547
     33          -15.667       -3.480       -2.835       -2.548
     32          -15.838       -3.480       -2.835       -2.548
     31          -16.100       -3.480       -2.835       -2.548
     30          -16.538       -3.480       -2.836       -2.548
     29          -16.439       -3.480       -2.836       -2.548
     28          -16.637       -3.480       -2.836       -2.548
     27          -17.212       -3.480       -2.836       -2.549
     26          -17.210       -3.480       -2.836       -2.549
     25          -17.462       -3.480       -2.836       -2.549
     24          -17.633       -3.480       -2.837       -2.549
     23          -18.207       -3.480       -2.837       -2.549
     22          -18.546       -3.480       -2.837       -2.549
     21          -18.890       -3.480       -2.837       -2.549
     20          -19.002       -3.480       -2.837       -2.550
     19          -19.570       -3.480       -2.837       -2.550
     18          -19.648       -3.480       -2.838       -2.550
     17          -20.251       -3.480       -2.838       -2.550
     16          -20.887       -3.480       -2.838       -2.550
     15          -21.719       -3.480       -2.838       -2.550
     14          -22.226       -3.480       -2.838       -2.551
     13          -23.422       -3.480       -2.838       -2.551
     12          -24.275       -3.480       -2.839       -2.551
     11          -25.750       -3.480       -2.839       -2.551
     10          -27.078       -3.480       -2.839       -2.551
      9          -28.540       -3.480       -2.839       -2.551
      8          -29.869       -3.480       -2.839       -2.551
      7          -31.001       -3.480       -2.839       -2.552
      6          -33.976       -3.480       -2.840       -2.552
      5          -36.297       -3.480       -2.840       -2.552
      4          -39.863       -3.480       -2.840       -2.552
      3          -44.541       -3.480       -2.840       -2.552
      2          -50.272       -3.480       -2.840       -2.552
      1          -62.062       -3.480       -2.840       -2.552
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 30 with RMSE = .0059528
Min SIC  = -10.24066 at lag  1 with RMSE = .0059671
Min MAIC = -8.266491 at lag  2 with RMSE = .0059669
```

UK-Sweden: dfgls D.lngbpsek

```
DF-GLS test for unit root
Variable: D.lngbpsek
Lag selection: Schwert criterion         Maximum lag   =    35

                               -------- Critical value ---------
 [lags]      DF-GLS tau            1%           5%           10%
-------------------------------------------------------------
     35         -14.749        -3.480       -2.835       -2.547
     34         -14.824        -3.480       -2.835       -2.547
     33         -15.729        -3.480       -2.835       -2.548
     32         -16.145        -3.480       -2.835       -2.548
     31         -16.349        -3.480       -2.835       -2.548
     30         -16.284        -3.480       -2.836       -2.548
     29         -16.219        -3.480       -2.836       -2.548
     28         -16.424        -3.480       -2.836       -2.548
     27         -16.565        -3.480       -2.836       -2.549
     26         -16.574        -3.480       -2.836       -2.549
     25         -17.229        -3.480       -2.836       -2.549
     24         -17.786        -3.480       -2.837       -2.549
     23         -18.153        -3.480       -2.837       -2.549
     22         -18.836        -3.480       -2.837       -2.549
     21         -19.267        -3.480       -2.837       -2.549
     20         -19.869        -3.480       -2.837       -2.550
     19         -20.582        -3.480       -2.837       -2.550
     18         -20.348        -3.480       -2.838       -2.550
     17         -20.795        -3.480       -2.838       -2.550
     16         -21.409        -3.480       -2.838       -2.550
     15         -22.046        -3.480       -2.838       -2.550
     14         -23.333        -3.480       -2.838       -2.551
     13         -24.005        -3.480       -2.838       -2.551
     12         -24.324        -3.480       -2.839       -2.551
     11         -25.111        -3.480       -2.839       -2.551
     10         -26.442        -3.480       -2.839       -2.551
      9         -28.130        -3.480       -2.839       -2.551
      8         -29.791        -3.480       -2.839       -2.551
      7         -31.603        -3.480       -2.839       -2.552
      6         -34.240        -3.480       -2.840       -2.552
      5         -36.909        -3.480       -2.840       -2.552
      4         -40.500        -3.480       -2.840       -2.552
      3         -45.108        -3.480       -2.840       -2.552
      2         -51.447        -3.480       -2.840       -2.552
      1         -62.015        -3.480       -2.840       -2.552
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0051039
Min SIC  = -10.54536 at lag  1 with RMSE = .0051238
Min MAIC = -8.563359 at lag  1 with RMSE = .0051238
```

Canada-Australia: dfgls D.lncadaud

```
DF-GLS test for unit root
Variable: D.lncadaud
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	1%	5%	10%
		-------- Critical value ---------		
35	-13.089	-3.480	-2.835	-2.547
34	-13.517	-3.480	-2.835	-2.547
33	-13.883	-3.480	-2.835	-2.548
32	-13.834	-3.480	-2.835	-2.548
31	-14.137	-3.480	-2.835	-2.548
30	-14.526	-3.480	-2.836	-2.548
29	-14.798	-3.480	-2.836	-2.548
28	-14.822	-3.480	-2.836	-2.548
27	-15.186	-3.480	-2.836	-2.549
26	-15.277	-3.480	-2.836	-2.549
25	-15.856	-3.480	-2.836	-2.549
24	-16.169	-3.480	-2.837	-2.549
23	-16.978	-3.480	-2.837	-2.549
22	-17.296	-3.480	-2.837	-2.549
21	-17.789	-3.480	-2.837	-2.549
20	-17.940	-3.480	-2.837	-2.550
19	-18.110	-3.480	-2.837	-2.550
18	-19.102	-3.480	-2.838	-2.550
17	-20.304	-3.480	-2.838	-2.550
16	-20.920	-3.480	-2.838	-2.550
15	-21.522	-3.480	-2.838	-2.550
14	-23.021	-3.480	-2.838	-2.551
13	-23.806	-3.480	-2.838	-2.551
12	-24.363	-3.480	-2.839	-2.551
11	-25.713	-3.480	-2.839	-2.551
10	-27.514	-3.480	-2.839	-2.551
9	-29.388	-3.480	-2.839	-2.551
8	-29.980	-3.480	-2.839	-2.551
7	-31.996	-3.480	-2.839	-2.552
6	-34.484	-3.480	-2.840	-2.552
5	-37.076	-3.480	-2.840	-2.552
4	-40.606	-3.480	-2.840	-2.552
3	-46.298	-3.480	-2.840	-2.552
2	-51.864	-3.480	-2.840	-2.552
1	-61.659	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0050313
Min SIC  = -10.57056 at lag  1 with RMSE = .0050597
Min MAIC = -8.859317 at lag 35 with RMSE = .0050313
```

Canada-New Zealand: dfgls D.lncadnzd

```
DF-GLS test for unit root
Variable: D.lncadnzd
Lag selection: Schwert criterion        Maximum lag  =   35
```

[lags]	DF-GLS tau	1%	5%	10%
		-------- Critical value ---------		
35	-15.218	-3.480	-2.835	-2.547
34	-15.110	-3.480	-2.835	-2.547

33	-15.333	-3.480	-2.835	-2.548
32	-15.116	-3.480	-2.835	-2.548
31	-15.362	-3.480	-2.835	-2.548
30	-15.870	-3.480	-2.836	-2.548
29	-15.998	-3.480	-2.836	-2.548
28	-15.936	-3.480	-2.836	-2.548
27	-16.686	-3.480	-2.836	-2.549
26	-16.653	-3.480	-2.836	-2.549
25	-17.139	-3.480	-2.836	-2.549
24	-17.339	-3.480	-2.837	-2.549
23	-17.755	-3.480	-2.837	-2.549
22	-17.899	-3.480	-2.837	-2.549
21	-18.046	-3.480	-2.837	-2.549
20	-18.305	-3.480	-2.837	-2.550
19	-19.078	-3.480	-2.837	-2.550
18	-19.584	-3.480	-2.838	-2.550
17	-20.581	-3.480	-2.838	-2.550
16	-21.262	-3.480	-2.838	-2.550
15	-21.794	-3.480	-2.838	-2.550
14	-22.379	-3.480	-2.838	-2.551
13	-23.554	-3.480	-2.838	-2.551
12	-24.353	-3.480	-2.839	-2.551
11	-25.855	-3.480	-2.839	-2.551
10	-27.115	-3.480	-2.839	-2.551
9	-28.560	-3.480	-2.839	-2.551
8	-29.992	-3.480	-2.839	-2.551
7	-31.602	-3.480	-2.839	-2.552
6	-34.453	-3.480	-2.840	-2.552
5	-37.518	-3.480	-2.840	-2.552
4	-40.934	-3.480	-2.840	-2.552
3	-45.986	-3.480	-2.840	-2.552
2	-51.332	-3.480	-2.840	-2.552
1	-62.602	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0055776
Min SIC  = -10.36822 at lag  1 with RMSE = .0055984
Min MAIC = -8.296971 at lag 20 with RMSE = .0055883
```

Canada-Sweden: dfgls D.lncadsek

```
DF-GLS test for unit root
Variable: D.lncadsek
Lag selection: Schwert criterion         Maximum lag   =    35
```

		-------- Critical value	---------	
[lags]	DF-GLS tau	1%	5%	10%
35	-15.063	-3.480	-2.835	-2.547
34	-15.186	-3.480	-2.835	-2.547
33	-15.999	-3.480	-2.835	-2.548
32	-16.254	-3.480	-2.835	-2.548
31	-16.741	-3.480	-2.835	-2.548
30	-17.076	-3.480	-2.836	-2.548
29	-17.480	-3.480	-2.836	-2.548
28	-17.394	-3.480	-2.836	-2.548

```
     27         -17.522       -3.480       -2.836       -2.549
     26         -17.655       -3.480       -2.836       -2.549
     25         -18.231       -3.480       -2.836       -2.549
     24         -18.526       -3.480       -2.837       -2.549
     23         -18.920       -3.480       -2.837       -2.549
     22         -19.312       -3.480       -2.837       -2.549
     21         -19.654       -3.480       -2.837       -2.549
     20         -20.690       -3.480       -2.837       -2.550
     19         -20.439       -3.480       -2.837       -2.550
     18         -20.544       -3.480       -2.838       -2.550
     17         -21.163       -3.480       -2.838       -2.550
     16         -21.920       -3.480       -2.838       -2.550
     15         -22.387       -3.480       -2.838       -2.550
     14         -23.252       -3.480       -2.838       -2.551
     13         -24.604       -3.480       -2.838       -2.551
     12         -25.088       -3.480       -2.839       -2.551
     11         -26.336       -3.480       -2.839       -2.551
     10         -27.367       -3.480       -2.839       -2.551
      9         -28.099       -3.480       -2.839       -2.551
      8         -29.505       -3.480       -2.839       -2.551
      7         -31.677       -3.480       -2.839       -2.552
      6         -34.726       -3.480       -2.840       -2.552
      5         -36.822       -3.480       -2.840       -2.552
      4         -39.678       -3.480       -2.840       -2.552
      3         -44.816       -3.480       -2.840       -2.552
      2         -50.700       -3.480       -2.840       -2.552
      1         -61.883       -3.480       -2.840       -2.552
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0053856
Min SIC  = -10.43722 at lag  1 with RMSE = .0054085
Min MAIC = -8.429384 at lag  1 with RMSE = .0054085
```

Australia-New Zealand: dfgls D.lnaudnzd

```
DF-GLS test for unit root
Variable: D.lnaudnzd
Lag selection: Schwert criterion        Maximum lag   =    35

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     35         -12.600       -3.480       -2.835       -2.547
     34         -12.729       -3.480       -2.835       -2.547
     33         -12.703       -3.480       -2.835       -2.548
     32         -12.672       -3.480       -2.835       -2.548
     31         -12.853       -3.480       -2.835       -2.548
     30         -13.216       -3.480       -2.836       -2.548
     29         -13.537       -3.480       -2.836       -2.548
     28         -13.844       -3.480       -2.836       -2.548
     27         -14.112       -3.480       -2.836       -2.549
     26         -14.323       -3.480       -2.836       -2.549
     25         -14.654       -3.480       -2.836       -2.549
     24         -14.633       -3.480       -2.837       -2.549
     23         -15.292       -3.480       -2.837       -2.549
     22         -15.675       -3.480       -2.837       -2.549
     21         -16.232       -3.480       -2.837       -2.549
```

20	-16.621	-3.480	-2.837	-2.550
19	-16.942	-3.480	-2.837	-2.550
18	-17.309	-3.480	-2.838	-2.550
17	-17.823	-3.480	-2.838	-2.550
16	-18.706	-3.480	-2.838	-2.550
15	-19.165	-3.480	-2.838	-2.550
14	-19.890	-3.480	-2.838	-2.551
13	-20.621	-3.480	-2.838	-2.551
12	-22.251	-3.480	-2.839	-2.551
11	-23.406	-3.480	-2.839	-2.551
10	-24.462	-3.480	-2.839	-2.551
9	-25.950	-3.480	-2.839	-2.551
8	-27.591	-3.480	-2.839	-2.551
7	-29.416	-3.480	-2.839	-2.552
6	-32.525	-3.480	-2.840	-2.552
5	-35.525	-3.480	-2.840	-2.552
4	-39.110	-3.480	-2.840	-2.552
3	-44.366	-3.480	-2.840	-2.552
2	-50.349	-3.480	-2.840	-2.552
1	-61.676	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 24 with RMSE = .0039968
Min SIC  = -11.03525 at lag  1 with RMSE = .0040107
Min MAIC = -9.974584 at lag 32 with RMSE = .0039951
```

Australia-Sweden: dfgls D.lnaudsek

```
DF-GLS test for unit root
Variable: D.lnaudsek
Lag selection: Schwert criterion         Maximum lag   =    35
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
35	-12.951	-3.480	-2.835	-2.547
34	-13.267	-3.480	-2.835	-2.547
33	-13.802	-3.480	-2.835	-2.548
32	-13.893	-3.480	-2.835	-2.548
31	-14.179	-3.480	-2.835	-2.548
30	-14.619	-3.480	-2.836	-2.548
29	-15.292	-3.480	-2.836	-2.548
28	-15.605	-3.480	-2.836	-2.548
27	-15.863	-3.480	-2.836	-2.549
26	-15.665	-3.480	-2.836	-2.549
25	-16.168	-3.480	-2.836	-2.549
24	-16.422	-3.480	-2.837	-2.549
23	-17.189	-3.480	-2.837	-2.549
22	-17.737	-3.480	-2.837	-2.549
21	-17.998	-3.480	-2.837	-2.549
20	-18.266	-3.480	-2.837	-2.550
19	-17.779	-3.480	-2.837	-2.550
18	-18.669	-3.480	-2.838	-2.550
17	-19.018	-3.480	-2.838	-2.550
16	-19.951	-3.480	-2.838	-2.550
15	-20.743	-3.480	-2.838	-2.550
14	-21.754	-3.480	-2.838	-2.551

13	-22.877	-3.480	-2.838	-2.551
12	-24.308	-3.480	-2.839	-2.551
11	-25.748	-3.480	-2.839	-2.551
10	-26.699	-3.480	-2.839	-2.551
9	-28.126	-3.480	-2.839	-2.551
8	-29.375	-3.480	-2.839	-2.551
7	-31.100	-3.480	-2.839	-2.552
6	-33.882	-3.480	-2.840	-2.552
5	-36.571	-3.480	-2.840	-2.552
4	-38.929	-3.480	-2.840	-2.552
3	-45.297	-3.480	-2.840	-2.552
2	-50.305	-3.480	-2.840	-2.552
1	-60.282	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE =  .005651
Min SIC  =  -10.3366 at lag  1 with RMSE = .0056876
Min MAIC = -8.820391 at lag 35 with RMSE = .0056506
```

New Zealand-Sweden: dfgls D.lnnzdsek

```
DF-GLS test for unit root
Variable: D.lnnzdsek
Lag selection: Schwert criterion        Maximum lag   =    35
```

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
35	-15.562	-3.480	-2.835	-2.547
34	-15.485	-3.480	-2.835	-2.547
33	-15.613	-3.480	-2.835	-2.548
32	-15.696	-3.480	-2.835	-2.548
31	-15.615	-3.480	-2.835	-2.548
30	-16.200	-3.480	-2.836	-2.548
29	-16.975	-3.480	-2.836	-2.548
28	-17.237	-3.480	-2.836	-2.548
27	-17.804	-3.480	-2.836	-2.549
26	-17.480	-3.480	-2.836	-2.549
25	-18.242	-3.480	-2.836	-2.549
24	-18.419	-3.480	-2.837	-2.549
23	-18.698	-3.480	-2.837	-2.549
22	-19.071	-3.480	-2.837	-2.549
21	-19.191	-3.480	-2.837	-2.549
20	-19.641	-3.480	-2.837	-2.550
19	-19.657	-3.480	-2.837	-2.550
18	-20.382	-3.480	-2.838	-2.550
17	-20.942	-3.480	-2.838	-2.550
16	-22.041	-3.480	-2.838	-2.550
15	-22.971	-3.480	-2.838	-2.550
14	-23.791	-3.480	-2.838	-2.551
13	-25.247	-3.480	-2.838	-2.551
12	-26.236	-3.480	-2.839	-2.551
11	-27.122	-3.480	-2.839	-2.551
10	-27.703	-3.480	-2.839	-2.551
9	-29.055	-3.480	-2.839	-2.551
8	-30.286	-3.480	-2.839	-2.551

7	-31.906	-3.480	-2.839	-2.552
6	-34.600	-3.480	-2.840	-2.552
5	-37.242	-3.480	-2.840	-2.552
4	-40.478	-3.480	-2.840	-2.552
3	-46.013	-3.480	-2.840	-2.552
2	-51.450	-3.480	-2.840	-2.552
1	-62.160	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0059715
Min SIC  = -10.22957 at lag  1 with RMSE = .0060002
Min MAIC = -8.164858 at lag  1 with RMSE = .0060002
```

US-Euro Area: dfgls D.lnusdeur

```
DF-GLS test for unit root
Variable: D.lnusdeur
Lag selection: Schwert criterion        Maximum lag   =    35
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
35	-13.422	-3.480	-2.835	-2.547
34	-13.582	-3.480	-2.835	-2.547
33	-13.943	-3.480	-2.835	-2.548
32	-14.041	-3.480	-2.835	-2.548
31	-14.132	-3.480	-2.835	-2.548
30	-14.245	-3.480	-2.836	-2.548
29	-14.898	-3.480	-2.836	-2.548
28	-15.159	-3.480	-2.836	-2.548
27	-15.312	-3.480	-2.836	-2.549
26	-15.710	-3.480	-2.836	-2.549
25	-16.251	-3.480	-2.836	-2.549
24	-16.514	-3.480	-2.837	-2.549
23	-16.959	-3.480	-2.837	-2.549
22	-17.278	-3.480	-2.837	-2.549
21	-17.687	-3.480	-2.837	-2.549
20	-18.301	-3.480	-2.837	-2.550
19	-18.702	-3.480	-2.837	-2.550
18	-19.328	-3.480	-2.838	-2.550
17	-19.922	-3.480	-2.838	-2.550
16	-20.809	-3.480	-2.838	-2.550
15	-21.525	-3.480	-2.838	-2.550
14	-22.664	-3.480	-2.838	-2.551
13	-23.249	-3.480	-2.838	-2.551
12	-23.517	-3.480	-2.839	-2.551
11	-24.447	-3.480	-2.839	-2.551
10	-25.603	-3.480	-2.839	-2.551
9	-26.831	-3.480	-2.839	-2.551
8	-28.475	-3.480	-2.839	-2.551
7	-30.666	-3.480	-2.839	-2.552
6	-32.348	-3.480	-2.840	-2.552
5	-34.680	-3.480	-2.840	-2.552
4	-39.334	-3.480	-2.840	-2.552
3	-44.315	-3.480	-2.840	-2.552
2	-49.884	-3.480	-2.840	-2.552
1	-60.925	-3.480	-2.840	-2.552

```
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 30 with RMSE = .0049608
Min SIC  = -10.60488 at lag  1 with RMSE = .0049736
Min MAIC =  -9.12699 at lag 30 with RMSE = .0049608
```

US-Switzerland: dfgls D.lnusdchf

```
DF-GLS test for unit root
Variable: D.lnusdchf
Lag selection: Schwert criterion          Maximum lag   =    35

                                    -------- Critical value ---------
 [lags]      DF-GLS tau            1%             5%             10%
------------------------------------------------------------------------------
     35         -15.362        -3.480         -2.835         -2.547
     34         -15.606        -3.480         -2.835         -2.547
     33         -15.948        -3.480         -2.835         -2.548
     32         -15.993        -3.480         -2.835         -2.548
     31         -15.844        -3.480         -2.835         -2.548
     30         -15.642        -3.480         -2.836         -2.548
     29         -16.082        -3.480         -2.836         -2.548
     28         -16.452        -3.480         -2.836         -2.548
     27         -16.247        -3.480         -2.836         -2.549
     26         -16.539        -3.480         -2.836         -2.549
     25         -17.327        -3.480         -2.836         -2.549
     24         -17.812        -3.480         -2.837         -2.549
     23         -18.665        -3.480         -2.837         -2.549
     22         -19.094        -3.480         -2.837         -2.549
     21         -19.685        -3.480         -2.837         -2.549
     20         -20.386        -3.480         -2.837         -2.550
     19         -20.202        -3.480         -2.837         -2.550
     18         -20.442        -3.480         -2.838         -2.550
     17         -21.106        -3.480         -2.838         -2.550
     16         -21.730        -3.480         -2.838         -2.550
     15         -22.288        -3.480         -2.838         -2.550
     14         -23.542        -3.480         -2.838         -2.551
     13         -24.119        -3.480         -2.838         -2.551
     12         -24.529        -3.480         -2.839         -2.551
     11         -25.443        -3.480         -2.839         -2.551
     10         -26.785        -3.480         -2.839         -2.551
      9         -27.996        -3.480         -2.839         -2.551
      8         -29.485        -3.480         -2.839         -2.551
      7         -31.575        -3.480         -2.839         -2.552
      6         -33.498        -3.480         -2.840         -2.552
      5         -35.777        -3.480         -2.840         -2.552
      4         -39.578        -3.480         -2.840         -2.552
      3         -44.819        -3.480         -2.840         -2.552
      2         -50.357        -3.480         -2.840         -2.552
      1         -60.440        -3.480         -2.840         -2.552
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 32 with RMSE = .0055021
Min SIC  =   -10.395 at lag  1 with RMSE = .0055239
Min MAIC = -8.536022 at lag  1 with RMSE = .0055239
```

Euro Area-Switzerland: dfgls D.lneurchf

```
DF-GLS test for unit root
Variable: D.lneurchf
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
35	-16.498	-3.480	-2.835	-2.547
34	-16.754	-3.480	-2.835	-2.547
33	-16.617	-3.480	-2.835	-2.548
32	-16.668	-3.480	-2.835	-2.548
31	-16.299	-3.480	-2.835	-2.548
30	-16.044	-3.480	-2.836	-2.548
29	-16.233	-3.480	-2.836	-2.548
28	-16.832	-3.480	-2.836	-2.548
27	-16.699	-3.480	-2.836	-2.549
26	-16.373	-3.480	-2.836	-2.549
25	-16.512	-3.480	-2.836	-2.549
24	-17.396	-3.480	-2.837	-2.549
23	-18.601	-3.480	-2.837	-2.549
22	-18.638	-3.480	-2.837	-2.549
21	-19.302	-3.480	-2.837	-2.549
20	-20.836	-3.480	-2.837	-2.550
19	-22.351	-3.480	-2.837	-2.550
18	-22.449	-3.480	-2.838	-2.550
17	-22.991	-3.480	-2.838	-2.550
16	-23.302	-3.480	-2.838	-2.550
15	-23.903	-3.480	-2.838	-2.550
14	-24.764	-3.480	-2.838	-2.551
13	-25.834	-3.480	-2.838	-2.551
12	-26.962	-3.480	-2.839	-2.551
11	-27.428	-3.480	-2.839	-2.551
10	-28.413	-3.480	-2.839	-2.551
9	-28.921	-3.480	-2.839	-2.551
8	-29.965	-3.480	-2.839	-2.551
7	-31.131	-3.480	-2.839	-2.552
6	-33.515	-3.480	-2.840	-2.552
5	-36.727	-3.480	-2.840	-2.552
4	-39.954	-3.480	-2.840	-2.552
3	-46.918	-3.480	-2.840	-2.552
2	-50.138	-3.480	-2.840	-2.552
1	-59.745	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0033126
Min SIC  = -11.39589 at lag  3 with RMSE =  .003345
Min MAIC = -9.729121 at lag  1 with RMSE = .0033551
```

Interest Rate Differential in levels:

UK-Canada: dfgls lnukcair

```
DF-GLS test for unit root
Variable: lnukcair
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	1% Critical value	5% Critical value	10% Critical value
35	-2.038	-3.480	-2.835	-2.547
34	-1.985	-3.480	-2.835	-2.547
33	-1.960	-3.480	-2.835	-2.548
32	-2.035	-3.480	-2.835	-2.548
31	-2.119	-3.480	-2.835	-2.548
30	-2.179	-3.480	-2.836	-2.548
29	-2.234	-3.480	-2.836	-2.548
28	-2.218	-3.480	-2.836	-2.548
27	-2.186	-3.480	-2.836	-2.549
26	-2.202	-3.480	-2.836	-2.549
25	-2.198	-3.480	-2.836	-2.549
24	-2.239	-3.480	-2.837	-2.549
23	-2.287	-3.480	-2.837	-2.549
22	-2.292	-3.480	-2.837	-2.549
21	-2.318	-3.480	-2.837	-2.549
20	-2.229	-3.480	-2.837	-2.550
19	-2.255	-3.480	-2.837	-2.550
18	-2.324	-3.480	-2.838	-2.550
17	-2.461	-3.480	-2.838	-2.550
16	-2.591	-3.480	-2.838	-2.550
15	-2.793	-3.480	-2.838	-2.550
14	-2.779	-3.480	-2.838	-2.551
13	-2.639	-3.480	-2.838	-2.551
12	-2.848	-3.480	-2.839	-2.551
11	-3.066	-3.480	-2.839	-2.551
10	-3.183	-3.480	-2.839	-2.551
9	-3.270	-3.480	-2.839	-2.551
8	-3.418	-3.480	-2.839	-2.551
7	-3.575	-3.480	-2.839	-2.552
6	-3.686	-3.480	-2.840	-2.552
5	-3.984	-3.480	-2.840	-2.552
4	-4.233	-3.480	-2.840	-2.552
3	-4.660	-3.480	-2.840	-2.552
2	-5.156	-3.480	-2.840	-2.552
1	-5.807	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE =  .034079
Min SIC  =  -6.72746 at lag 18 with RMSE = .0342231
Min MAIC = -6.747833 at lag 35 with RMSE =  .034079
```

UK-Australia: dfgls lnukauir

```
DF-GLS test for unit root
Variable: lnukauir
Lag selection: Schwert criterion        Maximum lag  =   35
```

[lags]	DF-GLS tau	1% Critical value	5% Critical value	10% Critical value
35	-0.086	-3.480	-2.835	-2.547
34	-0.056	-3.480	-2.835	-2.547

33	-0.020	-3.480	-2.835	-2.548
32	-0.081	-3.480	-2.835	-2.548
31	-0.129	-3.480	-2.835	-2.548
30	-0.172	-3.480	-2.836	-2.548
29	-0.205	-3.480	-2.836	-2.548
28	-0.185	-3.480	-2.836	-2.548
27	-0.160	-3.480	-2.836	-2.549
26	-0.194	-3.480	-2.836	-2.549
25	-0.194	-3.480	-2.836	-2.549
24	-0.226	-3.480	-2.837	-2.549
23	-0.266	-3.480	-2.837	-2.549
22	-0.282	-3.480	-2.837	-2.549
21	-0.292	-3.480	-2.837	-2.549
20	-0.203	-3.480	-2.837	-2.550
19	-0.217	-3.480	-2.837	-2.550
18	-0.275	-3.480	-2.838	-2.550
17	-0.380	-3.480	-2.838	-2.550
16	-0.473	-3.480	-2.838	-2.550
15	-0.604	-3.480	-2.838	-2.550
14	-0.612	-3.480	-2.838	-2.551
13	-0.539	-3.480	-2.838	-2.551
12	-0.698	-3.480	-2.839	-2.551
11	-0.879	-3.480	-2.839	-2.551
10	-0.981	-3.480	-2.839	-2.551
9	-1.048	-3.480	-2.839	-2.551
8	-1.150	-3.480	-2.839	-2.551
7	-1.240	-3.480	-2.839	-2.552
6	-1.302	-3.480	-2.840	-2.552
5	-1.494	-3.480	-2.840	-2.552
4	-1.615	-3.480	-2.840	-2.552
3	-1.873	-3.480	-2.840	-2.552
2	-2.167	-3.480	-2.840	-2.552
1	-2.581	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0322616
Min SIC  = -6.837242 at lag 21 with RMSE = .0323383
Min MAIC = -6.858857 at lag 35 with RMSE = .0322572
```

UK-New Zealand: dfgls lnuknzir

```
DF-GLS test for unit root
Variable: lnuknzir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-0.443	-3.480	-2.835	-2.547
34	-0.410	-3.480	-2.835	-2.547
33	-0.377	-3.480	-2.835	-2.548
32	-0.422	-3.480	-2.835	-2.548
31	-0.474	-3.480	-2.835	-2.548
30	-0.520	-3.480	-2.836	-2.548

29	-0.550	-3.480	-2.836	-2.548
28	-0.518	-3.480	-2.836	-2.548
27	-0.548	-3.480	-2.836	-2.549
26	-0.592	-3.480	-2.836	-2.549
25	-0.593	-3.480	-2.836	-2.549
24	-0.649	-3.480	-2.837	-2.549
23	-0.686	-3.480	-2.837	-2.549
22	-0.726	-3.480	-2.837	-2.549
21	-0.743	-3.480	-2.837	-2.549
20	-0.684	-3.480	-2.837	-2.550
19	-0.717	-3.480	-2.837	-2.550
18	-0.801	-3.480	-2.838	-2.550
17	-0.910	-3.480	-2.838	-2.550
16	-1.024	-3.480	-2.838	-2.550
15	-1.179	-3.480	-2.838	-2.550
14	-1.216	-3.480	-2.838	-2.551
13	-1.176	-3.480	-2.838	-2.551
12	-1.367	-3.480	-2.839	-2.551
11	-1.569	-3.480	-2.839	-2.551
10	-1.689	-3.480	-2.839	-2.551
9	-1.764	-3.480	-2.839	-2.551
8	-1.907	-3.480	-2.839	-2.551
7	-2.039	-3.480	-2.839	-2.552
6	-2.186	-3.480	-2.840	-2.552
5	-2.450	-3.480	-2.840	-2.552
4	-2.626	-3.480	-2.840	-2.552
3	-2.972	-3.480	-2.840	-2.552
2	-3.456	-3.480	-2.840	-2.552
1	-3.963	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 33 with RMSE = .0378812
Min SIC  = -6.517897 at lag 19 with RMSE = .0379814
Min MAIC = -6.537921 at lag 35 with RMSE = .0378709
```

UK-Sweden: dfgls lnukseir

```
DF-GLS test for unit root
Variable: lnukseir
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-1.007	-3.480	-2.835	-2.547
34	-0.972	-3.480	-2.835	-2.547
33	-0.943	-3.480	-2.835	-2.548
32	-0.974	-3.480	-2.835	-2.548
31	-1.002	-3.480	-2.835	-2.548
30	-1.029	-3.480	-2.836	-2.548
29	-1.054	-3.480	-2.836	-2.548
28	-1.040	-3.480	-2.836	-2.548
27	-1.036	-3.480	-2.836	-2.549
26	-1.044	-3.480	-2.836	-2.549
25	-1.033	-3.480	-2.836	-2.549
24	-1.046	-3.480	-2.837	-2.549

23	-1.072	-3.480	-2.837	-2.549
22	-1.089	-3.480	-2.837	-2.549
21	-1.093	-3.480	-2.837	-2.549
20	-1.003	-3.480	-2.837	-2.550
19	-0.992	-3.480	-2.837	-2.550
18	-0.996	-3.480	-2.838	-2.550
17	-1.043	-3.480	-2.838	-2.550
16	-1.084	-3.480	-2.838	-2.550
15	-1.162	-3.480	-2.838	-2.550
14	-1.162	-3.480	-2.838	-2.551
13	-1.073	-3.480	-2.838	-2.551
12	-1.144	-3.480	-2.839	-2.551
11	-1.244	-3.480	-2.839	-2.551
10	-1.290	-3.480	-2.839	-2.551
9	-1.310	-3.480	-2.839	-2.551
8	-1.349	-3.480	-2.839	-2.551
7	-1.398	-3.480	-2.839	-2.552
6	-1.388	-3.480	-2.840	-2.552
5	-1.511	-3.480	-2.840	-2.552
4	-1.560	-3.480	-2.840	-2.552
3	-1.691	-3.480	-2.840	-2.552
2	-1.844	-3.480	-2.840	-2.552
1	-2.064	-3.480	-2.840	-2.552

Opt lag (Ng-Perron seq t) = 35 with RMSE = .0374599
Min SIC = -6.541599 at lag 14 with RMSE = .037644
Min MAIC = -6.560395 at lag 21 with RMSE = .0375116

Canada-Australia: dfgls lncaauir

DF-GLS test for unit root
Variable: lncaauir
Lag selection: Schwert criterion   Maximum lag   =   35

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
35	-0.357	-3.480	-2.835	-2.547
34	-0.316	-3.480	-2.835	-2.547
33	-0.358	-3.480	-2.835	-2.548
32	-0.358	-3.480	-2.835	-2.548
31	-0.349	-3.480	-2.835	-2.548
30	-0.359	-3.480	-2.836	-2.548
29	-0.366	-3.480	-2.836	-2.548
28	-0.389	-3.480	-2.836	-2.548
27	-0.343	-3.480	-2.836	-2.549
26	-0.411	-3.480	-2.836	-2.549
25	-0.402	-3.480	-2.836	-2.549
24	-0.403	-3.480	-2.837	-2.549
23	-0.408	-3.480	-2.837	-2.549
22	-0.392	-3.480	-2.837	-2.549
21	-0.427	-3.480	-2.837	-2.549
20	-0.425	-3.480	-2.837	-2.550
19	-0.428	-3.480	-2.837	-2.550
18	-0.477	-3.480	-2.838	-2.550
17	-0.467	-3.480	-2.838	-2.550

16	-0.447	-3.480	-2.838	-2.550
15	-0.467	-3.480	-2.838	-2.550
14	-0.529	-3.480	-2.838	-2.551
13	-0.534	-3.480	-2.838	-2.551
12	-0.557	-3.480	-2.839	-2.551
11	-0.533	-3.480	-2.839	-2.551
10	-0.447	-3.480	-2.839	-2.551
9	-0.453	-3.480	-2.839	-2.551
8	-0.466	-3.480	-2.839	-2.551
7	-0.494	-3.480	-2.839	-2.552
6	-0.577	-3.480	-2.840	-2.552
5	-0.632	-3.480	-2.840	-2.552
4	-0.648	-3.480	-2.840	-2.552
3	-0.710	-3.480	-2.840	-2.552
2	-0.744	-3.480	-2.840	-2.552
1	-0.767	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0132271
Min SIC  = -8.627105 at lag  7 with RMSE = .0133234
Min MAIC = -8.641778 at lag 35 with RMSE = .0132271
```

Canada-New Zealand: dfgls lncanzir

```
DF-GLS test for unit root
Variable: lncanzir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-0.463	-3.480	-2.835	-2.547
34	-0.438	-3.480	-2.835	-2.547
33	-0.475	-3.480	-2.835	-2.548
32	-0.493	-3.480	-2.835	-2.548
31	-0.501	-3.480	-2.835	-2.548
30	-0.491	-3.480	-2.836	-2.548
29	-0.480	-3.480	-2.836	-2.548
28	-0.424	-3.480	-2.836	-2.548
27	-0.474	-3.480	-2.836	-2.549
26	-0.473	-3.480	-2.836	-2.549
25	-0.477	-3.480	-2.836	-2.549
24	-0.477	-3.480	-2.837	-2.549
23	-0.459	-3.480	-2.837	-2.549
22	-0.451	-3.480	-2.837	-2.549
21	-0.495	-3.480	-2.837	-2.549
20	-0.490	-3.480	-2.837	-2.550
19	-0.506	-3.480	-2.837	-2.550
18	-0.570	-3.480	-2.838	-2.550
17	-0.585	-3.480	-2.838	-2.550
16	-0.631	-3.480	-2.838	-2.550
15	-0.669	-3.480	-2.838	-2.550
14	-0.701	-3.480	-2.838	-2.551
13	-0.704	-3.480	-2.838	-2.551
12	-0.782	-3.480	-2.839	-2.551

11	-0.803	-3.480	-2.839	-2.551
10	-0.835	-3.480	-2.839	-2.551
9	-0.924	-3.480	-2.839	-2.551
8	-1.013	-3.480	-2.839	-2.551
7	-1.051	-3.480	-2.839	-2.552
6	-1.149	-3.480	-2.840	-2.552
5	-1.198	-3.480	-2.840	-2.552
4	-1.289	-3.480	-2.840	-2.552
3	-1.397	-3.480	-2.840	-2.552
2	-1.612	-3.480	-2.840	-2.552
1	-1.793	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0243483
Min SIC  = -7.403332 at lag 13 with RMSE = .0244809
Min MAIC = -7.421412 at lag 29 with RMSE = .0243668
```

Canada-Sweden: dfgls lncaseir

```
DF-GLS test for unit root
Variable: lncaseir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
35	-0.930	-3.480	-2.835	-2.547
34	-0.906	-3.480	-2.835	-2.547
33	-0.913	-3.480	-2.835	-2.548
32	-0.912	-3.480	-2.835	-2.548
31	-0.911	-3.480	-2.835	-2.548
30	-0.910	-3.480	-2.836	-2.548
29	-0.921	-3.480	-2.836	-2.548
28	-0.962	-3.480	-2.836	-2.548
27	-0.957	-3.480	-2.836	-2.549
26	-0.967	-3.480	-2.836	-2.549
25	-0.969	-3.480	-2.836	-2.549
24	-0.964	-3.480	-2.837	-2.549
23	-0.962	-3.480	-2.837	-2.549
22	-0.932	-3.480	-2.837	-2.549
21	-0.935	-3.480	-2.837	-2.549
20	-0.941	-3.480	-2.837	-2.550
19	-0.944	-3.480	-2.837	-2.550
18	-0.955	-3.480	-2.838	-2.550
17	-0.952	-3.480	-2.838	-2.550
16	-0.942	-3.480	-2.838	-2.550
15	-0.942	-3.480	-2.838	-2.550
14	-0.955	-3.480	-2.838	-2.551
13	-0.954	-3.480	-2.838	-2.551
12	-1.006	-3.480	-2.839	-2.551
11	-0.976	-3.480	-2.839	-2.551
10	-0.935	-3.480	-2.839	-2.551
9	-0.937	-3.480	-2.839	-2.551
8	-0.942	-3.480	-2.839	-2.551
7	-0.946	-3.480	-2.839	-2.552

6	-0.958	-3.480	-2.840	-2.552
5	-0.963	-3.480	-2.840	-2.552
4	-0.973	-3.480	-2.840	-2.552
3	-0.973	-3.480	-2.840	-2.552
2	-0.989	-3.480	-2.840	-2.552
1	-1.008	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 29 with RMSE = .0222035
Min SIC  = -7.609164 at lag  1 with RMSE = .0222424
Min MAIC = -7.610978 at lag  1 with RMSE = .0222424
```

Australia-New Zealand: dfgls lnaunzir

```
DF-GLS test for unit root
Variable: lnaunzir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	-------- Critical value --------- 1%	5%	10%
35	-1.517	-3.480	-2.835	-2.547
34	-1.479	-3.480	-2.835	-2.547
33	-1.476	-3.480	-2.835	-2.548
32	-1.472	-3.480	-2.835	-2.548
31	-1.484	-3.480	-2.835	-2.548
30	-1.484	-3.480	-2.836	-2.548
29	-1.477	-3.480	-2.836	-2.548
28	-1.456	-3.480	-2.836	-2.548
27	-1.514	-3.480	-2.836	-2.549
26	-1.521	-3.480	-2.836	-2.549
25	-1.555	-3.480	-2.836	-2.549
24	-1.589	-3.480	-2.837	-2.549
23	-1.588	-3.480	-2.837	-2.549
22	-1.605	-3.480	-2.837	-2.549
21	-1.627	-3.480	-2.837	-2.549
20	-1.650	-3.480	-2.837	-2.550
19	-1.665	-3.480	-2.837	-2.550
18	-1.727	-3.480	-2.838	-2.550
17	-1.746	-3.480	-2.838	-2.550
16	-1.790	-3.480	-2.838	-2.550
15	-1.843	-3.480	-2.838	-2.550
14	-1.896	-3.480	-2.838	-2.551
13	-1.934	-3.480	-2.838	-2.551
12	-2.071	-3.480	-2.839	-2.551
11	-2.140	-3.480	-2.839	-2.551
10	-2.150	-3.480	-2.839	-2.551
9	-2.179	-3.480	-2.839	-2.551
8	-2.247	-3.480	-2.839	-2.551
7	-2.305	-3.480	-2.839	-2.552
6	-2.519	-3.480	-2.840	-2.552
5	-2.611	-3.480	-2.840	-2.552
4	-2.753	-3.480	-2.840	-2.552
3	-3.010	-3.480	-2.840	-2.552
2	-3.508	-3.480	-2.840	-2.552

```
      1          -3.807       -3.480       -2.840       -2.552
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0221198
Min SIC  = -7.599007 at lag  7 with RMSE = .0222773
Min MAIC = -7.613827 at lag 28 with RMSE =  .022129
```

Australia-Sweden: dfgls lnauseir

```
DF-GLS test for unit root
Variable: lnauseir
Lag selection: Schwert criterion        Maximum lag   =    35

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     35          -0.248       -3.480       -2.835       -2.547
     34          -0.267       -3.480       -2.835       -2.547
     33          -0.267       -3.480       -2.835       -2.548
     32          -0.267       -3.480       -2.835       -2.548
     31          -0.265       -3.480       -2.835       -2.548
     30          -0.265       -3.480       -2.836       -2.548
     29          -0.263       -3.480       -2.836       -2.548
     28          -0.261       -3.480       -2.836       -2.548
     27          -0.195       -3.480       -2.836       -2.549
     26          -0.191       -3.480       -2.836       -2.549
     25          -0.190       -3.480       -2.836       -2.549
     24          -0.189       -3.480       -2.837       -2.549
     23          -0.189       -3.480       -2.837       -2.549
     22          -0.188       -3.480       -2.837       -2.549
     21          -0.186       -3.480       -2.837       -2.549
     20          -0.208       -3.480       -2.837       -2.550
     19          -0.208       -3.480       -2.837       -2.550
     18          -0.208       -3.480       -2.838       -2.550
     17          -0.206       -3.480       -2.838       -2.550
     16          -0.206       -3.480       -2.838       -2.550
     15          -0.182       -3.480       -2.838       -2.550
     14          -0.182       -3.480       -2.838       -2.551
     13          -0.286       -3.480       -2.838       -2.551
     12          -0.284       -3.480       -2.839       -2.551
     11          -0.283       -3.480       -2.839       -2.551
     10          -0.279       -3.480       -2.839       -2.551
      9          -0.280       -3.480       -2.839       -2.551
      8          -0.280       -3.480       -2.839       -2.551
      7          -0.281       -3.480       -2.839       -2.552
      6          -0.285       -3.480       -2.840       -2.552
      5          -0.285       -3.480       -2.840       -2.552
      4          -0.283       -3.480       -2.840       -2.552
      3          -0.283       -3.480       -2.840       -2.552
      2          -0.283       -3.480       -2.840       -2.552
      1          -0.283       -3.480       -2.840       -2.552
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 28 with RMSE = .0200324
Min SIC  = -7.815875 at lag  1 with RMSE = .0200584
Min MAIC = -7.817934 at lag  1 with RMSE = .0200584
```

New Zealand-Sweden: dfgls lnnzseir

```
DF-GLS test for unit root
Variable: lnnzseir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
35	-0.301	-3.480	-2.835	-2.547
34	-0.280	-3.480	-2.835	-2.547
33	-0.270	-3.480	-2.835	-2.548
32	-0.254	-3.480	-2.835	-2.548
31	-0.262	-3.480	-2.835	-2.548
30	-0.270	-3.480	-2.836	-2.548
29	-0.276	-3.480	-2.836	-2.548
28	-0.210	-3.480	-2.836	-2.548
27	-0.260	-3.480	-2.836	-2.549
26	-0.273	-3.480	-2.836	-2.549
25	-0.291	-3.480	-2.836	-2.549
24	-0.310	-3.480	-2.837	-2.549
23	-0.300	-3.480	-2.837	-2.549
22	-0.317	-3.480	-2.837	-2.549
21	-0.333	-3.480	-2.837	-2.549
20	-0.335	-3.480	-2.837	-2.550
19	-0.360	-3.480	-2.837	-2.550
18	-0.367	-3.480	-2.838	-2.550
17	-0.358	-3.480	-2.838	-2.550
16	-0.384	-3.480	-2.838	-2.550
15	-0.440	-3.480	-2.838	-2.550
14	-0.414	-3.480	-2.838	-2.551
13	-0.398	-3.480	-2.838	-2.551
12	-0.426	-3.480	-2.839	-2.551
11	-0.462	-3.480	-2.839	-2.551
10	-0.454	-3.480	-2.839	-2.551
9	-0.453	-3.480	-2.839	-2.551
8	-0.488	-3.480	-2.839	-2.551
7	-0.451	-3.480	-2.839	-2.552
6	-0.553	-3.480	-2.840	-2.552
5	-0.603	-3.480	-2.840	-2.552
4	-0.617	-3.480	-2.840	-2.552
3	-0.680	-3.480	-2.840	-2.552
2	-0.827	-3.480	-2.840	-2.552
1	-0.878	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 29 with RMSE = .0288209
Min SIC  = -7.081541 at lag  3 with RMSE = .0289232
Min MAIC = -7.087654 at lag  8 with RMSE = .0288713
```

US-Euro Area: dfgls lnuseuir

```
DF-GLS test for unit root
Variable: lnuseuir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
35	-0.852	-3.480	-2.835	-2.547
34	-0.824	-3.480	-2.835	-2.547
33	-0.860	-3.480	-2.835	-2.548
32	-0.888	-3.480	-2.835	-2.548
31	-0.947	-3.480	-2.835	-2.548
30	-0.899	-3.480	-2.836	-2.548
29	-0.939	-3.480	-2.836	-2.548
28	-1.005	-3.480	-2.836	-2.548
27	-0.890	-3.480	-2.836	-2.549
26	-0.866	-3.480	-2.836	-2.549
25	-0.894	-3.480	-2.836	-2.549
24	-0.869	-3.480	-2.837	-2.549
23	-0.840	-3.480	-2.837	-2.549
22	-0.906	-3.480	-2.837	-2.549
21	-0.901	-3.480	-2.837	-2.549
20	-0.916	-3.480	-2.837	-2.550
19	-0.872	-3.480	-2.837	-2.550
18	-0.892	-3.480	-2.838	-2.550
17	-0.911	-3.480	-2.838	-2.550
16	-0.888	-3.480	-2.838	-2.550
15	-0.827	-3.480	-2.838	-2.550
14	-0.877	-3.480	-2.838	-2.551
13	-0.783	-3.480	-2.838	-2.551
12	-0.860	-3.480	-2.839	-2.551
11	-0.817	-3.480	-2.839	-2.551
10	-0.718	-3.480	-2.839	-2.551
9	-0.861	-3.480	-2.839	-2.551
8	-0.832	-3.480	-2.839	-2.551
7	-0.968	-3.480	-2.839	-2.552
6	-0.808	-3.480	-2.840	-2.552
5	-0.858	-3.480	-2.840	-2.552
4	-0.793	-3.480	-2.840	-2.552
3	-0.837	-3.480	-2.840	-2.552
2	-0.860	-3.480	-2.840	-2.552
1	-0.945	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0210186
Min SIC  =  -7.68474 at lag 16 with RMSE = .0212304
Min MAIC = -7.715329 at lag 35 with RMSE = .0210186
```

US-Switzerland: dfgls lnuschir

```
DF-GLS test for unit root
Variable: lnuschir
Lag selection: Schwert criterion        Maximum lag   =   35
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
35	-1.777	-3.480	-2.835	-2.547
34	-1.811	-3.480	-2.835	-2.547

33	-1.885	-3.480	-2.835	-2.548
32	-1.870	-3.480	-2.835	-2.548
31	-1.885	-3.480	-2.835	-2.548
30	-1.864	-3.480	-2.836	-2.548
29	-1.854	-3.480	-2.836	-2.548
28	-1.821	-3.480	-2.836	-2.548
27	-1.764	-3.480	-2.836	-2.549
26	-1.892	-3.480	-2.836	-2.549
25	-1.876	-3.480	-2.836	-2.549
24	-1.880	-3.480	-2.837	-2.549
23	-1.916	-3.480	-2.837	-2.549
22	-1.942	-3.480	-2.837	-2.549
21	-1.939	-3.480	-2.837	-2.549
20	-1.809	-3.480	-2.837	-2.550
19	-1.950	-3.480	-2.837	-2.550
18	-1.967	-3.480	-2.838	-2.550
17	-2.008	-3.480	-2.838	-2.550
16	-2.001	-3.480	-2.838	-2.550
15	-2.033	-3.480	-2.838	-2.550
14	-2.074	-3.480	-2.838	-2.551
13	-2.161	-3.480	-2.838	-2.551
12	-2.323	-3.480	-2.839	-2.551
11	-2.395	-3.480	-2.839	-2.551
10	-2.457	-3.480	-2.839	-2.551
9	-2.582	-3.480	-2.839	-2.551
8	-2.768	-3.480	-2.839	-2.551
7	-2.965	-3.480	-2.839	-2.552
6	-2.941	-3.480	-2.840	-2.552
5	-3.267	-3.480	-2.840	-2.552
4	-4.032	-3.480	-2.840	-2.552
3	-4.846	-3.480	-2.840	-2.552
2	-5.414	-3.480	-2.840	-2.552
1	-6.464	-3.480	-2.840	-2.552

Opt lag (Ng-Perron seq t) = 34 with RMSE = .1534329
Min SIC = -3.715219 at lag 21 with RMSE = .1540481
Min MAIC = -3.739267 at lag 35 with RMSE = .1534083

Euro Area-Switzerland: dfgls lneuchir

DF-GLS test for unit root
Variable: lneuchir
Lag selection: Schwert criterion   Maximum lag   =   35

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
35	-2.177	-3.480	-2.835	-2.547
34	-2.231	-3.480	-2.835	-2.547
33	-2.373	-3.480	-2.835	-2.548
32	-2.349	-3.480	-2.835	-2.548
31	-2.386	-3.480	-2.835	-2.548
30	-2.367	-3.480	-2.836	-2.548
29	-2.351	-3.480	-2.836	-2.548
28	-2.312	-3.480	-2.836	-2.548
27	-2.229	-3.480	-2.836	-2.549

26	-2.482	-3.480	-2.836	-2.549
25	-2.474	-3.480	-2.836	-2.549
24	-2.505	-3.480	-2.837	-2.549
23	-2.568	-3.480	-2.837	-2.549
22	-2.631	-3.480	-2.837	-2.549
21	-2.655	-3.480	-2.837	-2.549
20	-2.432	-3.480	-2.837	-2.550
19	-2.726	-3.480	-2.837	-2.550
18	-2.773	-3.480	-2.838	-2.550
17	-2.873	-3.480	-2.838	-2.550
16	-2.872	-3.480	-2.838	-2.550
15	-2.951	-3.480	-2.838	-2.550
14	-2.030	-3.480	-2.838	-2.551
13	-2.213	-3.480	-2.838	-2.551
12	-2.531	-3.480	-2.839	-2.551
11	-2.675	-3.480	-2.839	-2.551
10	-2.799	-3.480	-2.839	-2.551
9	-3.043	-3.480	-2.839	-2.551
8	-3.414	-3.480	-2.839	-2.551
7	-3.797	-3.480	-2.839	-2.552
6	-3.736	-3.480	-2.840	-2.552
5	-1.361	-3.480	-2.840	-2.552
4	-1.858	-3.480	-2.840	-2.552
3	-1.403	-3.480	-2.840	-2.552
2	-2.463	-3.480	-2.840	-2.552
1	-2.434	-3.480	-2.840	-2.552

Opt lag (Ng-Perron seq t) = 34 with RMSE = .152257
Min SIC = -3.730137 at lag 21 with RMSE = .1529033
Min MAIC = -3.752319 at lag 35 with RMSE = .1522388

Interest Rate Differential in first differences:

UK-Canada: dfgls D.lnukcair

DF-GLS test for unit root
Variable: D.lnukcair
Lag selection: Schwert criterion   Maximum lag = 35

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-16.661	-3.480	-2.835	-2.547
34	-17.027	-3.480	-2.835	-2.547
33	-17.972	-3.480	-2.835	-2.548
32	-18.774	-3.480	-2.835	-2.548
31	-18.667	-3.480	-2.835	-2.548
30	-18.486	-3.480	-2.836	-2.548
29	-18.528	-3.480	-2.836	-2.548
28	-18.613	-3.480	-2.836	-2.548
27	-19.328	-3.480	-2.836	-2.549
26	-20.270	-3.480	-2.836	-2.549
25	-20.837	-3.480	-2.836	-2.549
24	-21.654	-3.480	-2.837	-2.549
23	-22.096	-3.480	-2.837	-2.549
22	-22.506	-3.480	-2.837	-2.549

21	-23.406	-3.480	-2.837	-2.549
20	-24.184	-3.480	-2.837	-2.550
19	-26.417	-3.480	-2.837	-2.550
18	-27.589	-3.480	-2.838	-2.550
17	-28.375	-3.480	-2.838	-2.550
16	-28.392	-3.480	-2.838	-2.550
15	-28.570	-3.480	-2.838	-2.550
14	-28.011	-3.480	-2.838	-2.551
13	-29.893	-3.480	-2.838	-2.551
12	-33.897	-3.480	-2.839	-2.551
11	-33.895	-3.480	-2.839	-2.551
10	-33.970	-3.480	-2.839	-2.551
9	-35.451	-3.480	-2.839	-2.551
8	-37.724	-3.480	-2.839	-2.551
7	-39.803	-3.480	-2.839	-2.552
6	-42.430	-3.480	-2.840	-2.552
5	-46.826	-3.480	-2.840	-2.552
4	-50.067	-3.480	-2.840	-2.552
3	-56.110	-3.480	-2.840	-2.552
2	-62.916	-3.480	-2.840	-2.552
1	-75.015	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0342241
Min SIC  = -6.720979 at lag 17 with RMSE = .0343542
Min MAIC = -3.160952 at lag  1 with RMSE = .0353288
```

UK-Australia: dfgls D.lnukauir

```
DF-GLS test for unit root
Variable: D.lnukauir
Lag selection: Schwert criterion          Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-15.955	-3.480	-2.835	-2.547
34	-16.351	-3.480	-2.835	-2.547
33	-17.115	-3.480	-2.835	-2.548
32	-18.025	-3.480	-2.835	-2.548
31	-17.982	-3.480	-2.835	-2.548
30	-18.062	-3.480	-2.836	-2.548
29	-18.199	-3.480	-2.836	-2.548
28	-18.433	-3.480	-2.836	-2.548
27	-19.274	-3.480	-2.836	-2.549
26	-20.258	-3.480	-2.836	-2.549
25	-20.636	-3.480	-2.836	-2.549
24	-21.459	-3.480	-2.837	-2.549
23	-21.956	-3.480	-2.837	-2.549
22	-22.372	-3.480	-2.837	-2.549
21	-23.160	-3.480	-2.837	-2.549
20	-24.113	-3.480	-2.837	-2.550
19	-26.756	-3.480	-2.837	-2.550
18	-28.179	-3.480	-2.838	-2.550
17	-29.057	-3.480	-2.838	-2.550
16	-29.192	-3.480	-2.838	-2.550
15	-29.537	-3.480	-2.838	-2.550

14	-29.267	-3.480	-2.838	-2.551
13	-31.152	-3.480	-2.838	-2.551
12	-35.156	-3.480	-2.839	-2.551
11	-35.089	-3.480	-2.839	-2.551
10	-34.608	-3.480	-2.839	-2.551
9	-35.734	-3.480	-2.839	-2.551
8	-37.880	-3.480	-2.839	-2.551
7	-39.815	-3.480	-2.839	-2.552
6	-42.645	-3.480	-2.840	-2.552
5	-47.336	-3.480	-2.840	-2.552
4	-50.362	-3.480	-2.840	-2.552
3	-57.418	-3.480	-2.840	-2.552
2	-64.505	-3.480	-2.840	-2.552
1	-77.392	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0324215
Min SIC  = -6.829124 at lag 20 with RMSE = .0324888
Min MAIC = -2.914782 at lag  1 with RMSE = .0335655
```

UK-New Zealand: dfgls D.lnuknzir

```
DF-GLS test for unit root
Variable: D.lnuknzir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-16.867	-3.480	-2.835	-2.547
34	-17.102	-3.480	-2.835	-2.547
33	-17.929	-3.480	-2.835	-2.548
32	-18.846	-3.480	-2.835	-2.548
31	-19.058	-3.480	-2.835	-2.548
30	-19.217	-3.480	-2.836	-2.548
29	-19.440	-3.480	-2.836	-2.548
28	-19.836	-3.480	-2.836	-2.548
27	-20.918	-3.480	-2.836	-2.549
26	-21.435	-3.480	-2.836	-2.549
25	-21.834	-3.480	-2.836	-2.549
24	-22.771	-3.480	-2.837	-2.549
23	-23.140	-3.480	-2.837	-2.549
22	-23.778	-3.480	-2.837	-2.549
21	-24.431	-3.480	-2.837	-2.549
20	-25.461	-3.480	-2.837	-2.550
19	-27.711	-3.480	-2.837	-2.550
18	-29.002	-3.480	-2.838	-2.550
17	-29.694	-3.480	-2.838	-2.550
16	-30.099	-3.480	-2.838	-2.550
15	-30.496	-3.480	-2.838	-2.550
14	-30.328	-3.480	-2.838	-2.551
13	-31.983	-3.480	-2.838	-2.551
12	-35.302	-3.480	-2.839	-2.551
11	-35.287	-3.480	-2.839	-2.551
10	-35.212	-3.480	-2.839	-2.551
9	-36.577	-3.480	-2.839	-2.551
8	-39.088	-3.480	-2.839	-2.551

7	-41.110	-3.480	-2.839	-2.552
6	-44.056	-3.480	-2.840	-2.552
5	-47.883	-3.480	-2.840	-2.552
4	-50.930	-3.480	-2.840	-2.552
3	-57.992	-3.480	-2.840	-2.552
2	-65.646	-3.480	-2.840	-2.552
1	-76.984	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0380615
Min SIC  = -6.510269 at lag 17 with RMSE = .0381712
Min MAIC =  -2.48798 at lag  1 with RMSE =  .039445
```

UK-Sweden: dfgls D.lnukseir

```
DF-GLS test for unit root
Variable: D.lnukseir
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	-------- Critical value ---------		
		1%	5%	10%
35	-15.553	-3.480	-2.835	-2.547
34	-15.722	-3.480	-2.835	-2.547
33	-16.406	-3.480	-2.835	-2.548
32	-17.082	-3.480	-2.835	-2.548
31	-17.107	-3.480	-2.835	-2.548
30	-17.166	-3.480	-2.836	-2.548
29	-17.240	-3.480	-2.836	-2.548
28	-17.342	-3.480	-2.836	-2.548
27	-17.906	-3.480	-2.836	-2.549
26	-18.390	-3.480	-2.836	-2.549
25	-18.757	-3.480	-2.836	-2.549
24	-19.405	-3.480	-2.837	-2.549
23	-19.781	-3.480	-2.837	-2.549
22	-20.014	-3.480	-2.837	-2.549
21	-20.387	-3.480	-2.837	-2.549
20	-20.963	-3.480	-2.837	-2.550
19	-22.991	-3.480	-2.837	-2.550
18	-24.090	-3.480	-2.838	-2.550
17	-25.054	-3.480	-2.838	-2.550
16	-25.395	-3.480	-2.838	-2.550
15	-25.878	-3.480	-2.838	-2.550
14	-25.780	-3.480	-2.838	-2.551
13	-27.049	-3.480	-2.838	-2.551
12	-30.313	-3.480	-2.839	-2.551
11	-30.839	-3.480	-2.839	-2.551
10	-30.900	-3.480	-2.839	-2.551
9	-32.127	-3.480	-2.839	-2.551
8	-34.165	-3.480	-2.839	-2.551
7	-36.262	-3.480	-2.839	-2.552
6	-38.677	-3.480	-2.840	-2.552
5	-43.510	-3.480	-2.840	-2.552
4	-46.166	-3.480	-2.840	-2.552
3	-52.630	-3.480	-2.840	-2.552
2	-59.904	-3.480	-2.840	-2.552
1	-72.563	-3.480	-2.840	-2.552

```
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0375111
Min SIC  = -6.540325 at lag 13 with RMSE =   .03769
Min MAIC = -3.321911 at lag  1 with RMSE = .0381389
```

Canada-Australia: dfgls D.lncaauir

```
DF-GLS test for unit root
Variable: D.lncaauir
Lag selection: Schwert criterion         Maximum lag   =    35

                                 -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
------------------------------------------------------------------------------
     35        -15.745        -3.480        -2.835        -2.547
     34        -16.056        -3.480        -2.835        -2.547
     33        -16.833        -3.480        -2.835        -2.548
     32        -16.631        -3.480        -2.835        -2.548
     31        -16.937        -3.480        -2.835        -2.548
     30        -17.375        -3.480        -2.836        -2.548
     29        -17.599        -3.480        -2.836        -2.548
     28        -17.862        -3.480        -2.836        -2.548
     27        -17.939        -3.480        -2.836        -2.549
     26        -18.971        -3.480        -2.836        -2.549
     25        -18.467        -3.480        -2.836        -2.549
     24        -19.018        -3.480        -2.837        -2.549
     23        -19.475        -3.480        -2.837        -2.549
     22        -19.892        -3.480        -2.837        -2.549
     21        -20.671        -3.480        -2.837        -2.549
     20        -20.723        -3.480        -2.837        -2.550
     19        -21.357        -3.480        -2.837        -2.550
     18        -21.975        -3.480        -2.838        -2.550
     17        -21.874        -3.480        -2.838        -2.550
     16        -22.763        -3.480        -2.838        -2.550
     15        -23.942        -3.480        -2.838        -2.550
     14        -24.505        -3.480        -2.838        -2.551
     13        -24.359        -3.480        -2.838        -2.551
     12        -25.254        -3.480        -2.839        -2.551
     11        -25.936        -3.480        -2.839        -2.551
     10        -27.643        -3.480        -2.839        -2.551
      9        -31.157        -3.480        -2.839        -2.551
      8        -33.196        -3.480        -2.839        -2.551
      7        -35.480        -3.480        -2.839        -2.552
      6        -37.932        -3.480        -2.840        -2.552
      5        -39.266        -3.480        -2.840        -2.552
      4        -41.925        -3.480        -2.840        -2.552
      3        -47.133        -3.480        -2.840        -2.552
      2        -52.823        -3.480        -2.840        -2.552
      1        -64.066        -3.480        -2.840        -2.552
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0132261
Min SIC  = -8.628355 at lag  6 with RMSE = .0133228
Min MAIC = -6.379941 at lag  1 with RMSE = .0133702
```

Canada-New Zealand: dfgls D.lncanzir

```
DF-GLS test for unit root
Variable: D.lncanzir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	1% Critical value	5% Critical value	10% Critical value
35	-17.051	-3.480	-2.835	-2.547
34	-17.295	-3.480	-2.835	-2.547
33	-18.002	-3.480	-2.835	-2.548
32	-17.859	-3.480	-2.835	-2.548
31	-17.994	-3.480	-2.835	-2.548
30	-18.266	-3.480	-2.836	-2.548
29	-18.828	-3.480	-2.836	-2.548
28	-19.449	-3.480	-2.836	-2.548
27	-20.846	-3.480	-2.836	-2.549
26	-20.622	-3.480	-2.836	-2.549
25	-21.248	-3.480	-2.836	-2.549
24	-21.822	-3.480	-2.837	-2.549
23	-22.534	-3.480	-2.837	-2.549
22	-23.660	-3.480	-2.837	-2.549
21	-24.754	-3.480	-2.837	-2.549
20	-24.900	-3.480	-2.837	-2.550
19	-26.067	-3.480	-2.837	-2.550
18	-26.963	-3.480	-2.838	-2.550
17	-26.908	-3.480	-2.838	-2.550
16	-27.936	-3.480	-2.838	-2.550
15	-28.422	-3.480	-2.838	-2.550
14	-29.141	-3.480	-2.838	-2.551
13	-30.148	-3.480	-2.838	-2.551
12	-32.038	-3.480	-2.839	-2.551
11	-32.379	-3.480	-2.839	-2.551
10	-34.268	-3.480	-2.839	-2.551
9	-36.334	-3.480	-2.839	-2.551
8	-37.228	-3.480	-2.839	-2.551
7	-38.445	-3.480	-2.839	-2.552
6	-41.594	-3.480	-2.840	-2.552
5	-43.876	-3.480	-2.840	-2.552
4	-48.859	-3.480	-2.840	-2.552
3	-54.737	-3.480	-2.840	-2.552
2	-63.957	-3.480	-2.840	-2.552
1	-75.857	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0243475
Min SIC  = -7.404462 at lag 12 with RMSE = .0244814
Min MAIC = -3.268502 at lag  1 with RMSE = .0248949
```

Canada-Sweden: dfgls D.lncaseir

```
DF-GLS test for unit root
```

```
Variable: D.lncaseir
Lag selection: Schwert criterion        Maximum lag   =    35

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
---------------------------------------------------------------
     35         -14.711        -3.480        -2.835        -2.547
     34         -14.996        -3.480        -2.835        -2.547
     33         -15.458        -3.480        -2.835        -2.548
     32         -15.633        -3.480        -2.835        -2.548
     31         -15.893        -3.480        -2.835        -2.548
     30         -16.181        -3.480        -2.836        -2.548
     29         -16.476        -3.480        -2.836        -2.548
     28         -16.653        -3.480        -2.836        -2.548
     27         -16.524        -3.480        -2.836        -2.549
     26         -16.879        -3.480        -2.836        -2.549
     25         -17.093        -3.480        -2.836        -2.549
     24         -17.406        -3.480        -2.837        -2.549
     23         -17.817        -3.480        -2.837        -2.549
     22         -18.222        -3.480        -2.837        -2.549
     21         -19.001        -3.480        -2.837        -2.549
     20         -19.424        -3.480        -2.837        -2.550
     19         -19.844        -3.480        -2.837        -2.550
     18         -20.340        -3.480        -2.838        -2.550
     17         -20.771        -3.480        -2.838        -2.550
     16         -21.418        -3.480        -2.838        -2.550
     15         -22.232        -3.480        -2.838        -2.550
     14         -22.990        -3.480        -2.838        -2.551
     13         -23.625        -3.480        -2.838        -2.551
     12         -24.556        -3.480        -2.839        -2.551
     11         -24.724        -3.480        -2.839        -2.551
     10         -26.291        -3.480        -2.839        -2.551
      9         -28.341        -3.480        -2.839        -2.551
      8         -29.927        -3.480        -2.839        -2.551
      7         -31.733        -3.480        -2.839        -2.552
      6         -33.979        -3.480        -2.840        -2.552
      5         -36.551        -3.480        -2.840        -2.552
      4         -40.099        -3.480        -2.840        -2.552
      3         -44.775        -3.480        -2.840        -2.552
      2         -52.114        -3.480        -2.840        -2.552
      1         -63.977        -3.480        -2.840        -2.552
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 28 with RMSE = .0222053
Min SIC  = -7.609103 at lag  1 with RMSE = .0222431
Min MAIC = -5.395735 at lag 11 with RMSE = .0222301
```

Australia-New Zealand: dfgls D.lnaunzir

```
DF-GLS test for unit root
Variable: D.lnaunzir
Lag selection: Schwert criterion        Maximum lag   =    35

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
---------------------------------------------------------------
```

35	-17.606	-3.480	-2.835	-2.547
34	-17.608	-3.480	-2.835	-2.547
33	-18.423	-3.480	-2.835	-2.548
32	-18.883	-3.480	-2.835	-2.548
31	-19.397	-3.480	-2.835	-2.548
30	-19.736	-3.480	-2.836	-2.548
29	-20.256	-3.480	-2.836	-2.548
28	-20.925	-3.480	-2.836	-2.548
27	-21.862	-3.480	-2.836	-2.549
26	-21.714	-3.480	-2.836	-2.549
25	-22.317	-3.480	-2.836	-2.549
24	-22.574	-3.480	-2.837	-2.549
23	-22.863	-3.480	-2.837	-2.549
22	-23.711	-3.480	-2.837	-2.549
21	-24.368	-3.480	-2.837	-2.549
20	-25.021	-3.480	-2.837	-2.550
19	-25.741	-3.480	-2.837	-2.550
18	-26.684	-3.480	-2.838	-2.550
17	-26.969	-3.480	-2.838	-2.550
16	-28.027	-3.480	-2.838	-2.550
15	-28.808	-3.480	-2.838	-2.550
14	-29.575	-3.480	-2.838	-2.551
13	-30.466	-3.480	-2.838	-2.551
12	-31.811	-3.480	-2.839	-2.551
11	-31.658	-3.480	-2.839	-2.551
10	-32.738	-3.480	-2.839	-2.551
9	-35.118	-3.480	-2.839	-2.551
8	-37.732	-3.480	-2.839	-2.551
7	-40.331	-3.480	-2.839	-2.552
6	-44.023	-3.480	-2.840	-2.552
5	-45.501	-3.480	-2.840	-2.552
4	-50.780	-3.480	-2.840	-2.552
3	-57.791	-3.480	-2.840	-2.552
2	-66.493	-3.480	-2.840	-2.552
1	-75.528	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 35 with RMSE = .0221197
Min SIC  = -7.599544 at lag 12 with RMSE = .0222062
Min MAIC =  -3.47192 at lag  1 with RMSE = .0227625
```

Australia-Sweden: dfgls D.lnauseir

```
DF-GLS test for unit root
Variable: D.lnauseir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-14.606	-3.480	-2.835	-2.547
34	-14.810	-3.480	-2.835	-2.547
33	-14.908	-3.480	-2.835	-2.548
32	-15.126	-3.480	-2.835	-2.548
31	-15.357	-3.480	-2.835	-2.548

30	-15.607	-3.480	-2.836	-2.548
29	-15.860	-3.480	-2.836	-2.548
28	-16.137	-3.480	-2.836	-2.548
27	-16.425	-3.480	-2.836	-2.549
26	-17.181	-3.480	-2.836	-2.549
25	-17.549	-3.480	-2.836	-2.549
24	-17.917	-3.480	-2.837	-2.549
23	-18.306	-3.480	-2.837	-2.549
22	-18.719	-3.480	-2.837	-2.549
21	-19.172	-3.480	-2.837	-2.549
20	-19.657	-3.480	-2.837	-2.550
19	-19.980	-3.480	-2.837	-2.550
18	-20.521	-3.480	-2.838	-2.550
17	-21.109	-3.480	-2.838	-2.550
16	-21.763	-3.480	-2.838	-2.550
15	-22.467	-3.480	-2.838	-2.550
14	-23.481	-3.480	-2.838	-2.551
13	-24.366	-3.480	-2.838	-2.551
12	-24.254	-3.480	-2.839	-2.551
11	-25.255	-3.480	-2.839	-2.551
10	-26.385	-3.480	-2.839	-2.551
9	-27.715	-3.480	-2.839	-2.551
8	-29.203	-3.480	-2.839	-2.551
7	-30.974	-3.480	-2.839	-2.552
6	-33.105	-3.480	-2.840	-2.552
5	-35.685	-3.480	-2.840	-2.552
4	-39.080	-3.480	-2.840	-2.552
3	-43.707	-3.480	-2.840	-2.552
2	-50.474	-3.480	-2.840	-2.552
1	-61.808	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 27 with RMSE = .0200307
Min SIC  =  -7.81603 at lag  1 with RMSE = .0200568
Min MAIC = -5.813996 at lag  1 with RMSE = .0200568
```

New Zealand-Sweden: dfgls D.lnnzseir

```
DF-GLS test for unit root
Variable: D.lnnzseir
Lag selection: Schwert criterion        Maximum lag  =   35
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
35	-15.198	-3.480	-2.835	-2.547
34	-15.579	-3.480	-2.835	-2.547
33	-15.992	-3.480	-2.835	-2.548
32	-16.339	-3.480	-2.835	-2.548
31	-16.756	-3.480	-2.835	-2.548
30	-17.010	-3.480	-2.836	-2.548
29	-17.265	-3.480	-2.836	-2.548
28	-17.566	-3.480	-2.836	-2.548
27	-18.496	-3.480	-2.836	-2.549
26	-18.478	-3.480	-2.836	-2.549
25	-18.781	-3.480	-2.836	-2.549
24	-19.068	-3.480	-2.837	-2.549

23	-19.356	-3.480	-2.837	-2.549
22	-19.937	-3.480	-2.837	-2.549
21	-20.316	-3.480	-2.837	-2.549
20	-20.723	-3.480	-2.837	-2.550
19	-21.303	-3.480	-2.837	-2.550
18	-21.705	-3.480	-2.838	-2.550
17	-22.326	-3.480	-2.838	-2.550
16	-23.188	-3.480	-2.838	-2.550
15	-23.740	-3.480	-2.838	-2.550
14	-24.005	-3.480	-2.838	-2.551
13	-25.285	-3.480	-2.838	-2.551
12	-26.613	-3.480	-2.839	-2.551
11	-27.555	-3.480	-2.839	-2.551
10	-28.508	-3.480	-2.839	-2.551
9	-30.285	-3.480	-2.839	-2.551
8	-32.285	-3.480	-2.839	-2.551
7	-34.120	-3.480	-2.839	-2.552
6	-37.789	-3.480	-2.840	-2.552
5	-39.667	-3.480	-2.840	-2.552
4	-43.279	-3.480	-2.840	-2.552
3	-49.428	-3.480	-2.840	-2.552
2	-57.574	-3.480	-2.840	-2.552
1	-68.693	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 28 with RMSE =  .028819
Min SIC  = -7.082711 at lag  2 with RMSE = .0289232
Min MAIC = -4.053641 at lag  1 with RMSE = .0289828
```

US-Euro Area: dfgls D.lnuseuir

```
DF-GLS test for unit root
Variable: D.lnuseuir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	-------- Critical value --------- 1%	5%	10%
35	-11.963	-3.480	-2.835	-2.547
34	-12.248	-3.480	-2.835	-2.547
33	-12.768	-3.480	-2.835	-2.548
32	-12.684	-3.480	-2.835	-2.548
31	-12.673	-3.480	-2.835	-2.548
30	-12.387	-3.480	-2.836	-2.548
29	-13.075	-3.480	-2.836	-2.548
28	-12.960	-3.480	-2.836	-2.548
27	-12.590	-3.480	-2.836	-2.549
26	-13.975	-3.480	-2.836	-2.549
25	-14.564	-3.480	-2.836	-2.549
24	-14.613	-3.480	-2.837	-2.549
23	-15.258	-3.480	-2.837	-2.549
22	-16.026	-3.480	-2.837	-2.549
21	-15.674	-3.480	-2.837	-2.549
20	-16.170	-3.480	-2.837	-2.550
19	-16.436	-3.480	-2.837	-2.550
18	-17.473	-3.480	-2.838	-2.550

17	-17.768	-3.480	-2.838	-2.550
16	-18.097	-3.480	-2.838	-2.550
15	-19.020	-3.480	-2.838	-2.550
14	-20.662	-3.480	-2.838	-2.551
13	-20.721	-3.480	-2.838	-2.551
12	-23.275	-3.480	-2.839	-2.551
11	-22.989	-3.480	-2.839	-2.551
10	-24.999	-3.480	-2.839	-2.551
9	-28.802	-3.480	-2.839	-2.551
8	-27.489	-3.480	-2.839	-2.551
7	-30.086	-3.480	-2.839	-2.552
6	-29.084	-3.480	-2.840	-2.552
5	-35.760	-3.480	-2.840	-2.552
4	-38.112	-3.480	-2.840	-2.552
3	-45.813	-3.480	-2.840	-2.552
2	-52.381	-3.480	-2.840	-2.552
1	-65.163	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 34 with RMSE = .0211209
Min SIC  =  -7.67635 at lag 28 with RMSE = .0211703
Min MAIC = -6.701072 at lag 27 with RMSE = .0211867
```

US-Switzerland: dfgls D.lnuschir

```
DF-GLS test for unit root
Variable: D.lnuschir
Lag selection: Schwert criterion         Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-17.103	-3.480	-2.835	-2.547
34	-17.449	-3.480	-2.835	-2.547
33	-17.526	-3.480	-2.835	-2.548
32	-17.239	-3.480	-2.835	-2.548
31	-17.770	-3.480	-2.835	-2.548
30	-18.052	-3.480	-2.836	-2.548
29	-18.717	-3.480	-2.836	-2.548
28	-19.317	-3.480	-2.836	-2.548
27	-20.223	-3.480	-2.836	-2.549
26	-21.544	-3.480	-2.836	-2.549
25	-20.764	-3.480	-2.836	-2.549
24	-21.622	-3.480	-2.837	-2.549
23	-22.321	-3.480	-2.837	-2.549
22	-22.709	-3.480	-2.837	-2.549
21	-23.261	-3.480	-2.837	-2.549
20	-24.225	-3.480	-2.837	-2.550
19	-27.206	-3.480	-2.837	-2.550
18	-26.521	-3.480	-2.838	-2.550
17	-27.652	-3.480	-2.838	-2.550
16	-28.592	-3.480	-2.838	-2.550
15	-30.457	-3.480	-2.838	-2.550
14	-32.020	-3.480	-2.838	-2.551
13	-33.737	-3.480	-2.838	-2.551
12	-34.999	-3.480	-2.839	-2.551
11	-35.245	-3.480	-2.839	-2.551

10	-37.248	-3.480	-2.839	-2.551
9	-40.022	-3.480	-2.839	-2.551
8	-42.435	-3.480	-2.839	-2.551
7	-44.538	-3.480	-2.839	-2.552
6	-47.401	-3.480	-2.840	-2.552
5	-57.136	-3.480	-2.840	-2.552
4	-63.842	-3.480	-2.840	-2.552
3	-64.394	-3.480	-2.840	-2.552
2	-67.925	-3.480	-2.840	-2.552
1	-84.555	-3.480	-2.840	-2.552

```
Opt lag (Ng-Perron seq t) = 33 with RMSE =  .153693
Min SIC  = -3.713209 at lag 20 with RMSE = .1542931
Min MAIC =  1.836069 at lag  1 with RMSE = .1645662
```

Euro Area-Switzerland: dfgls D.lneuchir

```
DF-GLS test for unit root
Variable: D.lneuchir
Lag selection: Schwert criterion        Maximum lag   =    35
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
35	-15.676	-3.480	-2.835	-2.547
34	-16.019	-3.480	-2.835	-2.547
33	-16.243	-3.480	-2.835	-2.548
32	-16.040	-3.480	-2.835	-2.548
31	-16.645	-3.480	-2.835	-2.548
30	-16.981	-3.480	-2.836	-2.548
29	-17.635	-3.480	-2.836	-2.548
28	-18.326	-3.480	-2.836	-2.548
27	-19.231	-3.480	-2.836	-2.549
26	-20.519	-3.480	-2.836	-2.549
25	-19.822	-3.480	-2.836	-2.549
24	-20.666	-3.480	-2.837	-2.549
23	-21.354	-3.480	-2.837	-2.549
22	-21.900	-3.480	-2.837	-2.549
21	-22.504	-3.480	-2.837	-2.549
20	-23.418	-3.480	-2.837	-2.550
19	-26.324	-3.480	-2.837	-2.550
18	-25.655	-3.480	-2.838	-2.550
17	-26.815	-3.480	-2.838	-2.550
16	-27.728	-3.480	-2.838	-2.550
15	-29.594	-3.480	-2.838	-2.550
14	-31.141	-3.480	-2.838	-2.551
13	-32.982	-3.480	-2.838	-2.551
12	-34.253	-3.480	-2.839	-2.551
11	-34.599	-3.480	-2.839	-2.551
10	-36.658	-3.480	-2.839	-2.551
9	-39.481	-3.480	-2.839	-2.551
8	-41.978	-3.480	-2.839	-2.551
7	-44.074	-3.480	-2.839	-2.552
6	-46.966	-3.480	-2.840	-2.552
5	-56.820	-3.480	-2.840	-2.552

```
      4         -63.670       -3.480       -2.840       -2.552
      3         -64.133       -3.480       -2.840       -2.552
      2         -67.823       -3.480       -2.840       -2.552
      1         -84.531       -3.480       -2.840       -2.552
------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 33 with RMSE = .1534009
Min SIC  = -3.717088 at lag 20 with RMSE = .1539941
Min MAIC =  1.829671 at lag  1 with RMSE = .1638417
```

KPSS Test for stationarity:

Nominal Exchange Rate in levels:

UK-Canada: kpss lngbpcad

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpcad is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           89.2
    1           44.6
    2           29.8
    3           22.3
    4           17.9
    5           14.9
    6           12.8
    7           11.2
    8           9.96
    9           8.96
   10           8.15
   11           7.48
```

UK-Australia: kpss lngbpaud

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            103
    1           51.3
    2           34.2
    3           25.7
    4           20.5
    5           17.1
    6           14.7
    7           12.9
    8           11.4
    9           10.3
   10           9.36
```

```
   11           8.58
```

UK-New Zealand: kpss lngbpnzd

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           68.8
    1           34.4
    2             23
    3           17.2
    4           13.8
    5           11.5
    6           9.88
    7           8.65
    8            7.7
    9           6.93
   10           6.31
   11           5.79
```

UK-Sweden: kpss lngbpsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lngbpsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           94.7
    1           47.4
    2           31.6
    3           23.7
    4             19
    5           15.9
    6           13.6
    7           11.9
    8           10.6
    9           9.54
   10           8.67
   11           7.96
```

Canada-Australia: kpss lncadaud

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncadaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

```
Lag order    Test statistic
    0           51.3
    1           25.7
    2           17.2
    3           12.9
    4           10.3
    5           8.61
    6           7.39
    7           6.47
    8           5.76
    9           5.19
   10           4.72
   11           4.33
```

Canada-New Zealand: kpss lncadnzd

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncadnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           32.2
    1           16.1
    2           10.7
    3           8.06
    4           6.46
    5           5.38
    6           4.62
    7           4.05
    8            3.6
    9           3.24
   10           2.95
   11           2.71
```

Canada-Sweden: kpss lncadsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncadsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           17.4
    1            8.7
    2           5.81
    3           4.37
    4            3.5
    5           2.92
```

```
    6           2.51
    7            2.2
    8           1.96
    9           1.76
   10            1.6
   11           1.47
```

Australia-New Zealand: kpss lnaudnzd

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaudnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           80.7
    1           40.4
    2           26.9
    3           20.2
    4           16.2
    5           13.5
    6           11.6
    7           10.1
    8           9.01
    9           8.12
   10           7.38
   11           6.77
```

Australia-Sweden: kpss lnaudsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaudsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           59.2
    1           29.7
    2           19.8
    3           14.9
    4           11.9
    5           9.95
    6           8.54
    7           7.49
    8           6.66
    9           6.01
   10           5.47
   11           5.02
```

New Zealand-Sweden: kpss lnnzdsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzdsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            19
    1          9.52
    2          6.36
    3          4.78
    4          3.83
    5           3.2
    6          2.75
    7          2.41
    8          2.15
    9          1.94
   10          1.76
   11          1.62
```

US-Euro Area: kpss lnusdeur

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusdeur is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           149
    1          74.4
    2          49.6
    3          37.2
    4          29.8
    5          24.8
    6          21.3
    7          18.6
    8          16.6
    9          14.9
   10          13.6
   11          12.4
```

US-Switzerland: kpss lnusdchf

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnusdchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           140
```

```
    1           70
    2         46.7
    3           35
    4           28
    5         23.4
    6           20
    7         17.5
    8         15.6
    9         14.1
   10         12.8
   11         11.7
```

Euro Area-Switzerland: kpss lneurchf

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneurchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           97.7
    1           48.9
    2           32.6
    3           24.5
    4           19.6
    5           16.3
    6             14
    7           12.3
    8           10.9
    9           9.81
   10           8.92
   11           8.18
```

<u>Nominal Exchange Rate in first differences:</u>

UK-Canada: kpss D.lngbpcad

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lngbpcad is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .042
    1          .0418
    2          .0422
    3           .042
    4          .0423
    5          .0426
    6          .0428
    7           .043
```

```
    8           .043
    9          .0428
   10          .0424
   11          .0423
```

UK-Australia: kpss D.lngbpaud

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lngbpaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0676
    1          .0683
    2          .0681
    3          .0683
    4          .0691
    5          .0695
    6          .0698
    7            .07
    8            .07
    9          .0702
   10          .0705
   11          .0708
```

UK-New Zealand: kpss D.lngbpnzd

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lngbpnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0315
    1          .0312
    2          .0313
    3          .0313
    4          .0316
    5          .0318
    6           .032
    7          .0322
    8          .0323
    9          .0325
   10          .0327
   11          .0329
```

UK-Sweden: kpss D.lngbpsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel
```

```
Critical values for H0: D.lngbpsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0326
    1          .0321
    2          .0323
    3          .0327
    4          .0332
    5          .0337
    6          .0342
    7          .0346
    8          .0349
    9          .0352
   10          .0354
   11          .0355
```

Canada-Australia: kpss D.lncadaud

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncadaud is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0292
    1          .0306
    2          .0307
    3          .0314
    4          .0323
    5          .0329
    6          .0335
    7           .034
    8          .0345
    9          .0349
   10          .0356
   11          .0361
```

Canada-New Zealand: kpss D.lncadnzd

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncadnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0282
    1          .0286
    2          .0288
    3          .0291
    4          .0297
```

```
    5          .0302
    6          .0307
    7           .031
    8          .0311
    9          .0313
   10          .0315
   11          .0316
```

Canada-Sweden: kpss D.lncadsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncadsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0181
    1          .0181
    2          .0182
    3          .0182
    4          .0185
    5          .0186
    6          .0188
    7          .0191
    8          .0192
    9          .0193
   10          .0194
   11          .0196
```

Australia-New Zealand: kpss D.lnaudnzd

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaudnzd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0382
    1          .0388
    2          .0392
    3          .0396
    4          .0403
    5          .0408
    6          .0412
    7          .0415
    8          .0415
    9          .0415
   10          .0415
   11          .0414
```

Australia-Sweden: kpss D.lnaudsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaudsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .0203
    1           .0212
    2           .0211
    3           .0213
    4           .0219
    5           .0221
    6           .0225
    7           .0229
    8           .0232
    9           .0236
   10           .0239
   11           .0243
```

New Zealand-Sweden: kpss D.lnnzdsek

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzdsek is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .0133
    1           .0136
    2           .0136
    3           .0138
    4           .0141
    5           .0143
    6           .0145
    7           .0147
    8           .0148
    9            .015
   10           .0151
   11           .0153
```

US-Euro Area: kpss D.lnusdeur

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusdeur is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .0675
```

```
    1           .067
    2          .0666
    3          .0664
    4          .0669
    5          .0673
    6           .067
    7          .0668
    8          .0669
    9          .0668
   10          .0666
   11          .0665
```

US-Switzerland: kpss D.lnusdchf

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnusdchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .029
    1          .0282
    2          .0278
    3          .0278
    4          .0281
    5          .0282
    6          .0283
    7          .0284
    8          .0286
    9          .0287
   10          .0288
   11          .0289
```

Euro Area-Switzerland: kpss D.lneurchf

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneurchf is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0653
    1          .0581
    2          .0566
    3          .0564
    4          .0579
    5          .0586
    6          .0592
    7          .0595
    8          .0596
    9          .0599
   10          .0604
```

```
   11          .0612
```

Interest Rate Differential in levels:

UK-Canada: kpss lnukcair

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukcair is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           40.5
    1           20.4
    2           13.7
    3           10.3
    4           8.27
    5           6.91
    6           5.94
    7           5.21
    8           4.64
    9           4.18
   10           3.81
   11            3.5
```

UK-Australia: kpss lnukauir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            133
    1           66.7
    2           44.5
    3           33.4
    4           26.8
    5           22.3
    6           19.1
    7           16.8
    8           14.9
    9           13.4
   10           12.2
   11           11.2
```

UK-New Zealand: kpss lnuknzir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel
```

```
Critical values for H0: lnuknzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            123
    1           61.8
    2           41.3
    3           31.1
    4           24.9
    5           20.8
    6           17.9
    7           15.6
    8           13.9
    9           12.5
   10           11.4
   11           10.5
```

UK-Sweden: kpss lnukseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnukseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           61.7
    1           30.9
    2           20.6
    3           15.5
    4           12.4
    5           10.3
    6           8.84
    7           7.74
    8           6.88
    9            6.2
   10           5.64
   11           5.17
```

Canada-Australia: kpss lncaauir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncaauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            138
```

```
    1           68.8
    2           45.9
    3           34.4
    4           27.6
    5             23
    6           19.7
    7           17.2
    8           15.3
    9           13.8
   10           12.5
   11           11.5
```

Canada-New Zealand: kpss lncanzir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncanzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            108
    1           54.1
    2           36.1
    3           27.1
    4           21.7
    5           18.1
    6           15.5
    7           13.6
    8           12.1
    9           10.9
   10           9.89
   11           9.07
```

Canada-Sweden: kpss lncaseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lncaseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           64.5
    1           32.2
    2           21.5
    3           16.1
    4           12.9
    5           10.8
    6           9.23
    7           8.08
    8           7.18
    9           6.47
   10           5.88
   11           5.39
```

Australia-New Zealand: kpss lnaunzir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnaunzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           74.7
    1           37.5
    2             25
    3           18.8
    4           15.1
    5           12.6
    6           10.8
    7           9.44
    8           8.39
    9           7.56
   10           6.88
   11           6.31
```

Australia-Sweden: kpss lnauseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnauseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           29.8
    1           14.9
    2           9.94
    3           7.46
    4           5.97
    5           4.98
    6           4.27
    7           3.73
    8           3.32
    9           2.99
   10           2.72
   11           2.49
```

New Zealand-Sweden: kpss lnnzseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnnzseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

```
Lag order    Test statistic
    0           35.3
    1           17.7
    2           11.8
    3           8.85
    4           7.08
    5           5.91
    6           5.06
    7           4.43
    8           3.94
    9           3.55
   10           3.23
   11           2.96
```

US-Euro Area: kpss lnuseuir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuseuir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            119
    1           59.4
    2           39.6
    3           29.7
    4           23.8
    5           19.8
    6             17
    7           14.9
    8           13.2
    9           11.9
   10           10.8
   11           9.91
```

US-Switzerland: kpss lnuschir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lnuschir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0            116
    1           58.8
    2           39.5
    3           29.8
    4           23.9
    5             20
    6           17.2
    7           15.1
    8           13.4
```

```
    9           12.1
   10             11
   11           10.1
```

Euro Area-Switzerland: kpss lneuchir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: lneuchir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           25.3
    1           13.2
    2           8.97
    3           6.83
    4           5.53
    5           4.65
    6           4.01
    7           3.53
    8           3.15
    9           2.85
   10            2.6
   11           2.39
```

Interest Rate Differential in first differences:

UK-Canada: kpss D.lnukcair

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukcair is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .00607
    1         .00726
    2         .00841
    3         .00958
    4          .0108
    5          .0119
    6          .0132
    7          .0141
    8          .0151
    9          .0161
   10           .017
   11          .0179
```

UK-Australia: kpss D.lnukauir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel
```

```
Critical values for H0: D.lnukauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0105
    1           .013
    2          .0155
    3          .0179
    4          .0204
    5          .0225
    6           .025
    7          .0268
    8          .0286
    9          .0306
   10          .0324
   11          .0345
```

UK-New Zealand: kpss D.lnuknzir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuknzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .00311
    1         .00399
    2          .0047
    3         .00552
    4         .00633
    5           .007
    6         .00779
    7         .00848
    8         .00916
    9         .00986
   10          .0105
   11          .0111
```

UK-Sweden: kpss D.lnukseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnukseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0587
    1          .0684
    2           .077
    3          .0849
```

```
    4          .0925
    5          .0983
    6           .105
    7            .11
    8           .114
    9           .119
   10           .122
   11           .127
```

Canada-Australia: kpss D.lncaauir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncaauir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0407
    1          .0426
    2          .0438
    3          .0449
    4          .0464
    5          .0476
    6           .049
    7           .051
    8          .0528
    9          .0544
   10          .0558
   11          .0561
```

Canada-New Zealand: kpss D.lncanzir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncanzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .00836
    1          .0114
    2          .0131
    3          .0151
    4          .0167
    5          .0182
    6          .0194
    7          .0208
    8           .022
    9          .0234
   10           .025
```

```
   11          .0263
```

Canada-Sweden: kpss D.lncaseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lncaseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .219
    1            .23
    2           .236
    3            .24
    4           .242
    5           .244
    6           .246
    7           .248
    8           .249
    9           .251
   10           .252
   11           .252
```

Australia-New Zealand: kpss D.lnaunzir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnaunzir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .00978
    1          .0134
    2          .0153
    3          .0182
    4          .0207
    5          .0228
    6          .0245
    7           .027
    8          .0287
    9          .0305
   10          .0318
   11          .0329
```

Australia-Sweden: kpss D.lnauseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnauseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

```
Lag order    Test statistic
    0           .249
    1           .249
    2           .249
    3            .25
    4            .25
    5            .25
    6            .25
    7            .25
    8            .25
    9           .251
   10           .251
   11           .251
```

New Zealand-Sweden: kpss D.lnnzseir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnnzseir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .119
    1           .146
    2           .156
    3           .169
    4           .178
    5           .184
    6            .19
    7           .198
    8           .202
    9           .207
   10           .211
   11           .214
```

US-Euro Area: kpss D.lnuseuir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuseuir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0782
    1            .08
    2          .0841
    3           .087
    4          .0901
    5          .0904
    6          .0917
    7          .0897
    8          .0904
```

```
    9          .0909
   10           .093
   11          .0937
```

US-Switzerland: kpss D.lnuschir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lnuschir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0019
    1         .00276
    2          .0035
    3         .00413
    4         .00513
    5         .00653
    6         .00757
    7          .0079
    8         .00864
    9         .00933
   10            .01
   11          .0107
```

Euro Area-Switzerland: kpss D.lneuchir

```
Maxlag = 11 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: D.lneuchir is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0         .00116
    1         .00169
    2         .00214
    3         .00253
    4         .00314
    5         .00401
    6         .00465
    7         .00485
    8         .00531
    9         .00575
   10         .00617
   11         .00663
```

Johansen Cointegration Tests

UK-Canada:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNGBPCAD LNUKCAIR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.005564	48.55424	25.87211	0.0003
At most 1	0.000753	5.775693	12.51798	0.4879

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.005564	42.77855	19.38704	0.0001
At most 1	0.000753	5.775693	12.51798	0.4879

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPCAD	LNUKCAIR	@TREND(1/02/00)
5.770925	5.499419	0.000284
-9.924752	0.621110	0.000469

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPCAD)	4.12E-05	0.000135
D(LNUKCAIR)	-0.002599	0.000102

1 Cointegrating Equation(s): Log likelihood 44643.72

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPCAD	LNUKCAIR	@TREND(1/02/00)
1.000000	0.952953	4.91E-05
	(0.13506)	(1.9E-05)

Adjustment coefficients (standard error in parentheses)

D(LNGBPCAD)	0.000238
	(0.00033)
D(LNUKCAIR)	-0.014998
	(0.00230)

UK-Australia:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNGBPAUD LNUKAUIR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.004303	35.58173	25.87211	0.0129
At most 1	0.000329	2.520874	12.51798	0.9323

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.004303	33.06086	19.38704	0.0023
At most 1	0.000329	2.520874	12.51798	0.9323

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPAUD	LNUKAUIR	@TREND(1/02/00)
-14.37490	-4.583361	0.000672
-4.774050	0.784856	0.000159

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPAUD)	0.000266	7.40E-05
D(LNUKAUIR)	0.001487	-0.000442

1 Cointegrating Equation(s): Log likelihood 43899.02

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPAUD	LNUKAUIR	@TREND(1/02/00)
1.000000	0.318845	-4.68E-05
	(0.03098)	(6.0E-06)

Adjustment coefficients (standard error in parentheses)

D(LNGBPAUD)	-0.003829
	(0.00094)
D(LNUKAUIR)	-0.021369
	(0.00546)

UK-New Zealand:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNGBPNZD LNUKNZIR
Lags interval (in first differences): 1 to 6

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.002657	26.07227	25.87211	0.0130
At most 1	0.000741	5.678214	12.51798	0.4064

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.002657	20.39405	19.38704	0.0103
At most 1	0.000741	5.678214	12.51798	0.4064

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPNZD	LNUKNZIR	@TREND(1/02/00)
-11.94220	-3.939315	0.000781
7.089589	-1.650435	-0.000566

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPNZD)	0.000190	-0.000128
D(LNUKNZIR)	0.001507	0.000686

1 Cointegrating Equation(s): Log likelihood 42457.07

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPNZD	LNUKNZIR	@TREND(1/02/00)
1.000000	0.329865	-6.54E-05
	(0.06820)	(9.8E-06)

Adjustment coefficients (standard error in parentheses)

D(LNGBPNZD)	-0.002269
	(0.00082)
D(LNUKNZIR)	-0.017995
	(0.00526)

UK-Sweden:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNGBPSEK LNUKSEIR
Lags interval (in first differences): 1 to 5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.001179	35.26537	25.87211	0.0022
At most 1	0.000289	2.219210	12.51798	0.6755

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.001179	37.46155	19.38704	0.0149
At most 1	0.000289	2.219210	12.51798	0.6755

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNGBPSEK	LNUKSEIR	@TREND(1/02/00)
-13.95690	-1.026600	0.000549
-1.567033	1.367493	9.83E-05

Unrestricted Adjustment Coefficients (alpha):

D(LNGBPSEK)	0.000172	1.80E-05
D(LNUKSEIR)	0.000258	-0.000631

1 Cointegrating Equation(s): Log likelihood 43793.61

Normalized cointegrating coefficients (standard error in parentheses)

LNGBPSEK	LNUKSEIR	@TREND(1/02/00)
1.000000	0.073555	-3.94E-05
	(0.03828)	(1.1E-05)

Adjustment coefficients (standard error in parentheses)

D(LNGBPSEK)	-0.002398
	(0.00082)
D(LNUKSEIR)	-0.003606
	(0.00604)

Canada-Australia:

Date: 01/01/21 Time: 08:12
Sample (adjusted): 1/07/2000 12/31/2020
Included observations: 7665 after adjustments
Trend assumption: Linear deterministic trend (restricted)
Series: LNCADAUD LNCAAUIR
Lags interval (in first differences): 1 to 5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.003041	28.83987	25.87211	0.0252
At most 1	0.000716	5.493270	12.51798	0.5501

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.003041	23.34660	19.38704	0.0149
At most 1	0.000716	5.493270	12.51798	0.5501

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNCADAUD	LNCAAUIR	@TREND(1/02/00)
-19.21007	-2.041169	0.000431
-2.749392	1.298462	-0.000341

Unrestricted Adjustment Coefficients (alpha):

D(LNCADAUD)	0.000278	4.11E-08
D(LNCAAUIR)	1.32E-05	-0.000358

1 Cointegrating Equation(s): Log likelihood 51869.45

Normalized cointegrating coefficients (standard error in parentheses)

LNCADAUD	LNCAAUIR	@TREND(1/02/00)
1.000000	0.106255	-2.24E-05
	(0.02776)	(4.9E-06)

Adjustment coefficients (standard error in parentheses)

D(LNCADAUD)	-0.005347
	(0.00111)
D(LNCAAUIR)	-0.000254
	(0.00294)

Canada-New Zealand:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNCADNZD LNCANZIR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.001537	39.51871	25.87211	0.0246
At most 1	0.000877	6.723847	12.51798	0.5144

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.001537	36.79486	19.38704	0.0014
At most 1	0.000877	6.723847	12.51798	0.5144

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNCADNZD	LNCANZIR	@TREND(1/02/00)
-11.19965	-2.038581	0.000556
6.618762	-2.217582	-1.90E-06

Unrestricted Adjustment Coefficients (alpha):

D(LNCADNZD)	0.000187	-8.78E-05
D(LNCANZIR)	0.000496	0.000628

1 Cointegrating Equation(s): Log likelihood 46365.69

Normalized cointegrating coefficients (standard error in parentheses)

LNCADNZD	LNCANZIR	@TREND(1/02/00)
1.000000	0.182022	-4.97E-05
	(0.08407)	(1.2E-05)

Adjustment coefficients (standard error in parentheses)

D(LNCADNZD)	-0.002090
	(0.00072)
D(LNCANZIR)	-0.005555
	(0.00316)

Canada-Sweden:

Date: 01/01/21 Time: 08:14
Sample (adjusted): 1/04/2000 12/31/2020
Included observations: 7668 after adjustments
Trend assumption: Linear deterministic trend (restricted)
Series: LNCADSEK LNCASEIR
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.002755	28.87162	25.87211	0.0364
At most 1	0.000224	1.716801	12.51798	0.8298

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.002755	41.15481	19.38704	0.0068
At most 1	0.000224	1.716801	12.51798	0.8298

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNCADSEK	LNCASEIR	@TREND(1/02/00)
16.83698	0.157214	0.000167
-1.093785	1.472267	-0.000129

Unrestricted Adjustment Coefficients (alpha):

D(LNCADSEK)	-0.000249	-3.87E-05
D(LNCASEIR)	0.000552	-0.000292

1 Cointegrating Equation(s): Log likelihood 47477.63

Normalized cointegrating coefficients (standard error in parentheses)

LNCADSEK	LNCASEIR	@TREND(1/02/00)
1.000000	0.009337	9.94E-06
	(0.02086)	(7.2E-06)

Adjustment coefficients (standard error in parentheses)

D(LNCADSEK)	-0.004195
	(0.00104)
D(LNCASEIR)	0.009302
	(0.00427)

Australia-New Zealand:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNAUDNZD LNAUNZIR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.005091	43.89668	25.87211	0.0006
At most 1	0.000621	4.762137	12.51798	0.6791

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.005091	39.13454	19.38704	0.0001
At most 1	0.000621	4.762137	12.51798	0.6791

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNAUDNZD	LNAUNZIR	@TREND(1/02/00)
-23.02476	-7.841931	0.000390
-9.495417	2.108230	0.000132

Unrestricted Adjustment Coefficients (alpha):

D(LNAUDNZD)	0.000117	9.05E-05
D(LNAUNZIR)	0.001456	-0.000235

1 Cointegrating Equation(s): Log likelihood 49719.16

Normalized cointegrating coefficients (standard error in parentheses)

LNAUDNZD	LNAUNZIR	@TREND(1/02/00)
1.000000	0.340587	-1.69E-05
	(0.03426)	(3.1E-06)

Adjustment coefficients (standard error in parentheses)

D(LNAUDNZD)	-0.002698
	(0.00105)
D(LNAUNZIR)	-0.033516
	(0.00590)

Australia-Sweden:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNAUDSEK LNAUSEIR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.004737	41.70696	25.87211	0.0005
At most 1	0.000692	5.304802	12.51798	0.5822

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.004737	36.40216	19.38704	0.0019
At most 1	0.000692	5.304802	12.51798	0.5822

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNAUDSEK	LNAUIR	@TREND(1/02/00)
16.38022	1.211341	0.000982
-7.302545	0.080610	0.000170

Unrestricted Adjustment Coefficients (alpha):

D(LNAUDSEK)	-0.000232	0.000120
D(LNAUIR)	-0.000365	-0.000110

1 Cointegrating Equation(s): Log likelihood 56262.62

Normalized cointegrating coefficients (standard error in parentheses)

LNAUDSEK	LNAUIR	@TREND(1/02/00)
1.000000	0.073951	6.00E-05
	(0.04138)	(9.0E-06)

Adjustment coefficients (standard error in parentheses)

D(LNAUDSEK)	-0.003803
	(0.00106)
D(LNAUIR)	-0.005981
	(0.00126)

New Zealand-Sweden:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNNZDSEK LNNZSEIR
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.003784	31.35305	25.87211	0.0185
At most 1	0.000298	2.285047	12.51798	0.9249

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.003784	29.06801	19.38704	0.0037
At most 1	0.000298	2.285047	12.51798	0.9249

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNNZDSEK	LNNZSEIR	@TREND(1/02/00)
20.14777	0.631832	0.000930
-1.454981	0.452176	0.000278

Unrestricted Adjustment Coefficients (alpha):

D(LNNZDSEK)	-0.000344	3.75E-05
D(LNNZSEIR)	-0.000645	-0.000465

1 Cointegrating Equation(s): Log likelihood 44649.81

Normalized cointegrating coefficients (standard error in parentheses)

LNNZDSEK	LNNZSEIR	@TREND(1/02/00)
1.000000	0.031360	4.62E-05
	(0.01445)	(4.8E-06)

Adjustment coefficients (standard error in parentheses)

D(LNNZDSEK)	-0.006934
	(0.00138)
D(LNNZSEIR)	-0.012995
	(0.00665)

US-Euro Area:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNUSDEUR LNUSEUIR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.006000	31.74542	25.87211	0.0057
At most 1	0.000410	3.144580	12.51798	0.3192

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.006000	41.60084	19.38704	0.0005
At most 1	0.000410	3.144580	12.51798	0.3192

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNUSDEUR	LNUSEUIR	@TREND(1/02/ 00)
5.841255	1.267894	-0.000393
5.935303	-0.061807	0.000162

Unrestricted Adjustment Coefficients (alpha):

D(LNUSDEUR)	-4.92E-05	-9.21E-05
D(LNUSEUIR)	-0.000487	0.000181

1 Cointegrating Equation(s): Log likelihood 48239.54

Normalized cointegrating coefficients (standard error in parentheses)

LNUSDEUR	LNUSEUIR	@TREND(1/02/ 00)
1.000000	0.217059	-6.73E-05
	(0.11540)	(3.7E-05)

Adjustment coefficients (standard error in parentheses)

D(LNUSDEUR)	-0.000287
	(0.00033)
D(LNUSEUIR)	-0.002847
	(0.00146)

US-Switzerland:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNUSDCHF LNUSCHIR
Lags interval (in first differences): 1 to 5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.004871	42.50926	25.87211	0.0000
At most 1	0.000663	5.084910	12.51798	0.5672

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.004871	37.42435	19.38704	0.0000
At most 1	0.000663	5.084910	12.51798	0.5672

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNUSDCHF	LNUSCHIR	@TREND(1/02/00)
-10.21829	-1.911428	0.001226
8.102236	-0.284423	-0.000467

Unrestricted Adjustment Coefficients (alpha):

D(LNUSDCHF)	0.000217	-0.000118
D(LNUSCHIR)	0.008987	0.002312

1 Cointegrating Equation(s): Log likelihood 32313.54

Normalized cointegrating coefficients (standard error in parentheses)

LNUSDCHF	LNUSCHIR	@TREND(1/02/00)
1.000000	0.187059	-0.000120
	(0.02289)	(8.9E-06)

Adjustment coefficients (standard error in parentheses)

D(LNUSDCHF)	-0.002213
	(0.00064)
D(LNUSCHIR)	-0.091832
	(0.01831)

Euro Area-Switzerland:

Sample (adjusted): 1/01/2000 12/31/2020
Trend assumption: Linear deterministic trend (restricted)
Series: LNEURCHF LNEUCHIR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.019330	154.9282	25.87211	0.0000
At most 1	0.000688	5.275614	12.51798	0.6506

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.019330	149.6526	19.38704	0.0000
At most 1	0.000688	5.275614	12.51798	0.6506

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNEURCHF	LNEUCHIR	@TREND(1/02/00)
-9.807407	2.899282	0.000145
13.77414	0.053734	-0.000925

Unrestricted Adjustment Coefficients (alpha):

D(LNEURCHF)	-4.50E-05	-8.74E-05
D(LNEUCHIR)	-0.022482	0.000362

1 Cointegrating Equation(s): Log likelihood 35956.10

Normalized cointegrating coefficients (standard error in parentheses)

LNEURCHF	LNEUCHIR	@TREND(1/02/00)
1.000000	-0.295622	-1.48E-05
	(0.01986)	(5.1E-06)

Adjustment coefficients (standard error in parentheses)

D(LNEURCHF)	0.000441
	(0.00038)
D(LNEUCHIR)	0.220487
	(0.01801)

Linear CVAR Model (including Lag Selection):

UK-Canada: var D.lngbpcad D.lnukcair, lags(1/3) exog(L.ukcaecm2 ukcadp ukcadn)

Sample: 05jan2000 thru 31dec2020		Number of obs	= 7,667
Log likelihood =	44679.02	AIC	= -11.64967
FPE =	2.99e-08	HQIC	= -11.64346
Det(Sigma_ml) =	2.97e-08	SBIC	= -11.63156

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lngbpcad	10	.024962	0.0510	789.1996	0.0000
D_lnukcair	10	.034806	0.0653	535.3773	0.0000

	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
D_lngbpcad						
lngbpcad						
LD.	.0042443	.011417	0.37	0.710	-.0181325	.0266211
L2D.	-.0137568	.0114154	-1.21	0.228	-.0361307	.008617
L3D.	.0149565	.0114213	1.31	0.190	-.0074287	.0373418
lnukcair						
LD.	.0000236	.0016188	0.01	0.988	-.0031492	.0031965
L2D.	-.0022735	.0016285	-1.40	0.163	-.0054653	.0009183
L3D.	.001685	.0016118	1.05	0.296	-.0014741	.0048441
ukcaecm2						
L1.	.0000736	.0002798	0.26	0.792	-.0004747	.0006219
ukcadp	9.89e-06	.000242	0.04	0.967	-.0004645	.0004843
ukcadn	.0005386	.0006006	0.90	0.370	-.0006384	.0017157
_cons	.0000352	.0000586	0.60	0.548	-.0000797	.0001501
D_lnukcair						
lngbpcad						
LD.	.0819212	.0800899	1.02	0.306	-.0750521	.2388945
L2D.	.1834969	.0800792	2.29	0.022	.0265445	.3404492
L3D.	.1134548	.08012	1.42	0.157	-.0435775	.2704871
lnukcair						
LD.	-.1931433	.0113562	-17.01	0.000	-.215401	-.1708857
L2D.	-.1337415	.0114239	-11.71	0.000	-.1561319	-.1113511
L3D.	-.1013946	.011307	-8.97	0.000	-.1235559	-.0792333
ukcaecm2						
L1.	-.0119814	.0019625	-6.11	0.000	-.0158278	-.008135
ukcadp	-.0006419	.0016978	-0.38	0.705	-.0039696	.0026858
ukcadn	.0365792	.0042129	8.68	0.000	.0283222	.0448363
_cons	-.0003636	.0004113	-0.88	0.377	-.0011698	.0004426

Lag-order selection criteria

Sample: 14jan2000 thru 31dec2020 Number of obs = 7,658

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	44421.7				3.1e-08	-11.5993	-11.5968	-11.592
1	44522.9	202.24	4	0.000	3.1e-08	-11.6247	-11.6209	-11.6138
2	44578.8	111.83	4	0.000	3.0e-08*	-11.6382	-11.6332	-11.6237
3	44621.2	84.771*	4	0.000	3.0e-08	-11.6483*	-11.642	-11.6301
4	44662.9	83.519	4	0.000	3.0e-08	-11.6581	-11.6506	-11.6364*
5	44675.8	25.856	4	0.000	3.0e-08	-11.6604	-11.6517	-11.6351
6	44698.2	44.622	4	0.000	2.9e-08	-11.6652	-11.6553	-11.6362
7	44702	7.7108	4	0.103	2.9e-08	-11.6652	-11.654	-11.6325
8	44714.8	25.488	4	0.000	2.9e-08	-11.6675	-11.655	-11.6312
9	44725.6	21.617	4	0.000	2.9e-08	-11.6693	-11.6556	-11.6294
10	44732.2	13.375	4	0.010	2.9e-08	-11.67	-11.655	-11.6264
11	44738.9	13.309	4	0.010	2.9e-08	-11.6706	-11.6545	-11.6235
12	44758.6	39.366	4	0.000	2.9e-08	-11.6747	-11.6573*	-11.624

* optimal lag

UK-Australia: var D.lngbpaud D.lnukauir, lags(1/3) exog(L.ukauecm1 ukaudp ukaudn)

```
Sample: 05jan2000 thru 31dec2020               Number of obs     =      7,667
Log likelihood =   43894.29                    AIC               =  -11.44497
FPE            =   3.67e-08                    HQIC              =  -11.43876
Det(Sigma_ml)  =   3.65e-08                    SBIC              =  -11.42685

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lngbpaud           10     .005755   0.0024   18.2731   0.0321
D_lnukauir           10     .033267   0.0678   557.3494  0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lngbpaud   |
    lngbpaud |
         LD. |  -.0105721   .0114161    -0.93   0.354    -.0329472    .0118031
        L2D. |   .0096894   .0114167     0.85   0.396     -.012687    .0320658
        L3D. |  -.0082735   .0114158    -0.72   0.469    -.0306481    .0141011
             |
    lnukauir |
         LD. |  -.0026424   .0019712    -1.34   0.180    -.0065058    .0012211
        L2D. |  -.0000919   .0019959    -0.05   0.963    -.0040038      .00382
        L3D. |  -.0006054   .0019674    -0.31   0.758    -.0044614    .0032505
             |
    ukauecm1 |
         L1. |  -.0014387    .000562    -2.56   0.010    -.0025401   -.0003373
             |
      ukaudp |   .0002368   .0003089     0.77   0.443    -.0003686    .0008422
      ukaudn |    .002011    .000786     2.56   0.011     .0004705    .0035515
       _cons |   .0000197   .0000676     0.29   0.770    -.0001127    .0001521
-------------+----------------------------------------------------------------
D_lnukauir   |
    lngbpaud |
         LD. |   -.091764   .0659978    -1.39   0.164    -.2211172    .0375892
        L2D. |   .0093936   .0660015     0.14   0.887    -.1199669    .1387541
        L3D. |   .0633462   .0659961     0.96   0.337    -.0660037    .1926961
             |
    lnukauir |
         LD. |  -.2309462   .0113957   -20.27   0.000    -.2532813   -.2086111
        L2D. |  -.1614086   .0115385   -13.99   0.000    -.1840237   -.1387935
        L3D. |  -.1067709   .0113735    -9.39   0.000    -.1290626   -.0844792
             |
    ukauecm1 |
         L1. |  -.0060506   .0032487    -1.86   0.063     -.012418    .0003167
             |
      ukaudp |  -.0002578   .0017857    -0.14   0.885    -.0037577    .0032421
      ukaudn |  -.0116092   .0045439    -2.55   0.011    -.0205151   -.0027033
       _cons |   .0000694   .0003906     0.18   0.859    -.0006961    .0008349
------------------------------------------------------------------------------
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                     Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL       LR      df    p      FPE       AIC       HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  43579.6                        3.9e-08  -11.3794  -11.3769  -11.3721  |
  |   1 |  43720.3  281.45    4   0.000 3.8e-08  -11.4151  -11.4113  -11.4042  |
  |   2 |  43794.5  148.23    4   0.000 3.7e-08  -11.4334  -11.4284  -11.4189  |
  |   3 |  43839.5  90.025*   4   0.000 3.7e-08  -11.4441* -11.4379   -11.426  |
  |   4 |  43885.8  92.577    4   0.000 3.6e-08  -11.4551  -11.4477  -11.4334  |
  |   5 |  43898.4  25.351    4   0.000 3.6e-08  -11.4574  -11.4487   -11.432  |
  |   6 |    43928  59.098    4   0.000 3.6e-08  -11.4641  -11.4541  -11.4351* |
  |   7 |  43932.7  9.4819    4   0.050 3.6e-08  -11.4643  -11.4531  -11.4316  |
  |   8 |  43942.1  18.781    4   0.001 3.6e-08  -11.4657  -11.4532  -11.4294  |
  |   9 |  43952.4   20.57    4   0.000 3.6e-08  -11.4673  -11.4536  -11.4274  |
  |  10 |  43958.5  12.132    4   0.016 3.6e-08  -11.4679  -11.4529  -11.4243  |
  |  11 |  43968.3  19.676    4   0.001 3.6e-08  -11.4694  -11.4532  -11.4222  |
  |  12 |  44004.6  72.653    4   0.000 3.6e-08* -11.4778  -11.4604* -11.4271  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

UK-New Zealand: var D.lngbpnzd D.lnuknzir, lags(1/6) exog(L.uknzecm1 uknzdp uknzdn)

```
Sample: 08jan2000 thru 31dec2020               Number of obs     =      7,664
Log likelihood =   42452.43                    AIC               =  -11.07005
FPE            =   5.34e-08                    HQIC              =   -11.0601
Det(Sigma_ml)  =   5.29e-08                    SBIC              =  -11.04106

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lngbpnzd           16     .059707   0.0229   221.0044   0.0077
D_lnuknzir           16     .038617   0.0987   839.2771   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lngbpnzd   |
    lngbpnzd |
         LD. |   .0082839   .0114331     0.72   0.469    -.0141246    .0306924
        L2D. |  -.0100421    .011427    -0.88   0.380    -.0324387    .0123545
        L3D. |   .0046841   .0114292     0.41   0.682    -.0177167    .0270848
        L4D. |  -.0193301   .0114171    -1.69   0.090    -.0417073    .0030471
        L5D. |  -.0040441    .011427    -0.35   0.723    -.0264407    .0183524
        L6D. |  -.0032452   .0114153    -0.28   0.776    -.0256187    .0191283
             |
    lnuknzir |
         LD. |  -.0028573   .0017707    -1.61   0.107    -.0063277    .0006132
        L2D. |   .0001594   .0018352     0.09   0.931    -.0034374    .0037563
        L3D. |   .0008223   .0018497     0.44   0.657    -.0028031    .0044477
        L4D. |  -.0016747   .0018479    -0.91   0.365    -.0052965     .001947
        L5D. |   .0036907   .0018313     2.02   0.044     .0001015    .0072799
        L6D. |  -.0004336    .001765    -0.25   0.806    -.0038929    .0030257
             |
    uknzecm1 |
         L1. |  -.0007309   .0004457    -1.64   0.101    -.0016045    .0001426
             |
      uknzdp |   .0000431   .0003606     0.12   0.905    -.0006637      .00075
      uknzdn |   .0016318   .0008667     1.88   0.060    -.0000668    .0033305
       _cons |   .0000571   .0000698     0.82   0.413    -.0000797    .0001938
-------------+----------------------------------------------------------------
D_lnuknzir   |
    lngbpnzd |
         LD. |  -.0667471   .0738693    -0.90   0.366    -.2115283    .0780341
        L2D. |  -.0844608     .07383    -1.14   0.253     -.229165    .0602434
        L3D. |   .0193402   .0738438     0.26   0.793     -.125391    .1640714
        L4D. |  -.1654008    .073766    -2.24   0.025    -.3099794   -.0208221
        L5D. |  -.0589581     .07383    -0.80   0.425    -.2036622     .085746
        L6D. |   .0121967   .0737539     0.17   0.869    -.1323583    .1567517
             |
    lnuknzir |
         LD. |  -.2850535   .0114403   -24.92   0.000     -.307476    -.262631
        L2D. |  -.1874897   .0118571   -15.81   0.000    -.2107292   -.1642502
        L3D. |  -.1783319   .0119511   -14.92   0.000    -.2017556   -.1549083
        L4D. |  -.1324351   .0119391   -11.09   0.000    -.1558353   -.1090349
        L5D. |  -.0802756   .0118317    -6.78   0.000    -.1034653   -.0570859
        L6D. |  -.0872533   .0114035    -7.65   0.000    -.1096038   -.0649028
             |
    uknzecm1 |
         L1. |  -.0044213   .0028796    -1.54   0.125    -.0100652    .0012226
             |
      uknzdp |   .0014383   .0023301     0.62   0.537    -.0031287    .0060052
      uknzdn |  -.0076261   .0055996    -1.36   0.173     -.018601    .0033489
       _cons |  -.0000614   .0004508    -0.14   0.892     -.000945    .0008221
------------------------------------------------------------------------------
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                        Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC       HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |   42020                        5.9e-08  -10.9721  -10.9696  -10.9648  |
  |   1 |  42209.1   378.1    4  0.000  5.6e-08  -11.0204  -11.0167  -11.0095  |
  |   2 |  42265.4  112.71    4  0.000  5.5e-08  -11.0341  -11.0291  -11.0196  |
  |   3 |  42328.3  125.82    4  0.000  5.4e-08  -11.0494  -11.0432  -11.0313  |
```

```
|    4 |  42372.4  88.077    4  0.000 5.4e-08  -11.0599  -11.0524  -11.0381  |
|    5 |  42386.2  27.705    4  0.000 5.4e-08  -11.0625  -11.0538  -11.0371  |
|    6 |  42415.7  58.953*   4  0.000 5.3e-08  -11.0691  -11.0592  -11.0401* |
|    7 |  42426.6  21.701    4  0.000 5.3e-08  -11.0709  -11.0597  -11.0383  |
|    8 |  42437.8  22.497    4  0.000 5.3e-08  -11.0728  -11.0604  -11.0365  |
|    9 |  42450.2  24.898    4  0.000 5.3e-08   -11.075  -11.0613  -11.0351  |
|   10 |  42455.1  9.6804    4  0.046 5.3e-08  -11.0752  -11.0603  -11.0317  |
|   11 |  42464.3  18.339    4  0.001 5.3e-08  -11.0766  -11.0604  -11.0294  |
|   12 |  42492.2  55.853    4  0.000 5.3e-08* -11.0828* -11.0654* -11.0321  |
+---------------------------------------------------------------------------+
 * optimal lag
```

UK-Sweden: var D.lngbpsek D.lnukseir, lags(1/5) exog(L.ukseecm1 uksedp uksedn)

```
Sample: 07jan2000 thru 31dec2020               Number of obs     =      7,665
Log likelihood =   43798.85                    AIC               =  -11.42096
FPE            =   3.76e-08                    HQIC              =  -11.41226
Det(Sigma_ml)  =   3.73e-08                    SBIC              =   -11.3956

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lngbpsek           14     .005115   0.0026   20.33214   0.0872
D_lnukseir           14     .037831   0.0415   332.0212   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lngbpsek   |
    lngbpsek |
         LD. |   .0148825   .0114213     1.30   0.193    -.0075028    .0372677
        L2D. |  -.0137775    .011421    -1.21   0.228    -.0361622    .0086072
        L3D. |  -.0193947   .0114269    -1.70   0.090    -.0417911    .0030017
        L4D. |  -.0198708   .0114268    -1.74   0.082     -.042267    .0025253
        L5D. |  -.0135017   .0114281    -1.18   0.237    -.0359003    .0088969
             |
    lnukseir |
         LD. |   .0018385   .0015446     1.19   0.234    -.0011888    .0048659
        L2D. |   .0008409   .0015607     0.54   0.590    -.0022181    .0038999
        L3D. |  -.0005803   .0015654    -0.37   0.711    -.0036484    .0024878
        L4D. |  -.0010501   .0015603    -0.67   0.501    -.0041082     .002008
        L5D. |  -.0003231    .001542    -0.21   0.834    -.0033454    .0026992
             |
    ukseecm1 |
         L1. |   -.000956   .0005291    -1.81   0.071    -.0019931    .0000811
             |
      uksedp |   .0003304   .0002732     1.21   0.227    -.0002051    .0008659
      uksedn |   .0007044   .0006378     1.10   0.269    -.0005456    .0019544
       _cons |   6.79e-06   .0000601     0.11   0.910    -.0001111    .0001247
-------------+----------------------------------------------------------------
D_lnukseir   |
    lngbpsek |
         LD. |  -.1229642   .0844668    -1.46   0.145    -.2885161    .0425877
        L2D. |   .1621944   .0844646     1.92   0.055    -.0033532    .3277421
        L3D. |  -.0086966   .0845087    -0.10   0.918    -.1743306    .1569375
        L4D. |  -.0898118   .0845078    -1.06   0.288     -.255444    .0758203
        L5D. |  -.1483233   .0845171    -1.75   0.079    -.3139737    .0173272
             |
    lnukseir |
         LD. |   -.166973   .0114232   -14.62   0.000    -.1893621   -.1445839
        L2D. |   -.115165   .0115425    -9.98   0.000    -.1377879   -.0925421
        L3D. |  -.0840159   .0115769    -7.26   0.000    -.1067061   -.0613256
        L4D. |  -.0689475   .0115392    -5.98   0.000    -.0915639   -.0463311
        L5D. |  -.0256795   .0114041    -2.25   0.024     -.048031    -.003328
             |
    ukseecm1 |
         L1. |  -.0020907   .0039133    -0.53   0.593    -.0097606    .0055793
             |
      uksedp |  -.0001961   .0020206    -0.10   0.923    -.0041563    .0037641
      uksedn |  -.0169788   .0047167    -3.60   0.000    -.0262234   -.0077343
       _cons |   .0000116   .0004448     0.03   0.979    -.0008601    .0008834
------------------------------------------------------------------------------

Lag-order selection criteria
```

Sample: 14jan2000 thru 31dec2020 Number of obs = 7,658

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	43591.9				3.9e-08	-11.3826	-11.3801	-11.3753
1	43670.4	157.11	4	0.000	3.8e-08	-11.402	-11.3983	-11.3912
2	43708.3	75.734	4	0.000	3.8e-08	-11.4109	-11.4059	-11.3964
3	43729.2	41.755	4	0.000	3.8e-08	-11.4153	-11.4091	-11.3972
4	43747.5	36.585	4	0.000	3.8e-08	-11.419	-11.4116	-11.3973
5	43752.2	9.5313*	4	0.049	3.8e-08	-11.4192	-11.4105*	-11.3938*
6	43769.7	34.882	4	0.000	3.8e-08	-11.4227	-11.4128	-11.3937
7	43773	6.6838	4	0.154	3.8e-08	-11.4226	-11.4114	-11.3899
8	43776.1	6.2333	4	0.182	3.8e-08	-11.4223	-11.4099	-11.3861
9	43778.9	5.6361	4	0.228	3.8e-08	-11.422	-11.4083	-11.3821
10	43779.4	1.0178	4	0.907	3.8e-08	-11.4211	-11.4062	-11.3776
11	43785.2	11.496	4	0.022	3.8e-08	-11.4216	-11.4054	-11.3744
12	43799.6	28.718	4	0.000	3.7e-08*	-11.4243*	-11.4069	-11.3735

* optimal lag

Canada-Australia: var D.lncadaud D.lncaauir, lags(1/5) exog(L.caauecm1 caaudp caaudn)

```
Sample: 07jan2000 thru 31dec2020                  Number of obs     =      7,665
Log likelihood =   52355.82                       AIC               =   -13.6537
FPE            =   4.03e-09                       HQIC              =    -13.645
Det(Sigma_ml)  =   4.00e-09                       SBIC              =  -13.62834
```

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lncadaud	14	.00504	0.0136	105.8875	0.0000
D_lncaauir	14	.012574	0.1225	1070.335	0.0000

	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
D_lncadaud						
lncadaud						
LD.	-.0433293	.0114097	-3.80	0.000	-.0656919	-.0209667
L2D.	.0133601	.0114069	1.17	0.242	-.0089971	.0357172
L3D.	-.0355223	.0113993	-3.12	0.002	-.0578645	-.0131802
L4D.	-.0365911	.0113895	-3.21	0.001	-.0589142	-.014268
L5D.	.0025413	.0113848	0.22	0.823	-.0197726	.0248552
lncaauir						
LD.	-.0025384	.0043024	-0.59	0.555	-.0109709	.0058942
L2D.	.0214303	.0043042	4.98	0.000	.0129943	.0298664
L3D.	.0019263	.0043108	0.45	0.655	-.0065228	.0103754
L4D.	.0077825	.0043097	1.81	0.071	-.0006644	.0162295
L5D.	.0047326	.0043086	1.10	0.272	-.0037122	.0131773
caauecm1						
L1.	-.0029047	.0008395	-3.46	0.001	-.00455	-.0012594
caaudp	.0002975	.000246	1.21	0.226	-.0001846	.0007797
caaudn	-.0033469	.0006643	-5.04	0.000	-.0046489	-.002045
_cons	.0000115	.0000595	0.19	0.846	-.0001051	.0001281
D_lncaauir						
lncadaud						
LD.	-.0316703	.0284669	-1.11	0.266	-.0874644	.0241238
L2D.	-.0620983	.02846	-2.18	0.029	-.1178788	-.0063178
L3D.	-.0175023	.0284409	-0.62	0.538	-.0732454	.0382407
L4D.	-.0181875	.0284166	-0.64	0.522	-.0738831	.037508
L5D.	-.0118212	.0284049	-0.42	0.677	-.0674937	.0438513
lncaauir						
LD.	-.0483209	.0107343	-4.50	0.000	-.0693598	-.027282
L2D.	-.0195316	.0107388	-1.82	0.069	-.0405793	.0015161
L3D.	-.0317166	.0107555	-2.95	0.003	-.0527969	-.0106363
L4D.	-.0405317	.0107527	-3.77	0.000	-.0616065	-.0194568
L5D.	-.0077313	.0107499	-0.72	0.472	-.0288008	.0133382
caauecm1						
L1.	.0021136	.0020945	1.01	0.313	-.0019915	.0062187

```
             |
     caaudp |    .000014   .0006138     0.02   0.982    -.0011889     .001217
     caaudn |  -.0529458   .0016573   -31.95   0.000    -.0561941   -.0496974
       _cons |   .0004261   .0001484     2.87   0.004     .0001353     .000717
------------------------------------------------------------------------------

Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                      Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  52246.8                      4.1e-09  -13.6429  -13.6404  -13.6357* |
  |   1 |    52264  34.447    4  0.000 4.1e-09  -13.6464  -13.6427  -13.6355  |
  |   2 |  52281.6  35.256    4  0.000 4.0e-09  -13.6499   -13.645  -13.6354  |
  |   3 |  52289.9  16.613    4  0.002 4.0e-09  -13.6511  -13.6448  -13.6329  |
  |   4 |  52303.8  27.748    4  0.000 4.0e-09  -13.6536  -13.6462  -13.6319  |
  |   5 |  52304.8  1.9416*   4  0.747 4.0e-09  -13.6529  -13.6441* -13.6275  |
  |   6 |    52309  8.4791    4  0.076 4.0e-09  -13.6529   -13.643  -13.6239  |
  |   7 |  52321.7  25.287    4  0.000 4.0e-09  -13.6552   -13.644  -13.6225  |
  |   8 |  52328.2  13.027    4  0.011 4.0e-09  -13.6558  -13.6434  -13.6196  |
  |   9 |  52332.4  8.4666    4  0.076 4.0e-09  -13.6559  -13.6422   -13.616  |
  |  10 |  52340.7  16.465    4  0.002 4.0e-09   -13.657  -13.6421  -13.6135  |
  |  11 |  52353.7  26.019    4  0.000 4.0e-09* -13.6594* -13.6432  -13.6122  |
  |  12 |  52356.8  6.3498    4  0.175 4.0e-09  -13.6591  -13.6417  -13.6084  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

Canada-New Zealand: var D.lncadnzd D.lncanzir, lags(1/3) exog(L.canzecm1 canzdp canzdn)

```
Sample: 05jan2000 thru 31dec2020                  Number of obs     =      7,667
Log likelihood =   46482.03                       AIC               =     -12.12
FPE            =   1.87e-08                       HQIC              =  -12.11379
Det(Sigma_ml)  =   1.86e-08                       SBIC              =  -12.10189

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lncadnzd           10     .005609   0.0023   17.34824   0.0435
D_lncanzir           10     .024343   0.1169   1014.836   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lncadnzd   |
    lncadnzd |
         LD. |  -.0106392   .0114184    -0.93   0.351    -.0330189    .0117404
        L2D. |  -.0083764   .0114182    -0.73   0.463    -.0307556    .0140028
        L3D. |   -.009263   .0114151    -0.81   0.417    -.0316362    .0131101
             |
    lncanzir |
         LD. |  -.0025709    .002577    -1.00   0.318    -.0076217    .0024799
        L2D. |   .0018986   .0026744     0.71   0.478     -.003343    .0071403
        L3D. |  -.0035628   .0025773    -1.38   0.167    -.0086141    .0014886
             |
    canzecm1 |
         L1. |  -.0012937   .0005887    -2.20   0.028    -.0024475     -.00014
             |
      canzdp |  -.0004616   .0003028    -1.52   0.127     -.001055    .0001319
      canzdn |  -.0014679   .0007811    -1.88   0.060    -.0029989    .0000631
       _cons |   .0000581   .0000658     0.88   0.377    -.0000708    .0001871
-------------+----------------------------------------------------------------
D_lncanzir   |
    lncadnzd |
         LD. |   -.009563   .0495554    -0.19   0.847    -.1066897    .0875638
        L2D. |  -.0449282   .0495544    -0.91   0.365     -.142053    .0521967
        L3D. |  -.0150444   .0495409    -0.30   0.761    -.1121428     .082054
             |
    lncanzir |
         LD. |  -.2972948    .011184   -26.58   0.000    -.3192151   -.2753745
        L2D. |   -.119828   .0116066   -10.32   0.000    -.1425765   -.0970796
        L3D. |  -.1098158   .0111853    -9.82   0.000    -.1317386   -.0878931
             |
```

```
    canzecm1 |
         L1. |   .0007021   .0025548     0.27   0.783    -.0043052    .0057094
             |
      canzdp |   .0022395   .0013141     1.70   0.088     -.000336    .0048151
      canzdn |  -.0517604   .0033901   -15.27   0.000    -.0584049   -.0451159
       _cons |   .0002489   .0002855     0.87   0.383    -.0003107    .0008085
------------------------------------------------------------------------------
```

```
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                      Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  46051.7                      2.1e-08   -12.025  -12.0225  -12.0177  |
  |   1 |  46339.2  574.93    4  0.000 1.9e-08   -12.099  -12.0953  -12.0881  |
  |   2 |  46370.7  62.967    4  0.000 1.9e-08  -12.1062  -12.1012  -12.0917  |
  |   3 |  46420.1  98.886*   4  0.000 1.9e-08  -12.1181  -12.1119  -12.0999* |
  |   4 |  46439.4  38.646    4  0.000 1.9e-08  -12.1221  -12.1146  -12.1003  |
  |   5 |  46447.9  16.916    4  0.002 1.9e-08  -12.1232  -12.1145  -12.0979  |
  |   6 |  46452.7  9.7401    4  0.045 1.9e-08  -12.1235  -12.1135  -12.0945  |
  |   7 |  46467.5  29.582    4  0.000 1.9e-08  -12.1263  -12.1151  -12.0936  |
  |   8 |  46472.4  9.6494    4  0.047 1.9e-08  -12.1265  -12.1141  -12.0902  |
  |   9 |  46487.8  30.908    4  0.000 1.9e-08  -12.1295  -12.1158  -12.0896  |
  |  10 |  46500.4  25.154    4  0.000 1.8e-08* -12.1317* -12.1168* -12.0882  |
  |  11 |  46503.8  6.8488    4  0.144 1.8e-08  -12.1316  -12.1154  -12.0844  |
  |  12 |  46505.8  3.9505    4  0.413 1.8e-08  -12.1311  -12.1136  -12.0803  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

Canada-Sweden: var D.lncadsek D.lncaseir, lags(1/2) exog(L.caseecm1 casedp casedn)

```
Sample: 04jan2000 thru 31dec2020                Number of obs     =      7,668
Log likelihood =   47634.74                     AIC               =  -12.42012
FPE            =   1.38e-08                     HQIC              =  -12.41515
Det(Sigma_ml)  =   1.38e-08                     SBIC              =  -12.40563

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lncadsek            8     .005403   0.0034   26.14555   0.0005
D_lncaseir            8     .021751   0.0435   348.7361   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lncadsek   |
    lncadsek |
         LD. |   .0000722   .0114172     0.01   0.995    -.0223051    .0224495
        L2D. |  -.0007948    .011412    -0.07   0.944    -.0231619    .0215724
             |
    lncaseir |
         LD. |  -.0075503   .0027795    -2.72   0.007    -.0129979   -.0021026
        L2D. |   .0040493   .0027802     1.46   0.145    -.0013998    .0094984
             |
    caseecm1 |
         L1. |   -.003695   .0009455    -3.91   0.000    -.0055482   -.0018417
             |
      casedp |   .0001399   .0002622     0.53   0.594     -.000374    .0006538
      casedn |   .0002974   .0006486     0.46   0.647    -.0009738    .0015686
       _cons |  -.0000226   .0000639    -0.35   0.723    -.0001478    .0001025
-------------+----------------------------------------------------------------
D_lncaseir   |
    lncadsek |
         LD. |  -.0873712   .0459654    -1.90   0.057    -.1774616    .0027192
        L2D. |   .0039491   .0459445     0.09   0.932    -.0861005    .0939987
             |
    lncaseir |
         LD. |  -.0517523   .0111901    -4.62   0.000    -.0736844   -.0298201
        L2D. |  -.0139469   .0111931    -1.25   0.213     -.035885    .0079911
             |
    caseecm1 |
         L1. |   .0074575   .0038067     1.96   0.050    -3.51e-06    .0149185
             |
      casedp |   .0001559   .0010556     0.15   0.883     -.001913    .0022249
```

```
      casedn |  -.0468185   .0026112   -17.93   0.000    -.0519362   -.0417007
       _cons |   .0003542   .0002571     1.38   0.168    -.0001497    .0008582
------------------------------------------------------------------------------
```

```
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                      Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |   47557                       1.4e-08  -12.4181  -12.4156  -12.4109  |
  |   1 |   47573  31.923    4  0.000 1.4e-08* -12.4213  -12.4175* -12.4104  |
  |   2 | 47574.9  3.7243*   4  0.445 1.4e-08  -12.4207* -12.4157  -12.4062* |
  |   3 | 47575.4  1.1004    4  0.894 1.4e-08  -12.4198  -12.4136  -12.4017  |
  |   4 | 47577.3  3.7923    4  0.435 1.4e-08  -12.4192  -12.4118  -12.3975  |
  |   5 | 47577.7  .73237    4  0.947 1.4e-08  -12.4183  -12.4096  -12.3929  |
  |   6 | 47579.9  4.4846    4  0.344 1.4e-08  -12.4178  -12.4079  -12.3888  |
  |   7 |   47584  8.1448    4  0.086 1.4e-08  -12.4179  -12.4067  -12.3852  |
  |   8 | 47591.3   14.56    4  0.006 1.4e-08  -12.4187  -12.4063  -12.3824  |
  |   9 | 47592.1  1.6738    4  0.795 1.4e-08  -12.4179  -12.4042   -12.378  |
  |  10 | 47592.3  .43536    4  0.979 1.4e-08  -12.4169   -12.402  -12.3734  |
  |  11 | 47596.2  7.8287    4  0.098 1.4e-08  -12.4169  -12.4007  -12.3697  |
  |  12 | 47598.3  4.1032    4  0.392 1.4e-08  -12.4164   -12.399  -12.3656  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

Australia-New Zealand: var D.lnaudnzd D.lnaunzir, lags(1/3) exog(L.aunzecm1 aunzdp aunzdn)

```
Sample: 05jan2000 thru 31dec2020                 Number of obs     =      7,667
Log likelihood =   49730.51                      AIC               =   -12.9674
FPE            =   8.01e-09                      HQIC              =  -12.96118
Det(Sigma_ml)  =   7.96e-09                      SBIC              =  -12.94928

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnaudnzd           10     .005986   0.0122   26.59936   0.0054
D_lnaunzir           10     .022417   0.1057   906.0433   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnaudnzd   |
    lnaudnzd |
         LD. |  -.0151589   .0114257    -1.33   0.185    -.0375529    .0072351
        L2D. |  -.0055409   .0114232    -0.49   0.628      -.02793    .0168481
        L3D. |   -.008881   .0114232    -0.78   0.437    -.0312701     .013508
             |
    lnaunzir |
         LD. |   .0015222   .0020053     0.76   0.448    -.0024081    .0054524
        L2D. |   -.002111   .0020792    -1.02   0.310    -.0061862    .0019641
        L3D. |  -.0025356   .0020021    -1.27   0.205    -.0064596    .0013885
             |
    aunzecm1 |
         L1. |  -.0019834    .000827    -2.40   0.016    -.0036043   -.0003625
             |
      aunzdp |  -.0005107   .0002427    -2.10   0.035    -.0009863   -.0000351
      aunzdn |  -.0001607   .0006485    -0.25   0.804    -.0014316    .0011103
       _cons |   .0000417   .0000465     0.90   0.369    -.0000493    .0001328
-------------+----------------------------------------------------------------
D_lnaunzir   |
    lnaudnzd |
         LD. |   .0461831   .0642529     0.72   0.472    -.0797503    .1721166
        L2D. |  -.0786384   .0642387    -1.22   0.221    -.2045439    .0472671
        L3D. |  -.0633072   .0642388    -0.99   0.324    -.1892129    .0625985
             |
    lnaunzir |
         LD. |  -.3004195   .0112767   -26.64   0.000    -.3225215   -.2783175
        L2D. |  -.1244811   .0116924   -10.65   0.000    -.1473978   -.1015643
        L3D. |  -.1479625   .0112588   -13.14   0.000    -.1700294   -.1258956
             |
    aunzecm1 |
         L1. |  -.0170757   .0046507    -3.67   0.000    -.0261908   -.0079606
             |
      aunzdp |   .0010415   .0013646     0.76   0.445    -.0016331    .0037162
```

```
      aunzdn |    .022654   .0036467     6.21   0.000     .0155067    .0298014
       _cons |  -.0001837   .0002613    -0.70   0.482    -.0006959    .0003284
------------------------------------------------------------------------------
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                     Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  49267.2                      8.9e-09  -12.8648  -12.8623  -12.8575  |
  |   1 |  49551.5  568.69    4  0.000 8.2e-09   -12.938  -12.9342  -12.9271  |
  |   2 |  49578.3   53.52    4  0.000 8.2e-09  -12.9439  -12.9389  -12.9294  |
  |   3 |  49665.2  173.82*   4  0.000 8.0e-09  -12.9656  -12.9594  -12.9474* |
  |   4 |  49697.4  64.379    4  0.000 8.0e-09  -12.9729  -12.9655  -12.9512  |
  |   5 |  49708.3  21.833    4  0.000 7.9e-09  -12.9747   -12.966  -12.9494  |
  |   6 |    49715  13.418    4  0.009 7.9e-09  -12.9755  -12.9655  -12.9464  |
  |   7 |  49744.3  58.625    4  0.000 7.9e-09  -12.9821  -12.9709* -12.9494  |
  |   8 |  49749.7  10.723    4  0.030 7.9e-09* -12.9824*    -12.97  -12.9462  |
  |   9 |  49753.1  6.8956    4  0.142 7.9e-09  -12.9823  -12.9686  -12.9424  |
  |  10 |  49754.8  3.4208    4  0.490 7.9e-09  -12.9817  -12.9667  -12.9382  |
  |  11 |  49756.1  2.6085    4  0.625 7.9e-09   -12.981  -12.9648  -12.9338  |
  |  12 |  49762.4  12.595    4  0.013 7.9e-09  -12.9816  -12.9642  -12.9308  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

Australia-Sweden: var D.lnaudsek D.lnauseir, lags(1/3) exog(L.auseecm1 ausedp ausedn)

```
Sample: 05jan2000 thru 31dec2020                Number of obs     =      7,667
Log likelihood =   47902.57                     AIC               =  -12.49056
FPE            =   1.29e-08                     HQIC              =  -12.48435
Det(Sigma_ml)  =   1.28e-08                     SBIC              =  -12.47245

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnaudsek           10      .00566   0.0057   43.76232   0.0000
D_lnauseir           10      .02003   0.0012   21.24350   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnaudsek   |
    lnaudsek |
         LD. |  -.0381562   .0114055    -3.35   0.001    -.0605106   -.0158018
        L2D. |   .0280812   .0114153     2.46   0.014     .0057076    .0504548
        L3D. |  -.0245959   .0114101    -2.16   0.031    -.0469592   -.0022326
             |
    lnauseir |
         LD. |   .0021229   .0032275     0.66   0.511    -.0042029    .0084486
        L2D. |    .004532   .0032268     1.40   0.160    -.0017923    .0108563
        L3D. |  -.0003446   .0032258    -0.11   0.915     -.006667    .0059778
             |
    auseecm1 |
         L1. |  -.0023696   .0007822    -3.03   0.002    -.0039027   -.0008365
             |
      ausedp |   .0001205   .0003005     0.40   0.688    -.0004684    .0007095
      ausedn |   .0020149    .000766     2.63   0.009     .0005135    .0035163
       _cons |  -.0000389   .0000665    -0.58   0.559    -.0001691    .0000914
-------------+----------------------------------------------------------------
D_lnauseir   |
    lnaudsek |
         LD. |  -.1082291   .0403783    -2.68   0.007    -.1873691    -.029089
        L2D. |  -.0359813   .0404129    -0.89   0.373    -.1151892    .0432266
        L3D. |  -.0072044   .0403943    -0.18   0.858    -.0863758    .0719671
             |
    lnauseir |
         LD. |  -.0013364   .0114261    -0.12   0.907    -.0237312    .0210584
        L2D. |  -.0000191   .0114235    -0.00   0.999    -.0224087    .0223706
        L3D. |   .0000547     .01142     0.00   0.996    -.0223281    .0224376
             |
    auseecm1 |
         L1. |   .0024597   .0027693     0.89   0.374    -.0029679    .0078874
             |
      ausedp |    .000118   .0010639     0.11   0.912    -.0019671    .0022031
      ausedn |  -.0024384    .002712    -0.90   0.369    -.0077537     .002877
```

```
       _cons |  -.0000738   .0002353    -0.31   0.754     -.000535    .0003874
------------------------------------------------------------------------------
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                     Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  47826.6                      1.3e-08  -12.4885   -12.486  -12.4813  |
  |   1 |  47836.4  19.635    4  0.001 1.3e-08    -12.49  -12.4863  -12.4792  |
  |   2 |  47841.2  9.6063    4  0.048 1.3e-08  -12.4903  -12.4853  -12.4758  |
  |   3 |  47843.5  4.6332*   4  0.327 1.3e-08  -12.4898  -12.4836* -12.4717* |
  |   4 |  47851.7  16.329    4  0.003 1.3e-08  -12.4909  -12.4834  -12.4691  |
  |   5 |  47854.9  6.4766    4  0.166 1.3e-08  -12.4907   -12.482  -12.4653  |
  |   6 |    47861  12.162    4  0.016 1.3e-08  -12.4912  -12.4813  -12.4622  |
  |   7 |  47867.9  13.842    4  0.008 1.3e-08*  -12.492* -12.4808  -12.4594  |
  |   8 |  47868.5  1.1104    4  0.893 1.3e-08  -12.4911  -12.4787  -12.4548  |
  |   9 |  47870.1  3.2129    4  0.523 1.3e-08  -12.4905  -12.4768  -12.4506  |
  |  10 |    47872  3.8216    4  0.431 1.3e-08  -12.4899   -12.475  -12.4464  |
  |  11 |  47872.3  .57204    4  0.966 1.3e-08   -12.489  -12.4728  -12.4418  |
  |  12 |  47874.6  4.6074    4  0.330 1.3e-08  -12.4885  -12.4711  -12.4378  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

New Zealand-Sweden: var D.lnnzdsek D.lnnzseir, lags(1/5) exog(L.nzseecm1 nzsedp nzsedn)

```
Sample: 07jan2000 thru 31dec2020                 Number of obs     =      7,665
Log likelihood =   44661.89                      AIC               =  -11.64616
FPE            =   3.00e-08                      HQIC              =  -11.63745
Det(Sigma_ml)  =   2.98e-08                      SBIC              =  -11.62079

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnnzdsek           14     .005992   0.0050   38.78235   0.0002
D_lnnzseir           14     .028855   0.0407   325.4691   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnnzdsek   |
    lnnzdsek |
         LD. |  -.0214221   .0114167    -1.88   0.061    -.0437985    .0009543
        L2D. |   .0031363   .0114129     0.27   0.783    -.0192325    .0255051
        L3D. |  -.0173794   .0114004    -1.52   0.127    -.0397239     .004965
        L4D. |   -.034589   .0114013    -3.03   0.002    -.0569352   -.0122428
        L5D. |   .0059809   .0114061     0.52   0.600    -.0163747    .0283365
             |
    lnnzseir |
         LD. |   .0011835   .0023714     0.50   0.618    -.0034643    .0058314
        L2D. |   .0055684   .0024131     2.31   0.021     .0008389    .0102979
        L3D. |  -.0012765   .0024097    -0.53   0.596    -.0059995    .0034465
        L4D. |  -.0029892   .0024136    -1.24   0.216    -.0077199    .0017414
        L5D. |   .0000498   .0023718     0.02   0.983    -.0045989    .0046984
             |
    nzseecm1 |
         L1. |  -.0017855   .0006985    -2.56   0.011    -.0031545   -.0004166
             |
      nzsedp |   .0004121   .0003607     1.14   0.253     -.000295    .0011191
      nzsedn |   .0022968   .0008499     2.70   0.007      .000631    .0039627
       _cons |  -.0000741   .0000699    -1.06   0.290    -.0002112     .000063
-------------+----------------------------------------------------------------
D_lnnzseir   |
    lnnzdsek |
         LD. |   -.079857   .0549774    -1.45   0.146    -.1876107    .0278967
        L2D. |  -.0636372   .0549587    -1.16   0.247    -.1713543      .04408
        L3D. |  -.0148272   .0548989    -0.27   0.787    -.1224271    .0927727
        L4D. |    .010232   .0549032     0.19   0.852    -.0973764    .1178404
        L5D. |  -.0151528   .0549263    -0.28   0.783    -.1228063    .0925006
             |
    lnnzseir |
         LD. |  -.1913375   .0114195   -16.76   0.000    -.2137194   -.1689557
        L2D. |  -.0355015   .0116201    -3.06   0.002    -.0582765   -.0127265
        L3D. |  -.0691253   .0116041    -5.96   0.000    -.0918689   -.0463818
```

```
         L4D. |  -.0287805   .0116229    -2.48   0.013    -.051561       -.006
         L5D. |  -.0070329   .0114214    -0.62   0.538   -.0294185    .0153527
              |
     nzseecm1 |
          L1. |   .0006572   .0033634     0.20   0.845    -.005935    .0072494
              |
       nzsedp |   .0009401   .0017372     0.54   0.588   -.0024647    .0043449
       nzsedn |  -.0141193   .0040929    -3.45   0.001   -.0221413   -.0060974
        _cons |  -.0000296   .0003368    -0.09   0.930   -.0006897    .0006305
------------------------------------------------------------------------------
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                      Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |   44453                        3.1e-08  -11.6075   -11.605  -11.6002  |
  |   1 |  44587.3  268.52    4  0.000 3.0e-08  -11.6415  -11.6378  -11.6306* |
  |   2 |  44593.1  11.582    4  0.021 3.0e-08   -11.642   -11.637  -11.6275  |
  |   3 |  44609.7  33.284    4  0.000 3.0e-08  -11.6453   -11.639* -11.6271  |
  |   4 |    44618  16.503    4  0.002 3.0e-08  -11.6464  -11.6389  -11.6246  |
  |   5 |  44618.3  .69909*   4  0.951 3.0e-08  -11.6454* -11.6367    -11.62  |
  |   6 |  44623.2  9.8571    4  0.043 3.0e-08  -11.6457  -11.6357  -11.6166  |
  |   7 |  44636.8  27.164    4  0.000 3.0e-08* -11.6482   -11.637  -11.6155  |
  |   8 |  44639.7   5.821    4  0.213 3.0e-08  -11.6479  -11.6354  -11.6116  |
  |   9 |  44641.3  3.0943    4  0.542 3.0e-08  -11.6472  -11.6336  -11.6073  |
  |  10 |  44642.7  2.8302    4  0.587 3.0e-08  -11.6466  -11.6316   -11.603  |
  |  11 |  44643.7  2.0555    4  0.726 3.0e-08  -11.6458  -11.6296  -11.5986  |
  |  12 |  44649.2  11.053    4  0.026 3.0e-08  -11.6462  -11.6288  -11.5954  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

US-Euro Area: var D.lnusdeur D.lnuseuir, lags(1/3) exog(L.useuecm1 useudp useudn)

```
Sample: 05jan2000 thru 31dec2020                   Number of obs     =      7,667
Log likelihood =   48249.05                        AIC               =  -12.58094
FPE            =   1.18e-08                        HQIC              =  -12.57473
Det(Sigma_ml)  =   1.17e-08                        SBIC              =  -12.56283

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnusdeur           10     .049071   0.0070   5.564876   0.0000
D_lnuseuir           10     .021806   0.0074   57.15167   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
              | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnusdeur    |
    lnusdeur |
         LD. |   .0075333   .0114061     0.66   0.509   -.0148222    .0298888
        L2D. |   .0062808   .0114046     0.55   0.582   -.0160718    .0286334
        L3D. |  -.0004801   .0114102    -0.04   0.966   -.0228437    .0218835
             |
    lnuseuir |
         LD. |   -.001106    .002602    -0.43   0.671   -.0062057    .0039937
        L2D. |  -.0020932   .0026002    -0.81   0.421   -.0071895    .0030032
        L3D. |   .0019325   .0026011     0.74   0.458   -.0031655    .0070305
             |
    useuecm1 |
         L1. |  -.0008142    .000443    -1.84   0.066   -.0016825    .0000542
             |
      useudp |    .000042   .0003381     0.12   0.901   -.0006206    .0007046
      useudn |   .0002591   .0008962     0.29   0.772   -.0014973    .0020156
       _cons |     .00002   .0000577     0.35   0.728   -.0000931    .0001332
-------------+----------------------------------------------------------------
D_lnuseuir    |
    lnusdeur |
         LD. |  -.0469665   .0500289    -0.94   0.348   -.1450214    .0510884
        L2D. |   .0351299   .0500224     0.70   0.483   -.0629122    .1331721
        L3D. |   .0286236    .050047     0.57   0.567   -.0694666    .1267139
             |
    lnuseuir |
         LD. |  -.0254424   .0114126    -2.23   0.026   -.0478107   -.0030741
        L2D. |  -.0599197    .011405    -5.25   0.000   -.0822731   -.0375662
```

```
         L3D. |  -.0171457   .0114087    -1.50   0.133    -.0395064    .0052151
              |
     useuecm1 |
          L1. |   .0000857   .0019433     0.04   0.965    -.0037231    .0038944
              |
       useudp |  -.0032299   .0014828    -2.18   0.029    -.0061362   -.0003236
       useudn |  -.0155529   .0039307    -3.96   0.000     -.023257   -.0078488
        _cons |   .0002086   .0002532     0.82   0.410    -.0002875    .0007048
------------------------------------------------------------------------------
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                     Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC       HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  48167.3                      1.2e-08  -12.5775   -12.575  -12.5703   |
  |   1 |    48170   5.535     4  0.237 1.2e-08  -12.5772  -12.5734  -12.5663   |
  |   2 |  48184.5  28.926     4  0.000 1.2e-08  -12.5799  -12.5749  -12.5654   |
  |   3 |  48186.1  3.1129*    4  0.539 1.2e-08  -12.5793  -12.5731* -12.5611*  |
  |   4 |  48193.2  14.253     4  0.007 1.2e-08  -12.5801  -12.5726  -12.5583   |
  |   5 |  48209.4  32.399     4  0.000 1.2e-08  -12.5833  -12.5746  -12.5579   |
  |   6 |  48220.2  21.583     4  0.000 1.2e-08  -12.5851  -12.5751   -12.556   |
  |   7 |  48272.6  104.84     4  0.000 1.2e-08  -12.5977  -12.5865  -12.5651   |
  |   8 |  48310.2  75.137     4  0.000 1.1e-08  -12.6065   -12.594  -12.5702   |
  |   9 |  48313.9  7.5002     4  0.112 1.1e-08  -12.6064  -12.5927  -12.5665   |
  |  10 |  48361.2  94.572     4  0.000 1.1e-08  -12.6177  -12.6028  -12.5742   |
  |  11 |  48384.4  46.484     4  0.000 1.1e-08  -12.6227  -12.6066  -12.5756   |
  |  12 |  48390.2   11.46     4  0.022 1.1e-08* -12.6232* -12.6058  -12.5724   |
  +---------------------------------------------------------------------------+
   * optimal lag
```

US-Switzerland: var D.lnusdchf D.lnuschir, lags(1/5) exog(L.uschecm1 uschdp uschdn)

```
Sample: 07jan2000 thru 31dec2020                  Number of obs     =      7,665
Log likelihood =    32307.4                       AIC               =  -8.422545
FPE            =   7.54e-07                       HQIC              =  -8.413843
Det(Sigma_ml)  =   7.48e-07                       SBIC              =  -8.397177

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnusdchf           14     .005517   0.0052   40.31298   0.0001
D_lnuschir           14     .157092   0.2011   1929.124   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lnusdchf   |
    lnusdchf |
         LD. |   .0272606   .0114078     2.39   0.017     .0049017    .0496195
        L2D. |   .0078801   .0114067     0.69   0.490    -.0144766    .0302368
        L3D. |  -.0129634   .0113936    -1.14   0.255    -.0352944    .0093675
        L4D. |  -.0274773   .0113952    -2.41   0.016    -.0498115   -.0051431
        L5D. |   .0067016   .0113941     0.59   0.556    -.0156304    .0290336
             |
    lnuschir |
         LD. |    .000439   .0003925     1.12   0.263    -.0003303    .0012083
        L2D. |  -.0000356   .0004177    -0.09   0.932    -.0008542    .0007831
        L3D. |  -.0004411   .0004237    -1.04   0.298    -.0012714    .0003893
        L4D. |   .0000449   .0004176     0.11   0.914    -.0007736    .0008634
        L5D. |  -.0001727   .0003924    -0.44   0.660    -.0009418    .0005965
             |
    uschecm1 |
         L1. |  -.0005555   .0003247    -1.71   0.087     -.001192     .000081
             |
      uschdp |   .0015992   .0004914     3.25   0.001      .000636    .0025624
      uschdn |   .0025887   .0008155     3.17   0.002     .0009904    .0041871
       _cons |   .0000317   .0000637     0.50   0.619    -.0000932    .0001565
-------------+----------------------------------------------------------------
D_lnuschir   |
    lnusdchf |
         LD. |   .0069742   .3248514     0.02   0.983    -.6297228    .6436713
        L2D. |  -.1588484   .3248203    -0.49   0.625    -.7954845    .4777878
        L3D. |   .5192221   .3244463     1.60   0.110    -.1166811    1.155125
        L4D. |    .128809   .3244936     0.40   0.691    -.5071867    .7648048
```

```
        L5D. |   .3831607   .3244612     1.18   0.238    -.2527717    1.019093
             |
    lnuschir |
         LD. |  -.4442057   .0111777   -39.74   0.000    -.4661135   -.4222978
        L2D. |  -.2947001   .0118942   -24.78   0.000    -.3180122   -.2713879
        L3D. |  -.2344861   .0120641   -19.44   0.000    -.2581314   -.2108408
        L4D. |  -.2656666   .0118922   -22.34   0.000    -.2889749   -.2423584
        L5D. |  -.2062227   .0111752   -18.45   0.000    -.2281256   -.1843198
             |
    uschecm1 |
         L1. |   .0118075   .0092473     1.28   0.202    -.0063168    .0299319
             |
      uschdp |   -.005606   .0139945    -0.40   0.689    -.0330346    .0218227
      uschdn |  -.0209716   .0232224    -0.90   0.366    -.0664866    .0245435
       _cons |   .0003857   .0018139     0.21   0.832    -.0031695    .0039408
------------------------------------------------------------------------------
```

```
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                      Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  31407.4                      9.4e-07  -8.20043  -8.19794  -8.19317  |
  |   1 |    31802  789.14    4  0.000 8.5e-07  -8.30243   -8.2987  -8.29155  |
  |   2 |  31923.5  242.89    4  0.000 8.2e-07   -8.3331  -8.32813   -8.3186  |
  |   3 |  31973.6  100.25    4  0.000 8.1e-07  -8.34515  -8.33893  -8.32702  |
  |   4 |    32105  262.93    4  0.000 7.9e-07  -8.37844  -8.37097  -8.35668  |
  |   5 |  32272.8  335.53*   4  0.000 7.5e-07  -8.42121   -8.4125  -8.39582* |
  |   6 |  32315.5  85.295    4  0.000 7.5e-07   -8.4313  -8.42135  -8.40229  |
  |   7 |  32317.6  4.2863    4  0.369 7.5e-07  -8.43082  -8.41962  -8.39818  |
  |   8 |  32343.4  51.646    4  0.000 7.4e-07  -8.43652  -8.42408  -8.40025  |
  |   9 |    32367  47.226    4  0.000 7.4e-07  -8.44164  -8.42795  -8.40174  |
  |  10 |  32381.9  29.797    4  0.000 7.4e-07* -8.44449* -8.42956* -8.40096  |
  |  11 |  32384.8  5.7455    4  0.219 7.4e-07  -8.44419  -8.42802  -8.39704  |
  |  12 |  32388.8  8.0749    4  0.089 7.4e-07   -8.4442  -8.42678  -8.39343  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

Euro Area-Switzerland: var D.lneurchf D.lneuchir, lags(1/3) exog(L.euchecm1 euchdp euchdn)

```
Sample: 05jan2000 thru 31dec2020                   Number of obs     =      7,667
Log likelihood =   35936.87                        AIC               = -9.369211
FPE            =   2.92e-07                        HQIC              = -9.362997
Det(Sigma_ml)  =   2.91e-07                        SBIC              = -9.351095

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lneurchf           10     .003344   0.0202   157.9141   0.0000
D_lneuchir           10      .16152   0.1471   1322.167   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             | Coefficient  Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
D_lneurchf   |
    lneurchf |
         LD. |   .1274096   .0114098    11.17   0.000     .1050469    .1497723
        L2D. |  -.0303988   .0114954    -2.64   0.008    -.0529293   -.0078682
        L3D. |  -.0163989   .0114088    -1.44   0.151    -.0387597     .005962
             |
    lneuchir |
         LD. |  -4.28e-06   .0002402    -0.02   0.986    -.0004751    .0004665
        L2D. |   .0000237    .000249     0.10   0.924    -.0004644    .0005118
        L3D. |  -.0001018   .0002352    -0.43   0.665    -.0005627    .0003591
             |
    euchecm1 |
         L1. |   .0001234    .000385     0.32   0.748    -.0006311     .000878
             |
      euchdp |     .00003   .0002708     0.11   0.912    -.0005007    .0005606
      euchdn |   .0025897   .0004895     5.29   0.000     .0016303    .0035492
       _cons |   .0000316   .0000387     0.82   0.414    -.0000442    .0001074
-------------+----------------------------------------------------------------
```

```
D_lneuchir   |
    lneurchf |
         LD. |   .8010771   .5511144     1.45   0.146    -.2790874    1.881241
        L2D. |   .1175656   .5552502     0.21   0.832    -.9707048    1.205836
        L3D. |   .0502295   .5510688     0.09   0.927    -1.029846    1.130305
             |
    lneuchir |
         LD. |  -.3645255   .0116032   -31.42   0.000    -.3872673   -.3417837
        L2D. |  -.2007493   .0120284   -16.69   0.000    -.2243246   -.1771741
        L3D. |  -.1002905   .0113592    -8.83   0.000     -.122554    -.078027
             |
    euchecm1 |
         L1. |    .169825   .0185953     9.13   0.000     .1333789     .206271
             |
      euchdp |  -.0041857   .0130783    -0.32   0.749    -.0298187    .0214473
      euchdn |  -.0094227   .0236458    -0.40   0.690    -.0557676    .0369221
       _cons |   .0001732   .0018681     0.09   0.926    -.0034882    .0038346
------------------------------------------------------------------------------
Lag-order selection criteria

   Sample: 14jan2000 thru 31dec2020                    Number of obs = 7,658
  +---------------------------------------------------------------------------+
  | Lag |    LL       LR      df    p      FPE       AIC       HQIC      SBIC    |
  |-----+---------------------------------------------------------------------|
  |   0 |  35344.6                        3.4e-07  -9.22869   -9.2262  -9.22143  |
  |   1 |    35740  790.77    4  0.000 3.0e-07   -9.3309  -9.32717  -9.32002  |
  |   2 |  35846.4  212.72    4  0.000 3.0e-07  -9.35763  -9.35266  -9.34313  |
  |   3 |  35886.2  79.674*   4  0.000 2.9e-07  -9.36699  -9.36077* -9.34886* |
  |   4 |  36025.2  277.94    4  0.000 2.8e-07  -9.40224  -9.39478  -9.38048  |
  |   5 |    36192   333.7    4  0.000 2.7e-07  -9.44477  -9.43607  -9.41939  |
  |   6 |  36232.9  81.805    4  0.000 2.7e-07  -9.45441  -9.44446   -9.4254  |
  |   7 |  36240.5  15.092    4  0.005 2.7e-07  -9.45534  -9.44414   -9.4227  |
  |   8 |  36282.7  84.509    4  0.000 2.7e-07  -9.46533  -9.45289  -9.42906  |
  |   9 |  36310.3  55.159    4  0.000 2.6e-07  -9.47149   -9.4578  -9.43159  |
  |  10 |  36328.8  37.036    4  0.000 2.6e-07  -9.47528  -9.46035  -9.43176  |
  |  11 |  36336.3  14.943    4  0.005 2.6e-07  -9.47619  -9.46001  -9.42904  |
  |  12 |  36341.7  10.766    4  0.029 2.6e-07* -9.47655* -9.45913  -9.42577  |
  +---------------------------------------------------------------------------+
   * optimal lag
```

Breusch-Godfrey LM Test for Serial Correlation

UK-Canada: varlmar, mlag(12)

```
   Lagrange-multiplier test
  +--------------------------------------+
  | lag  |      chi2    df   Prob > chi2 |
  |------+-------------------------------|
  |   1  |   36.2603     4     0.00000   |
  |   2  |   68.1450     4     0.00000   |
  |   3  |    2.9958     4     0.75406   |
  |   4  |  116.1437     4     0.00000   |
  |   5  |   16.5377     4     0.00238   |
  |   6  |   24.4452     4     0.00007   |
  |   7  |    3.2457     4     0.51757   |
  |   8  |   14.6960     4     0.00538   |
  |   9  |   11.3461     4     0.02294   |
  |  10  |    9.6856     4     0.04607   |
  |  11  |    4.6787     4     0.32189   |
  |  12  |   12.6395     4     0.01318   |
  +--------------------------------------+
   H0: no autocorrelation at lag order
```

UK-Australia: varlmar, mlag(12)

```
   Lagrange-multiplier test
```

lag	chi2	df	Prob > chi2
1	81.6693	4	0.00000
2	90.7557	4	0.00000
3	3.4987	4	0.43204
4	127.9135	4	0.00000
5	17.2458	4	0.00173
6	31.2449	4	0.00000
7	4.2037	4	0.37914
8	8.7770	4	0.06692
9	11.4881	4	0.02159
10	5.9686	4	0.20151
11	11.3283	4	0.02311
12	26.3004	4	0.00003

H0: no autocorrelation at lag order

UK-New Zealand: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	26.4893	4	0.00003
2	30.5124	4	0.00000
3	50.2173	4	0.00000
4	54.3674	4	0.00000
5	81.5017	4	0.00000
6	4.1817	4	0.39567
7	58.8216	4	0.00000
8	27.1660	4	0.00002
9	22.0040	4	0.00020
10	5.6752	4	0.22475
11	16.8065	4	0.00211
12	33.9088	4	0.00000

H0: no autocorrelation at lag order

UK-Sweden: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	15.6495	4	0.00353
2	26.5007	4	0.00003
3	14.1407	4	0.00686
4	18.1394	4	0.00116
5	3.1214	4	0.55324
6	35.9726	4	0.00000
7	7.6701	4	0.10444
8	8.2717	4	0.08212
9	5.5656	4	0.23402
10	0.6709	4	0.95487
11	10.7750	4	0.02921

lag	chi2	df	Prob > chi2
12	19.3759	4	0.00066

H0: no autocorrelation at lag order

Canada-Australia: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	5.8783	4	0.20843
2	5.8936	4	0.20724
3	38.6181	4	0.00000
4	22.0706	4	0.00019
5	3.3751	4	0.46546
6	10.5680	4	0.03187
7	22.6270	4	0.00015
8	14.6071	4	0.00559
9	8.5797	4	0.07251
10	14.5710	4	0.00568
11	28.9913	4	0.00001
12	6.0532	4	0.19521

H0: no autocorrelation at lag order

Canada-New Zealand: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	64.2035	4	0.00000
2	21.9240	4	0.00021
3	3.4159	4	0.43545
4	55.2799	4	0.00000
5	12.9218	4	0.01166
6	9.0633	4	0.05954
7	24.6106	4	0.00006
8	7.5271	4	0.11052
9	19.0672	4	0.00076
10	6.5053	4	0.16446
11	1.6691	4	0.79631
12	1.4669	4	0.83249

H0: no autocorrelation at lag order

Canada-Sweden: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	51.8021	4	0.00000

lag	chi2	df	Prob > chi2
2	6.4051	4	0.18093
3	1.2175	4	0.87520
4	3.8456	4	0.42731
5	1.0931	4	0.89536
6	10.2621	4	0.03624
7	7.5447	4	0.10976
8	13.2278	4	0.01021
9	2.5381	4	0.63782
10	0.2925	4	0.99030
11	7.4214	4	0.11523
12	3.3527	4	0.50063

H0: no autocorrelation at lag order

Australia-New Zealand: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	42.7622	4	0.00000
2	61.6815	4	0.00000
3	5.1029	4	0.31659
4	107.8819	4	0.00000
5	9.2327	4	0.05554
6	12.7601	4	0.01251
7	25.4627	4	0.00004
8	10.6763	4	0.03045
9	1.2895	4	0.86315
10	2.7534	4	0.59991
11	2.3463	4	0.67236
12	15.7526	4	0.00337

H0: no autocorrelation at lag order

Australia-Sweden: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	15.4948	4	0.00378
2	5.8131	4	0.21355
3	2.1968	4	0.78240
4	15.1745	4	0.00435
5	7.5042	4	0.11153
6	12.9370	4	0.01159
7	13.8996	4	0.00762
8	1.4427	4	0.83674
9	3.6570	4	0.45441
10	2.1774	4	0.70317
11	0.5679	4	0.96656
12	3.8002	4	0.43372

H0: no autocorrelation at lag order

New Zealand-Sweden: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	8.3796	4	0.07862
2	16.5084	4	0.00241
3	19.6474	4	0.00059
4	18.3945	4	0.00103
5	8.0981	4	0.08901
6	11.1630	4	0.02479
7	22.5524	4	0.00016
8	6.1057	4	0.19139
9	4.5266	4	0.33940
10	3.0656	4	0.54691
11	1.2785	4	0.86502
12	10.6083	4	0.03134

H0: no autocorrelation at lag order

US-Euro Area: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	50.5666	4	0.00000
2	12.2857	4	0.01535
3	2.9652	4	0.59991
4	14.4083	4	0.00610
5	37.5212	4	0.00000
6	22.4025	4	0.00017
7	98.9750	4	0.00000
8	78.1754	4	0.00000
9	5.0136	4	0.28590
10	67.7014	4	0.00000
11	27.5047	4	0.00002
12	39.6217	4	0.00000

H0: no autocorrelation at lag order

US-Switzerland: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2

lag	chi2	df	Prob > chi2
1	90.5399	4	0.00000
2	31.5985	4	0.00000
3	53.1646	4	0.00000
4	132.3617	4	0.00000
5	1.0566	4	0.68162
6	121.7908	4	0.00000
7	9.4581	4	0.05062
8	63.7344	4	0.00000
9	18.3437	4	0.00106
10	9.8973	4	0.04219
11	0.3082	4	0.98928
12	3.9553	4	0.41208

H0: no autocorrelation at lag order

Euro Area-Switzerland: varlmar, mlag(12)

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	241.9612	4	0.00000
2	511.8649	4	0.00000
3	3.1419	4	0.32374
4	493.5341	4	0.00000
5	76.9023	4	0.00000
6	25.4371	4	0.00004
7	69.6442	4	0.00000
8	36.5370	4	0.00000
9	10.9619	4	0.02700
10	7.5133	4	0.11112
11	11.7345	4	0.01944
12	17.5611	4	0.00150

H0: no autocorrelation at lag order

CVAR Model Stability

UK-Canada: varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.1217286 + .4714328i	.486895
.1217286 - .4714328i	.486895
-.432622	.432622
-.1178247 + .2381086i	.265666
-.1178247 - .2381086i	.265666
.2359152	.235915

All the eigenvalues lie inside the unit circle.
VAR satisfies stability condition.

UK-Australia: varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.09998423 + .4872272i	.49738
.09998423 - .4872272i	.49738
-.4297546	.429755
-.2262689	.226269
.1072684 + .1637348i	.195744
.1072684 - .1637348i	.195744

All the eigenvalues lie inside the unit circle.
VAR satisfies stability condition.

UK-New Zealand: varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.4978072 + .4896579i	.698267
.4978072 - .4896579i	.698267
-.5798767 + .3095594i	.657331
-.5798767 - .3095594i	.657331
-.05819219 + .6393764i	.642019
-.05819219 - .6393764i	.642019
.355022 + .2661828i	.443727
.355022 - .2661828i	.443727
-.3236076 + .2392167i	.402426
-.3236076 - .2392167i	.402426
-.02953742 + .3213992i	.322754
-.02953742 - .3213992i	.322754

All the eigenvalues lie inside the unit circle.
VAR satisfies stability condition.

UK-Sweden: varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.3538934 + .4357393i	.561346
.3538934 - .4357393i	.561346
-.2376147 + .3986567i	.464099
-.2376147 - .3986567i	.464099
.3337253 + .3222176i	.463893
.3337253 - .3222176i	.463893
-.3915067	.391507
-.1470937 + .3478118i	.377637
-.1470937 - .3478118i	.377637

```
|  -.3664044              |   .366404   |
+----------------------------------------+
 All the eigenvalues lie inside the unit circle.
 VAR satisfies stability condition.
```

Canada-Australia: varstable

```
 Eigenvalue stability condition
+----------------------------------------+
|        Eigenvalue       |   Modulus   |
|-------------------------+-------------|
|   .3633729 +   .323652i |   .486611   |
|   .3633729 -   .323652i |   .486611   |
|   .2880088 +  .3894764i |   .484398   |
|   .2880088 -  .3894764i |   .484398   |
|  -.3366222 +  .2900932i |   .444374   |
|  -.3366222 -  .2900932i |   .444374   |
|  -.2486416 +  .2205059i |   .332333   |
|  -.2486416 -  .2205059i |   .332333   |
|   -.111943 +  .1319958i |   .173073   |
|   -.111943 -  .1319958i |   .173073   |
+----------------------------------------+
 All the eigenvalues lie inside the unit circle.
 VAR satisfies stability condition.
```

Canada-New Zealand: varstable

```
 Eigenvalue stability condition
+----------------------------------------+
|        Eigenvalue       |   Modulus   |
|-------------------------+-------------|
|  -.4982558              |   .498256   |
|   .1016691 +  .4590872i |    .47021   |
|   .1016691 -  .4590872i |    .47021   |
|  .09235202 +  .1889754i |   .210334   |
|  .09235202 -  .1889754i |   .210334   |
|  -.1977205              |   .197721   |
+----------------------------------------+
 All the eigenvalues lie inside the unit circle.
 VAR satisfies stability condition.
```

Canada-Sweden: varstable

```
 Eigenvalue stability condition
+----------------------------------------+
|        Eigenvalue       |   Modulus   |
|-------------------------+-------------|
| -.01021885 +  .1170085i |   .117454   |
| -.01021885 -  .1170085i |   .117454   |
| -.04010965              |    .04011   |
|  .00886726              |   .008867   |
+----------------------------------------+
 All the eigenvalues lie inside the unit circle.
 VAR satisfies stability condition.
```

Australia-New Zealand: varstable

Eigenvalue stability condition

Eigenvalue	Modulus
-.5556815	.555681
.1295334 + .5018438i	.518292
.1295334 - .5018438i	.518292
.08896685 + .177011i	.198111
.08896685 - .177011i	.198111
-.1968974	.196897

All the eigenvalues lie inside the unit circle.
VAR satisfies stability condition.

Australia-Sweden: varstable

Eigenvalue stability condition

Eigenvalue	Modulus
-.3385039	.338504
.1533678 + .2271067i	.274042
.1533678 - .2271067i	.274042
-.02714925 + .04997123i	.05687
-.02714925 - .04997123i	.05687
.04657426	.046574

All the eigenvalues lie inside the unit circle.
VAR satisfies stability condition.

New Zealand-Sweden: varstable

Eigenvalue stability condition

Eigenvalue	Modulus
.2719921 + .3663676i	.456295
.2719921 - .3663676i	.456295
-.3420327 + .2915206i	.449411
-.3420327 - .2915206i	.449411
.2558197 + .3517505i	.434939
.2558197 - .3517505i	.434939
-.372021	.372021
-.1901796 + .2165357i	.288194
-.1901796 - .2165357i	.288194
.1680622	.168062

All the eigenvalues lie inside the unit circle.
VAR satisfies stability condition.

US-Euro Area: varstable

Eigenvalue stability condition

Eigenvalue	Modulus

```
|   .09204766 +  .2893351i  |   .303624   |
|   .09204766 -  .2893351i  |   .303624   |
|   -.2175251               |   .217525   |
|    .1336704               |    .13367   |
|  -.05907485 +  .1186389i  |   .132533   |
|  -.05907485 -  .1186389i  |   .132533   |
+-----------------------------------------+
 All the eigenvalues lie inside the unit circle.
 VAR satisfies stability condition.
```

US-Switzerland: varstable

```
 Eigenvalue stability condition
+-----------------------------------------+
|        Eigenvalue         |   Modulus   |
|---------------------------+-------------|
|    .4681877 +  .6115878i  |    .77022   |
|    .4681877 -  .6115878i  |    .77022   |
|   -.3561467 +  .6265661i  |   .720712   |
|   -.3561467 -  .6265661i  |   .720712   |
|   -.6678334               |   .667833   |
|   -.3338336 +  .2750074i  |    .43252   |
|   -.3338336 -  .2750074i  |    .43252   |
|    .2448222 +  .3270069i  |   .408499   |
|    .2448222 -  .3270069i  |   .408499   |
|    .2048294               |   .204829   |
+-----------------------------------------+
 All the eigenvalues lie inside the unit circle.
 VAR satisfies stability condition.
```

Euro Area-Switzerland: varstable

```
 Eigenvalue stability condition
+-----------------------------------------+
|        Eigenvalue         |   Modulus   |
|---------------------------+-------------|
|   .03479284 +  .4791147i  |   .480376   |
|   .03479284 -  .4791147i  |   .480376   |
|   -.4338086               |   .433809   |
|    .1565211 +  .2532487i  |   .297714   |
|    .1565211 -  .2532487i  |   .297714   |
|   -.1859352               |   .185935   |
+-----------------------------------------+
 All the eigenvalues lie inside the unit circle.
 VAR satisfies stability condition.
```

Rao F-Test

UK-Canada:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020

Test for nonlinearity using DUKCA30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	5.009669	(40, 7617)	0.0000
H03: b1=b2=b3=0	4.805267	(30, 7627)	0.0000
H02: b1=b2=0	4.834434	(20, 7637)	0.0000
H01: b1=0	2.996271	(10, 7647)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-Australia:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	7.025760	(38, 7615)	0.0000
H03: b1=b2=b3=0	8.233537	(30, 7623)	0.0000
H02: b1=b2=0	8.951565	(20, 7633)	0.0000
H01: b1=0	6.846237	(10, 7643)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-New Zealand:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	3.780837	(48, 7606)	0.0000
H03: b1=b2=b3=0	3.442469	(36, 7618)	0.0000
H02: b1=b2=0	3.189650	(24, 7630)	0.0000
H01: b1=0	2.529330	(12, 7642)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-Sweden:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value

H04: b1=b2=b3=b4=0	4.018198	(32, 7628)	0.0000
H03: b1=b2=b3=0	4.286132	(24, 7636)	0.0000
H02: b1=b2=0	4.970135	(16, 7644)	0.0000
H01: b1=0	3.952611	(8, 7652)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-Australia:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCAAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	7.856926	(38, 7615)	0.0000
H03: b1=b2=b3=0	6.599644	(30, 7623)	0.0000
H02: b1=b2=0	7.048208	(20, 7633)	0.0000
H01: b1=0	4.107631	(10, 7643)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-New Zealand:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCANZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	4.427628	(40, 7617)	0.0000
H03: b1=b2=b3=0	4.187926	(30, 7627)	0.0000
H02: b1=b2=0	4.265804	(20, 7637)	0.0000
H01: b1=0	2.303850	(10, 7647)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-Sweden:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCASE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	3.755595	(24, 7639)	0.0000
H03: b1=b2=b3=0	3.969393	(18, 7645)	0.0000
H02: b1=b2=0	4.104532	(12, 7651)	0.0000
H01: b1=0	4.226034	(6, 7657)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Australia-New Zealand:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DAUNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.174546	(36, 7617)	0.0000
H03: b1=b2=b3=0	1.210270	(30, 7623)	0.0000
H02: b1=b2=0	1.262093	(20, 7633)	0.0000
H01: b1=0	1.290959	(10, 7643)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Australia-Sweden:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DAUSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	8.666478	(36, 7617)	0.0000
H03: b1=b2=b3=0	9.884495	(29, 7624)	0.0000
H02: b1=b2=0	11.88149	(20, 7633)	0.0000
H01: b1=0	18.05338	(10, 7643)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

New Zealand-Sweden:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DNZSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	3.320948	(40, 7617)	0.0000
H03: b1=b2=b3=0	3.166417	(30, 7627)	0.0000
H02: b1=b2=0	3.147573	(20, 7637)	0.0000
H01: b1=0	2.979215	(10, 7647)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

US-Euro Area:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUSEU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	3.491209	(32, 7628)	0.0000
H03: b1=b2=b3=0	3.767590	(24, 7636)	0.0000
H02: b1=b2=0	4.207770	(16, 7644)	0.0000
H01: b1=0	4.158433	(8, 7652)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

US-Switzerland:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUSCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	16.75421	(32, 7628)	0.0000
H03: b1=b2=b3=0	12.70169	(24, 7636)	0.0000
H02: b1=b2=0	6.002739	(16, 7644)	0.0000
H01: b1=0	3.613593	(8, 7652)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Euro Area-Switzerland:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DEUCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Linearity Tests F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	45.60931	(24, 7639)	0.0000
H03: b1=b2=b3=0	44.11898	(18, 7645)	0.0000
H02: b1=b2=0	36.70008	(12, 7651)	0.0000
H01: b1=0	13.12321	(6, 7657)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Escribano-Jordá Test

UK-Canada – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKCA30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	6.515920	(20, 7617)	0.0000
H0E: b1=b3=0	4.392351	(20, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

UK-Canada – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKCA30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	19.13756	(20, 7617)	0.0000
H0E: b1=b3=0	51.14149	(20, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

UK-Australia – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	5.737312	(18, 7615)	0.0000
H0E: b1=b3=0	3.326160	(19, 7615)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

UK-Australia – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests

Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	13.36262	(18, 7615)	0.0000
H0E: b1=b3=0	31.59457	(19, 7615)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

UK-New Zealand – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

	Escribano-Jorda Tests		
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	5.885539	(24, 7606)	0.0000
H0E: b1=b3=0	2.228127	(24, 7606)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

UK-New Zealand – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

	Escribano-Jorda Tests		
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	11.08430	(24, 7606)	0.0000
H0E: b1=b3=0	40.78025	(24, 7606)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

UK-Sweden – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

	Escribano-Jorda Tests		
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	4.360436	(16, 7628)	0.0000
H0E: b1=b3=0	2.803416	(16, 7628)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

UK-Sweden – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUKSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	5.003244	(16, 7628)	0.0000
H0E: b1=b3=0	3.429026	(16, 7628)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

Canada-Australia – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCAAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	7.109164	(20, 7613)	0.0000
H0E: b1=b3=0	8.687698	(20, 7613)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

Canada-Australia – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCAAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	9.431783	(20, 7613)	0.0000
H0E: b1=b3=0	16.15933	(20, 7613)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

Canada-New Zealand – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCANZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	5.529138	(20, 7617)	0.0000
H0E: b1=b3=0	4.001048	(20, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

Canada-New Zealand – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCANZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	11.01002	(20, 7617)	0.0000
H0E: b1=b3=0	13.59810	(20, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

Canada-Sweden – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCASE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	3.675861	(12, 7639)	0.0000
H0E: b1=b3=0	4.540738	(12, 7639)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

Canada-Sweden – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DCASE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Escribano-Jorda Tests F-statistic	d.f.	p-value
H0L: b2=b4=0	13.23548	(12, 7639)	0.0000
H0E: b1=b3=0	10.86349	(12, 7639)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

Australia-New Zealand – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DAUNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Escribano-Jorda Tests F-statistic	d.f.	p-value
H0L: b2=b4=0	1.350381	(16, 7617)	0.0000
H0E: b1=b3=0	0.853350	(20, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is not rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

Australia-New Zealand – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DAUNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Escribano-Jorda Tests F-statistic	d.f.	p-value
H0L: b2=b4=0	2.018886	(16, 7617)	0.0092
H0E: b1=b3=0	1.143306	(20, 7617)	0.2958

All tests are based on the fourth-order Taylor expansion.
Linear model is not rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

Australia-Sweden – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DAUSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Null Hypothesis	Escribano-Jorda Tests F-statistic	d.f.	p-value
H0L: b2=b4=0	6.336682	(16, 7617)	0.0000
H0E: b1=b3=0	5.193371	(18, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

Australia-Sweden – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DAUSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	9.924798	(16, 7617)	0.0000
H0E: b1=b3=0	8.014502	(18, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

New Zealand-Sweden – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DNZSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	3.785190	(20, 7617)	0.0000
H0E: b1=b3=0	4.021991	(20, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

New Zealand-Sweden – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DNZSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	3.924016	(20, 7617)	0.0000
H0E: b1=b3=0	4.425110	(20, 7617)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

US-Euro Area – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUSEU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	2.680988	(16, 7628)	0.0000
H0E: b1=b3=0	4.140778	(16, 7628)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

US-Euro Area – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUSEU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	40.08084	(16, 7628)	0.0000
H0E: b1=b3=0	60.14662	(16, 7628)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

US-Switzerland – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DUSCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	24.85840	(16, 7628)	0.0000
H0E: b1=b3=0	24.47112	(16, 7628)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

US-Switzerland – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020

Test for nonlinearity using DUSCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	2.575215	(16, 7628)	0.0000
H0E: b1=b3=0	3.746502	(16, 7628)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

Euro Area-Switzerland – Exchange Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DEUCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	32.33508	(12, 7639)	0.0000
H0E: b1=b3=0	15.07055	(12, 7639)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: exponential with nonzero threshold.

Euro Area-Switzerland – Interest Rate Equation:

Smooth Threshold Linearity Tests
Sample: 1/01/2000 12/31/2020
Test for nonlinearity using DEUCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Escribano-Jorda Tests Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	3.931696	(12, 7639)	0.0000
H0E: b1=b3=0	5.424017	(12, 7639)	0.0000

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with nonzero threshold.

Nonlinear STCVAR Model

UK-Canada:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNGBPCAD) C D(LNGBPCAD(-1)) D(LNUKCAIR(-1)) D(LNGBPCAD(-2)) D(LNUKCAIR(-2)) D(LNGBPCAD(-3)) D(LNUKCAIR(-3)) UKCAECM2(-1) UKCADP(-1) UKCADN(-1) @THRESH DUKCA30D

Dependent Variable: D(LNGBPCAD)

Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DUKCA30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.000160	0.000874	1.834893	0.1831
D(LNGBPCAD(-1))	0.012795	0.014371	0.890359	0.3733
D(LNUKCAIR(-1))	-0.001810	0.001891	-0.956834	0.3387
D(LNGBPCAD(-2))	-0.017248	0.013972	-1.234427	0.2171
D(LNUKCAIR(-2))	-0.000321	0.001940	-0.165259	0.8687
D(LNGBPCAD(-3))	-0.035469	0.021620	-1.640581	0.1009
D(LNUKCAIR(-3))	0.000897	0.002008	0.446691	0.6551
UKCAECM2(-1)	0.000623	0.000329	0.188565	0.0404
UKCADP(-1)	-0.000924	0.000357	-0.244383	0.8069
UKCADN(-1)	0.002195	0.000780	2.813197	0.0049
Threshold Variables (nonlinear part)				
C	-0.002343	0.001024	-2.288044	0.0222
D(LNGBPCAD(-1))	-0.191413	0.142540	-1.342875	0.1794
D(LNUKCAIR(-1))	0.018779	0.010724	1.751068	0.0800
D(LNGBPCAD(-2))	0.064483	0.131909	0.488843	0.6250
D(LNUKCAIR(-2))	-0.029127	0.011200	-2.600641	0.0093
D(LNGBPCAD(-3))	0.847517	0.186411	4.546499	0.0000
D(LNUKCAIR(-3))	0.015967	0.018379	0.868791	0.3850
UKCAECM2(-1)	0.000622	0.002708	0.229746	0.8183
UKCADP(-1)	0.003332	0.004651	0.716368	0.4738
UKCADN(-1)	-0.017080	0.005634	-3.031487	0.0024
Slopes				
SLOPE	14.78672	5.553626	2.662535	0.0078
Thresholds				
THRESHOLD	-0.055868	0.011668	-4.788303	0.0000

R-squared	0.010110	Mean dependent var	4.08E-05
Adjusted R-squared	0.007391	S.D. dependent var	0.004961
S.E. of regression	0.004943	Akaike info criterion	-7.778867
Sum squared resid	0.186784	Schwarz criterion	-7.758940
Log likelihood	29842.29	Hannan-Quinn criter.	-7.772032
F-statistic	3.717995	Durbin-Watson stat	1.998282
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) D(LNUKCAIR) C D(LNGBPCAD(-1)) D(LNUKCAIR(-1)) D(LNGBPCAD(-2)) D(LNUKCAIR(-2)) D(LNGBPCAD(-3)) D(LNUKCAIR(-3)) UKCAECM2(-1) UKCADP(-1) UKCADN(-1) @THRESH DUKCA30D

Dependent Variable: D(LNUKCAIR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DUKCA30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.051723	0.005351	-9.667015	0.0000

D(LNGBPCAD(-1))	0.557338	0.332207	1.677680	0.0935
D(LNUKCAIR(-1))	-0.395688	0.041086	-9.630831	0.0000
D(LNGBPCAD(-2))	1.907575	0.364404	5.234776	0.0000
D(LNUKCAIR(-2))	-0.409833	0.044019	-9.310460	0.0000
D(LNGBPCAD(-3))	-0.889888	0.346717	-2.566609	0.0103
D(LNUKCAIR(-3))	-0.104094	0.043570	-2.389102	0.0169
UKCAECM2(-1)	0.068904	0.012225	5.636323	0.0000
UKCADP(-1)	0.011654	0.008270	1.409206	0.1588
UKCADN(-1)	0.011003	0.010944	1.005426	0.3147
Threshold Variables (nonlinear part)				
C	0.087461	0.007725	11.32169	0.0000
D(LNGBPCAD(-1))	-0.705407	0.551900	-1.278143	0.2012
D(LNUKCAIR(-1))	0.358444	0.065382	5.482310	0.0000
D(LNGBPCAD(-2))	-3.039062	0.603916	-5.032260	0.0000
D(LNUKCAIR(-2))	0.504211	0.069599	7.244461	0.0000
D(LNGBPCAD(-3))	1.734186	0.577212	3.004420	0.0027
D(LNUKCAIR(-3))	0.013520	0.072006	0.187763	0.8511
UKCAECM2(-1)	-0.132621	0.018793	-7.056922	0.0000
UKCADP(-1)	-0.017505	0.013636	-1.283756	0.1993
UKCADN(-1)	-0.016788	0.018566	-0.904233	0.3659
Slopes				
SLOPE	22.65341	2.599393	8.714884	0.0000
Thresholds				
THRESHOLD	-0.016814	0.005450	-3.085140	0.0020

R-squared	0.148894	Mean dependent var	-4.08E-05
Adjusted R-squared	0.146556	S.D. dependent var	0.035979
S.E. of regression	0.033238	Akaike info criterion	-3.967357
Sum squared resid	8.446122	Schwarz criterion	-3.947430
Log likelihood	15230.86	Hannan-Quinn criter.	-3.960522
F-statistic	63.68732	Durbin-Watson stat	2.062547
Prob(F-statistic)	0.000000		

UK-Australia:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNGBPAUD) C D(LNGBPAUD(-1)) D(LNUKAUIR(-1)) D(LNGBPAUD(-2)) D(LNUKAUIR(-2)) D(LNGBPAUD(-3)) D(LNUKAUIR(-3)) UKAUECM1(-1) UKAUDP(-1) UKAUDN(-1) @THRESH DUKAU30D

Dependent Variable: D(LNGBPAUD)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DUKAU30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.000331	0.000680	0.494063	0.4867
D(LNGBPAUD(-1))	-0.006662	0.011737	-0.567592	0.5703
D(LNUKAUIR(-1))	-0.004672	0.002050	-2.279098	0.0227
D(LNGBPAUD(-2))	-0.013018	0.011749	-1.107968	0.2679
D(LNUKAUIR(-2))	0.000627	0.002069	0.303229	0.7617
D(LNGBPAUD(-3))	-0.005078	0.011609	-0.437442	0.6618
D(LNUKAUIR(-3))	0.000956	0.002008	0.476371	0.6338
UKAUECM1(-1)	-0.001541	0.000566	-2.721260	0.0065
UKAUDP(-1)	0.000951	0.000317	2.995205	0.0028

UKAUDN(-1)	-0.000131	0.000864	-0.015205	0.1519
Threshold Variables (nonlinear part)				
C	-0.000240	0.000718	-0.334666	0.7379
D(LNGBPAUD(-1))	0.087341	0.070086	1.246200	0.2127
D(LNUKAUIR(-1))	0.108586	0.041252	2.632284	0.0085
D(LNGBPAUD(-2))	1.086803	0.311134	3.493042	0.0005
D(LNUKAUIR(-2))	0.018634	0.044183	0.421748	0.6732
D(LNGBPAUD(-3))	-0.230784	0.115036	-2.006198	0.0449
D(LNUKAUIR(-3))	-0.094664	0.044428	-2.130738	0.0331
UKAUECM1(-1)	0.004689	0.006163	0.760846	0.4468
UKAUDP(-1)	-0.042113	0.014082	-2.990544	0.0028
UKAUDN(-1)	-0.012623	0.009556	-1.320923	0.1866
Slopes				
SLOPE	13.16741	5.035898	2.614710	0.0089
Thresholds				
THRESHOLD	-0.005186	0.008105	-0.639931	0.5222

R-squared	0.019899	Mean dependent var	4.38E-05
Adjusted R-squared	0.017205	S.D. dependent var	0.005755
S.E. of regression	0.005705	Akaike info criterion	-7.491935
Sum squared resid	0.248728	Schwarz criterion	-7.471999
Log likelihood	28727.35	Hannan-Quinn criter.	-7.485097
F-statistic	7.387347	Durbin-Watson stat	2.001522
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) D(LNUKAUIR) C D(LNGBPAUD(-1)) D(LNUKAUIR(-1)) D(LNGBPAUD(-2)) D(LNUKAUIR(-2)) D(LNGBPAUD(-3)) D(LNUKAUIR(-3)) UKAUECM1(-1) UKAUDP(-1) UKAUDN(-1) @THRESH DUKAU30D

Dependent Variable: D(LNUKAUIR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DUKAU30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.027613	0.001848	-14.93942	0.0000
D(LNGBPAUD(-1))	-0.456876	0.164476	-2.777775	0.0055
D(LNUKAUIR(-1))	-0.465435	0.027338	-17.02549	0.0000
D(LNGBPAUD(-2))	1.122411	0.197484	5.683563	0.0000
D(LNUKAUIR(-2))	-0.523495	0.032317	-16.19865	0.0000
D(LNGBPAUD(-3))	-0.338626	0.198609	-1.704990	0.0882
D(LNUKAUIR(-3))	-0.140760	0.033416	-4.212413	0.0000
UKAUECM1(-1)	0.203292	0.014926	13.62027	0.0000
UKAUDP(-1)	-0.003601	0.005494	-0.655399	0.5122
UKAUDN(-1)	-0.001130	0.008560	-0.131975	0.8950
Threshold Variables (nonlinear part)				
C	0.049848	0.002939	16.96135	0.0000
D(LNGBPAUD(-1))	0.786460	0.276765	2.841613	0.0045
D(LNUKAUIR(-1))	0.476119	0.047692	9.983138	0.0000

D(LNGBPAUD(-2))	-1.907790	0.330150	-5.778547	0.0000
D(LNUKAUIR(-2))	0.738786	0.056132	13.16165	0.0000
D(LNGBPAUD(-3))	0.779029	0.337367	2.309145	0.0210
D(LNUKAUIR(-3))	0.091810	0.057074	1.608613	0.1077
UKAUECM1(-1)	-0.379047	0.023710	-15.98664	0.0000
UKAUDP(-1)	0.011656	0.009330	1.249372	0.2116
UKAUDN(-1)	0.007146	0.015488	0.461401	0.6445
Slopes				
SLOPE	45.75886	3.559342	12.85599	0.0000
Thresholds				
THRESHOLD	-0.006006	0.001667	-3.603023	0.0003

R-squared	0.237268	Mean dependent var	-3.07E-05
Adjusted R-squared	0.235172	S.D. dependent var	0.034426
S.E. of regression	0.030107	Akaike info criterion	-4.165241
Sum squared resid	6.926113	Schwarz criterion	-4.145305
Log likelihood	15981.12	Hannan-Quinn criter.	-4.158403
F-statistic	113.1875	Durbin-Watson stat	2.072678
Prob(F-statistic)	0.000000		

UK-New Zealand:

THRESHOLD(TYPE=SMOOTH) LNGBPNZD C D(LNGBPNZD(-1)) D(LNUKNZIR(-1)) D(LNGBPNZD(-2)) D(LNUKNZIR(-2)) D(LNGBPNZD(-3)) D(LNUKNZIR(-3)) D(LNGBPNZD(-4)) D(LNUKNZIR(-4)) UKNZECM1(-1) UKNZDP(-1) UKNZDN(-1) @THRESH DUKNZ30D

Dependent Variable: LNGBPNZD
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DUKNZ30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.910559	0.005256	-173.2298	0.0000
D(LNGBPNZD(-1))	-0.136703	0.647751	-0.211043	0.8329
D(LNUKNZIR(-1))	-0.456196	0.080169	-5.690460	0.0000
D(LNGBPNZD(-2))	0.142585	0.738400	0.193100	0.8469
D(LNUKNZIR(-2))	-0.521355	0.098544	-5.290590	0.0000
D(LNGBPNZD(-3))	0.742136	0.755702	0.982050	0.3261
D(LNUKNZIR(-3))	-0.345081	0.101378	-3.403915	0.0007
D(LNGBPNZD(-4))	-0.359207	0.714479	-0.502754	0.6152
D(LNUKNZIR(-4))	-0.390349	0.103899	-3.757005	0.0002
UKNZECM1(-1)	0.114006	0.003926	29.03681	0.0000
UKNZDP(-1)	-0.030612	0.020851	-1.468143	0.1421
UKNZDN(-1)	-0.048491	0.032702	-1.482827	0.1382
Threshold Variables (nonlinear part)				
C	0.063505	0.005510	11.52537	0.0000
D(LNGBPNZD(-1))	0.362612	0.704439	0.514752	0.6067
D(LNUKNZIR(-1))	0.254205	0.091985	2.763546	0.0057
D(LNGBPNZD(-2))	-0.087827	0.786461	-0.111674	0.9111
D(LNUKNZIR(-2))	0.431631	0.108005	3.996383	0.0001
D(LNGBPNZD(-3))	-0.680889	0.802764	-0.848181	0.3964
D(LNUKNZIR(-3))	0.234269	0.110405	2.121909	0.0339

D(LNGBPNZD(-4))	0.497824	0.764680	0.651023	0.5151
D(LNUKNZIR(-4))	0.342580	0.112159	3.054427	0.0023
UKNZECM1(-1)	-0.174181	0.040611	-4.288973	0.0000
UKNZDP(-1)	-0.016844	0.022592	-0.745566	0.4560
UKNZDN(-1)	0.056337	0.040837	1.379545	0.1678
Slopes				
SLOPE	62.36919	3.050356	0.175349	0.0000
Thresholds				
THRESHOLD	-0.012500	0.001507	-118703.6	0.0000

R-squared	0.585423	Mean dependent var	-0.857914
Adjusted R-squared	0.584066	S.D. dependent var	0.205809
S.E. of regression	0.132732	Akaike info criterion	-1.197582
Sum squared resid	134.6000	Schwarz criterion	-1.174029
Log likelihood	4616.333	Hannan-Quinn criter.	-1.189503
F-statistic	431.5370	Durbin-Watson stat	0.082470
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) D(LNUKNZIR) C D(LNGBPNZD(-1)) D(LNUKNZIR(-1)) D(LNGBPNZD(-2)) D(LNUKNZIR(-2)) D(LNGBPNZD(-3)) D(LNUKNZIR(-3)) D(LNGBPNZD(-4)) D(LNUKNZIR(-4)) UKNZECM1(-1) UKNZDP(-1) UKNZDN(-1) @THRESH DUKNZ30D

Dependent Variable: D(LNUKNZIR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DUKNZ30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.033743	0.003471	-9.720652	0.0000
D(LNGBPNZD(-1))	-0.242568	0.248936	-0.974419	0.3299
D(LNUKNZIR(-1))	-0.467392	0.038240	-12.22268	0.0000
D(LNGBPNZD(-2))	0.403506	0.297363	1.356948	0.1748
D(LNUKNZIR(-2))	-0.663091	0.056655	-11.70397	0.0000
D(LNGBPNZD(-3))	-0.763794	0.311770	-2.449860	0.0143
D(LNUKNZIR(-3))	-0.229115	0.047236	-4.850417	0.0000
D(LNGBPNZD(-4))	-0.870625	0.322487	-2.699719	0.0070
D(LNUKNZIR(-4))	-0.238167	0.048288	-4.932243	0.0000
UKNZECM1(-1)	0.169055	0.021444	7.883675	0.0000
UKNZDP(-1)	-0.016597	0.009837	-1.687155	0.0916
UKNZDN(-1)	-0.019857	0.012107	-1.640163	0.1010
Threshold Variables (nonlinear part)				
C	0.057603	0.005437	10.59563	0.0000
D(LNGBPNZD(-1))	0.450469	0.409067	1.101211	0.2708
D(LNUKNZIR(-1))	0.349021	0.063703	5.478863	0.0000
D(LNGBPNZD(-2))	-0.809055	0.496098	-1.630838	0.1030
D(LNUKNZIR(-2))	0.904446	0.093031	9.722005	0.0000
D(LNGBPNZD(-3))	1.420976	0.514379	2.762510	0.0057
D(LNUKNZIR(-3))	0.153472	0.078515	1.954677	0.0507
D(LNGBPNZD(-4))	1.308713	0.541759	2.415674	0.0157
D(LNUKNZIR(-4))	0.257301	0.080383	3.200958	0.0014
UKNZECM1(-1)	-0.297966	0.033240	-8.964041	0.0000

UKNZDP(-1)	0.036597	0.016375	2.234875	0.0255
UKNZDN(-1)	0.026906	0.019856	1.355032	0.1754
Slopes				
SLOPE	31.67953	3.311736	9.565839	0.0000
Thresholds				
THRESHOLD	-0.012345	0.003321	-3.717498	0.0002

R-squared	0.197666	Mean dependent var	-4.00E-05
Adjusted R-squared	0.195040	S.D. dependent var	0.040632
S.E. of regression	0.036455	Akaike info criterion	-3.782117
Sum squared resid	10.15304	Schwarz criterion	-3.758564
Log likelihood	14522.85	Hannan-Quinn criter.	-3.774038
F-statistic	75.28855	Durbin-Watson stat	2.072866
Prob(F-statistic)	0.000000		

UK-Sweden:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNGBPSEK) C D(LNGBPSEK(-1)) D(LNUKSEIR(-1)) D(LNGBPSEK(-2)) D(LNUKSEIR(-2)) UKSEECM1(-1) UKSEDP(-1) UKSEDN(-1) @THRESH DUKSE30D

Dependent Variable: D(LNGBPSEK)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DUKSE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.000198	0.000112	-1.764701	0.0777
D(LNGBPSEK(-1))	-0.021440	0.020952	-1.023286	0.3062
D(LNUKSEIR(-1))	0.002054	0.002701	0.760428	0.4470
D(LNGBPSEK(-2))	0.036139	0.023611	1.530557	0.1259
D(LNUKSEIR(-2))	-0.004531	0.002843	-1.593560	0.1111
UKSEECM1(-1)	-0.000579	0.000855	-0.676560	0.4987
UKSEDP(-1)	0.000106	0.000428	0.037671	0.2477
UKSEDN(-1)	0.003149	0.001336	2.357882	0.0184
Threshold Variables (nonlinear part)				
C	0.000633	0.000233	2.716592	0.0066
D(LNGBPSEK(-1))	0.097501	0.038450	2.535779	0.0112
D(LNUKSEIR(-1))	-0.000740	0.004483	-0.165137	0.8688
D(LNGBPSEK(-2))	-0.140470	0.043372	-3.238730	0.0012
D(LNUKSEIR(-2))	0.011597	0.004627	2.506637	0.0122
UKSEECM1(-1)	-0.001328	0.001924	-0.690248	0.4901
UKSEDP(-1)	0.000804	0.000974	0.825189	0.4093
UKSEDN(-1)	-0.006990	0.001876	-3.725655	0.0002
Slopes				
SLOPE	65.02806	3118.595	2.085172	0.0208
Thresholds				

THRESHOLD	0.020142	0.004701	4.284659	0.0000

R-squared	0.007453	Mean dependent var	2.69E-05
Adjusted R-squared	0.005247	S.D. dependent var	0.005117
S.E. of regression	0.005104	Akaike info criterion	-7.715315
Sum squared resid	0.199274	Schwarz criterion	-7.699013
Log likelihood	29598.52	Hannan-Quinn criter.	-7.709724
F-statistic	3.378923	Durbin-Watson stat	1.998370
Prob(F-statistic)	0.000003		

THRESHOLD(TYPE=SMOOTH) LNUKSEIR C D(LNGBPSEK(-1)) D(LNUKSEIR(-1)) D(LNGBPSEK(-2)) D(LNUKSEIR(-2)) UKSEECM1(-1) UKSEDP(-1) UKSEDN(-1) @THRESH DUKSE30D

Dependent Variable: LNUKSEIR
Method: Smooth Threshold Regression
Transition function: Logistic
Sample (adjusted): 1/01/2000 12/31/2020
Threshold variable: DUKSE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.127040	0.028021	4.533818	0.0000
D(LNGBPSEK(-1))	0.124519	0.037775	3.296371	0.0070
D(LNUKSEIR(-1))	0.124145	0.034068	3.644008	0.0096
D(LNGBPSEK(-2))	-0.795305	6.783274	-0.117245	0.9067
D(LNUKSEIR(-2))	0.332195	0.104851	3.168268	0.0064
UKSEECM1(-1)	0.319184	0.104173	3.063988	0.0074
UKSEDP(-1)	-0.119071	0.038333	-3.106240	0.0054
UKSEDN(-1)	-0.341643	0.881025	-0.387779	0.6982
Threshold Variables (nonlinear part)				
C	-0.781258	0.280356	-2.786669	0.0053
D(LNGBPSEK(-1))	-0.127029	0.038468	-3.302158	0.0025
D(LNUKSEIR(-1))	-0.120072	0.033143	-3.622804	0.0034
D(LNGBPSEK(-2))	0.817105	0.261859	3.120406	0.0042
D(LNUKSEIR(-2))	-0.328113	0.103630	-3.166196	0.0080
UKSEECM1(-1)	-0.322584	0.104907	-3.074963	0.0024
UKSEDP(-1)	0.010596	1.121389	0.009449	0.9925
UKSEDN(-1)	0.097830	0.885147	0.110524	0.9120
Slopes				
SLOPE	66.07738	17.87598	3.696433	0.0062
Thresholds				
THRESHOLD	-0.272267	0.041971	-6.487082	0.0000

R-squared	0.006374	Mean dependent var	0.483154
Adjusted R-squared	0.004166	S.D. dependent var	0.659914
S.E. of regression	0.658538	Akaike info criterion	2.004755
Sum squared resid	3317.591	Schwarz criterion	2.021057
Log likelihood	-7668.231	Hannan-Quinn criter.	2.010347
F-statistic	2.886751	Durbin-Watson stat	0.015600
Prob(F-statistic)	0.000061		

Canada-Australia:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNCADAUD) C D(LNCADAUD(-1)) D(LNCAAUIR(-1)) D(LNCADAUD(-2)) D(LNCAAUIR(-2)) D(LNCADAUD(-3)) D(LNCAAUIR(-3)) CAAUECM1(-1) CAAUDP(-1) CAAUDN(-1) @THRESH DCAAU30D

Dependent Variable: D(LNCADAUD)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DCAAU30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.001439	0.000339	4.251422	0.0000
D(LNCADAUD(-1))	0.256094	0.052761	4.853834	0.0000
D(LNCAAUIR(-1))	-0.067097	0.020193	-3.322732	0.0009
D(LNCADAUD(-2))	0.139053	0.045555	3.052407	0.0023
D(LNCAAUIR(-2))	0.049013	0.013491	3.633049	0.0003
D(LNCADAUD(-3))	0.243262	0.058687	4.145047	0.0000
D(LNCAAUIR(-3))	0.013876	0.016738	0.828987	0.4071
CAAUECM1(-1)	0.009426	0.004016	2.346899	0.0190
CAAUDP(-1)	-0.001540	0.001105	-1.393824	0.1634
CAAUDN(-1)	0.001661	0.001850	0.897785	0.3693
Threshold Variables (nonlinear part)				
C	-0.002970	0.000593	-5.009587	0.0000
D(LNCADAUD(-1))	-0.582218	0.069967	-8.321271	0.0000
D(LNCAAUIR(-1))	0.124912	0.036826	3.391923	0.0007
D(LNCADAUD(-2))	-0.275726	0.092594	-2.977802	0.0029
D(LNCAAUIR(-2))	-0.068930	0.029812	-2.312183	0.0208
D(LNCADAUD(-3))	-0.544558	0.092049	-5.915969	0.0000
D(LNCAAUIR(-3))	-0.022770	0.032582	-0.698855	0.4847
CAAUECM1(-1)	-0.024838	0.007308	-3.398569	0.0007
CAAUDP(-1)	0.003299	0.002208	1.494370	0.1351
CAAUDN(-1)	-0.004737	0.003700	-1.280304	0.2005
Slopes				
SLOPE	21.68449	5.170043	4.194258	0.0000
Thresholds				
THRESHOLD	-0.173465	0.017799	-9.745913	0.0000

R-squared	0.032295	Mean dependent var	5.43E-06
Adjusted R-squared	0.029635	S.D. dependent var	0.005070
S.E. of regression	0.004995	Akaike info criterion	-7.758069
Sum squared resid	0.190609	Schwarz criterion	-7.738133
Log likelihood	29747.04	Hannan-Quinn criter.	-7.751231
F-statistic	12.14294	Durbin-Watson stat	1.989728
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) D(LNCAAUIR) C D(LNCADAUD(-1)) D(LNCAAUIR(-1)) D(LNCADAUD(-2)) D(LNCAAUIR(-2)) D(LNCADAUD(-3)) D(LNCAAUIR(-3)) CAAUECM1(-1) CAAUDP(-1) CAAUDN(-1) @THRESH DCAAU30D

Dependent Variable: D(LNCAAUIR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DCAAU30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	Threshold Variables (linear part)			
C	-0.023616	0.001914	-12.33814	0.0000
D(LNCADAUD(-1))	0.110943	0.158172	0.701410	0.4831
D(LNCAAUIR(-1))	-0.842215	0.247304	-3.405589	0.0007
D(LNCADAUD(-2))	0.740074	0.197877	3.740066	0.0002
D(LNCAAUIR(-2))	-0.536854	0.059771	-8.981805	0.0000
D(LNCADAUD(-3))	-5.169150	0.381176	-13.56105	0.0000
D(LNCAAUIR(-3))	4.281989	0.664715	6.441844	0.0000
CAAUECM1(-1)	0.201231	0.025418	7.916913	0.0000
CAAUDP(-1)	191.2326	2329.715	0.082084	0.9346
CAAUDN(-1)	-0.052535	0.015453	-3.399678	0.0007
	Threshold Variables (nonlinear part)			
C	0.023729	0.001920	12.35661	0.0000
D(LNCADAUD(-1))	-0.155149	0.160949	-0.963962	0.3351
D(LNCAAUIR(-1))	0.805616	0.247584	3.253917	0.0011
D(LNCADAUD(-2))	-0.801090	0.200072	-4.004019	0.0001
D(LNCAAUIR(-2))	0.521696	0.060833	8.575837	0.0000
D(LNCADAUD(-3))	5.176542	0.382315	13.54001	0.0000
D(LNCAAUIR(-3))	-4.304866	0.664813	-6.475307	0.0000
CAAUECM1(-1)	-0.200020	0.025511	-7.840560	0.0000
CAAUDP(-1)	-191.2317	2329.715	-0.082084	0.9346
CAAUDN(-1)	0.058745	0.015565	3.774238	0.0002
	Slopes			
SLOPE	15.45625	1529.092	1.010813	0.0000
	Thresholds			
THRESHOLD	-0.192480	0.010335	-18.62411	0.0000

R-squared	0.075929	Mean dependent var	2.69E-05
Adjusted R-squared	0.073390	S.D. dependent var	0.013412
S.E. of regression	0.012911	Akaike info criterion	-5.858629
Sum squared resid	1.273680	Schwarz criterion	-5.838693
Log likelihood	22469.34	Hannan-Quinn criter.	-5.851791
F-statistic	29.89749	Durbin-Watson stat	2.012682
Prob(F-statistic)	0.000000		

<u>Canada-New Zealand:</u>

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNCADNZD) C D(LNCADNZD(-1)) D(LNCANZIR(-1)) D(LNCADNZD(-2)) D(LNCANZIR(-2)) D(LNCADNZD(-3)) D(LNCANZIR(-3)) CANZECM1(-1) CANZDP(-1) CANZDN(-1) @THRESH DCANZ30D

Dependent Variable: D(LNCADNZD)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DCANZ30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.000468	0.000161	2.912369	0.0036
D(LNCADNZD(-1))	0.034327	0.020694	1.658788	0.0972
D(LNCANZIR(-1))	-0.000849	0.004417	-0.192283	0.8475
D(LNCADNZD(-2))	-0.024710	0.019690	-1.254971	0.2095
D(LNCANZIR(-2))	0.001431	0.004197	0.340837	0.7332
D(LNCADNZD(-3))	0.025628	0.021270	1.204877	0.2283
D(LNCANZIR(-3))	0.002866	0.004339	0.660485	0.5090
CANZECM1(-1)	-0.002421	0.001087	-2.226346	0.0260
CANZDP(-1)	0.000947	0.004960	0.190894	0.1909
CANZDN(-1)	-0.003665	0.001304	-2.811880	0.0049
Threshold Variables (nonlinear part)				
C	-0.001896	0.000531	-3.572630	0.0004
D(LNCADNZD(-1))	-0.167034	0.053240	-3.137382	0.0017
D(LNCANZIR(-1))	-0.008647	0.014406	-0.600266	0.5483
D(LNCADNZD(-2))	0.058613	0.065588	0.893665	0.3715
D(LNCANZIR(-2))	-0.001170	0.012955	-0.090281	0.9281
D(LNCADNZD(-3))	-0.140615	0.066188	-2.124487	0.0337
D(LNCANZIR(-3))	-0.024038	0.012687	-1.894665	0.0582
CANZECM1(-1)	0.004290	0.004024	1.066121	0.2864
CANZDP(-1)	-0.001594	0.001720	-0.926457	0.3542
CANZDN(-1)	0.009167	0.003050	3.005573	0.0027
Slopes				
SLOPE	85.06376	38.34239	2.218530	0.0265
Thresholds				
THRESHOLD	-0.050491	0.013264	-3.806646	0.0001

R-squared	0.010343	Mean dependent var	2.57E-05
Adjusted R-squared	0.007624	S.D. dependent var	0.005612
S.E. of regression	0.005591	Akaike info criterion	-7.532605
Sum squared resid	0.238941	Schwarz criterion	-7.512677
Log likelihood	28898.24	Hannan-Quinn criter.	-7.525769
F-statistic	3.804521	Durbin-Watson stat	2.006484
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) D(LNCANZIR) C D(LNCADNZD(-1)) D(LNCANZIR(-1)) D(LNCADNZD(-2)) D(LNCANZIR(-2)) D(LNCADNZD(-3)) D(LNCANZIR(-3)) CANZECM1(-1) CANZDP(-1) CANZDN(-1) @THRESH DCANZ30D

Dependent Variable: D(LNCANZIR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DCANZ30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				

C	-0.000240	0.000286	-0.840824	0.4005
D(LNCADNZD(-1))	-0.002464	0.050161	-0.049130	0.9608
D(LNCANZIR(-1))	-0.278651	0.011448	-24.34103	0.0000
D(LNCADNZD(-2))	-0.033717	0.049804	-0.676989	0.4984
D(LNCANZIR(-2))	-0.114975	0.011822	-9.725832	0.0000
D(LNCADNZD(-3))	-0.013259	0.049937	-0.265522	0.7906
D(LNCANZIR(-3))	-0.099637	0.011444	-8.706471	0.0000
CANZECM1(-1)	0.002165	0.002556	0.847047	0.3970
CANZDP(-1)	0.001401	0.001322	1.059766	0.2893
CANZDN(-1)	-0.011667	0.003552	-3.284849	0.0010
Threshold Variables (nonlinear part)				
C	0.015833	0.002792	5.671531	0.0000
D(LNCADNZD(-1))	-0.045782	0.297313	-0.153984	0.8776
D(LNCANZIR(-1))	-0.968781	0.067887	-14.27044	0.0000
D(LNCADNZD(-2))	-0.050120	0.337742	-0.148398	0.8820
D(LNCANZIR(-2))	-0.151911	0.060397	-2.515195	0.0119
D(LNCADNZD(-3))	-0.833787	0.330029	-2.526409	0.0115
D(LNCANZIR(-3))	-0.057792	0.056085	-1.030430	0.3028
CANZECM1(-1)	0.097056	0.024151	4.018665	0.0001
CANZDP(-1)	0.059553	0.008298	7.176768	0.0000
CANZDN(-1)	-0.116891	0.013986	-8.357774	0.0000
Slopes				
SLOPE	18.91247	1418.598	0.000133	0.0133
Thresholds				
THRESHOLD	0.081161	8.709689	0.009318	0.0093

R-squared	0.134471	Mean dependent var	4.06E-07
Adjusted R-squared	0.132093	S.D. dependent var	0.025888
S.E. of regression	0.024118	Akaike info criterion	-4.608846
Sum squared resid	4.446950	Schwarz criterion	-4.588919
Log likelihood	17690.01	Hannan-Quinn criter.	-4.602011
F-statistic	56.55932	Durbin-Watson stat	2.021043
Prob(F-statistic)	0.000000		

Canada-Sweden:

THRESHOLD(TYPE=SMOOTH) D(LNCADSEK) C D(LNCADSEK(-1)) D(LNCASEIR(-1)) CASEECM1(-1) CASEDP(-1) CASEDN(-1) @THRESH DCASE30D

Dependent Variable: D(LNCADSEK)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DCASE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	8.59E-05	8.05E-05	1.067303	0.2859
D(LNCADSEK(-1))	0.001676	0.013540	0.123786	0.9015
D(LNCASEIR(-1))	-0.009326	0.003427	-2.721382	0.0065
CASEECM1(-1)	-0.001023	0.001359	-0.752623	0.4517
CASEDP(-1)	-0.000254	0.000316	-0.804233	0.4213
CASEDN(-1)	0.002457	0.000821	2.993844	0.0028
Threshold Variables (nonlinear part)				

C	-0.000431	0.000177	-2.443158	0.0146
D(LNCADSEK(-1))	-0.008340	0.028006	-0.297797	0.7659
D(LNCASEIR(-1))	0.011359	0.006294	1.804620	0.0712
CASEECM1(-1)	-0.011496	0.002845	-4.040772	0.0001
CASEDP(-1)	-0.000386	0.000657	-0.587864	0.5566
CASEDN(-1)	-0.001204	0.001472	-0.817589	0.4136
Slopes				
SLOPE	42.40906	5597.713	0.757614	0.0075
Thresholds				
THRESHOLD	0.009453	0.002333	4.051662	0.0001

R-squared	0.008791	Mean dependent var	-1.14E-05
Adjusted R-squared	0.007108	S.D. dependent var	0.005409
S.E. of regression	0.005390	Akaike info criterion	-7.606793
Sum squared resid	0.222377	Schwarz criterion	-7.594115
Log likelihood	29182.25	Hannan-Quinn criter.	-7.602444
F-statistic	5.222738	Durbin-Watson stat	2.000508
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNCASEIR) C D(LNCADSEK(-1)) D(LNCASEIR(-1)) CASEECM1(-1) CASEDP(-1) CASEDN(-1) @THRESH DCASE30D

Dependent Variable: D(LNCASEIR)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DCASE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.000688	0.000346	1.986648	0.0470
D(LNCADSEK(-1))	0.013802	0.055476	0.248802	0.8035
D(LNCASEIR(-1))	-0.050530	0.014573	-3.467375	0.0005
CASEECM1(-1)	-0.016077	0.006741	-2.384978	0.0171
CASEDP(-1)	0.001130	0.001308	0.863543	0.3879
CASEDN(-1)	0.025210	0.003230	7.804759	0.0000
Threshold Variables (nonlinear part)				
C	-0.014344	0.003109	-4.614228	0.0000
D(LNCADSEK(-1))	-1.192497	0.354826	-3.360796	0.0008
D(LNCASEIR(-1))	0.059541	0.051731	1.150972	0.2498
CASEECM1(-1)	-0.425032	0.068632	6.192953	0.0000
CASEDP(-1)	0.010578	0.013834	0.764638	0.4445
CASEDN(-1)	-0.049282	0.011430	-4.311664	0.0000
Slopes				
SLOPE	16.40401	4.296346	3.818132	0.0001
Thresholds				
THRESHOLD	0.047907	0.009728	4.924574	0.0000

R-squared	0.031890	Mean dependent var	-5.93E-05
Adjusted R-squared	0.030245	S.D. dependent var	0.022229

S.E. of regression	0.021890	Akaike info criterion	-4.803767
Sum squared resid	3.667999	Schwarz criterion	-4.791089
Log likelihood	18434.05	Hannan-Quinn criter.	-4.799418
F-statistic	19.39656	Durbin-Watson stat	2.002661
Prob(F-statistic)	0.000000		

Australia-New Zealand:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) LNAUDNZD C D(LNAUDNZD(-1)) D(LNAUNZIR(-1)) D(LNAUDNZD(-2)) D(LNAUNZIR(-2)) D(LNAUDNZD(-3)) D(LNAUNZIR(-3)) AUNZECM1(-1) AUNZDP(-1) AUNZDN(-1) @THRESH DAUNZ30D

Dependent Variable: LNAUDNZD
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DAUNZ30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.156155	0.006483	-24.08852	0.0000
D(LNAUDNZD(-1))	2.729777	1.180279	2.312823	0.0208
D(LNAUNZIR(-1))	0.095647	0.270824	0.353170	0.7240
D(LNAUDNZD(-2))	0.916497	1.159081	0.790710	0.4291
D(LNAUNZIR(-2))	0.706010	0.410860	1.718374	0.0858
D(LNAUDNZD(-3))	-1.641960	1.356811	-1.210161	0.2263
D(LNAUNZIR(-3))	0.713666	0.331542	2.152565	0.0314
AUNZECM1(-1)	0.665456	0.115408	5.766133	0.0000
AUNZDP(-1)	-0.041232	0.032185	-1.281120	0.2002
AUNZDN(-1)	0.121293	0.055144	2.199568	0.0279
Threshold Variables (nonlinear part)				
C	0.014953	0.006537	2.287304	0.0222
D(LNAUDNZD(-1))	-2.953693	1.197140	-2.467290	0.0136
D(LNAUNZIR(-1))	-0.256083	0.274891	-0.931580	0.3516
D(LNAUDNZD(-2))	-1.039471	1.176612	-0.883445	0.3770
D(LNAUNZIR(-2))	-0.845842	0.414121	-2.042500	0.0411
D(LNAUDNZD(-3))	1.536971	1.375883	1.117080	0.2640
D(LNAUNZIR(-3))	-0.819295	0.333378	-2.457556	0.0140
AUNZECM1(-1)	0.343909	0.116121	2.961652	0.0031
AUNZDP(-1)	0.028214	0.032654	0.864037	0.3876
AUNZDN(-1)	-0.130863	0.056702	-2.307904	0.0210
Slopes				
SLOPE	88.81159	35.24615	2.519753	0.0118
Thresholds				
THRESHOLD	-0.088433	0.006529	-13.54423	0.0000

R-squared	0.556216	Mean dependent var	-0.141885
Adjusted R-squared	0.554996	S.D. dependent var	0.074406
S.E. of regression	0.049635	Akaike info criterion	-3.165368
Sum squared resid	18.82474	Schwarz criterion	-3.145431
Log likelihood	12150.11	Hannan-Quinn criter.	-3.158529
F-statistic	456.0399	Durbin-Watson stat	0.028192
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) LNAUNZIR C D(LNAUDNZD(-1)) D(LNAUNZIR(-1)) D(LNAUDNZD(-2)) D(LNAUNZIR(-2)) D(LNAUDNZD(-3)) D(LNAUNZIR(-3)) AUNZECM2(-1) AUNZDP(-1) AUNZDN(-1) @THRESH DAUNZ30D

Dependent Variable: LNAUNZIR
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DAUNZ30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.034270	0.001720	-19.92525	0.0000
D(LNAUDNZD(-1))	-0.595017	0.436570	-1.362937	0.1729
D(LNAUNZIR(-1))	-0.205961	0.075618	-2.723712	0.0065
D(LNAUDNZD(-2))	-0.979611	0.421319	-2.325107	0.0201
D(LNAUNZIR(-2))	-0.016434	0.076067	-0.216040	0.8290
D(LNAUDNZD(-3))	-0.875092	0.419321	-2.086927	0.0369
D(LNAUNZIR(-3))	-0.067363	0.072041	-0.935072	0.3498
AUNZECM2(-1)	0.993682	0.011461	86.69813	0.0000
AUNZDP(-1)	0.023249	0.009164	2.536916	0.0112
AUNZDN(-1)	-0.034604	0.027639	-1.252003	0.2106
Threshold Variables (nonlinear part)				
C	0.038482	0.005004	7.689641	0.0000
D(LNAUDNZD(-1))	-1.436812	1.021983	-1.405906	0.1598
D(LNAUNZIR(-1))	-0.454329	0.196970	-2.306596	0.0211
D(LNAUDNZD(-2))	-0.387430	1.196518	-0.323798	0.7461
D(LNAUNZIR(-2))	-0.653306	0.245180	-2.664595	0.0077
D(LNAUDNZD(-3))	-0.294747	1.236249	-0.238421	0.8116
D(LNAUNZIR(-3))	-0.743527	0.265924	-2.796015	0.0052
AUNZECM2(-1)	0.033017	0.010450	3.158313	0.0068
AUNZDP(-1)	0.015275	0.022770	0.670841	0.5023
AUNZDN(-1)	-0.025155	0.047754	-0.526762	0.5984
Slopes				
SLOPE	464196.0	1.18E+14	3.92E-09	1.0000
Thresholds				
THRESHOLD	0.014948	12487.63	1.20E-06	1.0000

R-squared	0.546348	Mean dependent var	-0.028624
Adjusted R-squared	0.545101	S.D. dependent var	0.203762
S.E. of regression	0.137430	Akaike info criterion	-1.128541
Sum squared resid	144.3151	Schwarz criterion	-1.108604
Log likelihood	4346.004	Hannan-Quinn criter.	-1.121702
F-statistic	438.2049	Durbin-Watson stat	0.078375
Prob(F-statistic)	0.000000		

Australia-Sweden:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNAUDSEK) C D(LNAUDSEK(-1)) D(LNAUSEIR(-1)) D(LNAUDSEK(-2)) D(LNAUSEIR(-2)) D(LNAUDSEK(-3)) D(LNAUSEIR(-3)) AUSEECM1(-1) AUSEDP(-1) AUSEDN(-1) @THRESH DAUSE30D

Dependent Variable: D(LNAUDSEK)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DAUSE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-1.62E-05	9.45E-05	-0.171075	0.8642
D(LNAUDSEK(-1))	-0.034604	0.014543	-2.379442	0.0174
D(LNAUSEIR(-1))	0.000434	0.004506	0.096382	0.9232
D(LNAUDSEK(-2))	-0.129457	0.038838	-3.333246	0.0009
D(LNAUSEIR(-2))	0.007376	0.004417	1.669834	0.0950
D(LNAUDSEK(-3))	-0.012386	0.016536	-0.749068	0.4538
D(LNAUSEIR(-3))	-0.080697	0.037653	-2.143170	0.0321
AUSEECM1(-1)	-0.000925	0.001174	-0.788016	0.4307
AUSEDP(-1)	0.000452	0.000509	0.887778	0.3747
AUSEDN(-1)	0.000870	0.000953	0.913339	0.3611
Threshold Variables (nonlinear part)				
C	-0.000358	0.000633	-0.565382	0.5718
D(LNAUDSEK(-1))	-0.020303	0.072977	-0.278203	0.7809
D(LNAUSEIR(-1))	0.021074	0.036516	0.577118	0.5639
D(LNAUDSEK(-2))	1.425503	0.195422	7.294473	0.0000
D(LNAUSEIR(-2))	-0.012510	0.011997	-1.042792	0.2971
D(LNAUDSEK(-3))	-0.130386	0.106855	-1.220209	0.2224
D(LNAUSEIR(-3))	0.885750	0.447812	1.977950	0.0480
AUSEECM1(-1)	-0.015959	0.007833	-2.037542	0.0416
AUSEDP(-1)	-0.002175	0.004068	-0.534602	0.5929
AUSEDN(-1)	0.003798	0.003807	0.997653	0.3185
Slopes				
SLOPE	8.321685	2.882481	2.886987	0.0039
Thresholds				
THRESHOLD	-0.107431	0.022965	-4.678023	0.0000

R-squared	0.031459	Mean dependent var	-1.88E-05
Adjusted R-squared	0.028797	S.D. dependent var	0.005672
S.E. of regression	0.005590	Akaike info criterion	-7.532865
Sum squared resid	0.238753	Schwarz criterion	-7.512929
Log likelihood	28884.17	Hannan-Quinn criter.	-7.526027
F-statistic	11.81842	Durbin-Watson stat	1.973645
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) LNAUSEIR C D(LNAUDSEK(-1)) D(LNAUSEIR(-1)) D(LNAUDSEK(-2)) D(LNAUSEIR(-2)) D(LNAUDSEK(-3)) D(LNAUSEIR(-3)) AUSEECM1(-1) AUSEDP(-1) AUSEDN(-1) @THRESH DAUSE30D

Dependent Variable: LNAUSEIR
Method: Smooth Threshold Regression
Transition function: Exponential

Sample: 1/01/2000 12/31/2020
Threshold variable: DAUSE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.025420	0.004456	5.705151	0.0000
D(LNAUDSEK(-1))	-0.661076	0.988434	-0.668812	0.5036
D(LNAUSEIR(-1))	0.756401	1.088787	0.694719	0.4873
D(LNAUDSEK(-2))	-1.197021	1.121576	-1.067267	0.2859
D(LNAUSEIR(-2))	-0.146004	0.038205	-3.821634	0.0013
D(LNAUDSEK(-3))	1.047190	1.322263	0.791968	0.4284
D(LNAUSEIR(-3))	-1.141117	0.303390	-3.761224	0.0005
AUSEECM1(-1)	0.135590	0.088013	1.540558	0.1235
AUSEDP(-1)	0.010051	0.066190	0.151847	0.8793
AUSEDN(-1)	-0.095384	0.055762	-1.710564	0.0872
Threshold Variables (nonlinear part)				
C	-0.015839	0.004367	-3.62677	0.0003
D(LNAUDSEK(-1))	0.668784	0.996809	0.670925	0.5023
D(LNAUSEIR(-1))	-0.759980	1.093533	-0.694977	0.4871
D(LNAUDSEK(-2))	1.211114	1.129729	1.072039	0.2837
D(LNAUSEIR(-2))	0.157548	0.179751	0.87648	0.3808
D(LNAUDSEK(-3))	-1.066411	0.380776	-2.800627	0.0034
D(LNAUSEIR(-3))	1.158490	1.501051	0.771786	0.4403
AUSEECM1(-1)	-0.378124	0.105980	-3.567893	0.0069
AUSEDP(-1)	-0.010253	0.067141	-0.152706	0.8786
AUSEDN(-1)	0.097178	0.055023	1.766127	0.0774
Slopes				
SLOPE	2.311828	0.898351	2.573411	0.0101
Thresholds				
THRESHOLD	1.353898	0.099620	13.59057	0.0000

R-squared	0.006544	Mean dependent var	0.982810
Adjusted R-squared	0.003814	S.D. dependent var	0.709899
S.E. of regression	0.708544	Akaike info criterion	2.151658
Sum squared resid	3836.049	Schwarz criterion	2.171595
Log likelihood	-8222.079	Hannan-Quinn criter.	2.158497
F-statistic	2.396803	Durbin-Watson stat	0.012029
Prob(F-statistic)	0.000339		

New Zealand-Sweden:

THRESHOLD(TYPE=SMOOTH) D(LNNZDSEK) C D(LNNZDSEK(-1)) D(LNNZSEIR(-1)) D(LNNZDSEK(-2)) D(LNNZSEIR(-2)) D(LNNZDSEK(-3)) D(LNNZSEIR(-3)) NZSEECM1(-1) NZSEDP(-1) NZSEDN(-1) @THRESH DNZSE30D

Dependent Variable: D(LNNZDSEK)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DNZSE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				

C	-6.10E-04	7.66E-04	-0.796302	0.4259
D(LNNZDSEK(-1))	-0.008512	0.012955	-0.657055	0.5112
D(LNNZSEIR(-1))	-0.001293	0.002726	-0.474293	0.6353
D(LNNZDSEK(-2))	-0.014452	0.012385	-1.166867	0.2433
D(LNNZSEIR(-2))	0.004696	0.002957	1.588130	0.1123
D(LNNZDSEK(-3))	-0.010347	0.012283	-0.842396	0.3996
D(LNNZSEIR(-3))	0.000377	0.002465	0.152950	0.8784
NZSEECM1(-1)	-0.001530	0.000762	-2.007465	0.0447
NZSEDP(-1)	0.000208	0.000410	0.508756	0.6109
NZSEDN(-1)	0.002899	0.001098	2.640679	0.0083
Threshold Variables (nonlinear part)				
C	4.97E-04	0.000152	3.263985	0.0018
D(LNNZDSEK(-1))	-0.055389	0.027453	-2.017591	0.0437
D(LNNZSEIR(-1))	0.009747	0.003530	2.761214	0.0782
D(LNNZDSEK(-2))	0.114662	0.031802	3.605467	0.0003
D(LNNZSEIR(-2))	0.001754	0.000749	2.341309	0.0729
D(LNNZDSEK(-3))	-0.048522	0.033212	-1.460994	0.1441
D(LNNZSEIR(-3))	-0.015638	0.009086	-1.721162	0.0853
NZSEECM1(-1)	-0.001949	0.001903	-1.023866	0.3059
NZSEDP(-1)	-0.001135	0.000866	-1.310456	0.1901
NZSEDN(-1)	-0.003295	0.001764	-1.868113	0.0618
Slopes				
SLOPE	13.86116	4.531340	3.058951	0.0000
Thresholds				
THRESHOLD	0.010824	0.003691	2.935582	0.0010

R-squared	0.007156	Mean dependent var	-4.02E-05
Adjusted R-squared	0.004428	S.D. dependent var	0.006002
S.E. of regression	0.005989	Akaike info criterion	-7.395078
Sum squared resid	0.274168	Schwarz criterion	-7.375150
Log likelihood	28371.03	Hannan-Quinn criter.	-7.388242
F-statistic	2.623804	Durbin-Watson stat	2.002279
Prob(F-statistic)	0.000071		

THRESHOLD(TYPE=SMOOTH) LNNZSEIR C D(LNNZDSEK(-1)) D(LNNZSEIR(-1)) D(LNNZDSEK(-2)) D(LNNZSEIR(-2)) D(LNNZDSEK(-3)) D(LNNZSEIR(-3)) NZSEECM1(-1) NZSEDP(-1) NZSEDN(-1) @THRESH DNZSE30D

Dependent Variable: LNNZSEIR
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DNZSE30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.018215	0.008640	117.8453	0.0000
D(LNNZDSEK(-1))	0.246105	1.413293	0.174136	0.8618
D(LNNZSEIR(-1))	0.470200	0.295550	1.590934	0.1117
D(LNNZDSEK(-2))	0.446389	1.418248	0.314747	0.7530
D(LNNZSEIR(-2))	0.612992	0.308998	1.983804	0.0473
D(LNNZDSEK(-3))	0.254799	1.409564	0.180764	0.8566
D(LNNZSEIR(-3))	0.444000	0.292648	1.517180	0.1293
NZSEECM1(-1)	0.006129	0.086184	0.071111	0.9433

NZSEDP(-1)	-0.205079	0.044616	-4.596570	0.0000
NZSEDN(-1)	0.052051	0.108200	0.481065	0.6305
Threshold Variables (nonlinear part)				
C	0.010300	1.403461	0.007339	0.9941
D(LNNZDSEK(-1))	-0.120000	0.033451	-3.587341	0.0025
D(LNNZSEIR(-1))	0.176000	0.045627	3.857339	0.0035
D(LNNZDSEK(-2))	-0.391000	0.078714	-4.967341	0.0003
D(LNNZSEIR(-2))	-0.279000	0.044731	-6.237351	0.0000
D(LNNZDSEK(-3))	-0.138000	0.033436	-4.127342	0.0058
D(LNNZSEIR(-3))	-0.042000	0.006002	-6.997343	0.0000
NZSEECM1(-1)	-0.383000	-0.070961	5.397334	0.0002
NZSEDP(-1)	-0.043500	4.869040	-0.008934	0.2596
NZSEDN(-1)	0.011100	0.002068	5.367734	0.0042
Slopes				
SLOPE	31.05755	11.28986	2.750924	0.0427
Thresholds				
THRESHOLD	2.131533	0.62144	3.430015	0.0072

R-squared	0.005672	Mean dependent var	1.010960
Adjusted R-squared	0.002940	S.D. dependent var	0.740504
S.E. of regression	0.739415	Akaike info criterion	2.236949
Sum squared resid	4179.781	Schwarz criterion	2.256877
Log likelihood	-8553.345	Hannan-Quinn criter.	2.243785
F-statistic	2.076560	Durbin-Watson stat	0.011978
Prob(F-statistic)	0.002682		

US-Euro Area:

THRESHOLD(TYPE=SMOOTH) D(LNUSDEUR) C D(LNUSDEUR(-1)) D(LNUSEUIR(-1)) D(LNUSDEUR(-2)) D(LNUSEUIR(-2)) USEUECM2(-1) USEUDP(-1) USEUDN(-1) @THRESH DUSEU30D

Dependent Variable: D(LNUSDEUR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DUSEU30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.000140	0.000154	0.905011	0.3655
D(LNUSDEUR(-1))	0.072564	0.027778	2.612291	0.0090
D(LNUSEUIR(-1))	-0.009114	0.005866	-1.553600	0.1203
D(LNUSDEUR(-2))	-0.026413	0.031607	-0.835651	0.4034
D(LNUSEUIR(-2))	-0.008360	0.005476	-1.526625	0.1269
USEUECM2(-1)	-0.000337	0.000222	-1.516363	0.1295
USEUDP(-1)	0.002507	0.000941	2.664505	0.0077
USEUDN(-1)	0.004110	0.001645	2.498264	0.0125
Threshold Variables (nonlinear part)				
C	-0.000149	0.000223	-0.667079	0.5047
D(LNUSDEUR(-1))	-0.110310	0.039839	-2.768855	0.0056
D(LNUSEUIR(-1))	0.012443	0.007644	1.627791	0.1036
D(LNUSDEUR(-2))	0.047215	0.045644	1.034409	0.3010
D(LNUSEUIR(-2))	0.010590	0.007633	1.387330	0.1654

USEUECM2(-1)	0.000446	0.000327	1.361543	0.1734
USEUDP(-1)	-0.005569	0.001333	-4.176279	0.0000
USEUDN(-1)	-0.005331	0.002156	-2.472536	0.0134
		Slopes		
SLOPE	34.44399	863.7859	2.102990	0.0399
		Thresholds		
THRESHOLD	-0.001864	0.04108	-1.324135	0.0454

R-squared	0.008337	Mean dependent var	2.57E-05
Adjusted R-squared	0.006133	S.D. dependent var	0.004978
S.E. of regression	0.004962	Akaike info criterion	-7.771488
Sum squared resid	0.188388	Schwarz criterion	-7.755186
Log likelihood	29813.89	Hannan-Quinn criter.	-7.765896
F-statistic	3.783180	Durbin-Watson stat	1.994214
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) D(LNUSEUIR) C D(LNUSDEUR(-1)) D(LNUSEUIR(-1)) D(LNUSDEUR(-2)) D(LNUSEUIR(-2)) USEUECM2(-1) USEUDP(-1) USEUDN(-1) @THRESH DUSEU30D

Dependent Variable: D(LNUSEUIR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DUSEU30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
		Threshold Variables (linear part)		
C	0.000137	0.000229	0.598633	0.5494
D(LNUSDEUR(-1))	0.002184	0.045354	0.048144	0.9616
D(LNUSEUIR(-1))	0.048504	0.011041	4.393011	0.0000
D(LNUSDEUR(-2))	0.076650	0.045389	1.688757	0.0913
D(LNUSEUIR(-2))	-0.103059	0.010559	-9.759874	0.0000
USEUECM2(-1)	-0.000351	0.000351	-0.999219	0.3177
USEUDP(-1)	-9.59E-05	0.001342	-0.071453	0.9430
USEUDN(-1)	-0.024018	0.003618	-6.638986	0.0000
		Threshold Variables (nonlinear part)		
C	-0.476418	0.397966	-1.197134	0.2313
D(LNUSDEUR(-1))	-88.08167	68.54814	-1.284961	0.1988
D(LNUSEUIR(-1))	-1.775489	1.555757	-1.141239	0.2538
D(LNUSDEUR(-2))	-0.628314	0.669422	-0.938591	0.3480
D(LNUSEUIR(-2))	-1.400031	1.130229	-1.238715	0.2155
USEUECM2(-1)	0.208983	0.066783	3.129283	0.0061
USEUDP(-1)	-0.659847	0.603810	-1.092807	0.2745
USEUDN(-1)	1.469555	0.998802	1.471317	0.1412
		Slopes		
SLOPE	26.28246	3144.217	8.358986	0.0000
		Thresholds		
THRESHOLD	0.162205	0.005102	31.79039	0.0000

R-squared	0.188440	Mean dependent var	4.54E-05

Adjusted R-squared	0.186636	S.D. dependent var	0.021873
S.E. of regression	0.019726	Akaike info criterion	-5.011371
Sum squared resid	2.976858	Schwarz criterion	-4.995068
Log likelihood	19231.60	Hannan-Quinn criter.	-5.005779
F-statistic	104.4873	Durbin-Watson stat	1.902851
Prob(F-statistic)	0.000000		

US-Switzerland:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNUSDCHF) C D(LNUSDCHF(-1)) D(LNUSCHIR(-1)) D(LNUSDCHF(-2)) D(LNUSCHIR(-2)) USCHECM1(-1) USCHDP(-1) USCHDN(-1) @THRESH DUSCH30D

Dependent Variable: D(LNUSDCHF)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DUSCH30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	2.77E-05	0.000161	0.172359	0.8632
D(LNUSDCHF(-1))	-0.087250	0.034630	-2.519520	0.0118
D(LNUSCHIR(-1))	0.000632	0.000716	0.882059	0.3778
D(LNUSDCHF(-2))	-0.028526	0.027134	-1.051320	0.2931
D(LNUSCHIR(-2))	0.000138	0.000711	0.194340	0.8459
USCHECM1(-1)	-0.000895	0.000714	-1.253468	0.2101
USCHDP(-1)	0.003414	0.001294	2.638177	0.0084
USCHDN(-1)	0.000208	0.001584	0.131371	0.8955
Threshold Variables (nonlinear part)				
C	9.90E-05	0.000384	0.258107	0.7963
D(LNUSDCHF(-1))	0.243722	0.046118	5.284779	0.0000
D(LNUSCHIR(-1))	-0.000365	0.001394	-0.261857	0.7934
D(LNUSDCHF(-2))	0.088527	0.058442	1.514767	0.1299
D(LNUSCHIR(-2))	-6.76E-05	0.001371	-0.049340	0.9606
USCHECM1(-1)	0.000886	0.001565	0.566142	0.5713
USCHDP(-1)	-0.008391	0.002335	-3.594210	0.0003
USCHDN(-1)	0.004184	0.002498	1.674824	0.0940
Slopes				
SLOPE	12.51957	591.9381	2.115014	0.0212
Thresholds				
THRESHOLD	-0.018740	0.003676	-5.097595	0.0000

R-squared	0.009576	Mean dependent var	7.71E-05
Adjusted R-squared	0.007375	S.D. dependent var	0.005532
S.E. of regression	0.005511	Akaike info criterion	-7.561723
Sum squared resid	0.232356	Schwarz criterion	-7.545421
Log likelihood	29009.65	Hannan-Quinn criter.	-7.556131
F-statistic	4.350916	Durbin-Watson stat	1.992496
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNUSCHIR) C D(LNUSDCHF(-1)) D(LNUSCHIR(-1)) D(LNUSDCHF(-2)) D(LNUSCHIR(-2)) USCHECM2(-1) USCHDP(-1) USCHDN(-1) @THRESH DUSCH30D

Dependent Variable: D(LNUSCHIR)
Method: Smooth Threshold Regression
Transition function: Exponential
Sample: 1/01/2000 12/31/2020
Threshold variable: DUSCH30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-0.001151	0.002985	-0.385631	0.6998
D(LNUSDCHF(-1))	-0.082896	0.615756	-0.134625	0.8929
D(LNUSCHIR(-1))	0.011160	0.039700	0.281098	0.7786
D(LNUSDCHF(-2))	-0.236214	0.451321	-0.523383	0.6007
D(LNUSCHIR(-2))	0.011893	0.029580	0.402059	0.6877
USCHECM2(-1)	-0.032010	0.004167	-7.682043	0.0000
USCHDP(-1)	-0.025361	0.036349	-0.697719	0.4854
USCHDN(-1)	2835.529	69687.42	0.040689	0.9675
Threshold Variables (nonlinear part)				
C	0.000723	0.003809	0.189862	0.8494
D(LNUSDCHF(-1))	0.266586	0.733600	0.363394	0.7163
D(LNUSCHIR(-1))	-0.503840	0.041939	-12.01353	0.0000
D(LNUSDCHF(-2))	0.296020	0.662533	0.446800	0.6550
D(LNUSCHIR(-2))	-0.275532	0.032165	-8.566303	0.0000
USCHECM2(-1)	0.032444	0.005001	6.488015	0.0000
USCHDP(-1)	0.020348	0.039623	0.513548	0.6076
USCHDN(-1)	-2835.554	69687.42	-0.040690	0.9675
Slopes				
SLOPE	0.000023	0.000005	4.553691	0.0000
Thresholds				
THRESHOLD	1.94	0.639972	3.031382	0.0075

R-squared	0.178333	Mean dependent var	9.25E-05
Adjusted R-squared	0.176507	S.D. dependent var	0.175570
S.E. of regression	0.159323	Akaike info criterion	-0.833417
Sum squared resid	194.1871	Schwarz criterion	-0.817115
Log likelihood	3213.321	Hannan-Quinn criter.	-0.827825
F-statistic	97.66730	Durbin-Watson stat	2.014363
Prob(F-statistic)	0.000000		

Euro Area-Switzerland:

THRESHOLD(TYPE=SMOOTH, SMOOTHTRANS=EXPONENTIAL) D(LNEURCHF) C D(LNEURCHF(-1)) D(LNEUCHIR(-1)) EUCHECM2(-1) EUCHDP(-1) EUCHDN(-1) @THRESH DEUCH30D

Dependent Variable: D(LNEURCHF)
Method: Smooth Threshold Regression
Transition function: Exponential

Sample: 1/01/2000 12/31/2020
Threshold variable: DEUCH30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	-4.86E-05	5.21E-05	-0.933142	0.3508
D(LNEURCHF(-1))	-0.003862	0.021984	-0.175687	0.8605
D(LNEUCHIR(-1))	-0.000274	0.000317	-0.863985	0.3876
EUCHECM2(-1)	0.000136	0.000146	0.931907	0.3514
EUCHDP(-1)	-5.71E-05	0.000360	-0.158678	0.8739
EUCHDN(-1)	0.000246	0.000819	0.299995	0.7642
Threshold Variables (nonlinear part)				
C	0.000298	0.000131	2.272239	0.0231
D(LNEURCHF(-1))	0.261740	0.032621	8.023725	0.0000
D(LNEUCHIR(-1))	0.000890	0.000623	1.428099	0.1533
EUCHECM2(-1)	-0.000825	0.000350	-2.359740	0.0183
EUCHDP(-1)	0.001944	0.000841	2.310145	0.0209
EUCHDN(-1)	-1.26E-05	0.001237	-0.010145	0.9919
Slopes				
SLOPE	67.78872	25.473133	2.661185	0.0078
Thresholds				
THRESHOLD	0.003511	0.001106	3.173749	0.0015

R-squared	0.030702	Mean dependent var	5.21E-05
Adjusted R-squared	0.029056	S.D. dependent var	0.003376
S.E. of regression	0.003326	Akaike info criterion	-8.572010
Sum squared resid	0.084704	Schwarz criterion	-8.559332
Log likelihood	32883.37	Hannan-Quinn criter.	-8.567661
F-statistic	18.65132	Durbin-Watson stat	1.997821
Prob(F-statistic)	0.000000		

THRESHOLD(TYPE=SMOOTH) D(LNEUCHIR) C D(LNEURCHF(-1)) D(LNEUCHIR(-1)) EUCHECM2(-1) EUCHDP(-1) EUCHDN(-1) @THRESH DEUCH30D

Dependent Variable: D(LNEUCHIR)
Method: Smooth Threshold Regression
Transition function: Logistic
Sample: 1/01/2000 12/31/2020
Threshold variable: DEUCH30D

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Threshold Variables (linear part)				
C	0.001620	0.001923	0.842280	0.3997
D(LNEURCHF(-1))	0.624130	0.666809	0.935994	0.3493
D(LNEUCHIR(-1))	-0.249803	0.011343	-22.02268	0.0000
EUCHECM2(-1)	-0.076404	0.005333	-14.32793	0.0000
EUCHDP(-1)	-0.009546	0.013693	-0.697113	0.4858
EUCHDN(-1)	-0.017721	0.024527	-0.722511	0.4700
Threshold Variables (nonlinear part)				
C	-0.062710	0.010154	-6.175983	0.0000
D(LNEURCHF(-1))	-0.768034	1.322413	-0.580782	0.5614
D(LNEUCHIR(-1))	-0.199929	0.042866	-4.664034	0.0000

EUCHECM2(-1)	-0.181458	0.026392	-6.875519	0.0000
EUCHDP(-1)	0.177937	0.049563	3.590116	0.0003
EUCHDN(-1)	0.119838	0.113462	1.056199	0.2909
		Slopes		
SLOPE	17.30912	5.748941	3.010836	0.0093
		Thresholds		
THRESHOLD	0.01626	0.004889	3.325919	0.0049

R-squared	0.141929	Mean dependent var	4.71E-05
Adjusted R-squared	0.140472	S.D. dependent var	0.174768
S.E. of regression	0.162029	Akaike info criterion	-0.800259
Sum squared resid	200.9698	Schwarz criterion	-0.787581
Log likelihood	3082.593	Hannan-Quinn criter.	-0.795910
F-statistic	97.39829	Durbin-Watson stat	2.082621
Prob(F-statistic)	0.000000		

Test for Serial Independence

UK-Canada:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.636301	Prob. F(3,7642)	0.5916
Obs*R-squared	1.914668	Prob. Chi-Square(3)	0.5903

UK-Australia:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.082026	Prob. F(3,7638)	0.9698
Obs*R-squared	0.246875	Prob. Chi-Square(3)	0.9697

UK-New Zealand:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 4 lags

F-statistic	0.082026	Prob. F(4,7638)	0.1462
Obs*R-squared	0.246875	Prob. Chi-Square(3)	0.1458

UK-Sweden:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.487745	Prob. F(2,7648)	0.6140
Obs*R-squared	0.977916	Prob. Chi-Square(2)	0.6133

Canada-Australia:

Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.333279	Prob. F(3,7638)	0.5677
Obs*R-squared	0.071945	Prob. Chi-Square(3)	0.5674

Canada-New Zealand:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.087853	Prob. F(3,7642)	0.9876
Obs*R-squared	0.278376	Prob. Chi-Square(3)	0.9874

Canada-Sweden:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 1 lag

F-statistic	0.078721	Prob. F(1,7654)	0.7790
Obs*R-squared	0.078874	Prob. Chi-Square(1)	0.7788

Australia-New Zealand:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.215428	Prob. F(3,7638)	0.7638
Obs*R-squared	0.075734	Prob. Chi-Square(3)	0.7633

Australia-Sweden:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.216490	Prob. F(3,7638)	0.7067
Obs*R-squared	0.065249	Prob. Chi-Square(3)	0.7062

New Zealand-Sweden:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	1.272592	Prob. F(3,7642)	0.2819
Obs*R-squared	3.828353	Prob. Chi-Square(3)	0.2806

US-Euro Area:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.156196	Prob. F(2,7648)	0.3147
Obs*R-squared	2.317739	Prob. Chi-Square(2)	0.3138

US-Switzerland:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.375331	Prob. F(2,7648)	0.9187

Obs*R-squared	0.762346	Prob. Chi-Square(2)	0.9181

Euro Area-Switzerland:

Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 1 lag

F-statistic	0.314117	Prob. F(1,7654)	0.5752
Obs*R-squared	0.314720	Prob. Chi-Square(1)	0.5748

Test for no remaining nonlinearity

UK-Canada:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DUKCA30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests

Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.224051	(40, 7605)	0.1141
H03: b1=b2=b3=0	1.852888	(30, 7615)	0.0000
H02: b1=b2=0	2.093121	(20, 7625)	0.0000
H01: b1=0	1.796932	(10, 7635)	0.0000

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-Australia:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DUKAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests

Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.375465	(35, 7606)	0.1629
H03: b1=b2=b3=0	1.014201	(29, 7612)	0.3450
H02: b1=b2=0	1.387385	(20, 7621)	0.2876
H01: b1=0	1.806609	(10, 7631)	0.0953

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-New Zealand:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DUKNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.005962	(32, 7618)	0.7581
H03: b1=b2=b3=0	1.126940	(24, 7626)	0.6689
H02: b1=b2=0	1.458282	(16, 7634)	0.0923
H01: b1=0	1.273401	(8, 7642)	0.1414

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-Sweden:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DUKSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.473120	(32, 7618)	0.1560
H03: b1=b2=b3=0	1.347171	(24, 7626)	0.2457
H02: b1=b2=0	1.961696	(16, 7634)	0.0905
H01: b1=0	1.563979	(8, 7642)	0.1104

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-Australia:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DCAAU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.655615	(36, 7605)	0.1083
H03: b1=b2=b3=0	1.832685	(29, 7612)	0.0901
H02: b1=b2=0	1.564730	(20, 7621)	0.1075
H01: b1=0	1.571454	(10, 7631)	0.1373

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-New Zealand:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DCANZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	0.708926	(40, 7605)	0.7039
H03: b1=b2=b3=0	0.962142	(30, 7615)	0.9844

H02: b1=b2=0	1.116886	(20, 7625)	0.1189
H01: b1=0	1.477822	(10, 7635)	0.1406

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-Sweden:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DCASE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests

Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	0.616552	(21, 7634)	0.8870
H03: b1=b2=b3=0	1.099770	(16, 7639)	0.2504
H02: b1=b2=0	1.084550	(11, 7644)	0.3169
H01: b1=0	1.058591	(6, 7649)	0.3472

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Australia-New Zealand:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DAUNZ30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests

Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	0.868429	(34, 7607)	0.6959
H03: b1=b2=b3=0	1.215254	(28, 7613)	0.2006
H02: b1=b2=0	1.324951	(19, 7622)	0.1553
H01: b1=0	1.434194	(10, 7631)	0.1582

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Australia-Sweden:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DAUSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests

Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.125310	(34, 7607)	0.4491
H03: b1=b2=b3=0	1.548513	(28, 7613)	0.0859
H02: b1=b2=0	0.708279	(20, 7621)	0.7563
H01: b1=0	0.755162	(10, 7631)	0.7404

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

New Zealand-Sweden:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DNZSE30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests

Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.425977	(32, 7618)	0.0704
H03: b1=b2=b3=0	1.504591	(24, 7626)	0.0955
H02: b1=b2=0	1.030669	(16, 7634)	0.1285
H01: b1=0	1.074253	(8, 7642)	0.1166

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

US-Euro Area:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DUSEU30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.074941	(32, 7618)	0.2530
H03: b1=b2=b3=0	1.740977	(24, 7626)	0.0870
H02: b1=b2=0	1.713209	(16, 7634)	0.0926
H01: b1=0	1.551610	(8, 7642)	0.1339

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

US-Switzerland:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DUSCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.183918	(32, 7618)	0.2895
H03: b1=b2=b3=0	1.286506	(24, 7626)	0.1706
H02: b1=b2=0	0.743622	(16, 7634)	0.4566
H01: b1=0	0.651337	(8, 7642)	0.9812

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Euro Area-Switzerland:

Smooth Threshold Remaining Nonlinearity Tests
Sample: 1/01/2000 12/31/2020
Additive nonlinearity tests using DEUCH30D as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Additive Nonlinearity Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.025739	(23, 7633)	0.2070
H03: b1=b2=b3=0	1.368145	(17, 7639)	0.0814
H02: b1=b2=0	1.004015	(11, 7645)	0.3549
H01: b1=0	1.075058	(5, 7651)	0.1956

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Test for Parameter Constancy

UK-Canada:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.314717	(80, 7565)	0.0531
H03: b1=b2=b3=0	1.284694	(60, 7585)	0.0628
H02: b1=b2=0	1.387341	(40, 7605)	0.0589
H01: b1=0	1.415716	(20, 7625)	0.0504

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-Australia:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.177789	(80, 7565)	0.1800
H03: b1=b2=b3=0	1.898056	(60, 7585)	0.0925
H02: b1=b2=0	1.497780	(40, 7605)	0.1265
H01: b1=0	1.235389	(20, 7625)	0.1689

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-New Zealand:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.069517	(80, 7561)	0.1623
H03: b1=b2=b3=0	1.061012	(60, 7581)	0.2081
H02: b1=b2=0	1.454439	(40, 7601)	0.1015
H01: b1=0	1.172924	(20, 7621)	0.0818

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

UK-Sweden:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.140352	(59, 7591)	0.3158
H03: b1=b2=b3=0	1.591536	(44, 7606)	0.0078
H02: b1=b2=0	1.939764	(29, 7621)	0.0018
H01: b1=0	1.707856	(14, 7636)	0.0968

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-Australia:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.401105	(80, 7561)	0.4600
H03: b1=b2=b3=0	1.520333	(60, 7581)	0.0891
H02: b1=b2=0	1.782542	(40, 7601)	0.0655
H01: b1=0	1.015965	(20, 7621)	0.3068

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-New Zealand:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.347852	(80, 7565)	0.1369
H03: b1=b2=b3=0	1.787742	(60, 7585)	0.0038
H02: b1=b2=0	1.805733	(40, 7605)	0.0014
H01: b1=0	1.156363	(20, 7625)	0.1675

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Canada-Sweden:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	0.709976	(39, 7616)	0.9510
H03: b1=b2=b3=0	1.467680	(29, 7626)	0.1569
H02: b1=b2=0	1.738667	(19, 7636)	0.0601
H01: b1=0	1.651032	(9, 7646)	0.0969

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Australia-New Zealand:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.401203	(48, 7607)	0.0762
H03: b1=b2=b3=0	1.082027	(36, 7619)	0.1458
H02: b1=b2=0	1.378401	(24, 7631)	0.1025
H01: b1=0	1.594458	(12, 7643)	0.0536

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Australia-Sweden:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.036047	(79, 7562)	0.3835
H03: b1=b2=b3=0	1.473964	(60, 7581)	0.0989
H02: b1=b2=0	1.858177	(40, 7601)	0.0085
H01: b1=0	1.968340	(20, 7621)	0.0061

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

New Zealand-Sweden:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.151277	(64, 7577)	0.1590
H03: b1=b2=b3=0	1.663204	(53, 7588)	0.0645
H02: b1=b2=0	1.398889	(39, 7602)	0.0923
H01: b1=0	1.517643	(20, 7621)	0.0704

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

US-Euro Area:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.424131	(58, 7592)	0.1393
H03: b1=b2=b3=0	1.284367	(42, 7608)	0.2014
H02: b1=b2=0	1.193978	(27, 7623)	0.2603
H01: b1=0	1.694117	(13, 7637)	0.0003

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

US-Switzerland:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.478134	(54, 7596)	0.1517
H03: b1=b2=b3=0	1.363786	(40, 7610)	0.2859
H02: b1=b2=0	1.669778	(26, 7624)	0.0923
H01: b1=0	1.278924	(12, 7638)	0.3002

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Euro Area-Switzerland:

Smooth Threshold Parameter Constancy Test
Sample: 1/01/2000 12/31/2020
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4*s^4]

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	1.339578	(7, 7649)	0.2442
H03: b1=b2=b3=0	1.757281	(5, 7651)	0.0913
H02: b1=b2=0	2.157844	(3, 7653)	0.0908
H01: b1=0	0.436747	(1, 7655)	0.5087

The H0i test uses the i-th order Taylor expansion (bj=0 for all j>i).

Chapter 7

Data Sources

Frequency: Monthly
Time Period: January 1993 – December 2020

The interest rate series are obtained from the OECD (Organisation for Economic Co-operation and Development) and are the nominal short term rates, which are the monthly averages of daily three-month money market rates. All nominal exchange rate series are obtained from the Pacific Exchange Rate Service database. The money supply data are obtained from the OECD Broad Money (M3) series for all countries. The data obtained for the output series are volume estimates of real GDP in national currency and are retrieved from the Federal Reserve Bank of St Louis Economic Database. The real exchange rates series are effective CPI-based measures and are obtained from the BIS (Bank for International Settlements) Statistics Warehouse. All variables are transformed to their natural logarithm.

The market-based measure of inflation expectations is derived from the yield curve. Specifically, we take the difference between nominal and inflation-indexed 10-year bond yields (the latter representing real forward interest rates), which is essentially the compensation demanded by investors to offset expected future inflation and any associated risks (Sack, 2000). Low volatility of this measure suggests that the inflation targeting framework has been successful in anchoring long-run inflation expectations. The data for the nominal 10-year government bond yields for all countries are obtained from the Federal Reserve Bank of St Louis Economic Database. The data for the 10-year inflation-indexed government bond yields are obtained from Bloomberg.

The second measure we use is based on quantitative rather than qualitative survey data. More precisely, we compute the monthly 12-months ahead mean inflation forecast. Unlike financial instrument-based measures, survey measures do not necessarily represent expectations on which agents are willing to act but have the advantage of being a more direct estimate of inflation expectations. Data for the survey measure of inflation expectations for inflation targeting countries are obtained from the respective central bank databases. Data for the UK was obtained from the Inflation Attitudes Survey published by the Bank of England; for Canada, the data was obtained from Canadian Survey of Consumer Expectations released by the Bank of Canada; for Australia, we use a survey measure of consumer expectations about increases in final prices for the 12-month ahead period published by the Reserve Bank of Australia; for New Zealand the series comes from the Monetary Conditions Survey published by the Reserve Bank of New Zealand; and for Sweden this series was obtained from the Survey of Inflation Expectations released by the Swedish Riksbank. Survey data for non-targeters (The United States, the Euro-Area and Switzerland) are obtained from the Federal Reserve Bank of St Louis Economic Database Consumer Opinion Survey of Future Tendency of Inflation.

Data Abbreviation	Variable
lnukcarer	Log of GBPCAD Real Exchange Rate
lnukaurer	Log of GBPAUD Real Exchange Rate
lnuknzrer	Log of GBPNZD Real Exchange Rate
lnukserer	Log of GBPSEK Real Exchange Rate
lncaaurer	Log of CADAUD Real Exchange Rate
lncanzrer	Log of CADNZD Real Exchange Rate
lncaserer	Log of CADSEK Real Exchange Rate
lnaunzrer	Log of AUDNZD Real Exchange Rate
lnauserer	Log of AUDSEK Real Exchange Rate
lnnzserer	Log of NZDSEK Real Exchange Rate
lnuseurer	Log of USDEUR Real Exchange Rate
lnuschrer	Log of USDCHF Real Exchange Rate
lneuchrer	Log of EURCHF Real Exchange Rate
lnukcair	Log of UK-Canada Interest Rate Differential
lnukauir	Log of UK-Australia Interest Rate Differential
lnuknzir	Log of UK-New Zealand Interest Rate Differential
lnukseir	Log of UK-Sweden Interest Rate Differential
lncaauir	Log of Canada-Australia Interest Rate Differential
lncanzir	Log of Canada-New Zealand Interest Rate Differential
lncaseir	Log of Canada-Sweden Interest Rate Differential
lnaunzir	Log of Australia-New Zealand Interest Rate Differential
lnauseir	Log of Australia-Sweden Interest Rate Differential
lnnzseir	Log of New Zealand-Sweden Interest Rate Differential
lnuseuir	Log of US-Euro Area Interest Rate Differential
lnuschir	Log of US-Switzerland Interest Rate Differential
lneuchir	Log of Euro Area-Switzerland Interest Rate Differential
lnukcam3	Log of UK-Canada Money Supply M3
lnukaum3	Log of UK-Australia Money Supply M3
lnuknzm3	Log of UK-New Zealand Money Supply M3
lnuksem3	Log of UK-Sweden Money Supply M3
lncaaum3	Log of Canada-Australia Money Supply M3
lncanzm3	Log of Canada-New Zealand Money Supply M3
lncasem3	Log of Canada-Sweden Money Supply M3
lnaunzm3	Log of Australia-New Zealand Money Supply M3
lnausem3	Log of Australia-Sweden Money Supply M3
lnnzsem3	Log of New Zealand-Sweden Money Supply M3
lnuseum3	Log of US-Euro Area Money Supply M3
lnuschm3	Log of US-Switzerland Money Supply M3
lneuchm3	Log of Euro Area-Switzerland Money Supply M3
lnukcagdp	Log of UK-Canada Output
lnukaugdp	Log of UK-Australia Output
lnuknzgdp	Log of UK-New Zealand Output
lnuksegdp	Log of UK-Sweden Output
lncaaugdp	Log of Canada-Australia Output
lncanzgdp	Log of Canada-New Zealand Output
lncasegdp	Log of Canada-Sweden Output
lnaunzgdp	Log of Australia-New Zealand Output
lnausegdp	Log of Australia-Sweden Output

lnnzsegdp	Log of New Zealand-Sweden Output
lnuseugdp	Log of US-Euro Area Output
lnuschgdp	Log of US-Switzerland Output
lneuchgdp	Log of Euro Area-Switzerland Output
lnukcaexp	Log of UK-Canada Market Inflation Expectations
lnukauexp	Log of UK-Australia Market Inflation Expectations
lnuknzexp	Log of UK-New Zealand Market Inflation Expectations
lnukseexp	Log of UK-Sweden Market Inflation Expectations
lncaauexp	Log of Canada-Australia Market Inflation Expectations
lncanzexp	Log of Canada-New Zealand Market Inflation Expectations
lncaseexp	Log of Canada-Sweden Market Inflation Expectations
lnaunzexp	Log of Australia-New Zealand Market Inflation Expectations
lnauseexp	Log of Australia-Sweden Market Inflation Expectations
lnnzseexp	Log of New Zealand-Sweden Market Inflation Expectations
lnuseuexp	Log of US-Euro Area Market Inflation Expectations
lnuschexp	Log of US-Switzerland Market Inflation Expectations
lneuchexp	Log of Euro Area-Switzerland Market Inflation Expectations
lnukcasexp	Log of UK-Canada Survey Inflation Expectations
lnukausexp	Log of UK-Australia Survey Inflation Expectations
lnuknzsexp	Log of UK-New Zealand Survey Inflation Expectations
lnuksesexp	Log of UK-Sweden Survey Inflation Expectations
lncaausexp	Log of Canada-Australia Survey Inflation Expectations
lncanzsexp	Log of Canada-New Zealand Survey Inflation Expectations
lncasesexp	Log of Canada-Sweden Survey Inflation Expectations
lnaunzsexp	Log of Australia-New Zealand Survey Inflation Expectations
lnausesexp	Log of Australia-Sweden Survey Inflation Expectations
lnnzsesexp	Log of New Zealand-Sweden Survey Inflation Expectations
lnuseusexp	Log of US-Euro Area Survey Inflation Expectations
lnuschsexp	Log of US-Switzerland Survey Inflation Expectations
lneuchsexp	Log of Euro Area-Switzerland Survey Inflation Expectations

Software Codes and Outputs

<u>Dickey-Fuller GLS Unit Root Tests:</u>

<u>Real Exchange Rates in levels:</u>

UK-Canada: dfgls lnukcarer

```
DF-GLS test for unit root
Variable: lnukcarer
Lag selection: Schwert criterion         Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau          1%          5%           10%
--------------------------------------------------------------
     16          -1.395      -3.480      -2.814       -2.533
     15          -1.339      -3.480      -2.820       -2.539
     14          -1.321      -3.480      -2.827       -2.545
     13          -1.333      -3.480      -2.833       -2.551
     12          -1.366      -3.480      -2.839       -2.556
     11          -1.348      -3.480      -2.845       -2.562
```

```
    10          -1.276       -3.480       -2.851       -2.567
     9          -1.234       -3.480       -2.857       -2.572
     8          -1.284       -3.480       -2.862       -2.577
     7          -1.405       -3.480       -2.868       -2.582
     6          -1.513       -3.480       -2.873       -2.587
     5          -1.346       -3.480       -2.878       -2.592
     4          -1.335       -3.480       -2.883       -2.596
     3          -1.207       -3.480       -2.888       -2.600
     2          -1.241       -3.480       -2.892       -2.604
     1          -1.267       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 6 with RMSE = .0204641
Min SIC  =   -7.7152 at lag 1 with RMSE = .0207404
Min MAIC = -7.734913 at lag 1 with RMSE = .0207404
```

UK-Australia: dfgls lnukaurer

```
DF-GLS test for unit root
Variable: lnukaurer
Lag selection: Schwert criterion          Maximum lag   =  16

                            -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16          -1.600       -3.480       -2.814       -2.533
    15          -1.595       -3.480       -2.820       -2.539
    14          -1.674       -3.480       -2.827       -2.545
    13          -1.549       -3.480       -2.833       -2.551
    12          -1.623       -3.480       -2.839       -2.556
    11          -1.714       -3.480       -2.845       -2.562
    10          -1.582       -3.480       -2.851       -2.567
     9          -1.645       -3.480       -2.857       -2.572
     8          -1.638       -3.480       -2.862       -2.577
     7          -1.801       -3.480       -2.868       -2.582
     6          -1.748       -3.480       -2.873       -2.587
     5          -1.524       -3.480       -2.878       -2.592
     4          -1.487       -3.480       -2.883       -2.596
     3          -1.474       -3.480       -2.888       -2.600
     2          -1.463       -3.480       -2.892       -2.604
     1          -1.693       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0251061
Min SIC  = -7.293521 at lag 2 with RMSE = .0253781
Min MAIC = -7.321453 at lag 2 with RMSE = .0253781
```

UK-New Zealand: dfgls lnuknzrer

```
DF-GLS test for unit root
Variable: lnuknzrer
Lag selection: Schwert criterion          Maximum lag   =  16

                            -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16          -1.849       -3.480       -2.814       -2.533
    15          -1.871       -3.480       -2.820       -2.539
    14          -2.030       -3.480       -2.827       -2.545
```

13	-2.121	-3.480	-2.833	-2.551
12	-2.087	-3.480	-2.839	-2.556
11	-2.100	-3.480	-2.845	-2.562
10	-2.086	-3.480	-2.851	-2.567
9	-2.136	-3.480	-2.857	-2.572
8	-1.998	-3.480	-2.862	-2.577
7	-1.993	-3.480	-2.868	-2.582
6	-1.947	-3.480	-2.873	-2.587
5	-1.721	-3.480	-2.878	-2.592
4	-1.720	-3.480	-2.883	-2.596
3	-1.848	-3.480	-2.888	-2.600
2	-1.823	-3.480	-2.892	-2.604
1	-1.838	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0222876
Min SIC  = -7.548582 at lag 1 with RMSE = .0225423
Min MAIC = -7.557004 at lag 1 with RMSE = .0225423
```

UK-Sweden: dfgls lnukserer

```
DF-GLS test for unit root
Variable: lnukserer
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value	---------	
[lags]	DF-GLS tau	1%	5%	10%
16	-1.582	-3.480	-2.814	-2.533
15	-1.466	-3.480	-2.820	-2.539
14	-1.595	-3.480	-2.827	-2.545
13	-1.676	-3.480	-2.833	-2.551
12	-1.712	-3.480	-2.839	-2.556
11	-1.730	-3.480	-2.845	-2.562
10	-1.669	-3.480	-2.851	-2.567
9	-1.654	-3.480	-2.857	-2.572
8	-1.727	-3.480	-2.862	-2.577
7	-1.860	-3.480	-2.868	-2.582
6	-1.698	-3.480	-2.873	-2.587
5	-1.529	-3.480	-2.878	-2.592
4	-1.406	-3.480	-2.883	-2.596
3	-1.404	-3.480	-2.888	-2.600
2	-1.412	-3.480	-2.892	-2.604
1	-1.520	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0199546
Min SIC  = -7.761123 at lag 1 with RMSE = .0202696
Min MAIC = -7.776335 at lag 1 with RMSE = .0202696
```

Canada-Australia: dfgls lncaaurer

```
DF-GLS test for unit root
Variable: lncaaurer
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value	---------	
[lags]	DF-GLS tau	1%	5%	10%

16	-1.833	-3.480	-2.814	-2.533
15	-1.891	-3.480	-2.820	-2.539
14	-1.777	-3.480	-2.827	-2.545
13	-1.746	-3.480	-2.833	-2.551
12	-1.873	-3.480	-2.839	-2.556
11	-1.926	-3.480	-2.845	-2.562
10	-1.961	-3.480	-2.851	-2.567
9	-1.968	-3.480	-2.857	-2.572
8	-2.017	-3.480	-2.862	-2.577
7	-2.184	-3.480	-2.868	-2.582
6	-2.249	-3.480	-2.873	-2.587
5	-2.399	-3.480	-2.878	-2.592
4	-2.383	-3.480	-2.883	-2.596
3	-2.617	-3.480	-2.888	-2.600
2	-2.631	-3.480	-2.892	-2.604
1	-3.008	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 2 with RMSE = .0172839
Min SIC = -8.061741 at lag 2 with RMSE = .0172839
Min MAIC = -8.060492 at lag 4 with RMSE = .0172115

Canada-New Zealand: dfgls lncanzrer

DF-GLS test for unit root
Variable: lncanzrer
Lag selection: Schwert criterion   Maximum lag = 16

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
16	-1.754	-3.480	-2.814	-2.533
15	-1.696	-3.480	-2.820	-2.539
14	-1.609	-3.480	-2.827	-2.545
13	-1.753	-3.480	-2.833	-2.551
12	-1.595	-3.480	-2.839	-2.556
11	-1.562	-3.480	-2.845	-2.562
10	-1.626	-3.480	-2.851	-2.567
9	-1.492	-3.480	-2.857	-2.572
8	-1.490	-3.480	-2.862	-2.577
7	-1.423	-3.480	-2.868	-2.582
6	-1.562	-3.480	-2.873	-2.587
5	-1.541	-3.480	-2.878	-2.592
4	-1.619	-3.480	-2.883	-2.596
3	-1.812	-3.480	-2.888	-2.600
2	-1.886	-3.480	-2.892	-2.604
1	-1.879	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 1 with RMSE = .0195866
Min SIC = -7.771603 at lag 1 with RMSE = .0201636
Min MAIC = -7.782198 at lag 4 with RMSE = .0199957

Canada-Sweden: dfgls lncaserer

DF-GLS test for unit root
Variable: lncaserer
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.114	-3.480	-2.814	-2.533
15	-1.172	-3.480	-2.820	-2.539
14	-1.166	-3.480	-2.827	-2.545
13	-1.405	-3.480	-2.833	-2.551
12	-1.462	-3.480	-2.839	-2.556
11	-1.501	-3.480	-2.845	-2.562
10	-1.534	-3.480	-2.851	-2.567
9	-1.429	-3.480	-2.857	-2.572
8	-1.513	-3.480	-2.862	-2.577
7	-1.535	-3.480	-2.868	-2.582
6	-1.575	-3.480	-2.873	-2.587
5	-1.708	-3.480	-2.878	-2.592
4	-1.668	-3.480	-2.883	-2.596
3	-1.670	-3.480	-2.888	-2.600
2	-1.662	-3.480	-2.892	-2.604
1	-1.773	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0160698
Min SIC  = -8.174215 at lag  1 with RMSE =  .016487
Min MAIC = -8.184091 at lag  1 with RMSE =  .016487
```

Australia-New Zealand: dfgls lnaunzrer

```
DF-GLS test for unit root
Variable: lnaunzrer
Lag selection: Schwert criterion           Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.764	-3.480	-2.814	-2.533
15	-1.744	-3.480	-2.820	-2.539
14	-1.599	-3.480	-2.827	-2.545
13	-1.640	-3.480	-2.833	-2.551
12	-1.694	-3.480	-2.839	-2.556
11	-1.861	-3.480	-2.845	-2.562
10	-1.904	-3.480	-2.851	-2.567
9	-1.665	-3.480	-2.857	-2.572
8	-1.673	-3.480	-2.862	-2.577
7	-1.682	-3.480	-2.868	-2.582
6	-1.678	-3.480	-2.873	-2.587
5	-1.686	-3.480	-2.878	-2.592
4	-1.951	-3.480	-2.883	-2.596
3	-2.156	-3.480	-2.888	-2.600
2	-2.334	-3.480	-2.892	-2.604
1	-2.681	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0188119
Min SIC  = -7.839102 at lag  1 with RMSE = .0194945
Min MAIC = -7.874633 at lag  5 with RMSE = .0190096
```

Australia-Sweden: dfgls lnauserer

```
DF-GLS test for unit root
```

```
Variable: lnauserer
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau          1%           5%          10%
--------------------------------------------------------------
     16          -1.688       -3.480       -2.814       -2.533
     15          -1.888       -3.480       -2.820       -2.539
     14          -1.902       -3.480       -2.827       -2.545
     13          -2.138       -3.480       -2.833       -2.551
     12          -2.269       -3.480       -2.839       -2.556
     11          -2.657       -3.480       -2.845       -2.562
     10          -2.582       -3.480       -2.851       -2.567
      9          -2.642       -3.480       -2.857       -2.572
      8          -2.624       -3.480       -2.862       -2.577
      7          -2.821       -3.480       -2.868       -2.582
      6          -2.630       -3.480       -2.873       -2.587
      5          -2.654       -3.480       -2.878       -2.592
      4          -2.698       -3.480       -2.883       -2.596
      3          -2.735       -3.480       -2.888       -2.600
      2          -2.735       -3.480       -2.892       -2.604
      1          -3.385       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng−Perron seq t) = 2 with RMSE = .0190221
Min SIC  = -7.812938 at lag  2 with RMSE = .0195735
Min MAIC = -7.804351 at lag  2 with RMSE = .0195735
```

New Zealand-Sweden: dfgls lnnzserer

```
DF-GLS test for unit root
Variable: lnnzserer
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau          1%           5%          10%
--------------------------------------------------------------
     16          -2.018       -3.480       -2.814       -2.533
     15          -2.021       -3.480       -2.820       -2.539
     14          -2.151       -3.480       -2.827       -2.545
     13          -2.333       -3.480       -2.833       -2.551
     12          -2.360       -3.480       -2.839       -2.556
     11          -2.570       -3.480       -2.845       -2.562
     10          -2.741       -3.480       -2.851       -2.567
      9          -2.727       -3.480       -2.857       -2.572
      8          -2.797       -3.480       -2.862       -2.577
      7          -2.766       -3.480       -2.868       -2.582
      6          -2.661       -3.480       -2.873       -2.587
      5          -2.538       -3.480       -2.878       -2.592
      4          -2.691       -3.480       -2.883       -2.596
      3          -3.026       -3.480       -2.888       -2.600
      2          -2.950       -3.480       -2.892       -2.604
      1          -3.129       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng−Perron seq t) = 4 with RMSE = .0193488
Min SIC  = -7.837019 at lag 1 with RMSE = .0195148
Min MAIC = -7.816847 at lag 5 with RMSE = .0193135
```

US-Euro Area: dfgls lnuseurer

DF-GLS test for unit root
Variable: lnuseurer
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-1.733	-3.480	-2.814	-2.533
15	-1.631	-3.480	-2.820	-2.539
14	-1.600	-3.480	-2.827	-2.545
13	-1.647	-3.480	-2.833	-2.551
12	-1.727	-3.480	-2.839	-2.556
11	-1.768	-3.480	-2.845	-2.562
10	-1.897	-3.480	-2.851	-2.567
9	-1.775	-3.480	-2.857	-2.572
8	-1.845	-3.480	-2.862	-2.577
7	-1.768	-3.480	-2.868	-2.582
6	-1.921	-3.480	-2.873	-2.587
5	-1.842	-3.480	-2.878	-2.592
4	-1.851	-3.480	-2.883	-2.596
3	-1.750	-3.480	-2.888	-2.600
2	-1.702	-3.480	-2.892	-2.604
1	-1.879	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 1 with RMSE = .0241593
Min SIC = -7.401422 at lag 1 with RMSE = .0242635
Min MAIC = -7.415005 at lag 2 with RMSE = .0241593

US-Switzerland: dfgls lnuschrer

DF-GLS test for unit root
Variable: lnuschrer
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.042	-3.480	-2.814	-2.533
15	-1.914	-3.480	-2.820	-2.539
14	-1.842	-3.480	-2.827	-2.545
13	-1.863	-3.480	-2.833	-2.551
12	-1.830	-3.480	-2.839	-2.556
11	-2.014	-3.480	-2.845	-2.562
10	-2.004	-3.480	-2.851	-2.567
9	-1.794	-3.480	-2.857	-2.572
8	-1.800	-3.480	-2.862	-2.577
7	-1.660	-3.480	-2.868	-2.582
6	-1.772	-3.480	-2.873	-2.587
5	-1.686	-3.480	-2.878	-2.592
4	-1.794	-3.480	-2.883	-2.596
3	-1.786	-3.480	-2.888	-2.600
2	-1.818	-3.480	-2.892	-2.604
1	-1.925	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0210296
Min SIC  = -7.652414 at lag  1 with RMSE = .0214018
Min MAIC = -7.658733 at lag  1 with RMSE = .0214018
```

Euro Area-Switzerland: dfgls lneuchrer

```
DF-GLS test for unit root
Variable: lneuchrer
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau          1%            5%            10%
--------------------------------------------------------------
     16          -2.266       -3.480       -2.814       -2.533
     15          -2.139       -3.480       -2.820       -2.539
     14          -2.127       -3.480       -2.827       -2.545
     13          -2.022       -3.480       -2.833       -2.551
     12          -2.107       -3.480       -2.839       -2.556
     11          -2.146       -3.480       -2.845       -2.562
     10          -1.953       -3.480       -2.851       -2.567
      9          -1.996       -3.480       -2.857       -2.572
      8          -2.200       -3.480       -2.862       -2.577
      7          -2.249       -3.480       -2.868       -2.582
      6          -2.060       -3.480       -2.873       -2.587
      5          -2.053       -3.480       -2.878       -2.592
      4          -1.830       -3.480       -2.883       -2.596
      3          -2.018       -3.480       -2.888       -2.600
      2          -1.829       -3.480       -2.892       -2.604
      1          -1.976       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 11 with RMSE = .0159814
Min SIC  = -8.154686 at lag  1 with RMSE = .0166488
Min MAIC = -8.181845 at lag  5 with RMSE = .0162344
```

Real Exchange Rates in first differences:

UK-Canada: dfgls D.lnukcarer

```
DF-GLS test for unit root
Variable: D.lnukcarer
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau          1%            5%            10%
--------------------------------------------------------------
     16          -1.975       -3.480       -2.813       -2.533
     15          -1.977       -3.480       -2.820       -2.539
     14          -1.952       -3.480       -2.827       -2.545
     13          -1.944       -3.480       -2.833       -2.551
     12          -1.956       -3.480       -2.839       -2.556
     11          -1.974       -3.480       -2.845       -2.562
     10          -2.014       -3.480       -2.851       -2.567
      9          -2.116       -3.480       -2.857       -2.572
      8          -2.269       -3.480       -2.863       -2.577
      7          -2.368       -3.480       -2.868       -2.582
      6          -2.395       -3.480       -2.873       -2.587
      5          -2.437       -3.480       -2.878       -2.592
      4          -2.885       -3.480       -2.883       -2.596
```

```
      3          -3.281       -3.480       -2.888       -2.600
      2          -4.306       -3.480       -2.892       -2.604
      1          -5.475       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0210898
Min SIC  = -7.571581 at lag  5 with RMSE = .0214904
Min MAIC = -7.618397 at lag 2 with RMSE = .0210231
```

UK-Australia: dfgls D.lnukaurer

```
DF-GLS test for unit root
Variable: D.lnukaurer
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -1.603       -3.480       -2.813       -2.533
     15          -1.609       -3.480       -2.820       -2.539
     14          -1.626       -3.480       -2.827       -2.545
     13          -1.631       -3.480       -2.833       -2.551
     12          -1.715       -3.480       -2.839       -2.556
     11          -1.740       -3.480       -2.845       -2.562
     10          -1.758       -3.480       -2.851       -2.567
      9          -1.961       -3.480       -2.857       -2.572
      8          -2.042       -3.480       -2.863       -2.577
      7          -2.235       -3.480       -2.868       -2.582
      6          -2.240       -3.480       -2.873       -2.587
      5          -2.512       -3.480       -2.878       -2.592
      4          -3.218       -3.480       -2.883       -2.596
      3          -3.917       -3.480       -2.888       -2.600
      2          -4.955       -3.480       -2.892       -2.604
      1          -6.888       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE = .0256285
Min SIC  = -7.149088 at lag  5 with RMSE = .0265453
Min MAIC =  -7.21582 at lag 3 with RMSE = .0256285
```

UK-New Zealand: dfgls D.lnuknzrer

```
DF-GLS test for unit root
Variable: D.lnuknzrer
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -1.644       -3.480       -2.813       -2.533
     15          -1.711       -3.480       -2.820       -2.539
     14          -1.750       -3.480       -2.827       -2.545
     13          -1.734       -3.480       -2.833       -2.551
     12          -1.744       -3.480       -2.839       -2.556
     11          -1.824       -3.480       -2.845       -2.562
     10          -1.890       -3.480       -2.851       -2.567
      9          -1.983       -3.480       -2.857       -2.572
      8          -2.050       -3.480       -2.863       -2.577
      7          -2.292       -3.480       -2.868       -2.582
```

```
      6          -2.482        -3.480        -2.873        -2.587
      5          -2.785        -3.480        -2.878        -2.592
      4          -3.556        -3.480        -2.883        -2.596
      3          -4.257        -3.480        -2.888        -2.600
      2          -4.881        -3.480        -2.892        -2.604
      1          -6.413        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0231686
Min SIC  = -7.380893 at lag 5 with RMSE = .0236402
Min MAIC = -7.432321 at lag 2 with RMSE = .0231686
```

UK-Sweden: dfgls D.lnukserer

```
DF-GLS test for unit root
Variable: D.lnukserer
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -2.084        -3.480        -2.813        -2.533
     15          -2.097        -3.480        -2.820        -2.539
     14          -2.245        -3.480        -2.827        -2.545
     13          -2.216        -3.480        -2.833        -2.551
     12          -2.233        -3.480        -2.839        -2.556
     11          -2.303        -3.480        -2.845        -2.562
     10          -2.397        -3.480        -2.851        -2.567
      9          -2.597        -3.480        -2.857        -2.572
      8          -2.816        -3.480        -2.863        -2.577
      7          -2.904        -3.480        -2.868        -2.582
      6          -2.919        -3.480        -2.873        -2.587
      5          -3.437        -3.480        -2.878        -2.592
      4          -4.225        -3.480        -2.883        -2.596
      3          -5.367        -3.480        -2.888        -2.600
      2          -6.648        -3.480        -2.892        -2.604
      1          -8.728        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 4 with RMSE = .0202851
Min SIC  = -7.632332 at lag  6 with RMSE = .0206594
Min MAIC =  -7.62321 at lag 4 with RMSE = .0202851
```

Canada-Australia: dfgls D.lncaaurer

```
DF-GLS test for unit root
Variable: D.lncaaurer
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -4.957        -3.480        -2.813        -2.533
     15          -5.446        -3.480        -2.820        -2.539
     14          -5.507        -3.480        -2.827        -2.545
     13          -6.131        -3.480        -2.833        -2.551
     12          -6.624        -3.480        -2.839        -2.556
     11          -6.561        -3.480        -2.845        -2.562
     10          -6.795        -3.480        -2.851        -2.567
```

9	-7.114	-3.480	-2.857	-2.572
8	-7.613	-3.480	-2.863	-2.577
7	-8.126	-3.480	-2.868	-2.582
6	-8.147	-3.480	-2.873	-2.587
5	-8.684	-3.480	-2.878	-2.592
4	-8.974	-3.480	-2.883	-2.596
3	-10.325	-3.480	-2.888	-2.600
2	-10.781	-3.480	-2.892	-2.604
1	-13.277	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 1 with RMSE = .0173762
Min SIC = -8.055816 at lag 1 with RMSE = .0174917
Min MAIC = -6.216564 at lag 1 with RMSE = .0174917

Canada-New Zealand: dfgls D.lncanzrer

DF-GLS test for unit root
Variable: D.lncanzrer
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-3.450	-3.480	-2.813	-2.533
15	-3.637	-3.480	-2.820	-2.539
14	-3.828	-3.480	-2.827	-2.545
13	-4.118	-3.480	-2.833	-2.551
12	-3.984	-3.480	-2.839	-2.556
11	-4.486	-3.480	-2.845	-2.562
10	-4.807	-3.480	-2.851	-2.567
9	-4.882	-3.480	-2.857	-2.572
8	-5.703	-3.480	-2.863	-2.577
7	-6.220	-3.480	-2.868	-2.582
6	-7.319	-3.480	-2.873	-2.587
5	-7.343	-3.480	-2.878	-2.592
4	-8.492	-3.480	-2.883	-2.596
3	-9.318	-3.480	-2.888	-2.600
2	-9.527	-3.480	-2.892	-2.604
1	-10.871	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 1 with RMSE = .0198866
Min SIC = -7.736961 at lag 1 with RMSE = .020515
Min MAIC = -7.032448 at lag 16 with RMSE = .0197187

Canada-Sweden: dfgls D.lncaserer

DF-GLS test for unit root
Variable: D.lncaserer
Lag selection: Schwert criterion   Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-2.199	-3.480	-2.813	-2.533
15	-2.296	-3.480	-2.820	-2.539
14	-2.356	-3.480	-2.827	-2.545
13	-2.466	-3.480	-2.833	-2.551

12	-2.380	-3.480	-2.839	-2.556
11	-2.450	-3.480	-2.845	-2.562
10	-2.560	-3.480	-2.851	-2.567
9	-2.648	-3.480	-2.857	-2.572
8	-2.983	-3.480	-2.863	-2.577
7	-3.128	-3.480	-2.868	-2.582
6	-3.435	-3.480	-2.873	-2.587
5	-3.763	-3.480	-2.878	-2.592
4	-3.982	-3.480	-2.883	-2.596
3	-4.713	-3.480	-2.888	-2.600
2	-5.816	-3.480	-2.892	-2.604
1	-7.772	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 4 with RMSE = .0168669
Min SIC  = -7.990957 at lag  4 with RMSE = .0175838
Min MAIC = -8.002721 at lag 16 with RMSE = .0167979
```

Australia-New Zealand: dfgls D.lnaunzrer

```
DF-GLS test for unit root
Variable: D.lnaunzrer
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.308	-3.480	-2.813	-2.533
15	-3.239	-3.480	-2.820	-2.539
14	-3.427	-3.480	-2.827	-2.545
13	-3.905	-3.480	-2.833	-2.551
12	-4.084	-3.480	-2.839	-2.556
11	-4.255	-3.480	-2.845	-2.562
10	-4.157	-3.480	-2.851	-2.567
9	-4.339	-3.480	-2.857	-2.572
8	-5.436	-3.480	-2.863	-2.577
7	-6.043	-3.480	-2.868	-2.582
6	-6.776	-3.480	-2.873	-2.587
5	-7.831	-3.480	-2.878	-2.592
4	-9.327	-3.480	-2.883	-2.596
3	-9.581	-3.480	-2.888	-2.600
2	-10.457	-3.480	-2.892	-2.604
1	-12.061	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0191181
Min SIC  = -7.800952 at lag  1 with RMSE =  .019869
Min MAIC = -7.028595 at lag 15 with RMSE = .0190978
```

Australia-Sweden: dfgls D.lnauserer

```
DF-GLS test for unit root
Variable: D.lnauserer
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-1.985	-3.480	-2.813	-2.533

```
     15          -2.123       -3.480       -2.820       -2.539
     14          -2.150       -3.480       -2.827       -2.545
     13          -2.323       -3.480       -2.833       -2.551
     12          -2.334       -3.480       -2.839       -2.556
     11          -2.450       -3.480       -2.845       -2.562
     10          -2.349       -3.480       -2.851       -2.567
      9          -2.588       -3.480       -2.857       -2.572
      8          -2.777       -3.480       -2.863       -2.577
      7          -3.139       -3.480       -2.868       -2.582
      6          -3.286       -3.480       -2.873       -2.587
      5          -3.985       -3.480       -2.878       -2.592
      4          -4.617       -3.480       -2.883       -2.596
      3          -5.512       -3.480       -2.888       -2.600
      2          -6.905       -3.480       -2.892       -2.604
      1          -9.633       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 6 with RMSE = .0203816
Min SIC  = -7.615413 at lag  6 with RMSE = .0208349
Min MAIC = -7.615322 at lag 16 with RMSE = .0203081
```

New Zealand-Sweden: dfgls D.lnnzserer

```
DF-GLS test for unit root
Variable: D.lnnzserer
Lag selection: Schwert criterion           Maximum lag   =  16

                            -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -2.697       -3.480       -2.813       -2.533
     15          -2.788       -3.480       -2.820       -2.539
     14          -3.062       -3.480       -2.827       -2.545
     13          -3.146       -3.480       -2.833       -2.551
     12          -3.169       -3.480       -2.839       -2.556
     11          -3.436       -3.480       -2.845       -2.562
     10          -3.442       -3.480       -2.851       -2.567
      9          -3.460       -3.480       -2.857       -2.572
      8          -3.776       -3.480       -2.863       -2.577
      7          -3.995       -3.480       -2.868       -2.582
      6          -4.459       -3.480       -2.873       -2.587
      5          -5.256       -3.480       -2.878       -2.592
      4          -6.450       -3.480       -2.883       -2.596
      3          -7.258       -3.480       -2.888       -2.600
      2          -7.654       -3.480       -2.892       -2.604
      1          -9.839       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .0202727
Min SIC  = -7.706372 at lag  1 with RMSE = .0208312
Min MAIC = -7.496574 at lag 16 with RMSE = .0200183
```

US-Euro Area: dfgls D.lnuseurer

```
DF-GLS test for unit root
Variable: D.lnuseurer
Lag selection: Schwert criterion           Maximum lag   =  16

                            -------- Critical value ---------
```

[lags]	DF-GLS tau	1%	5%	10%
16	-3.403	-3.480	-2.813	-2.533
15	-3.813	-3.480	-2.820	-2.539
14	-4.226	-3.480	-2.827	-2.545
13	-4.530	-3.480	-2.833	-2.551
12	-4.635	-3.480	-2.839	-2.556
11	-4.655	-3.480	-2.845	-2.562
10	-4.789	-3.480	-2.851	-2.567
9	-4.693	-3.480	-2.857	-2.572
8	-5.309	-3.480	-2.863	-2.577
7	-5.422	-3.480	-2.868	-2.582
6	-6.083	-3.480	-2.873	-2.587
5	-6.030	-3.480	-2.878	-2.592
4	-6.834	-3.480	-2.883	-2.596
3	-7.492	-3.480	-2.888	-2.600
2	-9.010	-3.480	-2.892	-2.604
1	-11.101	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 1 with RMSE = .0203927
Min SIC = -7.379419 at lag 1 with RMSE = .0245307
Min MAIC = -6.740218 at lag 16 with RMSE = .0239964

US-Switzerland: dfgls D.lnuschrer

DF-GLS test for unit root
Variable: D.lnuschrer
Lag selection: Schwert criterion   Maximum lag   = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.333	-3.480	-2.813	-2.533
15	-3.490	-3.480	-2.820	-2.539
14	-3.819	-3.480	-2.827	-2.545
13	-4.104	-3.480	-2.833	-2.551
12	-4.221	-3.480	-2.839	-2.556
11	-4.490	-3.480	-2.845	-2.562
10	-4.265	-3.480	-2.851	-2.567
9	-4.468	-3.480	-2.857	-2.572
8	-5.250	-3.480	-2.863	-2.577
7	-5.559	-3.480	-2.868	-2.582
6	-6.573	-3.480	-2.873	-2.587
5	-6.747	-3.480	-2.878	-2.592
4	-7.901	-3.480	-2.883	-2.596
3	-8.369	-3.480	-2.888	-2.600
2	-9.746	-3.480	-2.892	-2.604
1	-11.630	-3.480	-2.897	-2.608

Opt lag (Ng-Perron seq t) = 1 with RMSE = .0213168
Min SIC = -7.624922 at lag 1 with RMSE = .021697
Min MAIC = -6.921379 at lag 16 with RMSE = .0211257

Euro Area-Switzerland: dfgls D.lneuchrer

DF-GLS test for unit root
Variable: D.lneuchrer

Lag selection: Schwert criterion   Maximum lag   = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.774	-3.480	-2.813	-2.533
15	-3.947	-3.480	-2.820	-2.539
14	-4.278	-3.480	-2.827	-2.545
13	-4.418	-3.480	-2.833	-2.551
12	-4.801	-3.480	-2.839	-2.556
11	-4.762	-3.480	-2.845	-2.562
10	-4.833	-3.480	-2.851	-2.567
9	-5.571	-3.480	-2.857	-2.572
8	-5.721	-3.480	-2.863	-2.577
7	-5.389	-3.480	-2.868	-2.582
6	-5.509	-3.480	-2.873	-2.587
5	-6.446	-3.480	-2.878	-2.592
4	-6.933	-3.480	-2.883	-2.596
3	-8.807	-3.480	-2.888	-2.600
2	-8.792	-3.480	-2.892	-2.604
1	-11.887	-3.480	-2.897	-2.608

Opt lag (Ng−Perron seq t) = 6 with RMSE = .0161367
Min SIC = -8.145165 at lag 1 with RMSE = .0167275
Min MAIC = -7.275357 at lag 6 with RMSE = .0163106

Money Supply M3 in levels:

UK-Canada: dfgls lnukcam3

DF-GLS test for unit root
Variable: lnukcam3
Lag selection: Schwert criterion   Maximum lag   = 16

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-1.082	-3.480	-2.814	-2.533
15	-1.043	-3.480	-2.820	-2.539
14	-1.110	-3.480	-2.827	-2.545
13	-0.967	-3.480	-2.833	-2.551
12	-0.984	-3.480	-2.839	-2.556
11	-0.819	-3.480	-2.845	-2.562
10	-0.738	-3.480	-2.851	-2.567
9	-0.578	-3.480	-2.857	-2.572
8	-0.454	-3.480	-2.862	-2.577
7	-0.426	-3.480	-2.868	-2.582
6	-0.372	-3.480	-2.873	-2.587
5	-0.154	-3.480	-2.878	-2.592
4	-0.126	-3.480	-2.883	-2.596
3	0.002	-3.480	-2.888	-2.600
2	0.067	-3.480	-2.892	-2.604
1	0.049	-3.480	-2.896	-2.608

Opt lag (Ng−Perron seq t) = 12 with RMSE = .0078315
Min SIC = -9.602842 at lag 1 with RMSE = .0080709
Min MAIC = -9.632702 at lag 1 with RMSE = .0080709

UK-Australia: dfgls lnukaum3

DF-GLS test for unit root
Variable: lnukaum3
Lag selection: Schwert criterion Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.175	-3.480	-2.814	-2.533
15	-1.262	-3.480	-2.820	-2.539
14	-1.214	-3.480	-2.827	-2.545
13	-1.310	-3.480	-2.833	-2.551
12	-1.163	-3.480	-2.839	-2.556
11	-1.305	-3.480	-2.845	-2.562
10	-1.266	-3.480	-2.851	-2.567
9	-1.363	-3.480	-2.857	-2.572
8	-1.090	-3.480	-2.862	-2.577
7	-1.155	-3.480	-2.868	-2.582
6	-1.014	-3.480	-2.873	-2.587
5	-1.126	-3.480	-2.878	-2.592
4	-0.976	-3.480	-2.883	-2.596
3	-1.110	-3.480	-2.888	-2.600
2	-0.806	-3.480	-2.892	-2.604
1	-1.179	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 3 with RMSE = .0057877
Min SIC = -10.10431 at lag 3 with RMSE = .0061685
Min MAIC = -10.21054 at lag 13 with RMSE = .0057877

UK-New Zealand: dfgls lnuknzm3

DF-GLS test for unit root
Variable: lnuknzm3
Lag selection: Schwert criterion Maximum lag = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-1.446	-3.480	-2.814	-2.533
15	-1.294	-3.480	-2.820	-2.539
14	-1.291	-3.480	-2.827	-2.545
13	-1.237	-3.480	-2.833	-2.551
12	-1.126	-3.480	-2.839	-2.556
11	-1.219	-3.480	-2.845	-2.562
10	-1.057	-3.480	-2.851	-2.567
9	-0.970	-3.480	-2.857	-2.572
8	-0.889	-3.480	-2.862	-2.577
7	-0.922	-3.480	-2.868	-2.582
6	-0.748	-3.480	-2.873	-2.587
5	-0.817	-3.480	-2.878	-2.592
4	-0.652	-3.480	-2.883	-2.596
3	-0.655	-3.480	-2.888	-2.600
2	-0.425	-3.480	-2.892	-2.604
1	-0.809	-3.480	-2.896	-2.608

```
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE = .0080391
Min SIC  = -9.517781 at lag  3 with RMSE = .0082707
Min MAIC = -9.579521 at lag  7 with RMSE =  .008111
```

UK-Sweden: dfgls lnuksem3

```
DF-GLS test for unit root
Variable: lnuksem3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%           10%
---------------------------------------------------------------
     16          -1.352       -3.480       -2.814       -2.533
     15          -1.303       -3.480       -2.820       -2.539
     14          -1.328       -3.480       -2.827       -2.545
     13          -1.242       -3.480       -2.833       -2.551
     12          -1.405       -3.480       -2.839       -2.556
     11          -1.349       -3.480       -2.845       -2.562
     10          -1.355       -3.480       -2.851       -2.567
      9          -1.466       -3.480       -2.857       -2.572
      8          -1.310       -3.480       -2.862       -2.577
      7          -1.131       -3.480       -2.868       -2.582
      6          -1.034       -3.480       -2.873       -2.587
      5          -0.990       -3.480       -2.878       -2.592
      4          -0.855       -3.480       -2.883       -2.596
      3          -0.852       -3.480       -2.888       -2.600
      2          -0.473       -3.480       -2.892       -2.604
      1          -0.917       -3.480       -2.896       -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE = .0105596
Min SIC  = -9.029157 at lag 3 with RMSE = .0105596
Min MAIC = -9.077874 at lag 3 with RMSE = .0105596
```

Canada-Australia: dfgls lncaaum3

```
DF-GLS test for unit root
Variable: lncaaum3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%           10%
---------------------------------------------------------------
     16          -0.668       -3.480       -2.814       -2.533
     15          -0.627       -3.480       -2.820       -2.539
     14          -0.672       -3.480       -2.827       -2.545
     13          -0.731       -3.480       -2.833       -2.551
     12          -0.786       -3.480       -2.839       -2.556
     11          -0.722       -3.480       -2.845       -2.562
     10          -0.909       -3.480       -2.851       -2.567
      9          -0.588       -3.480       -2.857       -2.572
      8          -0.345       -3.480       -2.862       -2.577
      7          -0.196       -3.480       -2.868       -2.582
      6          -0.325       -3.480       -2.873       -2.587
      5          -0.166       -3.480       -2.878       -2.592
      4          -0.211       -3.480       -2.883       -2.596
```

3	0.061	-3.480	-2.888	-2.600
2	0.245	-3.480	-2.892	-2.604
1	0.421	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 10 with RMSE = .0060146
Min SIC  = -10.12158 at lag  1 with RMSE =  .006227
Min MAIC = -10.16188 at lag 11 with RMSE =  .005991
```

Canada-New Zealand: dfgls lncanzm3

```
DF-GLS test for unit root
Variable: lncanzm3
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-0.910	-3.480	-2.814	-2.533
15	-0.811	-3.480	-2.820	-2.539
14	-0.766	-3.480	-2.827	-2.545
13	-0.802	-3.480	-2.833	-2.551
12	-0.805	-3.480	-2.839	-2.556
11	-0.861	-3.480	-2.845	-2.562
10	-0.921	-3.480	-2.851	-2.567
9	-0.737	-3.480	-2.857	-2.572
8	-0.702	-3.480	-2.862	-2.577
7	-0.579	-3.480	-2.868	-2.582
6	-0.597	-3.480	-2.873	-2.587
5	-0.534	-3.480	-2.878	-2.592
4	-0.603	-3.480	-2.883	-2.596
3	-0.616	-3.480	-2.888	-2.600
2	-0.640	-3.480	-2.892	-2.604
1	-0.746	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0073716
Min SIC  =  -9.75364 at lag  1 with RMSE = .0074847
Min MAIC = -9.779986 at lag  1 with RMSE = .0074847
```

Canada-Sweden: dfgls lncasem3

```
DF-GLS test for unit root
Variable: lncasem3
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-1.923	-3.480	-2.814	-2.533
15	-1.941	-3.480	-2.820	-2.539
14	-1.988	-3.480	-2.827	-2.545
13	-1.829	-3.480	-2.833	-2.551
12	-2.042	-3.480	-2.839	-2.556
11	-1.753	-3.480	-2.845	-2.562
10	-1.859	-3.480	-2.851	-2.567
9	-1.887	-3.480	-2.857	-2.572
8	-1.729	-3.480	-2.862	-2.577
7	-1.679	-3.480	-2.868	-2.582

```
       6           -1.661       -3.480       -2.873       -2.587
       5           -1.583       -3.480       -2.878       -2.592
       4           -1.601       -3.480       -2.883       -2.596
       3           -1.505       -3.480       -2.888       -2.600
       2           -1.373       -3.480       -2.892       -2.604
       1           -1.585       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0107521
Min SIC  = -8.951717 at lag  1 with RMSE = .0111766
Min MAIC = -8.980924 at lag  2 with RMSE = .0110782
```

Australia-New Zealand: dfgls lnaunzm3

```
DF-GLS test for unit root
Variable: lnaunzm3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau             1%           5%           10%
------------------------------------------------------------------
     16           -1.644       -3.480       -2.814       -2.533
     15           -1.460       -3.480       -2.820       -2.539
     14           -1.165       -3.480       -2.827       -2.545
     13           -1.072       -3.480       -2.833       -2.551
     12           -1.043       -3.480       -2.839       -2.556
     11           -1.153       -3.480       -2.845       -2.562
     10           -1.167       -3.480       -2.851       -2.567
      9           -1.131       -3.480       -2.857       -2.572
      8           -1.036       -3.480       -2.862       -2.577
      7           -1.066       -3.480       -2.868       -2.582
      6           -1.002       -3.480       -2.873       -2.587
      5           -1.124       -3.480       -2.878       -2.592
      4           -1.030       -3.480       -2.883       -2.596
      3           -0.999       -3.480       -2.888       -2.600
      2           -0.743       -3.480       -2.892       -2.604
      1           -1.078       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE =  .006248
Min SIC  = -10.00715 at lag  3 with RMSE = .0064756
Min MAIC = -10.05419 at lag  3 with RMSE = .0064756
```

Australia-Sweden: dfgls lnausem3

```
DF-GLS test for unit root
Variable: lnausem3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau             1%           5%           10%
------------------------------------------------------------------
     16           -1.916       -3.480       -2.814       -2.533
     15           -1.912       -3.480       -2.820       -2.539
     14           -2.013       -3.480       -2.827       -2.545
     13           -1.853       -3.480       -2.833       -2.551
     12           -2.013       -3.480       -2.839       -2.556
```

```
     11          -1.795       -3.480       -2.845       -2.562
     10          -1.819       -3.480       -2.851       -2.567
      9          -1.808       -3.480       -2.857       -2.572
      8          -1.612       -3.480       -2.862       -2.577
      7          -1.325       -3.480       -2.868       -2.582
      6          -1.137       -3.480       -2.873       -2.587
      5          -1.118       -3.480       -2.878       -2.592
      4          -1.094       -3.480       -2.883       -2.596
      3          -1.197       -3.480       -2.888       -2.600
      2          -0.883       -3.480       -2.892       -2.604
      1          -1.236       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE = .0092751
Min SIC  =  -9.24091 at lag  3 with RMSE = .0094987
Min MAIC = -9.284973 at lag  3 with RMSE = .0094987
```

New Zealand-Sweden: dfgls lnnzsem3

```
DF-GLS test for unit root
Variable: lnnzsem3
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -3.005       -3.480       -2.814       -2.533
     15          -2.733       -3.480       -2.820       -2.539
     14          -2.956       -3.480       -2.827       -2.545
     13          -2.453       -3.480       -2.833       -2.551
     12          -2.686       -3.480       -2.839       -2.556
     11          -2.586       -3.480       -2.845       -2.562
     10          -2.762       -3.480       -2.851       -2.567
      9          -2.645       -3.480       -2.857       -2.572
      8          -2.428       -3.480       -2.862       -2.577
      7          -2.120       -3.480       -2.868       -2.582
      6          -2.097       -3.480       -2.873       -2.587
      5          -2.161       -3.480       -2.878       -2.592
      4          -1.996       -3.480       -2.883       -2.596
      3          -1.807       -3.480       -2.888       -2.600
      2          -1.491       -3.480       -2.892       -2.604
      1          -1.809       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 3 with RMSE = .0098928
Min SIC  = -9.050091 at lag  3 with RMSE = .0104496
Min MAIC = -9.082234 at lag  3 with RMSE = .0104496
```

US-Euro Area: dfgls lnuseum3

```
DF-GLS test for unit root
Variable: lnuseum3
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -0.924       -3.480       -2.814       -2.533
     15          -0.965       -3.480       -2.820       -2.539
```

14	-1.045	-3.480	-2.827	-2.545
13	-1.036	-3.480	-2.833	-2.551
12	-1.159	-3.480	-2.839	-2.556
11	-0.686	-3.480	-2.845	-2.562
10	-0.591	-3.480	-2.851	-2.567
9	-0.555	-3.480	-2.857	-2.572
8	-0.548	-3.480	-2.862	-2.577
7	-0.644	-3.480	-2.868	-2.582
6	-0.672	-3.480	-2.873	-2.587
5	-0.310	-3.480	-2.878	-2.592
4	-0.129	-3.480	-2.883	-2.596
3	-0.115	-3.480	-2.888	-2.600
2	0.014	-3.480	-2.892	-2.604
1	-0.027	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 12 with RMSE = .0061277
Min SIC  = -9.954922 at lag 12 with RMSE = .0061277
Min MAIC = -10.10893 at lag 13 with RMSE = .0061024
```

US-Switzerland: dfgls lnuschm3

```
DF-GLS test for unit root
Variable: lnuschm3
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.025	-3.480	-2.814	-2.533
15	-1.965	-3.480	-2.820	-2.539
14	-1.998	-3.480	-2.827	-2.545
13	-2.024	-3.480	-2.833	-2.551
12	-2.132	-3.480	-2.839	-2.556
11	-2.243	-3.480	-2.845	-2.562
10	-2.191	-3.480	-2.851	-2.567
9	-2.016	-3.480	-2.857	-2.572
8	-1.922	-3.480	-2.862	-2.577
7	-1.796	-3.480	-2.868	-2.582
6	-1.744	-3.480	-2.873	-2.587
5	-1.595	-3.480	-2.878	-2.592
4	-1.304	-3.480	-2.883	-2.596
3	-1.085	-3.480	-2.888	-2.600
2	-0.929	-3.480	-2.892	-2.604
1	-0.794	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0068862
Min SIC  = -9.874478 at lag 1 with RMSE = .0070459
Min MAIC = -9.907945 at lag 5 with RMSE = .0068862
```

Euro Area-Switzerland: dfgls lneuchm3

```
DF-GLS test for unit root
Variable: lneuchm3
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%

```
---------------------------------------------------------------
     16          -2.259        -3.480        -2.814        -2.533
     15          -2.395        -3.480        -2.820        -2.539
     14          -2.614        -3.480        -2.827        -2.545
     13          -2.514        -3.480        -2.833        -2.551
     12          -2.618        -3.480        -2.839        -2.556
     11          -1.782        -3.480        -2.845        -2.562
     10          -1.669        -3.480        -2.851        -2.567
      9          -1.712        -3.480        -2.857        -2.572
      8          -1.738        -3.480        -2.862        -2.577
      7          -1.604        -3.480        -2.868        -2.582
      6          -1.478        -3.480        -2.873        -2.587
      5          -1.197        -3.480        -2.878        -2.592
      4          -1.049        -3.480        -2.883        -2.596
      3          -0.936        -3.480        -2.888        -2.600
      2          -0.778        -3.480        -2.892        -2.604
      1          -0.753        -3.480        -2.896        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 12 with RMSE = .0069957
Min SIC  = -9.689969 at lag 12 with RMSE = .0069957
Min MAIC =  -9.80138 at lag 12 with RMSE = .0069957
```

__Money Supply M3 in first differences:__

UK-Canada: dfgls D.lnukcam3

```
DF-GLS test for unit root
Variable: D.lnukcam3
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
---------------------------------------------------------------
     16          -2.659        -3.480        -2.813        -2.533
     15          -2.470        -3.480        -2.820        -2.539
     14          -2.564        -3.480        -2.827        -2.545
     13          -2.491        -3.480        -2.833        -2.551
     12          -2.750        -3.480        -2.839        -2.556
     11          -2.762        -3.480        -2.845        -2.562
     10          -3.099        -3.480        -2.851        -2.567
      9          -3.334        -3.480        -2.857        -2.572
      8          -3.794        -3.480        -2.863        -2.577
      7          -4.271        -3.480        -2.868        -2.582
      6          -4.525        -3.480        -2.873        -2.587
      5          -4.915        -3.480        -2.878        -2.592
      4          -6.022        -3.480        -2.883        -2.596
      3          -6.622        -3.480        -2.888        -2.600
      2          -7.994        -3.480        -2.892        -2.604
      1          -9.634        -3.480        -2.897        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0078605
Min SIC  = -9.586971 at lag  1 with RMSE = .0081348
Min MAIC = -9.454516 at lag 13 with RMSE = .0078294
```

UK-Australia: dfgls D.lnukaum3

```
DF-GLS test for unit root
Variable: D.lnukaum3
```

```
Lag selection: Schwert criterion          Maximum lag   =  16

                                  -------- Critical value ---------
 [lags]      DF-GLS tau              1%              5%             10%
------------------------------------------------------------------------
     16          -3.084          -3.480          -2.813          -2.533
     15          -3.556          -3.480          -2.820          -2.539
     14          -3.434          -3.480          -2.827          -2.545
     13          -3.669          -3.480          -2.833          -2.551
     12          -3.528          -3.480          -2.839          -2.556
     11          -4.065          -3.480          -2.845          -2.562
     10          -3.798          -3.480          -2.851          -2.567
      9          -4.040          -3.480          -2.857          -2.572
      8          -3.913          -3.480          -2.863          -2.577
      7          -5.055          -3.480          -2.868          -2.582
      6          -5.044          -3.480          -2.873          -2.587
      5          -6.094          -3.480          -2.878          -2.592
      4          -5.915          -3.480          -2.883          -2.596
      3          -7.446          -3.480          -2.888          -2.600
      2          -7.268          -3.480          -2.892          -2.604
      1         -11.638          -3.480          -2.897          -2.608
------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0057693
Min SIC  = -10.10237 at lag  2 with RMSE = .0062301
Min MAIC = -9.874125 at lag 16 with RMSE = .0057693
```

UK-New Zealand: dfgls D.lnuknzm3

```
DF-GLS test for unit root
Variable: D.lnuknzm3
Lag selection: Schwert criterion          Maximum lag   =  16

                                  -------- Critical value ---------
 [lags]      DF-GLS tau              1%              5%             10%
------------------------------------------------------------------------
     16          -2.707          -3.480          -2.813          -2.533
     15          -3.027          -3.480          -2.820          -2.539
     14          -3.343          -3.480          -2.827          -2.545
     13          -3.406          -3.480          -2.833          -2.551
     12          -3.572          -3.480          -2.839          -2.556
     11          -3.880          -3.480          -2.845          -2.562
     10          -3.761          -3.480          -2.851          -2.567
      9          -4.254          -3.480          -2.857          -2.572
      8          -4.629          -3.480          -2.863          -2.577
      7          -5.097          -3.480          -2.868          -2.582
      6          -5.194          -3.480          -2.873          -2.587
      5          -6.299          -3.480          -2.878          -2.592
      4          -6.339          -3.480          -2.883          -2.596
      3          -7.945          -3.480          -2.888          -2.600
      2          -8.851          -3.480          -2.892          -2.604
      1         -13.073          -3.480          -2.897          -2.608
------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0079678
Min SIC  =  -9.53424 at lag  2 with RMSE = .0082768
Min MAIC = -9.225634 at lag 16 with RMSE = .0079678
```

UK-Sweden: dfgls D.lnuksem3

```
DF-GLS test for unit root
Variable: D.lnuksem3
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
--------------------------------------------------------------
     16          -3.402       -3.480        -2.813        -2.533
     15          -3.159       -3.480        -2.820        -2.539
     14          -3.338       -3.480        -2.827        -2.545
     13          -3.395       -3.480        -2.833        -2.551
     12          -3.661       -3.480        -2.839        -2.556
     11          -3.518       -3.480        -2.845        -2.562
     10          -3.740       -3.480        -2.851        -2.567
      9          -3.855       -3.480        -2.857        -2.572
      8          -3.772       -3.480        -2.863        -2.577
      7          -4.183       -3.480        -2.868        -2.582
      6          -4.800       -3.480        -2.873        -2.587
      5          -5.346       -3.480        -2.878        -2.592
      4          -5.851       -3.480        -2.883        -2.596
      3          -6.834       -3.480        -2.888        -2.600
      2          -7.599       -3.480        -2.892        -2.604
      1         -11.442       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0105767
Min SIC  = -9.021272 at lag 2 with RMSE = .0106967
Min MAIC = -8.719655 at lag 8 with RMSE = .0105466
```

Canada-Australia: dfgls D.lncaaum3

```
DF-GLS test for unit root
Variable: D.lncaaum3
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
--------------------------------------------------------------
     16          -3.870       -3.480        -2.813        -2.533
     15          -3.865       -3.480        -2.820        -2.539
     14          -4.027       -3.480        -2.827        -2.545
     13          -4.005       -3.480        -2.833        -2.551
     12          -3.957       -3.480        -2.839        -2.556
     11          -3.907       -3.480        -2.845        -2.562
     10          -4.117       -3.480        -2.851        -2.567
      9          -3.824       -3.480        -2.857        -2.572
      8          -4.563       -3.480        -2.863        -2.577
      7          -5.263       -3.480        -2.868        -2.582
      6          -5.853       -3.480        -2.873        -2.587
      5          -5.780       -3.480        -2.878        -2.592
      4          -6.498       -3.480        -2.883        -2.596
      3          -6.779       -3.480        -2.888        -2.600
      2          -8.315       -3.480        -2.892        -2.604
      1         -10.284       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0059774
```

```
Min SIC  =  -10.1425 at lag  1 with RMSE = .0061619
Min MAIC = -9.673866 at lag  9 with RMSE = .0060066
```

Canada-New Zealand: dfgls D.lncanzm3

```
DF-GLS test for unit root
Variable: D.lncanzm3
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.143	-3.480	-2.813	-2.533
15	-3.268	-3.480	-2.820	-2.539
14	-3.571	-3.480	-2.827	-2.545
13	-3.807	-3.480	-2.833	-2.551
12	-3.856	-3.480	-2.839	-2.556
11	-4.005	-3.480	-2.845	-2.562
10	-4.015	-3.480	-2.851	-2.567
9	-4.025	-3.480	-2.857	-2.572
8	-4.752	-3.480	-2.863	-2.577
7	-5.167	-3.480	-2.868	-2.582
6	-6.036	-3.480	-2.873	-2.587
5	-6.518	-3.480	-2.878	-2.592
4	-7.562	-3.480	-2.883	-2.596
3	-8.232	-3.480	-2.888	-2.600
2	-9.436	-3.480	-2.892	-2.604
1	-11.425	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE =    .00744
Min SIC  = -9.731671 at lag  1 with RMSE =  .007567
Min MAIC = -9.186446 at lag 16 with RMSE = .0073966
```

Canada-Sweden: dfgls D.lncasem3

```
DF-GLS test for unit root
Variable: D.lncasem3
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.830	-3.480	-2.813	-2.533
15	-3.733	-3.480	-2.820	-2.539
14	-3.787	-3.480	-2.827	-2.545
13	-3.785	-3.480	-2.833	-2.551
12	-4.224	-3.480	-2.839	-2.556
11	-3.881	-3.480	-2.845	-2.562
10	-4.668	-3.480	-2.851	-2.567
9	-4.558	-3.480	-2.857	-2.572
8	-4.666	-3.480	-2.863	-2.577
7	-5.316	-3.480	-2.868	-2.582
6	-5.768	-3.480	-2.873	-2.587
5	-6.207	-3.480	-2.878	-2.592
4	-7.026	-3.480	-2.883	-2.596
3	-7.597	-3.480	-2.888	-2.600
2	-9.134	-3.480	-2.892	-2.604

```
      1        -12.257       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0108358
Min SIC  = -8.956435 at lag  1 with RMSE = .0111498
Min MAIC = -8.276498 at lag 11 with RMSE = .0109014
```

Australia-New Zealand: dfgls D.lnaunzm3

```
DF-GLS test for unit root
Variable: D.lnaunzm3
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16         -2.841       -3.480       -2.813       -2.533
     15         -3.109       -3.480       -2.820       -2.539
     14         -3.457       -3.480       -2.827       -2.545
     13         -4.161       -3.480       -2.833       -2.551
     12         -4.542       -3.480       -2.839       -2.556
     11         -4.789       -3.480       -2.845       -2.562
     10         -4.636       -3.480       -2.851       -2.567
      9         -4.759       -3.480       -2.857       -2.572
      8         -5.050       -3.480       -2.863       -2.577
      7         -5.652       -3.480       -2.868       -2.582
      6         -5.866       -3.480       -2.873       -2.587
      5         -6.568       -3.480       -2.878       -2.592
      4         -6.441       -3.480       -2.883       -2.596
      3         -7.480       -3.480       -2.888       -2.600
      2         -8.496       -3.480       -2.892       -2.604
      1        -12.524       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0062782
Min SIC  = -10.01729 at lag  2 with RMSE = .0065009
Min MAIC =  -9.64552 at lag 16 with RMSE = .0062533
```

Australia-Sweden: dfgls D.lnausem3

```
DF-GLS test for unit root
Variable: D.lnausem3
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16         -3.253       -3.480       -2.813       -2.533
     15         -3.277       -3.480       -2.820       -2.539
     14         -3.350       -3.480       -2.827       -2.545
     13         -3.271       -3.480       -2.833       -2.551
     12         -3.575       -3.480       -2.839       -2.556
     11         -3.426       -3.480       -2.845       -2.562
     10         -3.882       -3.480       -2.851       -2.567
      9         -3.939       -3.480       -2.857       -2.572
      8         -4.079       -3.480       -2.863       -2.577
      7         -4.550       -3.480       -2.868       -2.582
      6         -5.426       -3.480       -2.873       -2.587
```

```
      5          -6.348       -3.480       -2.878       -2.592
      4          -6.919       -3.480       -2.883       -2.596
      3          -7.669       -3.480       -2.888       -2.600
      2          -8.073       -3.480       -2.892       -2.604
      1         -11.381       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .0093645
Min SIC  = -9.244308 at lag  2 with RMSE =  .009568
Min MAIC = -8.884731 at lag 11 with RMSE = .0093645
```

New Zealand-Sweden: dfgls D.lnnzsem3

```
DF-GLS test for unit root
Variable: D.lnnzsem3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -3.122       -3.480       -2.813       -2.533
     15          -2.922       -3.480       -2.820       -2.539
     14          -3.242       -3.480       -2.827       -2.545
     13          -3.066       -3.480       -2.833       -2.551
     12          -3.730       -3.480       -2.839       -2.556
     11          -3.507       -3.480       -2.845       -2.562
     10          -3.739       -3.480       -2.851       -2.567
      9          -3.587       -3.480       -2.857       -2.572
      8          -3.838       -3.480       -2.863       -2.577
      7          -4.300       -3.480       -2.868       -2.582
      6          -5.147       -3.480       -2.873       -2.587
      5          -5.505       -3.480       -2.878       -2.592
      4          -5.675       -3.480       -2.883       -2.596
      3          -6.566       -3.480       -2.888       -2.600
      2          -7.994       -3.480       -2.892       -2.604
      1         -11.554       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE =  .010153
Min SIC  = -9.034308 at lag  2 with RMSE = .0106273
Min MAIC = -8.809851 at lag 15 with RMSE = .0100836
```

US-Euro Area: dfgls D.lnuseum3

```
DF-GLS test for unit root
Variable: D.lnuseum3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -2.288       -3.480       -2.813       -2.533
     15          -2.438       -3.480       -2.820       -2.539
     14          -2.372       -3.480       -2.827       -2.545
     13          -2.205       -3.480       -2.833       -2.551
     12          -2.271       -3.480       -2.839       -2.556
     11          -1.990       -3.480       -2.845       -2.562
     10          -3.628       -3.480       -2.851       -2.567
      9          -4.252       -3.480       -2.857       -2.572
```

```
      8          -4.721       -3.480       -2.863       -2.577
      7          -5.078       -3.480       -2.868       -2.582
      6          -4.899       -3.480       -2.873       -2.587
      5          -4.996       -3.480       -2.878       -2.592
      4          -6.420       -3.480       -2.883       -2.596
      3          -7.886       -3.480       -2.888       -2.600
      2          -8.887       -3.480       -2.892       -2.604
      1         -11.289       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0061287
Min SIC  = -9.972096 at lag  1 with RMSE = .0061287
Min MAIC = -9.952936 at lag  1 with RMSE = .0061287
```

US-Switzerland: dfgls D.lnuschm3

```
DF-GLS test for unit root
Variable: D.lnuschm3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -2.203       -3.480       -2.813       -2.533
     15          -2.271       -3.480       -2.820       -2.539
     14          -2.429       -3.480       -2.827       -2.545
     13          -2.459       -3.480       -2.833       -2.551
     12          -2.510       -3.480       -2.839       -2.556
     11          -2.449       -3.480       -2.845       -2.562
     10          -2.375       -3.480       -2.851       -2.567
      9          -2.553       -3.480       -2.857       -2.572
      8          -3.067       -3.480       -2.863       -2.577
      7          -3.491       -3.480       -2.868       -2.582
      6          -3.894       -3.480       -2.873       -2.587
      5          -4.158       -3.480       -2.878       -2.592
      4          -4.649       -3.480       -2.883       -2.596
      3          -5.690       -3.480       -2.888       -2.600
      2          -7.064       -3.480       -2.892       -2.604
      1          -8.950       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  4 with RMSE = .0068944
Min SIC  = -9.833175 at lag  4 with RMSE = .0069997
Min MAIC = -9.771165 at lag 10 with RMSE = .0068897
```

Euro Area-Switzerland: dfgls D.lneuchm3

```
DF-GLS test for unit root
Variable: D.lneuchm3
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -2.265       -3.480       -2.813       -2.533
     15          -2.223       -3.480       -2.820       -2.539
     14          -2.114       -3.480       -2.827       -2.545
     13          -1.949       -3.480       -2.833       -2.551
     12          -2.028       -3.480       -2.839       -2.556
```

```
     11          -1.953        -3.480        -2.845        -2.562
     10          -2.856        -3.480        -2.851        -2.567
      9          -3.096        -3.480        -2.857        -2.572
      8          -3.085        -3.480        -2.863        -2.577
      7          -3.103        -3.480        -2.868        -2.582
      6          -3.437        -3.480        -2.873        -2.587
      5          -3.843        -3.480        -2.878        -2.592
      4          -4.943        -3.480        -2.883        -2.596
      3          -6.019        -3.480        -2.888        -2.600
      2          -7.402        -3.480        -2.892        -2.604
      1         -10.572        -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .0070937
Min SIC  = -9.679671 at lag  1 with RMSE = .0070937
Min MAIC = -9.730946 at lag  1 with RMSE = .0070937
```

<u>Real GDP in levels:</u>

UK-Canada: dfgls lnukcagdp

```
DF-GLS test for unit root
Variable: lnukcagdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
--------------------------------------------------------------
     16          -2.562        -3.480        -2.814        -2.533
     15          -2.602        -3.480        -2.820        -2.539
     14          -2.651        -3.480        -2.827        -2.545
     13          -2.730        -3.480        -2.833        -2.551
     12          -2.837        -3.480        -2.839        -2.556
     11          -3.058        -3.480        -2.845        -2.562
     10          -3.290        -3.480        -2.851        -2.567
      9          -3.339        -3.480        -2.857        -2.572
      8          -3.576        -3.480        -2.862        -2.577
      7          -3.649        -3.480        -2.868        -2.582
      6          -3.943        -3.480        -2.873        -2.587
      5          -4.152        -3.480        -2.878        -2.592
      4          -4.248        -3.480        -2.883        -2.596
      3          -4.801        -3.480        -2.888        -2.600
      2          -5.502        -3.480        -2.892        -2.604
      1          -7.536        -3.480        -2.896        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .1548844
Min SIC  = -3.564814 at lag  2 with RMSE = .1637334
Min MAIC = -3.540949 at lag 16 with RMSE = .1545539
```

UK-Australia: dfgls lnukaugdp

```
DF-GLS test for unit root
Variable: lnukaugdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
--------------------------------------------------------------
     16          -2.601        -3.480        -2.814        -2.533
```

```
     15          -2.717       -3.480       -2.820       -2.539
     14          -2.673       -3.480       -2.827       -2.545
     13          -3.293       -3.480       -2.833       -2.551
     12          -3.312       -3.480       -2.839       -2.556
     11          -3.522       -3.480       -2.845       -2.562
     10          -3.917       -3.480       -2.851       -2.567
      9          -3.752       -3.480       -2.857       -2.572
      8          -3.799       -3.480       -2.862       -2.577
      7          -4.009       -3.480       -2.868       -2.582
      6          -4.299       -3.480       -2.873       -2.587
      5          -4.339       -3.480       -2.878       -2.592
      4          -5.355       -3.480       -2.883       -2.596
      3          -6.036       -3.480       -2.888       -2.600
      2          -6.576       -3.480       -2.892       -2.604
      1          -9.947       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .2019213
Min SIC  = -3.059183 at lag  2 with RMSE = .2108305
Min MAIC = -2.889925 at lag 14 with RMSE = .2019213
```

UK-New Zealand: dfgls lnuknzgdp

```
DF-GLS test for unit root
Variable: lnuknzgdp
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
------------------------------------------------------------------
     16          -2.483       -3.480       -2.814       -2.533
     15          -2.386       -3.480       -2.820       -2.539
     14          -2.526       -3.480       -2.827       -2.545
     13          -2.971       -3.480       -2.833       -2.551
     12          -3.097       -3.480       -2.839       -2.556
     11          -3.157       -3.480       -2.845       -2.562
     10          -3.683       -3.480       -2.851       -2.567
      9          -3.681       -3.480       -2.857       -2.572
      8          -3.709       -3.480       -2.862       -2.577
      7          -4.218       -3.480       -2.868       -2.582
      6          -4.191       -3.480       -2.873       -2.587
      5          -4.103       -3.480       -2.878       -2.592
      4          -4.892       -3.480       -2.883       -2.596
      3          -5.581       -3.480       -2.888       -2.600
      2          -5.743       -3.480       -2.892       -2.604
      1          -9.789       -3.480       -2.896       -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .1221818
Min SIC  = -4.009619 at lag  2 with RMSE = .1310838
Min MAIC = -3.968859 at lag 15 with RMSE = .1221818
```

UK-Sweden: dfgls lnuksegdp

```
DF-GLS test for unit root
Variable: lnuksegdp
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
```

```
 [lags]      DF-GLS tau          1%           5%           10%
--------------------------------------------------------------
     16          -2.436       -3.480       -2.814       -2.533
     15          -2.610       -3.480       -2.820       -2.539
     14          -2.821       -3.480       -2.827       -2.545
     13          -3.434       -3.480       -2.833       -2.551
     12          -3.744       -3.480       -2.839       -2.556
     11          -3.875       -3.480       -2.845       -2.562
     10          -4.093       -3.480       -2.851       -2.567
      9          -4.391       -3.480       -2.857       -2.572
      8          -4.989       -3.480       -2.862       -2.577
      7          -4.957       -3.480       -2.868       -2.582
      6          -5.381       -3.480       -2.873       -2.587
      5          -5.546       -3.480       -2.878       -2.592
      4          -5.569       -3.480       -2.883       -2.596
      3          -6.946       -3.480       -2.888       -2.600
      2          -8.226       -3.480       -2.892       -2.604
      1         -10.740       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .1756489
Min SIC  = -3.329149 at lag  1 with RMSE = .1858813
Min MAIC = -3.154995 at lag 16 with RMSE = .1744853
```

Canada-Australia: dfgls lncaaugdp

```
DF-GLS test for unit root
Variable: lncaaugdp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau          1%           5%           10%
--------------------------------------------------------------
     16          -2.123       -3.480       -2.814       -2.533
     15          -2.228       -3.480       -2.820       -2.539
     14          -2.212       -3.480       -2.827       -2.545
     13          -2.339       -3.480       -2.833       -2.551
     12          -2.379       -3.480       -2.839       -2.556
     11          -2.514       -3.480       -2.845       -2.562
     10          -2.623       -3.480       -2.851       -2.567
      9          -2.632       -3.480       -2.857       -2.572
      8          -2.663       -3.480       -2.862       -2.577
      7          -2.750       -3.480       -2.868       -2.582
      6          -2.998       -3.480       -2.873       -2.587
      5          -3.060       -3.480       -2.878       -2.592
      4          -3.489       -3.480       -2.883       -2.596
      3          -3.831       -3.480       -2.888       -2.600
      2          -4.309       -3.480       -2.892       -2.604
      1          -5.954       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .1962477
Min SIC  = -3.076102 at lag  2 with RMSE = .2090546
Min MAIC = -3.105974 at lag 16 with RMSE = .1962477
```

Canada-New Zealand: dfgls lncanzgdp

```
DF-GLS test for unit root
```

```
Variable: lncanzgdp
Lag selection: Schwert criterion         Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
--------------------------------------------------------------
     16          -2.644       -3.480        -2.814        -2.533
     15          -2.795       -3.480        -2.820        -2.539
     14          -2.724       -3.480        -2.827        -2.545
     13          -3.020       -3.480        -2.833        -2.551
     12          -3.054       -3.480        -2.839        -2.556
     11          -3.048       -3.480        -2.845        -2.562
     10          -3.619       -3.480        -2.851        -2.567
      9          -3.540       -3.480        -2.857        -2.572
      8          -3.508       -3.480        -2.862        -2.577
      7          -4.211       -3.480        -2.868        -2.582
      6          -4.623       -3.480        -2.873        -2.587
      5          -4.469       -3.480        -2.878        -2.592
      4          -5.564       -3.480        -2.883        -2.596
      3          -5.779       -3.480        -2.888        -2.600
      2          -6.089       -3.480        -2.892        -2.604
      1         -11.043       -3.480        -2.896        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .1267301
Min SIC  = -3.932235 at lag  2 with RMSE = .1362551
Min MAIC = -3.858043 at lag 16 with RMSE = .1262448
```

Canada-Sweden: dfgls lncasegdp

```
DF-GLS test for unit root
Variable: lncasegdp
Lag selection: Schwert criterion         Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
--------------------------------------------------------------
     16          -2.568       -3.480        -2.814        -2.533
     15          -2.566       -3.480        -2.820        -2.539
     14          -2.505       -3.480        -2.827        -2.545
     13          -2.523       -3.480        -2.833        -2.551
     12          -2.523       -3.480        -2.839        -2.556
     11          -2.547       -3.480        -2.845        -2.562
     10          -2.575       -3.480        -2.851        -2.567
      9          -2.598       -3.480        -2.857        -2.572
      8          -2.744       -3.480        -2.862        -2.577
      7          -2.752       -3.480        -2.868        -2.582
      6          -2.962       -3.480        -2.873        -2.587
      5          -3.084       -3.480        -2.878        -2.592
      4          -3.337       -3.480        -2.883        -2.596
      3          -3.631       -3.480        -2.888        -2.600
      2          -4.588       -3.480        -2.892        -2.604
      1          -6.227       -3.480        -2.896        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 5 with RMSE = .1671864
Min SIC  = -3.345231 at lag  5 with RMSE = .1778467
```

```
Min MAIC = -3.415793 at lag 15 with RMSE = .1671864
```

Australia-New Zealand: dfgls lnaunzgdp

```
DF-GLS test for unit root
Variable: lnaunzgdp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
---------------------------------------------------------------
     16          -1.945        -3.480        -2.814        -2.533
     15          -1.974        -3.480        -2.820        -2.539
     14          -1.949        -3.480        -2.827        -2.545
     13          -2.156        -3.480        -2.833        -2.551
     12          -2.101        -3.480        -2.839        -2.556
     11          -2.141        -3.480        -2.845        -2.562
     10          -2.343        -3.480        -2.851        -2.567
      9          -2.353        -3.480        -2.857        -2.572
      8          -2.400        -3.480        -2.862        -2.577
      7          -2.692        -3.480        -2.868        -2.582
      6          -2.756        -3.480        -2.873        -2.587
      5          -3.754        -3.480        -2.878        -2.592
      4          -3.648        -3.480        -2.883        -2.596
      3          -3.794        -3.480        -2.888        -2.600
      2          -4.136        -3.480        -2.892        -2.604
      1          -7.887        -3.480        -2.896        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 5 with RMSE = .1620418
Min SIC  =  -3.42316 at lag  5 with RMSE = .1710502
Min MAIC = -3.497381 at lag 14 with RMSE = .1620418
```

Australia-Sweden: dfgls lnausegdp

```
DF-GLS test for unit root
Variable: lnausegdp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
---------------------------------------------------------------
     16          -3.765        -3.480        -2.814        -2.533
     15          -4.043        -3.480        -2.820        -2.539
     14          -4.133        -3.480        -2.827        -2.545
     13          -4.715        -3.480        -2.833        -2.551
     12          -4.422        -3.480        -2.839        -2.556
     11          -4.879        -3.480        -2.845        -2.562
     10          -5.226        -3.480        -2.851        -2.567
      9          -5.334        -3.480        -2.857        -2.572
      8          -5.581        -3.480        -2.862        -2.577
      7          -5.648        -3.480        -2.868        -2.582
      6          -6.242        -3.480        -2.873        -2.587
      5          -6.138        -3.480        -2.878        -2.592
      4          -7.703        -3.480        -2.883        -2.596
      3          -8.346        -3.480        -2.888        -2.600
      2          -9.708        -3.480        -2.892        -2.604
      1         -11.960        -3.480        -2.896        -2.608
```

```
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 1 with RMSE = .2089935
Min SIC  = -3.053371 at lag  1 with RMSE = .2133634
Min MAIC = -1.770466 at lag  5 with RMSE = .2114054
```

New Zealand-Sweden: dfgls lnnzsegdp

```
DF-GLS test for unit root
Variable: lnnzsegdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
-------------------------------------------------------------
     16          -2.091       -3.480        -2.814        -2.533
     15          -2.098       -3.480        -2.820        -2.539
     14          -2.101       -3.480        -2.827        -2.545
     13          -2.190       -3.480        -2.833        -2.551
     12          -2.207       -3.480        -2.839        -2.556
     11          -2.251       -3.480        -2.845        -2.562
     10          -2.442       -3.480        -2.851        -2.567
      9          -2.452       -3.480        -2.857        -2.572
      8          -2.604       -3.480        -2.862        -2.577
      7          -2.747       -3.480        -2.868        -2.582
      6          -2.986       -3.480        -2.873        -2.587
      5          -3.000       -3.480        -2.878        -2.592
      4          -3.733       -3.480        -2.883        -2.596
      3          -4.217       -3.480        -2.888        -2.600
      2          -4.685       -3.480        -2.892        -2.604
      1          -7.960       -3.480        -2.896        -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 5 with RMSE = .1455961
Min SIC  = -3.594774 at lag  5 with RMSE =  .156985
Min MAIC = -3.704841 at lag 14 with RMSE = .1455961
```

US-Euro Area: dfgls lnuseugdp

```
DF-GLS test for unit root
Variable: lnuseugdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
-------------------------------------------------------------
     16          -2.036       -3.480        -2.814        -2.533
     15          -2.191       -3.480        -2.820        -2.539
     14          -2.265       -3.480        -2.827        -2.545
     13          -2.309       -3.480        -2.833        -2.551
     12          -2.253       -3.480        -2.839        -2.556
     11          -2.418       -3.480        -2.845        -2.562
     10          -2.734       -3.480        -2.851        -2.567
      9          -2.943       -3.480        -2.857        -2.572
      8          -3.199       -3.480        -2.862        -2.577
      7          -3.437       -3.480        -2.868        -2.582
      6          -3.635       -3.480        -2.873        -2.587
      5          -4.255       -3.480        -2.878        -2.592
      4          -4.786       -3.480        -2.883        -2.596
```

```
      3          -4.878       -3.480       -2.888       -2.600
      2          -5.891       -3.480       -2.892       -2.604
      1          -7.824       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .1636169
Min SIC  = -3.529606 at lag  2 with RMSE = .1666413
Min MAIC = -3.461454 at lag 12 with RMSE = .1620137
```

US-Switzerland: dfgls lnuschgdp

```
DF-GLS test for unit root
Variable: lnuschgdp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -1.525       -3.480       -2.814       -2.533
     15          -1.558       -3.480       -2.820       -2.539
     14          -1.519       -3.480       -2.827       -2.545
     13          -1.641       -3.480       -2.833       -2.551
     12          -1.595       -3.480       -2.839       -2.556
     11          -1.629       -3.480       -2.845       -2.562
     10          -1.795       -3.480       -2.851       -2.567
      9          -2.070       -3.480       -2.857       -2.572
      8          -2.308       -3.480       -2.862       -2.577
      7          -2.346       -3.480       -2.868       -2.582
      6          -2.510       -3.480       -2.873       -2.587
      5          -2.830       -3.480       -2.878       -2.592
      4          -3.135       -3.480       -2.883       -2.596
      3          -3.634       -3.480       -2.888       -2.600
      2          -4.168       -3.480       -2.892       -2.604
      1          -6.088       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .1670617
Min SIC  =  -3.40246 at lag  2 with RMSE = .1775791
Min MAIC = -3.462523 at lag 11 with RMSE =  .168319
```

Euro Area-Switzerland: dfgls lneuchgdp

```
DF-GLS test for unit root
Variable: lneuchgdp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -2.613       -3.480       -2.814       -2.533
     15          -2.723       -3.480       -2.820       -2.539
     14          -2.762       -3.480       -2.827       -2.545
     13          -2.916       -3.480       -2.833       -2.551
     12          -3.011       -3.480       -2.839       -2.556
     11          -2.908       -3.480       -2.845       -2.562
     10          -3.034       -3.480       -2.851       -2.567
      9          -3.400       -3.480       -2.857       -2.572
      8          -3.727       -3.480       -2.862       -2.577
      7          -4.142       -3.480       -2.868       -2.582
```

```
      6          -4.289        -3.480        -2.873        -2.587
      5          -4.529        -3.480        -2.878        -2.592
      4          -4.818        -3.480        -2.883        -2.596
      3          -5.387        -3.480        -2.888        -2.600
      2          -6.031        -3.480        -2.892        -2.604
      1          -7.917        -3.480        -2.896        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .1316246
Min SIC  = -3.942679 at lag  2 with RMSE = .1355454
Min MAIC = -3.849336 at lag 16 with RMSE = .1300864
```

<u>Real GDP in first differences:</u>

UK-Canada: dfgls D.lnukcagdp

```
DF-GLS test for unit root                  Number of obs = 318
Variable: D.lnukcagdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -2.483        -3.480        -2.813        -2.533
     15          -2.484        -3.480        -2.820        -2.539
     14          -3.281        -3.480        -2.827        -2.545
     13          -3.156        -3.480        -2.833        -2.551
     12          -3.006        -3.480        -2.839        -2.556
     11          -3.868        -3.480        -2.845        -2.562
     10          -4.837        -3.480        -2.851        -2.567
      9          -4.787        -3.480        -2.857        -2.572
      8          -4.678        -3.480        -2.863        -2.577
      7          -4.675        -3.480        -2.868        -2.582
      6          -5.727        -3.480        -2.873        -2.587
      5          -5.856        -3.480        -2.878        -2.592
      4          -6.104        -3.480        -2.883        -2.596
      3          -6.732        -3.480        -2.888        -2.600
      2          -6.816        -3.480        -2.892        -2.604
      1          -6.607        -3.480        -2.897        -2.608
-------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1754703
Min SIC  = -3.236486 at lag  1 with RMSE = .1810754
Min MAIC = -3.323943 at lag  9 with RMSE = .1810754
```

UK-Australia: dfgls D.lnukaugdp

```
DF-GLS test for unit root
Variable: D.lnukaugdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
-------------------------------------------------------------------
     16          -2.771        -3.480        -2.813        -2.533
     15          -2.777        -3.480        -2.820        -2.539
     14          -2.804        -3.480        -2.827        -2.545
     13          -2.950        -3.480        -2.833        -2.551
     12          -2.918        -3.480        -2.839        -2.556
```

```
     11          -3.089       -3.480       -2.845       -2.562
     10          -3.237       -3.480       -2.851       -2.567
      9          -3.315       -3.480       -2.857       -2.572
      8          -3.745       -3.480       -2.863       -2.577
      7          -4.270       -3.480       -2.868       -2.582
      6          -4.915       -3.480       -2.873       -2.587
      5          -4.819       -3.480       -2.878       -2.592
      4          -6.747       -3.480       -2.883       -2.596
      3          -8.142       -3.480       -2.888       -2.600
      2         -11.073       -3.480       -2.892       -2.604
      1         -19.091       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .218646
Min SIC  = -2.772275 at lag  9 with RMSE = .228382
Min MAIC = -2.600178 at lag  1 with RMSE = .218646
```

UK-New Zealand: dfgls D.lnuknzgdp

```
DF-GLS test for unit root
Variable: D.lnuknzgdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -4.832       -3.480       -2.813       -2.533
     15          -4.835       -3.480       -2.820       -2.539
     14          -4.832       -3.480       -2.827       -2.545
     13          -4.882       -3.480       -2.833       -2.551
     12          -4.869       -3.480       -2.839       -2.556
     11          -4.914       -3.480       -2.845       -2.562
     10          -5.023       -3.480       -2.851       -2.567
      9          -7.020       -3.480       -2.857       -2.572
      8          -7.190       -3.480       -2.863       -2.577
      7          -7.520       -3.480       -2.868       -2.582
      6          -7.705       -3.480       -2.873       -2.587
      5          -8.375       -3.480       -2.878       -2.592
      4         -11.709       -3.480       -2.883       -2.596
      3         -15.934       -3.480       -2.888       -2.600
      2         -15.179       -3.480       -2.892       -2.604
      1         -16.962       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1339156
Min SIC  = -3.731176 at lag  1 with RMSE = .1339156
Min MAIC = -3.742503 at lag  1 with RMSE = .1339156
```

UK-Sweden: dfgls D.lnuksegdp

```
DF-GLS test for unit root
Variable: D.lnuksegdp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -1.691       -3.480       -2.813       -2.533
     15          -1.694       -3.480       -2.820       -2.539
```

14	-1.704	-3.480	-2.827	-2.545
13	-1.781	-3.480	-2.833	-2.551
12	-1.780	-3.480	-2.839	-2.556
11	-1.862	-3.480	-2.845	-2.562
10	-2.013	-3.480	-2.851	-2.567
9	-2.208	-3.480	-2.857	-2.572
8	-2.462	-3.480	-2.863	-2.577
7	-2.634	-3.480	-2.868	-2.582
6	-3.223	-3.480	-2.873	-2.587
5	-3.792	-3.480	-2.878	-2.592
4	-4.889	-3.480	-2.883	-2.596
3	-7.315	-3.480	-2.888	-2.600
2	-9.757	-3.480	-2.892	-2.604
1	-15.026	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1985517
Min SIC  = -2.968433 at lag  7 with RMSE = .2108317
Min MAIC = -2.972836 at lag  1 with RMSE = .1985517
```

Canada-Australia: dfgls D.lncaaugdp

```
DF-GLS test for unit root
Variable: D.lncaaugdp
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-1.775	-3.480	-2.813	-2.533
15	-1.742	-3.480	-2.820	-2.539
14	-1.729	-3.480	-2.827	-2.545
13	-1.651	-3.480	-2.833	-2.551
12	-1.653	-3.480	-2.839	-2.556
11	-1.633	-3.480	-2.845	-2.562
10	-1.635	-3.480	-2.851	-2.567
9	-1.640	-3.480	-2.857	-2.572
8	-1.703	-3.480	-2.863	-2.577
7	-1.887	-3.480	-2.868	-2.582
6	-2.201	-3.480	-2.873	-2.587
5	-2.550	-3.480	-2.878	-2.592
4	-3.383	-3.480	-2.883	-2.596
3	-4.246	-3.480	-2.888	-2.600
2	-6.092	-3.480	-2.892	-2.604
1	-10.637	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2158249
Min SIC  =  -2.81292 at lag  9 with RMSE = .2237875
Min MAIC = -2.904767 at lag  1 with RMSE = .2158249
```

Canada-New Zealand: dfgls D.lncanzgdp

```
DF-GLS test for unit root
Variable: D.lncanzgdp
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%

[lags]	DF-GLS tau	1%	5%	10%
16	-2.343	-3.480	-2.813	-2.533
15	-2.358	-3.480	-2.820	-2.539
14	-2.299	-3.480	-2.827	-2.545
13	-2.027	-3.480	-2.833	-2.551
12	-2.026	-3.480	-2.839	-2.556
11	-1.863	-3.480	-2.845	-2.562
10	-1.715	-3.480	-2.851	-2.567
9	-1.726	-3.480	-2.857	-2.572
8	-1.633	-3.480	-2.863	-2.577
7	-1.707	-3.480	-2.868	-2.582
6	-1.767	-3.480	-2.873	-2.587
5	-1.931	-3.480	-2.878	-2.592
4	-2.500	-3.480	-2.883	-2.596
3	-2.879	-3.480	-2.888	-2.600
2	-4.248	-3.480	-2.892	-2.604
1	-9.686	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1405226
Min SIC  = -3.655603 at lag  1 with RMSE = .1429044
Min MAIC = -3.748871 at lag  1 with RMSE = .1405226
```

Canada-Sweden: dfgls D.lncasegdp

```
DF-GLS test for unit root
Variable: D.lncasegdp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-3.167	-3.480	-2.813	-2.533
15	-2.974	-3.480	-2.820	-2.539
14	-2.662	-3.480	-2.827	-2.545
13	-2.674	-3.480	-2.833	-2.551
12	-2.753	-3.480	-2.839	-2.556
11	-2.408	-3.480	-2.845	-2.562
10	-2.259	-3.480	-2.851	-2.567
9	-2.078	-3.480	-2.857	-2.572
8	-1.883	-3.480	-2.863	-2.577
7	-1.858	-3.480	-2.868	-2.582
6	-1.814	-3.480	-2.873	-2.587
5	-1.873	-3.480	-2.878	-2.592
4	-2.048	-3.480	-2.883	-2.596
3	-2.391	-3.480	-2.888	-2.600
2	-3.435	-3.480	-2.892	-2.604
1	-5.493	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1917189
Min SIC  = -3.051145 at lag  1 with RMSE = .1933313
Min MAIC = -3.131946 at lag  1 with RMSE = .1933313
```

Australia-New Zealand: dfgls D.lnaunzgdp

```
DF-GLS test for unit root
Variable: D.lnaunzgdp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1% Critical value	5% Critical value	10% Critical value
16	-5.813	-3.480	-2.813	-2.533
15	-5.784	-3.480	-2.820	-2.539
14	-6.214	-3.480	-2.827	-2.545
13	-7.308	-3.480	-2.833	-2.551
12	-6.374	-3.480	-2.839	-2.556
11	-7.610	-3.480	-2.845	-2.562
10	-8.319	-3.480	-2.851	-2.567
9	-7.525	-3.480	-2.857	-2.572
8	-8.471	-3.480	-2.863	-2.577
7	-9.605	-3.480	-2.868	-2.582
6	-9.490	-3.480	-2.873	-2.587
5	-11.022	-3.480	-2.878	-2.592
4	-14.280	-3.480	-2.883	-2.596
3	-12.977	-3.480	-2.888	-2.600
2	-17.087	-3.480	-2.892	-2.604
1	-30.499	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  4 with RMSE = .1651278
Min SIC  = -3.408528 at lag  4 with RMSE = .1738498
Min MAIC =   20.2515 at lag  1 with RMSE = .1837006
```

Australia-Sweden: dfgls D.lnausegdp

```
DF-GLS test for unit root
Variable: D.lnausegdp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	1% Critical value	5% Critical value	10% Critical value
16	-2.087	-3.480	-2.813	-2.533
15	-2.977	-3.480	-2.820	-2.539
14	-2.884	-3.480	-2.827	-2.545
13	-2.780	-3.480	-2.833	-2.551
12	-2.765	-3.480	-2.839	-2.556
11	-3.735	-3.480	-2.845	-2.562
10	-3.749	-3.480	-2.851	-2.567
9	-3.793	-3.480	-2.857	-2.572
8	-3.902	-3.480	-2.863	-2.577
7	-4.073	-3.480	-2.868	-2.582
6	-4.430	-3.480	-2.873	-2.587
5	-4.835	-3.480	-2.878	-2.592
4	-4.950	-3.480	-2.883	-2.596
3	-7.813	-3.480	-2.888	-2.600
2	-7.102	-3.480	-2.892	-2.604
1	-11.339	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2332647
Min SIC  = -2.652984 at lag  1 with RMSE = .2359182
Min MAIC = -2.723566 at lag  1 with RMSE = .2359182
```

New Zealand-Sweden: dfgls D.lnnzsegdp

```
DF-GLS test for unit root
Variable: D.lnnzsegdp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%            10%
--------------------------------------------------------------
     16          -2.309       -3.480       -2.813       -2.533
     15          -2.366       -3.480       -2.820       -2.539
     14          -2.178       -3.480       -2.827       -2.545
     13          -3.954       -3.480       -2.833       -2.551
     12          -3.013       -3.480       -2.839       -2.556
     11          -4.878       -3.480       -2.845       -2.562
     10          -4.769       -3.480       -2.851       -2.567
      9          -4.774       -3.480       -2.857       -2.572
      8          -5.742       -3.480       -2.863       -2.577
      7          -5.805       -3.480       -2.868       -2.582
      6          -5.978       -3.480       -2.873       -2.587
      5          -7.238       -3.480       -2.878       -2.592
      4          -8.010       -3.480       -2.883       -2.596
      3          -8.560       -3.480       -2.888       -2.600
      2         -10.088       -3.480       -2.892       -2.604
      1         -10.630       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1641093
Min SIC  = -3.328679 at lag  1 with RMSE = .1652597
Min MAIC = -3.412877 at lag  1 with RMSE = .1652597
```

US-Euro Area: dfgls D.lnuseugdp

```
DF-GLS test for unit root
Variable: D.lnuseugdp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%            10%
--------------------------------------------------------------
     16          -2.788       -3.480       -2.813       -2.533
     15          -2.798       -3.480       -2.820       -2.539
     14          -2.826       -3.480       -2.827       -2.545
     13          -2.882       -3.480       -2.833       -2.551
     12          -3.006       -3.480       -2.839       -2.556
     11          -3.235       -3.480       -2.845       -2.562
     10          -3.471       -3.480       -2.851       -2.567
      9          -4.693       -3.480       -2.857       -2.572
      8          -4.007       -3.480       -2.863       -2.577
      7          -4.433       -3.480       -2.868       -2.582
      6          -4.087       -3.480       -2.873       -2.587
      5          -5.172       -3.480       -2.878       -2.592
      4          -6.047       -3.480       -2.883       -2.596
      3          -7.469       -3.480       -2.888       -2.600
      2         -11.204       -3.480       -2.892       -2.604
      1         -16.538       -3.480       -2.897       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1745629
Min SIC  = -3.227745 at lag  1 with RMSE = .1769921
```

```
Min MAIC = -3.095352 at lag  1 with RMSE = .1741872
```

US-Switzerland: dfgls D.lnuschgdp

```
DF-GLS test for unit root
Variable: D.lnuschgdp
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
---------------------------------------------------------------
     16          -2.066        -3.480        -2.813        -2.533
     15          -2.329        -3.480        -2.820        -2.539
     14          -2.493        -3.480        -2.827        -2.545
     13          -2.825        -3.480        -2.833        -2.551
     12          -2.941        -3.480        -2.839        -2.556
     11          -3.462        -3.480        -2.845        -2.562
     10          -4.090        -3.480        -2.851        -2.567
      9          -4.522        -3.480        -2.857        -2.572
      8          -4.707        -3.480        -2.863        -2.577
      7          -5.042        -3.480        -2.868        -2.582
      6          -6.121        -3.480        -2.873        -2.587
      5          -7.375        -3.480        -2.878        -2.592
      4          -8.695        -3.480        -2.883        -2.596
      3         -10.894        -3.480        -2.888        -2.600
      2         -13.698        -3.480        -2.892        -2.604
      1         -20.612        -3.480        -2.897        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1750456
Min SIC  = -3.246202 at lag  1 with RMSE = .1937434
Min MAIC = -2.244194 at lag 16 with RMSE = .1750456
```

Euro Area-Switzerland: dfgls D.lneuchgdp

```
DF-GLS test for unit root
Variable: D.lneuchgdp
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
---------------------------------------------------------------
     16          -2.228        -3.480        -2.813        -2.533
     15          -2.322        -3.480        -2.820        -2.539
     14          -2.460        -3.480        -2.827        -2.545
     13          -2.773        -3.480        -2.833        -2.551
     12          -2.944        -3.480        -2.839        -2.556
     11          -3.268        -3.480        -2.845        -2.562
     10          -4.284        -3.480        -2.851        -2.567
      9          -5.109        -3.480        -2.857        -2.572
      8          -5.433        -3.480        -2.863        -2.577
      7          -5.964        -3.480        -2.868        -2.582
      6          -6.420        -3.480        -2.873        -2.587
      5          -7.615        -3.480        -2.878        -2.592
      4          -9.085        -3.480        -2.883        -2.596
      3         -11.273        -3.480        -2.888        -2.600
      2         -13.941        -3.480        -2.892        -2.604
      1         -19.613        -3.480        -2.897        -2.608
```

```
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1415986
Min SIC  = -3.757815 at lag  1 with RMSE =  .150014
Min MAIC = -2.150886 at lag 16 with RMSE = .1410098
```

Market-based inflation expectations in levels:

UK-Canada: dfgls lnukcaexp

```
DF-GLS test for unit root
Variable: lnukcaexp
Lag selection: Schwert criterion          Maximum lag   =  16

                                    -------- Critical value ---------
 [lags]      DF-GLS tau            1%             5%             10%
------------------------------------------------------------------------------
     16          -2.903       -3.480         -2.814         -2.533
     15          -2.968       -3.480         -2.820         -2.539
     14          -3.130       -3.480         -2.827         -2.545
     13          -3.048       -3.480         -2.833         -2.551
     12          -3.364       -3.480         -2.839         -2.556
     11          -4.007       -3.480         -2.845         -2.562
     10          -3.871       -3.480         -2.851         -2.567
      9          -3.828       -3.480         -2.857         -2.572
      8          -3.670       -3.480         -2.862         -2.577
      7          -3.722       -3.480         -2.868         -2.582
      6          -4.052       -3.480         -2.873         -2.587
      5          -4.007       -3.480         -2.878         -2.592
      4          -4.047       -3.480         -2.883         -2.596
      3          -4.845       -3.480         -2.888         -2.600
      2          -5.208       -3.480         -2.892         -2.604
      1          -4.555       -3.480         -2.896         -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .2386611
Min SIC  = -2.744123 at lag  2 with RMSE = .2468016
Min MAIC = -2.676905 at lag 13 with RMSE = .2377687
```

UK-Australia: dfgls lnukauexp

```
DF-GLS test for unit root
Variable: lnukauexp
Lag selection: Schwert criterion          Maximum lag   =  16

                                    -------- Critical value ---------
 [lags]      DF-GLS tau            1%             5%             10%
------------------------------------------------------------------------------
     16          -2.103       -3.480         -2.814         -2.533
     15          -2.031       -3.480         -2.820         -2.539
     14          -1.642       -3.480         -2.827         -2.545
     13          -1.735       -3.480         -2.833         -2.551
     12          -1.647       -3.480         -2.839         -2.556
     11          -2.055       -3.480         -2.845         -2.562
     10          -1.974       -3.480         -2.851         -2.567
      9          -1.823       -3.480         -2.857         -2.572
      8          -2.062       -3.480         -2.862         -2.577
      7          -2.046       -3.480         -2.868         -2.582
      6          -2.953       -3.480         -2.873         -2.587
```

```
      5          -2.897       -3.480       -2.878       -2.592
      4          -3.907       -3.480       -2.883       -2.596
      3          -3.856       -3.480       -2.888       -2.600
      2          -3.907       -3.480       -2.892       -2.604
      1          -4.277       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .1493423
Min SIC  = -3.614055 at lag  2 with RMSE = .1597513
Min MAIC =  -3.67664 at lag 15 with RMSE = .1493423
```

UK-New Zealand: dfgls lnuknzexp

```
DF-GLS test for unit root
Variable: lnuknzexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -2.173       -3.480       -2.814       -2.533
     15          -2.081       -3.480       -2.820       -2.539
     14          -2.030       -3.480       -2.827       -2.545
     13          -2.186       -3.480       -2.833       -2.551
     12          -3.533       -3.480       -2.839       -2.556
     11          -3.609       -3.480       -2.845       -2.562
     10          -3.533       -3.480       -2.851       -2.567
      9          -3.206       -3.480       -2.857       -2.572
      8          -3.503       -3.480       -2.862       -2.577
      7          -3.479       -3.480       -2.868       -2.582
      6          -3.307       -3.480       -2.873       -2.587
      5          -3.664       -3.480       -2.878       -2.592
      4          -3.457       -3.480       -2.883       -2.596
      3          -3.498       -3.480       -2.888       -2.600
      2          -2.723       -3.480       -2.892       -2.604
      1          -3.011       -3.480       -2.896       -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 12 with RMSE = .1324703
Min SIC  = -3.807848 at lag 12 with RMSE = .1324703
Min MAIC = -3.922497 at lag 14 with RMSE = .1317798
```

UK-Sweden: dfgls lnukseexp

```
DF-GLS test for unit root
Variable: lnukseexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16          -2.493       -3.480       -2.814       -2.533
     15          -2.489       -3.480       -2.820       -2.539
     14          -2.465       -3.480       -2.827       -2.545
     13          -2.677       -3.480       -2.833       -2.551
     12          -2.523       -3.480       -2.839       -2.556
     11          -3.224       -3.480       -2.845       -2.562
     10          -3.131       -3.480       -2.851       -2.567
      9          -2.997       -3.480       -2.857       -2.572
```

8	-2.911	-3.480	-2.862	-2.577
7	-3.032	-3.480	-2.868	-2.582
6	-2.960	-3.480	-2.873	-2.587
5	-2.761	-3.480	-2.878	-2.592
4	-3.116	-3.480	-2.883	-2.596
3	-2.984	-3.480	-2.888	-2.600
2	-2.983	-3.480	-2.892	-2.604
1	-3.413	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1767755
Min SIC  = -3.342438 at lag  1 with RMSE = .1846503
Min MAIC =  -3.32978 at lag 12 with RMSE = .1767755
```

Canada-Australia: dfgls lncaauexp

```
DF-GLS test for unit root
Variable: lncaauexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.455	-3.480	-2.814	-2.533
15	-2.381	-3.480	-2.820	-2.539
14	-2.438	-3.480	-2.827	-2.545
13	-2.364	-3.480	-2.833	-2.551
12	-2.580	-3.480	-2.839	-2.556
11	-3.133	-3.480	-2.845	-2.562
10	-2.936	-3.480	-2.851	-2.567
9	-2.898	-3.480	-2.857	-2.572
8	-2.958	-3.480	-2.862	-2.577
7	-2.932	-3.480	-2.868	-2.582
6	-3.085	-3.480	-2.873	-2.587
5	-3.292	-3.480	-2.878	-2.592
4	-3.317	-3.480	-2.883	-2.596
3	-3.776	-3.480	-2.888	-2.600
2	-4.244	-3.480	-2.892	-2.604
1	-4.249	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2953156
Min SIC  = -2.291329 at lag  1 with RMSE = .3123168
Min MAIC =  -2.30704 at lag 13 with RMSE = .2953156
```

Canada-New Zealand: dfgls lncanzexp

```
DF-GLS test for unit root
Variable: lncanzexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.674	-3.480	-2.814	-2.533
15	-2.844	-3.480	-2.820	-2.539
14	-3.003	-3.480	-2.827	-2.545
13	-2.989	-3.480	-2.833	-2.551
12	-3.396	-3.480	-2.839	-2.556

11	-4.391	-3.480	-2.845	-2.562
10	-4.126	-3.480	-2.851	-2.567
9	-3.848	-3.480	-2.857	-2.572
8	-3.844	-3.480	-2.862	-2.577
7	-3.734	-3.480	-2.868	-2.582
6	-3.915	-3.480	-2.873	-2.587
5	-4.141	-3.480	-2.878	-2.592
4	-4.169	-3.480	-2.883	-2.596
3	-4.567	-3.480	-2.888	-2.600
2	-4.905	-3.480	-2.892	-2.604
1	-4.573	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2771815
Min SIC  = -2.420339 at lag  1 with RMSE = .2928068
Min MAIC = -2.373008 at lag 16 with RMSE = .2765096
```

Canada-Sweden: dfgls lncaseexp

```
DF-GLS test for unit root
Variable: lncaseexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-1.829	-3.480	-2.814	-2.533
15	-1.778	-3.480	-2.820	-2.539
14	-2.018	-3.480	-2.827	-2.545
13	-2.175	-3.480	-2.833	-2.551
12	-2.202	-3.480	-2.839	-2.556
11	-2.833	-3.480	-2.845	-2.562
10	-2.787	-3.480	-2.851	-2.567
9	-2.630	-3.480	-2.857	-2.572
8	-2.845	-3.480	-2.862	-2.577
7	-2.876	-3.480	-2.868	-2.582
6	-2.884	-3.480	-2.873	-2.587
5	-3.120	-3.480	-2.878	-2.592
4	-3.162	-3.480	-2.883	-2.596
3	-3.453	-3.480	-2.888	-2.600
2	-4.178	-3.480	-2.892	-2.604
1	-5.007	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  3 with RMSE = .2439143
Min SIC  = -2.658266 at lag  3 with RMSE = .2553096
Min MAIC = -2.693176 at lag 15 with RMSE = .2439143
```

Australia-New Zealand: dfgls lnaunzexp

```
DF-GLS test for unit root
Variable: lnaunzexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-2.514	-3.480	-2.814	-2.533
15	-2.485	-3.480	-2.820	-2.539

```
     14          -2.673       -3.480       -2.827       -2.545
     13          -2.648       -3.480       -2.833       -2.551
     12          -2.625       -3.480       -2.839       -2.556
     11          -3.343       -3.480       -2.845       -2.562
     10          -3.292       -3.480       -2.851       -2.567
      9          -3.244       -3.480       -2.857       -2.572
      8          -3.018       -3.480       -2.862       -2.577
      7          -2.982       -3.480       -2.868       -2.582
      6          -2.947       -3.480       -2.873       -2.587
      5          -2.967       -3.480       -2.878       -2.592
      4          -2.910       -3.480       -2.883       -2.596
      3          -2.855       -3.480       -2.888       -2.600
      2          -3.130       -3.480       -2.892       -2.604
      1          -3.084       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1615502
Min SIC  = -3.536399 at lag  1 with RMSE = .1675838
Min MAIC = -3.504621 at lag 12 with RMSE = .1615502
```

Australia-Sweden: dfgls lnauseexp

```
DF-GLS test for unit root
Variable: lnauseexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -1.382       -3.480       -2.814       -2.533
     15          -1.390       -3.480       -2.820       -2.539
     14          -1.397       -3.480       -2.827       -2.545
     13          -1.600       -3.480       -2.833       -2.551
     12          -1.550       -3.480       -2.839       -2.556
     11          -2.114       -3.480       -2.845       -2.562
     10          -2.073       -3.480       -2.851       -2.567
      9          -2.036       -3.480       -2.857       -2.572
      8          -2.090       -3.480       -2.862       -2.577
      7          -2.069       -3.480       -2.868       -2.582
      6          -2.216       -3.480       -2.873       -2.587
      5          -2.184       -3.480       -2.878       -2.592
      4          -2.127       -3.480       -2.883       -2.596
      3          -2.250       -3.480       -2.888       -2.600
      2          -2.438       -3.480       -2.892       -2.604
      1          -2.966       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2408221
Min SIC  = -2.705108 at lag  1 with RMSE = .2539477
Min MAIC = -2.743585 at lag 14 with RMSE = .2408221
```

New Zealand-Sweden: dfgls lnnzseexp

```
DF-GLS test for unit root
Variable: lnnzseexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
```

16	-1.678	-3.480	-2.814	-2.533
15	-1.791	-3.480	-2.820	-2.539
14	-1.728	-3.480	-2.827	-2.545
13	-2.096	-3.480	-2.833	-2.551
12	-2.121	-3.480	-2.839	-2.556
11	-3.043	-3.480	-2.845	-2.562
10	-3.087	-3.480	-2.851	-2.567
9	-2.992	-3.480	-2.857	-2.572
8	-3.184	-3.480	-2.862	-2.577
7	-3.096	-3.480	-2.868	-2.582
6	-3.367	-3.480	-2.873	-2.587
5	-3.328	-3.480	-2.878	-2.592
4	-3.187	-3.480	-2.883	-2.596
3	-3.192	-3.480	-2.888	-2.600
2	-3.227	-3.480	-2.892	-2.604
1	-3.368	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2131754
Min SIC  = -2.899701 at lag  1 with RMSE = .2304035
Min MAIC = -2.973752 at lag 14 with RMSE = .2131754
```

US-Euro Area: dfgls lnuseuexp

```
DF-GLS test for unit root
Variable: lnuseuexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	-------- Critical value --------- 1%	5%	10%
16	-1.947	-3.480	-2.814	-2.533
15	-1.917	-3.480	-2.820	-2.539
14	-2.019	-3.480	-2.827	-2.545
13	-1.878	-3.480	-2.833	-2.551
12	-1.806	-3.480	-2.839	-2.556
11	-2.529	-3.480	-2.845	-2.562
10	-2.492	-3.480	-2.851	-2.567
9	-2.705	-3.480	-2.857	-2.572
8	-2.715	-3.480	-2.862	-2.577
7	-2.786	-3.480	-2.868	-2.582
6	-3.025	-3.480	-2.873	-2.587
5	-3.191	-3.480	-2.878	-2.592
4	-3.146	-3.480	-2.883	-2.596
3	-3.326	-3.480	-2.888	-2.600
2	-3.582	-3.480	-2.892	-2.604
1	-3.017	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  2 with RMSE = .1325699
Min SIC  = -3.868024 at lag  2 with RMSE = .1407006
Min MAIC = -3.935456 at lag 12 with RMSE = .1325699
```

US-Switzerland: dfgls lnuschexp

```
DF-GLS test for unit root
Variable: lnuschexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-2.894	-3.480	-2.814	-2.533
15	-2.756	-3.480	-2.820	-2.539
14	-2.797	-3.480	-2.827	-2.545
13	-2.732	-3.480	-2.833	-2.551
12	-2.470	-3.480	-2.839	-2.556
11	-3.267	-3.480	-2.845	-2.562
10	-3.453	-3.480	-2.851	-2.567
9	-3.316	-3.480	-2.857	-2.572
8	-3.245	-3.480	-2.862	-2.577
7	-3.188	-3.480	-2.868	-2.582
6	-3.142	-3.480	-2.873	-2.587
5	-3.197	-3.480	-2.878	-2.592
4	-3.453	-3.480	-2.883	-2.596
3	-3.651	-3.480	-2.888	-2.600
2	-3.883	-3.480	-2.892	-2.604
1	-3.757	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1114755
Min SIC  = -4.248222 at lag  1 with RMSE = .1173982
Min MAIC = -4.239128 at lag 12 with RMSE = .1122088
```

Euro Area-Switzerland: dfgls lneuchexp

```
DF-GLS test for unit root
Variable: lneuchexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-3.243	-3.480	-2.814	-2.533
15	-3.204	-3.480	-2.820	-2.539
14	-3.313	-3.480	-2.827	-2.545
13	-2.961	-3.480	-2.833	-2.551
12	-2.770	-3.480	-2.839	-2.556
11	-3.963	-3.480	-2.845	-2.562
10	-3.580	-3.480	-2.851	-2.567
9	-3.786	-3.480	-2.857	-2.572
8	-4.086	-3.480	-2.862	-2.577
7	-4.407	-3.480	-2.868	-2.582
6	-4.507	-3.480	-2.873	-2.587
5	-4.156	-3.480	-2.878	-2.592
4	-4.222	-3.480	-2.883	-2.596
3	-4.347	-3.480	-2.888	-2.600
2	-4.185	-3.480	-2.892	-2.604
1	-3.451	-3.480	-2.896	-2.608

```
Opt lag (Ng-Perron seq t) =  2 with RMSE = .1459676
Min SIC  = -3.622294 at lag  2 with RMSE = .1590946
Min MAIC = -3.656166 at lag 12 with RMSE = .1476859
```

Market-based inflation expectations in first differences:

UK-Canada: dfgls D.lnukcaexp

```
DF-GLS test for unit root
Variable: D.lnukcaexp
Lag selection: Schwert criterion          Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------
     16          -4.101        -3.480        -2.813        -2.533
     15          -4.604        -3.480        -2.820        -2.539
     14          -4.898        -3.480        -2.827        -2.545
     13          -5.064        -3.480        -2.833        -2.551
     12          -5.701        -3.480        -2.839        -2.556
     11          -5.680        -3.480        -2.845        -2.562
     10          -5.153        -3.480        -2.851        -2.567
      9          -5.651        -3.480        -2.857        -2.572
      8          -6.140        -3.480        -2.863        -2.577
      7          -7.027        -3.480        -2.868        -2.582
      6          -7.793        -3.480        -2.873        -2.587
      5          -8.016        -3.480        -2.878        -2.592
      4          -9.242        -3.480        -2.883        -2.596
      3         -10.979        -3.480        -2.888        -2.600
      2         -10.761        -3.480        -2.892        -2.604
      1         -11.842        -3.480        -2.897        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2477305
Min SIC  = -2.660122 at lag  3 with RMSE = .2550488
Min MAIC = -.5508212 at lag  1 with RMSE = .2601386
```

UK-Australia: dfgls D.lnukauexp

```
DF-GLS test for unit root
Variable: D.lnukauexp
Lag selection: Schwert criterion          Maximum lag   =  16

                                 -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%           10%
------------------------------------------------------------------
     16          -3.946        -3.480        -2.813        -2.533
     15          -4.122        -3.480        -2.820        -2.539
     14          -4.349        -3.480        -2.827        -2.545
     13          -5.420        -3.480        -2.833        -2.551
     12          -5.370        -3.480        -2.839        -2.556
     11          -5.998        -3.480        -2.845        -2.562
     10          -4.912        -3.480        -2.851        -2.567
      9          -5.383        -3.480        -2.857        -2.572
      8          -6.266        -3.480        -2.863        -2.577
      7          -5.732        -3.480        -2.868        -2.582
      6          -6.153        -3.480        -2.873        -2.587
      5          -7.055        -3.480        -2.878        -2.592
      4          -8.148        -3.480        -2.883        -2.596
      3          -9.387        -3.480        -2.888        -2.600
      2         -11.711        -3.480        -2.892        -2.604
      1         -14.935        -3.480        -2.897        -2.608
------------------------------------------------------------------
```

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1507463
Min SIC  =  -3.61387 at lag  1 with RMSE = .1612088
Min MAIC = -1.347558 at lag 16 with RMSE = .1505879
```

UK-New Zealand: dfgls D.lnuknzexp

```
DF-GLS test for unit root
Variable: D.lnuknzexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-4.797	-3.480	-2.813	-2.533
15	-5.284	-3.480	-2.820	-2.539
14	-5.990	-3.480	-2.827	-2.545
13	-6.795	-3.480	-2.833	-2.551
12	-7.004	-3.480	-2.839	-2.556
11	-7.074	-3.480	-2.845	-2.562
10	-4.934	-3.480	-2.851	-2.567
9	-5.233	-3.480	-2.857	-2.572
8	-6.084	-3.480	-2.863	-2.577
7	-5.878	-3.480	-2.868	-2.582
6	-6.262	-3.480	-2.873	-2.587
5	-7.078	-3.480	-2.878	-2.592
4	-6.817	-3.480	-2.883	-2.596
3	-7.839	-3.480	-2.888	-2.600
2	-8.569	-3.480	-2.892	-2.604
1	-13.957	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  4 with RMSE = .1356947
Min SIC  =  -3.77726 at lag 11 with RMSE = .1356947
Min MAIC = -2.342233 at lag  4 with RMSE = .1488685
```

UK-Sweden: dfgls D.lnukseexp

```
DF-GLS test for unit root
Variable: D.lnukseexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	5%	10%
16	-5.257	-3.480	-2.813	-2.533
15	-5.390	-3.480	-2.820	-2.539
14	-5.644	-3.480	-2.827	-2.545
13	-5.992	-3.480	-2.833	-2.551
12	-5.812	-3.480	-2.839	-2.556
11	-6.496	-3.480	-2.845	-2.562
10	-5.381	-3.480	-2.851	-2.567
9	-5.746	-3.480	-2.857	-2.572
8	-6.300	-3.480	-2.863	-2.577
7	-6.888	-3.480	-2.868	-2.582
6	-7.062	-3.480	-2.873	-2.587
5	-7.804	-3.480	-2.878	-2.592
4	-9.326	-3.480	-2.883	-2.596
3	-9.328	-3.480	-2.888	-2.600

```
      2         -11.440       -3.480        -2.892        -2.604
      1         -14.683       -3.480        -2.897        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1790811
Min SIC  = -3.324154 at lag  1 with RMSE = .1863373
Min MAIC = -.6481096 at lag  3 with RMSE = .1862516
```

Canada-Australia: dfgls D.lncaauexp

```
DF-GLS test for unit root
Variable: D.lncaauexp
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
------------------------------------------------------------------
     16          -3.880       -3.480        -2.813        -2.533
     15          -4.090       -3.480        -2.820        -2.539
     14          -4.463       -3.480        -2.827        -2.545
     13          -4.724       -3.480        -2.833        -2.551
     12          -5.399       -3.480        -2.839        -2.556
     11          -5.412       -3.480        -2.845        -2.562
     10          -4.704       -3.480        -2.851        -2.567
      9          -5.456       -3.480        -2.857        -2.572
      8          -6.087       -3.480        -2.863        -2.577
      7          -6.628       -3.480        -2.868        -2.582
      6          -7.768       -3.480        -2.873        -2.587
      5          -8.512       -3.480        -2.878        -2.592
      4          -9.298       -3.480        -2.883        -2.596
      3         -11.331       -3.480        -2.888        -2.600
      2         -12.182       -3.480        -2.892        -2.604
      1         -13.353       -3.480        -2.897        -2.608
------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .3087393
Min SIC  = -2.206851 at lag  1 with RMSE =  .325776
Min MAIC =  .2325964 at lag 16 with RMSE = .3066532
```

Canada-New Zealand: dfgls D.lncanzexp

```
DF-GLS test for unit root
Variable: D.lncanzexp
Lag selection: Schwert criterion           Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
------------------------------------------------------------------
     16          -4.407       -3.480        -2.813        -2.533
     15          -5.057       -3.480        -2.820        -2.539
     14          -5.240       -3.480        -2.827        -2.545
     13          -5.448       -3.480        -2.833        -2.551
     12          -6.046       -3.480        -2.839        -2.556
     11          -5.871       -3.480        -2.845        -2.562
     10          -4.881       -3.480        -2.851        -2.567
      9          -5.409       -3.480        -2.857        -2.572
      8          -6.174       -3.480        -2.863        -2.577
      7          -6.706       -3.480        -2.868        -2.582
      6          -7.688       -3.480        -2.873        -2.587
```

```
      5          -8.281       -3.480       -2.878       -2.592
      4          -8.821       -3.480       -2.883       -2.596
      3         -10.197       -3.480       -2.888       -2.600
      2         -11.040       -3.480       -2.892       -2.604
      1         -12.360       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2879656
Min SIC  = -2.338333 at lag  1 with RMSE =  .305048
Min MAIC = -.2136434 at lag  1 with RMSE =  .305048
```

Canada-Sweden: dfgls D.lncaseexp

```
DF-GLS test for unit root
Variable: D.lncaseexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -4.183       -3.480       -2.813       -2.533
     15          -4.610       -3.480       -2.820       -2.539
     14          -5.294       -3.480       -2.827       -2.545
     13          -5.280       -3.480       -2.833       -2.551
     12          -5.469       -3.480       -2.839       -2.556
     11          -6.061       -3.480       -2.845       -2.562
     10          -5.202       -3.480       -2.851       -2.567
      9          -5.712       -3.480       -2.857       -2.572
      8          -6.676       -3.480       -2.863       -2.577
      7          -6.899       -3.480       -2.868       -2.582
      6          -7.679       -3.480       -2.873       -2.587
      5          -8.886       -3.480       -2.878       -2.592
      4          -9.663       -3.480       -2.883       -2.596
      3         -11.622       -3.480       -2.888       -2.600
      2         -13.992       -3.480       -2.892       -2.604
      1         -15.358       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2548397
Min SIC  = -2.603394 at lag  2 with RMSE = .2647746
Min MAIC =  .3915848 at lag  1 with RMSE = .2693796
```

Australia-New Zealand: dfgls D.lnaunzexp

```
DF-GLS test for unit root
Variable: D.lnaunzexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -5.055       -3.480       -2.813       -2.533
     15          -5.323       -3.480       -2.820       -2.539
     14          -5.631       -3.480       -2.827       -2.545
     13          -5.376       -3.480       -2.833       -2.551
     12          -5.722       -3.480       -2.839       -2.556
     11          -6.133       -3.480       -2.845       -2.562
     10          -4.930       -3.480       -2.851       -2.567
```

```
     9          -5.181       -3.480       -2.857       -2.572
     8          -5.470       -3.480       -2.863       -2.577
     7          -6.202       -3.480       -2.868       -2.582
     6          -6.690       -3.480       -2.873       -2.587
     5          -7.302       -3.480       -2.878       -2.592
     4          -8.010       -3.480       -2.883       -2.596
     3          -9.236       -3.480       -2.888       -2.600
     2         -11.226       -3.480       -2.892       -2.604
     1         -12.489       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1638375
Min SIC  = -3.503155 at lag  1 with RMSE = .1703846
Min MAIC = -1.569885 at lag  1 with RMSE = .1703846
```

Australia-Sweden: dfgls D.lnauseexp

```
DF-GLS test for unit root
Variable: D.lnauseexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16          -5.240       -3.480       -2.813       -2.533
    15          -5.687       -3.480       -2.820       -2.539
    14          -6.054       -3.480       -2.827       -2.545
    13          -6.498       -3.480       -2.833       -2.551
    12          -6.191       -3.480       -2.839       -2.556
    11          -6.895       -3.480       -2.845       -2.562
    10          -5.486       -3.480       -2.851       -2.567
     9          -5.912       -3.480       -2.857       -2.572
     8          -6.421       -3.480       -2.863       -2.577
     7          -6.724       -3.480       -2.868       -2.582
     6          -7.421       -3.480       -2.873       -2.587
     5          -7.547       -3.480       -2.878       -2.592
     4          -8.523       -3.480       -2.883       -2.596
     3         -10.089       -3.480       -2.888       -2.600
     2         -11.535       -3.480       -2.892       -2.604
     1         -13.263       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2437251
Min SIC  = -2.680316 at lag  1 with RMSE = .2571032
Min MAIC = -.4893182 at lag  1 with RMSE = .2571032
```

New Zealand-Sweden: dfgls D.lnnzseexp

```
DF-GLS test for unit root
Variable: D.lnnzseexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16          -5.562       -3.480       -2.813       -2.533
    15          -6.185       -3.480       -2.820       -2.539
    14          -6.398       -3.480       -2.827       -2.545
    13          -7.407       -3.480       -2.833       -2.551
```

```
    12          -6.815       -3.480       -2.839       -2.556
    11          -7.480       -3.480       -2.845       -2.562
    10          -5.625       -3.480       -2.851       -2.567
     9          -5.846       -3.480       -2.857       -2.572
     8          -6.411       -3.480       -2.863       -2.577
     7          -6.432       -3.480       -2.868       -2.582
     6          -7.139       -3.480       -2.873       -2.587
     5          -7.058       -3.480       -2.878       -2.592
     4          -7.751       -3.480       -2.883       -2.596
     3          -9.089       -3.480       -2.888       -2.600
     2         -10.503       -3.480       -2.892       -2.604
     1         -12.715       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .2182886
Min SIC  =  -2.85723 at lag  1 with RMSE = .2353375
Min MAIC = -1.044526 at lag  5 with RMSE = .2350983
```

US-Euro Area: dfgls D.lnuseuexp

```
DF-GLS test for unit root
Variable: D.lnuseuexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
    16          -4.285       -3.480       -2.813       -2.533
    15          -4.407       -3.480       -2.820       -2.539
    14          -4.860       -3.480       -2.827       -2.545
    13          -5.027       -3.480       -2.833       -2.551
    12          -5.975       -3.480       -2.839       -2.556
    11          -7.062       -3.480       -2.845       -2.562
    10          -5.561       -3.480       -2.851       -2.567
     9          -6.150       -3.480       -2.857       -2.572
     8          -6.170       -3.480       -2.863       -2.577
     7          -6.749       -3.480       -2.868       -2.582
     6          -7.325       -3.480       -2.873       -2.587
     5          -7.518       -3.480       -2.878       -2.592
     4          -7.988       -3.480       -2.883       -2.596
     3          -9.100       -3.480       -2.888       -2.600
     2          -9.916       -3.480       -2.892       -2.604
     1         -10.790       -3.480       -2.897       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1356686
Min SIC  = -3.833123 at lag  1 with RMSE = .1444703
Min MAIC = -2.384262 at lag  1 with RMSE = .1444703
```

US-Switzerland: dfgls D.lnuschexp

```
DF-GLS test for unit root
Variable: D.lnuschexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
```

16	-4.058	-3.480	-2.813	-2.533
15	-4.251	-3.480	-2.820	-2.539
14	-4.729	-3.480	-2.827	-2.545
13	-4.957	-3.480	-2.833	-2.551
12	-5.428	-3.480	-2.839	-2.556
11	-6.616	-3.480	-2.845	-2.562
10	-5.356	-3.480	-2.851	-2.567
9	-5.334	-3.480	-2.857	-2.572
8	-5.868	-3.480	-2.863	-2.577
7	-6.409	-3.480	-2.868	-2.582
6	-7.071	-3.480	-2.873	-2.587
5	-7.973	-3.480	-2.878	-2.592
4	-8.867	-3.480	-2.883	-2.596
3	-9.350	-3.480	-2.888	-2.600
2	-10.228	-3.480	-2.892	-2.604
1	-11.429	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1150723
Min SIC  = -4.184963 at lag  1 with RMSE = .1211651
Min MAIC = -2.733482 at lag  1 with RMSE = .1211651
```

Euro Area-Switzerland: dfgls D.lneuchexp

```
DF-GLS test for unit root
Variable: D.lneuchexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

		-------- Critical value ---------		
[lags]	DF-GLS tau	1%	5%	10%
16	-3.472	-3.480	-2.813	-2.533
15	-3.928	-3.480	-2.820	-2.539
14	-4.249	-3.480	-2.827	-2.545
13	-4.392	-3.480	-2.833	-2.551
12	-5.380	-3.480	-2.839	-2.556
11	-6.479	-3.480	-2.845	-2.562
10	-4.887	-3.480	-2.851	-2.567
9	-5.839	-3.480	-2.857	-2.572
8	-5.981	-3.480	-2.863	-2.577
7	-5.959	-3.480	-2.868	-2.582
6	-5.901	-3.480	-2.873	-2.587
5	-6.259	-3.480	-2.878	-2.592
4	-7.662	-3.480	-2.883	-2.596
3	-8.370	-3.480	-2.888	-2.600
2	-9.181	-3.480	-2.892	-2.604
1	-11.272	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .1522939
Min SIC  = -3.556501 at lag  1 with RMSE =    .1659
Min MAIC = -2.107237 at lag 16 with RMSE = .1514582
```

Survey-based inflation expectations in levels:

UK-Canada: dfgls lnukcasexp

```
DF-GLS test for unit root
Variable: lnukcasexp
```

```
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau             1%             5%            10%
--------------------------------------------------------------------
     16          -2.325         -3.480         -2.814         -2.533
     15          -2.345         -3.480         -2.820         -2.539
     14          -2.423         -3.480         -2.827         -2.545
     13          -2.286         -3.480         -2.833         -2.551
     12          -2.516         -3.480         -2.839         -2.556
     11          -2.412         -3.480         -2.845         -2.562
     10          -2.320         -3.480         -2.851         -2.567
      9          -2.514         -3.480         -2.857         -2.572
      8          -2.630         -3.480         -2.862         -2.577
      7          -2.829         -3.480         -2.868         -2.582
      6          -3.045         -3.480         -2.873         -2.587
      5          -3.307         -3.480         -2.878         -2.592
      4          -3.784         -3.480         -2.883         -2.596
      3          -4.383         -3.480         -2.888         -2.600
      2          -4.844         -3.480         -2.892         -2.604
      1          -5.624         -3.480         -2.896         -2.608
--------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .5583094
Min SIC  = -1.076392 at lag  1 with RMSE = .5733443
Min MAIC = -1.066172 at lag 10 with RMSE = .5524751
```

UK-Australia: dfgls lnukausexp

```
DF-GLS test for unit root
Variable: lnukausexp
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau             1%             5%            10%
--------------------------------------------------------------------
     16          -2.309         -3.480         -2.814         -2.533
     15          -2.454         -3.480         -2.820         -2.539
     14          -2.519         -3.480         -2.827         -2.545
     13          -2.486         -3.480         -2.833         -2.551
     12          -2.299         -3.480         -2.839         -2.556
     11          -2.090         -3.480         -2.845         -2.562
     10          -2.077         -3.480         -2.851         -2.567
      9          -2.564         -3.480         -2.857         -2.572
      8          -2.739         -3.480         -2.862         -2.577
      7          -2.867         -3.480         -2.868         -2.582
      6          -2.896         -3.480         -2.873         -2.587
      5          -3.048         -3.480         -2.878         -2.592
      4          -3.634         -3.480         -2.883         -2.596
      3          -4.177         -3.480         -2.888         -2.600
      2          -4.946         -3.480         -2.892         -2.604
      1          -5.807         -3.480         -2.896         -2.608
--------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .4581015
Min SIC  =  -1.37588 at lag  1 with RMSE = .4936085
Min MAIC = -1.423262 at lag 10 with RMSE = .4635829
```

UK-New Zealand: dfgls lnuknzsexp

```
DF-GLS test for unit root
Variable: lnuknzsexp
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
---------------------------------------------------------------
     16          -1.764        -3.480        -2.814        -2.533
     15          -1.812        -3.480        -2.820        -2.539
     14          -1.992        -3.480        -2.827        -2.545
     13          -1.999        -3.480        -2.833        -2.551
     12          -1.907        -3.480        -2.839        -2.556
     11          -1.769        -3.480        -2.845        -2.562
     10          -1.671        -3.480        -2.851        -2.567
      9          -2.201        -3.480        -2.857        -2.572
      8          -2.399        -3.480        -2.862        -2.577
      7          -2.368        -3.480        -2.868        -2.582
      6          -2.432        -3.480        -2.873        -2.587
      5          -2.720        -3.480        -2.878        -2.592
      4          -3.032        -3.480        -2.883        -2.596
      3          -3.416        -3.480        -2.888        -2.600
      2          -3.867        -3.480        -2.892        -2.604
      1          -4.697        -3.480        -2.896        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .4133338
Min SIC  = -1.556137 at lag  2 with RMSE = .4470085
Min MAIC = -1.651842 at lag 10 with RMSE = .4183993
```

UK-Sweden: dfgls lnuksesexp

```
DF-GLS test for unit root
Variable: lnuksesexp
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau            1%            5%           10%
---------------------------------------------------------------
     16          -2.220        -3.480        -2.814        -2.533
     15          -2.262        -3.480        -2.820        -2.539
     14          -2.389        -3.480        -2.827        -2.545
     13          -2.453        -3.480        -2.833        -2.551
     12          -2.191        -3.480        -2.839        -2.556
     11          -2.137        -3.480        -2.845        -2.562
     10          -2.042        -3.480        -2.851        -2.567
      9          -2.779        -3.480        -2.857        -2.572
      8          -2.811        -3.480        -2.862        -2.577
      7          -2.731        -3.480        -2.868        -2.582
      6          -3.026        -3.480        -2.873        -2.587
      5          -3.244        -3.480        -2.878        -2.592
      4          -3.509        -3.480        -2.883        -2.596
      3          -4.124        -3.480        -2.888        -2.600
      2          -4.563        -3.480        -2.892        -2.604
      1          -5.757        -3.480        -2.896        -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .3818291
```

```
Min SIC  = -1.728429 at lag  2 with RMSE = .4101125
Min MAIC = -1.792615 at lag 10 with RMSE =  .385559
```

Canada-Australia: dfgls lncaausexp

```
DF-GLS test for unit root
Variable: lncaausexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
--------------------------------------------------------------
     16          -3.100       -3.480        -2.814        -2.533
     15          -3.264       -3.480        -2.820        -2.539
     14          -3.445       -3.480        -2.827        -2.545
     13          -3.396       -3.480        -2.833        -2.551
     12          -3.383       -3.480        -2.839        -2.556
     11          -3.479       -3.480        -2.845        -2.562
     10          -3.747       -3.480        -2.851        -2.567
      9          -3.564       -3.480        -2.857        -2.572
      8          -3.539       -3.480        -2.862        -2.577
      7          -3.851       -3.480        -2.868        -2.582
      6          -3.876       -3.480        -2.873        -2.587
      5          -4.168       -3.480        -2.878        -2.592
      4          -4.599       -3.480        -2.883        -2.596
      3          -4.993       -3.480        -2.888        -2.600
      2          -5.305       -3.480        -2.892        -2.604
      1          -6.310       -3.480        -2.896        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 2 with RMSE = .5451429
Min SIC  = -1.159197 at lag 2 with RMSE = .5451429
Min MAIC = -1.050592 at lag 8 with RMSE = .5380713
```

Canada-New Zealand: dfgls lncanzsexp

```
DF-GLS test for unit root
Variable: lncanzsexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
--------------------------------------------------------------
     16          -2.355       -3.480        -2.814        -2.533
     15          -2.389       -3.480        -2.820        -2.539
     14          -2.512       -3.480        -2.827        -2.545
     13          -2.354       -3.480        -2.833        -2.551
     12          -2.568       -3.480        -2.839        -2.556
     11          -2.526       -3.480        -2.845        -2.562
     10          -2.543       -3.480        -2.851        -2.567
      9          -2.458       -3.480        -2.857        -2.572
      8          -2.579       -3.480        -2.862        -2.577
      7          -2.582       -3.480        -2.868        -2.582
      6          -2.818       -3.480        -2.873        -2.587
      5          -3.087       -3.480        -2.878        -2.592
      4          -3.468       -3.480        -2.883        -2.596
      3          -3.918       -3.480        -2.888        -2.600
      2          -4.415       -3.480        -2.892        -2.604
```

1	-4.929	-3.480	-2.896	-2.608

Opt lag (Ng−Perron seq t) = 1 with RMSE = .4742685
Min SIC = -1.413058 at lag 1 with RMSE = .4845174
Min MAIC = -1.399856 at lag 7 with RMSE = .4710571

Canada-Sweden: dfgls lncasesexp

DF-GLS test for unit root
Variable: lncasesexp
Lag selection: Schwert criterion   Maximum lag   = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-3.299	-3.480	-2.814	-2.533
15	-3.277	-3.480	-2.820	-2.539
14	-3.450	-3.480	-2.827	-2.545
13	-3.301	-3.480	-2.833	-2.551
12	-3.566	-3.480	-2.839	-2.556
11	-3.600	-3.480	-2.845	-2.562
10	-3.583	-3.480	-2.851	-2.567
9	-3.558	-3.480	-2.857	-2.572
8	-3.586	-3.480	-2.862	-2.577
7	-3.550	-3.480	-2.868	-2.582
6	-3.903	-3.480	-2.873	-2.587
5	-4.031	-3.480	-2.878	-2.592
4	-4.331	-3.480	-2.883	-2.596
3	-4.856	-3.480	-2.888	-2.600
2	-5.206	-3.480	-2.892	-2.604
1	-6.074	-3.480	-2.896	-2.608

Opt lag (Ng−Perron seq t) = 1 with RMSE = .4530501
Min SIC = -1.518257 at lag 1 with RMSE = .4596908
Min MAIC = -1.417539 at lag 7 with RMSE = .4505126

Australia-New Zealand: dfgls lnaunzsexp

DF-GLS test for unit root
Variable: lnaunzsexp
Lag selection: Schwert criterion   Maximum lag   = 16

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-2.813	-3.480	-2.814	-2.533
15	-2.742	-3.480	-2.820	-2.539
14	-2.810	-3.480	-2.827	-2.545
13	-2.686	-3.480	-2.833	-2.551
12	-3.530	-3.480	-2.839	-2.556
11	-2.369	-3.480	-2.845	-2.562
10	-2.546	-3.480	-2.851	-2.567
9	-2.636	-3.480	-2.857	-2.572
8	-2.765	-3.480	-2.862	-2.577
7	-3.068	-3.480	-2.868	-2.582
6	-3.019	-3.480	-2.873	-2.587
5	-3.066	-3.480	-2.878	-2.592

```
     4          -3.524       -3.480       -2.883       -2.596
     3          -3.621       -3.480       -2.888       -2.600
     2          -3.961       -3.480       -2.892       -2.604
     1          -4.684       -3.480       -2.896       -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .3437562
Min SIC  = -1.994358 at lag  2 with RMSE =  .359052
Min MAIC = -2.039451 at lag  1 with RMSE = .3453072
```

Australia-Sweden: dfgls lnausesexp

```
DF-GLS test for unit root
Variable: lnausesexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
---------------------------------------------------------------
    16          -3.327       -3.480       -2.814       -2.533
    15          -3.401       -3.480       -2.820       -2.539
    14          -3.600       -3.480       -2.827       -2.545
    13          -3.471       -3.480       -2.833       -2.551
    12          -3.345       -3.480       -2.839       -2.556
    11          -3.223       -3.480       -2.845       -2.562
    10          -3.610       -3.480       -2.851       -2.567
     9          -3.835       -3.480       -2.857       -2.572
     8          -4.096       -3.480       -2.862       -2.577
     7          -4.618       -3.480       -2.868       -2.582
     6          -4.777       -3.480       -2.873       -2.587
     5          -4.532       -3.480       -2.878       -2.592
     4          -5.352       -3.480       -2.883       -2.596
     3          -5.844       -3.480       -2.888       -2.600
     2          -6.217       -3.480       -2.892       -2.604
     1          -8.748       -3.480       -2.896       -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE =  .304588
Min SIC  = -2.267988 at lag  2 with RMSE = .3131406
Min MAIC = -2.088414 at lag 11 with RMSE =  .304588
```

New Zealand-Sweden: dfgls lnnzsesexp

```
DF-GLS test for unit root
Variable: lnnzsesexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
---------------------------------------------------------------
    16          -1.118       -3.480       -2.814       -2.533
    15          -1.146       -3.480       -2.820       -2.539
    14          -1.197       -3.480       -2.827       -2.545
    13          -1.081       -3.480       -2.833       -2.551
    12          -0.971       -3.480       -2.839       -2.556
    11          -0.938       -3.480       -2.845       -2.562
    10          -1.026       -3.480       -2.851       -2.567
     9          -1.211       -3.480       -2.857       -2.572
```

8	-1.359	-3.480	-2.862	-2.577
7	-1.291	-3.480	-2.868	-2.582
6	-1.369	-3.480	-2.873	-2.587
5	-1.499	-3.480	-2.878	-2.592
4	-1.670	-3.480	-2.883	-2.596
3	-1.730	-3.480	-2.888	-2.600
2	-2.047	-3.480	-2.892	-2.604
1	-3.114	-3.480	-2.896	-2.608

Opt lag (Ng−Perron seq t) = 1 with RMSE = .2306582
Min SIC = -2.822074 at lag 2 with RMSE = .2373675
Min MAIC = -2.862423 at lag 1 with RMSE = .2306582

US-Euro Area: dfgls lnuseusexp

DF-GLS test for unit root
Variable: lnuseusexp
Lag selection: Schwert criterion   Maximum lag = 16

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
16	-3.310	-3.480	-2.814	-2.533
15	-3.342	-3.480	-2.820	-2.539
14	-3.453	-3.480	-2.827	-2.545
13	-3.376	-3.480	-2.833	-2.551
12	-3.391	-3.480	-2.839	-2.556
11	-3.242	-3.480	-2.845	-2.562
10	-3.147	-3.480	-2.851	-2.567
9	-2.973	-3.480	-2.857	-2.572
8	-2.525	-3.480	-2.862	-2.577
7	-2.883	-3.480	-2.868	-2.582
6	-2.956	-3.480	-2.873	-2.587
5	-3.070	-3.480	-2.878	-2.592
4	-3.263	-3.480	-2.883	-2.596
3	-3.610	-3.480	-2.888	-2.600
2	-3.823	-3.480	-2.892	-2.604
1	-4.529	-3.480	-2.896	-2.608

Opt lag (Ng-Perron seq t) = 2 with RMSE = .3989889
Min SIC = -1.734979 at lag 2 with RMSE = .4087717
Min MAIC = -1.700551 at lag 8 with RMSE = .4044335

US-Switzerland: dfgls lnuschsexp

DF-GLS test for unit root
Variable: lnuschsexp
Lag selection: Schwert criterion   Maximum lag = 16

		Critical value		
[lags]	DF-GLS tau	1%	5%	10%
16	-2.409	-3.480	-2.814	-2.533
15	-2.524	-3.480	-2.820	-2.539
14	-2.426	-3.480	-2.827	-2.545
13	-2.316	-3.480	-2.833	-2.551
12	-2.484	-3.480	-2.839	-2.556

```
     11          -2.315       -3.480       -2.845       -2.562
     10          -2.287       -3.480       -2.851       -2.567
      9          -2.391       -3.480       -2.857       -2.572
      8          -2.604       -3.480       -2.862       -2.577
      7          -3.068       -3.480       -2.868       -2.582
      6          -3.033       -3.480       -2.873       -2.587
      5          -3.285       -3.480       -2.878       -2.592
      4          -3.815       -3.480       -2.883       -2.596
      3          -4.389       -3.480       -2.888       -2.600
      2          -5.006       -3.480       -2.892       -2.604
      1          -7.534       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .4462461
Min SIC  = -1.492308 at lag  2 with RMSE = .4615048
Min MAIC = -1.477832 at lag 10 with RMSE = .4444071
```

Euro Area-Switzerland: dfgls lneuchsexp

```
DF-GLS test for unit root
Variable: lneuchsexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -2.993       -3.480       -2.814       -2.533
     15          -3.389       -3.480       -2.820       -2.539
     14          -3.191       -3.480       -2.827       -2.545
     13          -3.308       -3.480       -2.833       -2.551
     12          -3.224       -3.480       -2.839       -2.556
     11          -3.142       -3.480       -2.845       -2.562
     10          -3.170       -3.480       -2.851       -2.567
      9          -2.987       -3.480       -2.857       -2.572
      8          -3.123       -3.480       -2.862       -2.577
      7          -4.245       -3.480       -2.868       -2.582
      6          -4.253       -3.480       -2.873       -2.587
      5          -4.737       -3.480       -2.878       -2.592
      4          -5.015       -3.480       -2.883       -2.596
      3          -5.341       -3.480       -2.888       -2.600
      2          -6.340       -3.480       -2.892       -2.604
      1          -6.889       -3.480       -2.896       -2.608
-------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .5233034
Min SIC  = -1.136161 at lag  1 with RMSE = .5564638
Min MAIC = -1.071574 at lag  9 with RMSE = .5303289
```

Survey-based inflation expectations in first differences:

UK-Canada: dfgls D.lnukcasexp

```
DF-GLS test for unit root
Variable: D.lnukcasexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
-------------------------------------------------------------
     16          -5.605       -3.480       -2.813       -2.533
```

15	-5.851	-3.480	-2.820	-2.539
14	-6.119	-3.480	-2.827	-2.545
13	-6.251	-3.480	-2.833	-2.551
12	-7.119	-3.480	-2.839	-2.556
11	-6.902	-3.480	-2.845	-2.562
10	-7.767	-3.480	-2.851	-2.567
9	-8.937	-3.480	-2.857	-2.572
8	-9.172	-3.480	-2.863	-2.577
7	-9.911	-3.480	-2.868	-2.582
6	-10.539	-3.480	-2.873	-2.587
5	-11.416	-3.480	-2.878	-2.592
4	-12.604	-3.480	-2.883	-2.596
3	-13.447	-3.480	-2.888	-2.600
2	-14.418	-3.480	-2.892	-2.604
1	-17.852	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .5559069
Min SIC  = -1.034385 at lag  4 with RMSE = .5697876
Min MAIC =   5.24954 at lag  1 with RMSE = .5917648
```

UK-Australia: dfgls D.lnukausexp

```
DF-GLS test for unit root
Variable: D.lnukausexp
Lag selection: Schwert criterion          Maximum lag   =  16
```

[lags]	DF-GLS tau	Critical value 1%	Critical value 5%	Critical value 10%
16	-2.912	-3.480	-2.813	-2.533
15	-2.905	-3.480	-2.820	-2.539
14	-2.902	-3.480	-2.827	-2.545
13	-2.887	-3.480	-2.833	-2.551
12	-3.849	-3.480	-2.839	-2.556
11	-3.791	-3.480	-2.845	-2.562
10	-3.845	-3.480	-2.851	-2.567
9	-4.021	-3.480	-2.857	-2.572
8	-4.023	-3.480	-2.863	-2.577
7	-4.179	-3.480	-2.868	-2.582
6	-4.432	-3.480	-2.873	-2.587
5	-5.971	-3.480	-2.878	-2.592
4	-5.914	-3.480	-2.883	-2.596
3	-6.899	-3.480	-2.888	-2.600
2	-6.691	-3.480	-2.892	-2.604
1	-9.894	-3.480	-2.897	-2.608

```
Opt lag (Ng-Perron seq t) =  1 with RMSE = .4869279
Min SIC  = -1.194632 at lag 12 with RMSE = .4891463
Min MAIC = -1.268004 at lag  1 with RMSE = .4891463
```

UK-New Zealand: dfgls D.lnuknzsexp

```
DF-GLS test for unit root
Variable: D.lnuknzsexp
Lag selection: Schwert criterion          Maximum lag   =  16

                               -------- Critical value ---------
```

```
 [lags]      DF-GLS tau          1%            5%            10%
--------------------------------------------------------------
     16          -1.852       -3.480        -2.813        -2.533
     15          -1.913       -3.480        -2.820        -2.539
     14          -1.995       -3.480        -2.827        -2.545
     13          -1.999       -3.480        -2.833        -2.551
     12          -2.133       -3.480        -2.839        -2.556
     11          -2.409       -3.480        -2.845        -2.562
     10          -2.928       -3.480        -2.851        -2.567
      9          -3.772       -3.480        -2.857        -2.572
      8          -3.529       -3.480        -2.863        -2.577
      7          -3.836       -3.480        -2.868        -2.582
      6          -4.735       -3.480        -2.873        -2.587
      5          -5.937       -3.480        -2.878        -2.592
      4          -7.076       -3.480        -2.883        -2.596
      3          -8.717       -3.480        -2.888        -2.600
      2         -11.156       -3.480        -2.892        -2.604
      1         -15.811       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .4388317
Min SIC  = -1.402759 at lag  1 with RMSE = .4408031
Min MAIC = -1.164344 at lag 16 with RMSE = .4369269
```

UK-Sweden: dfgls D.lnuksesexp

```
DF-GLS test for unit root
Variable: D.lnuksesexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau          1%            5%            10%
--------------------------------------------------------------
     16          -5.768       -3.480        -2.813        -2.533
     15          -5.633       -3.480        -2.820        -2.539
     14          -5.829       -3.480        -2.827        -2.545
     13          -5.810       -3.480        -2.833        -2.551
     12          -5.971       -3.480        -2.839        -2.556
     11          -7.223       -3.480        -2.845        -2.562
     10          -8.169       -3.480        -2.851        -2.567
      9          -9.799       -3.480        -2.857        -2.572
      8          -7.873       -3.480        -2.863        -2.577
      7          -8.612       -3.480        -2.868        -2.582
      6         -10.170       -3.480        -2.873        -2.587
      5         -10.650       -3.480        -2.878        -2.592
      4         -11.830       -3.480        -2.883        -2.596
      3         -13.640       -3.480        -2.888        -2.600
      2         -14.976       -3.480        -2.892        -2.604
      1         -19.834       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .3867993
Min SIC  = -1.703927 at lag  9 with RMSE = .3896285
Min MAIC =   7.79153 at lag  1 with RMSE = .4242346
```

Canada-Australia: dfgls D.lncaausexp

```
DF-GLS test for unit root
Variable: D.lncaausexp
```

```
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
--------------------------------------------------------------------
     16          -1.179       -3.480        -2.813        -2.533
     15          -1.212       -3.480        -2.820        -2.539
     14          -2.222       -3.480        -2.827        -2.545
     13          -2.240       -3.480        -2.833        -2.551
     12          -2.306       -3.480        -2.839        -2.556
     11          -3.394       -3.480        -2.845        -2.562
     10          -3.498       -3.480        -2.851        -2.567
      9          -3.556       -3.480        -2.857        -2.572
      8          -3.860       -3.480        -2.863        -2.577
      7          -4.258       -3.480        -2.868        -2.582
      6          -4.538       -3.480        -2.873        -2.587
      5          -4.254       -3.480        -2.878        -2.592
      4          -5.055       -3.480        -2.883        -2.596
      3          -5.049       -3.480        -2.888        -2.600
      2          -6.774       -3.480        -2.892        -2.604
      1         -10.674       -3.480        -2.897        -2.608
--------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .5723924
Min SIC  =  -.862797 at lag  9 with RMSE = .5933346
Min MAIC = -.9771635 at lag  1 with RMSE = .5723924
```

Canada-New Zealand: dfgls D.lncanzsexp

```
DF-GLS test for unit root
Variable: D.lncanzsexp
Lag selection: Schwert criterion          Maximum lag   =  16

                                   -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
--------------------------------------------------------------------
     16          -4.432       -3.480        -2.813        -2.533
     15          -4.837       -3.480        -2.820        -2.539
     14          -5.088       -3.480        -2.827        -2.545
     13          -5.147       -3.480        -2.833        -2.551
     12          -6.934       -3.480        -2.839        -2.556
     11          -6.841       -3.480        -2.845        -2.562
     10          -7.415       -3.480        -2.851        -2.567
      9          -7.935       -3.480        -2.857        -2.572
      8          -8.978       -3.480        -2.863        -2.577
      7          -9.559       -3.480        -2.868        -2.582
      6         -10.913       -3.480        -2.873        -2.587
      5         -15.660       -3.480        -2.878        -2.592
      4         -17.061       -3.480        -2.883        -2.596
      3         -17.733       -3.480        -2.888        -2.600
      2         -18.146       -3.480        -2.892        -2.604
      1         -19.061       -3.480        -2.897        -2.608
--------------------------------------------------------------------
Opt lag (Ng-Perron seq t) = 4 with RMSE = .4885936
Min SIC  = -1.345481 at lag 3 with RMSE = .4921461
Min MAIC =  4.686608 at lag 1 with RMSE = .5014419
```

Canada-Sweden: dfgls D.lncasesexp

```
DF-GLS test for unit root
Variable: D.lncasesexp
Lag selection: Schwert criterion          Maximum lag   =  16

                            -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
--------------------------------------------------------------
     16          -5.666       -3.480        -2.813        -2.533
     15          -5.870       -3.480        -2.820        -2.539
     14          -6.197       -3.480        -2.827        -2.545
     13          -6.149       -3.480        -2.833        -2.551
     12          -6.836       -3.480        -2.839        -2.556
     11          -6.648       -3.480        -2.845        -2.562
     10          -6.968       -3.480        -2.851        -2.567
      9          -7.476       -3.480        -2.857        -2.572
      8          -8.136       -3.480        -2.863        -2.577
      7          -8.851       -3.480        -2.868        -2.582
      6         -10.106       -3.480        -2.873        -2.587
      5         -10.322       -3.480        -2.878        -2.592
      4         -11.651       -3.480        -2.883        -2.596
      3         -13.038       -3.480        -2.888        -2.600
      2         -14.223       -3.480        -2.892        -2.604
      1         -18.256       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .4594835
Min SIC  = -1.446249 at lag  1 with RMSE = .4765206
Min MAIC =  5.190932 at lag  1 with RMSE = .4765206
```

Australia-New Zealand: dfgls D.lnaunzsexp

```
DF-GLS test for unit root
Variable: D.lnaunzsexp
Lag selection: Schwert criterion          Maximum lag   =  16

                            -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%           10%
--------------------------------------------------------------
     16          -1.748       -3.480        -2.813        -2.533
     15          -1.748       -3.480        -2.820        -2.539
     14          -1.736       -3.480        -2.827        -2.545
     13          -1.742       -3.480        -2.833        -2.551
     12          -1.761       -3.480        -2.839        -2.556
     11          -1.800       -3.480        -2.845        -2.562
     10          -1.973       -3.480        -2.851        -2.567
      9          -2.057       -3.480        -2.857        -2.572
      8          -2.252       -3.480        -2.863        -2.577
      7          -2.480       -3.480        -2.868        -2.582
      6          -2.596       -3.480        -2.873        -2.587
      5          -3.213       -3.480        -2.878        -2.592
      4          -4.276       -3.480        -2.883        -2.596
      3          -5.068       -3.480        -2.888        -2.600
      2          -7.679       -3.480        -2.892        -2.604
      1         -14.222       -3.480        -2.897        -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .3561243
```

```
Min SIC  = -1.798857 at lag 13 with RMSE = .3583424
Min MAIC = -1.843922 at lag  1 with RMSE = .3583424
```

Australia-Sweden: dfgls D.lnausesexp

```
DF-GLS test for unit root
Variable: D.lnausesexp
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%            10%
---------------------------------------------------------------
     16          -2.275       -3.480       -2.813       -2.533
     15          -2.218       -3.480       -2.820       -2.539
     14          -2.144       -3.480       -2.827       -2.545
     13          -2.116       -3.480       -2.833       -2.551
     12          -3.977       -3.480       -2.839       -2.556
     11          -3.833       -3.480       -2.845       -2.562
     10          -4.742       -3.480       -2.851       -2.567
      9          -5.734       -3.480       -2.857       -2.572
      8          -5.744       -3.480       -2.863       -2.577
      7          -6.795       -3.480       -2.868       -2.582
      6          -6.842       -3.480       -2.873       -2.587
      5          -6.023       -3.480       -2.878       -2.592
      4          -7.641       -3.480       -2.883       -2.596
      3          -8.184       -3.480       -2.888       -2.600
      2          -9.386       -3.480       -2.892       -2.604
      1         -12.184       -3.480       -2.897       -2.608
---------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  3 with RMSE = .3304081
Min SIC  = -1.961178 at lag  3 with RMSE = .3304081
Min MAIC = -2.064375 at lag 13 with RMSE = .3304081
```

New Zealand-Sweden: dfgls D.lnnzsesexp

```
DF-GLS test for unit root
Variable: D.lnnzsesexp
Lag selection: Schwert criterion          Maximum lag   =  16

                              -------- Critical value ---------
 [lags]      DF-GLS tau             1%            5%            10%
---------------------------------------------------------------
     16          -1.753       -3.480       -2.813       -2.533
     15          -1.750       -3.480       -2.820       -2.539
     14          -1.753       -3.480       -2.827       -2.545
     13          -1.766       -3.480       -2.833       -2.551
     12          -1.840       -3.480       -2.839       -2.556
     11          -2.029       -3.480       -2.845       -2.562
     10          -2.285       -3.480       -2.851       -2.567
      9          -2.497       -3.480       -2.857       -2.572
      8          -2.603       -3.480       -2.863       -2.577
      7          -2.767       -3.480       -2.868       -2.582
      6          -3.405       -3.480       -2.873       -2.587
      5          -4.083       -3.480       -2.878       -2.592
      4          -4.963       -3.480       -2.883       -2.596
      3          -6.222       -3.480       -2.888       -2.600
      2          -9.317       -3.480       -2.892       -2.604
```

```
      1        -15.665      -3.480      -2.897      -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE = .2394488
Min SIC  = -2.605156 at lag  2 with RMSE = .2394488
Min MAIC = -2.575909 at lag 13 with RMSE = .2394488
```

US-Euro Area: dfgls D.lnuseusexp

```
DF-GLS test for unit root
Variable: D.lnuseusexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16         -1.839      -3.480      -2.813      -2.533
     15         -1.894      -3.480      -2.820      -2.539
     14         -1.955      -3.480      -2.827      -2.545
     13         -1.990      -3.480      -2.833      -2.551
     12         -2.116      -3.480      -2.839      -2.556
     11         -2.219      -3.480      -2.845      -2.562
     10         -2.444      -3.480      -2.851      -2.567
      9         -2.707      -3.480      -2.857      -2.572
      8         -3.139      -3.480      -2.863      -2.577
      7         -4.244      -3.480      -2.868      -2.582
      6         -4.529      -3.480      -2.873      -2.587
      5         -5.373      -3.480      -2.878      -2.592
      4         -6.496      -3.480      -2.883      -2.596
      3         -7.978      -3.480      -2.888      -2.600
      2         -9.785      -3.480      -2.892      -2.604
      1        -13.857      -3.480      -2.897      -2.608
--------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  1 with RMSE = .4198632
Min SIC  = -1.533386 at lag  9 with RMSE = .4243098
Min MAIC = -1.440008 at lag  1 with RMSE = .4175038
```

US-Switzerland: dfgls D.lnuschsexp

```
DF-GLS test for unit root
Variable: D.lnuschsexp
Lag selection: Schwert criterion          Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%           5%          10%
--------------------------------------------------------------
     16         -1.785      -3.480      -2.813      -2.533
     15         -1.787      -3.480      -2.820      -2.539
     14         -1.788      -3.480      -2.827      -2.545
     13         -1.798      -3.480      -2.833      -2.551
     12         -1.855      -3.480      -2.839      -2.556
     11         -1.886      -3.480      -2.845      -2.562
     10         -2.059      -3.480      -2.851      -2.567
      9         -2.309      -3.480      -2.857      -2.572
      8         -2.603      -3.480      -2.863      -2.577
      7         -2.961      -3.480      -2.868      -2.582
      6         -3.168      -3.480      -2.873      -2.587
      5         -4.133      -3.480      -2.878      -2.592
```

```
      4          -5.392        -3.480        -2.883        -2.596
      3          -6.974        -3.480        -2.888        -2.600
      2          -9.780        -3.480        -2.892        -2.604
      1         -17.118        -3.480        -2.897        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE =  .465913
Min SIC  = -1.261345 at lag 11 with RMSE = .4774049
Min MAIC = -1.184891 at lag  2 with RMSE =  .465913
```

Euro Area-Switzerland: dfgls D.lneuchsexp

```
DF-GLS test for unit root
Variable: D.lneuchsexp
Lag selection: Schwert criterion           Maximum lag   =  16

                             -------- Critical value ---------
 [lags]      DF-GLS tau           1%            5%            10%
------------------------------------------------------------------------------
     16          -2.843        -3.480        -2.813        -2.533
     15          -3.168        -3.480        -2.820        -2.539
     14          -3.031        -3.480        -2.827        -2.545
     13          -3.526        -3.480        -2.833        -2.551
     12          -3.735        -3.480        -2.839        -2.556
     11          -4.256        -3.480        -2.845        -2.562
     10          -4.945        -3.480        -2.851        -2.567
      9          -5.663        -3.480        -2.857        -2.572
      8          -7.286        -3.480        -2.863        -2.577
      7          -8.793        -3.480        -2.868        -2.582
      6          -7.741        -3.480        -2.873        -2.587
      5          -9.217        -3.480        -2.878        -2.592
      4          -9.968        -3.480        -2.883        -2.596
      3         -11.606        -3.480        -2.888        -2.600
      2         -14.252        -3.480        -2.892        -2.604
      1         -16.376        -3.480        -2.897        -2.608
------------------------------------------------------------------------------
Opt lag (Ng-Perron seq t) =  2 with RMSE =  .556056
Min SIC  = -.9893584 at lag  2 with RMSE = .5934166
Min MAIC =  2.213467 at lag 16 with RMSE = .5532468
```

Linear ARDL Model Results with Market Expectations:

UK-Canada:

ukca <- ARDL::ardl(lnukcarer ~ lnukcair + lnukcam3 + lnukcagdp + lnukcaexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
ukcauecm <- ARDL::uecm(ukca, case=2)
summary(ukcauecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)      0.0037768  0.0033208   1.137  0.25624
L(lnukcarer, 1) -0.0096826  0.0089101  -1.087  0.27798
L(lnukcair, 1)   0.0074011  0.0056202   1.317  0.18881
L(lnukcam3, 1)  -0.0192337  0.0100801  -1.908  0.05726 .
L(lnukcagdp, 1) -0.0040976  0.0091989  -0.445  0.65630
L(lnukcaexp, 1)  0.0006233  0.0027210   0.229  0.81895
```

```
d(lnukcair)       0.1006727  0.0209182   4.813 2.28e-06 ***
d(lnukcam3)      -0.3804554  0.1353564  -2.811  0.00524 **
d(lnukcagdp)      0.0117603  0.0069683   1.688  0.09243 .
d(lnukcaexp)      0.0045190  0.0044601   1.013  0.31172
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02012 on 325 degrees of freedom
Multiple R-squared:  0.1313,     Adjusted R-squared:  0.1073
F-statistic: 5.459 on 9 and 325 DF,  p-value: 5.443e-07
```

UK-Australia:

ukau <- ARDL::ardl(lnukaurer ~ lnukauir + lnukaum3 + lnukaugdp + lnukauexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
ukauuecm <- ARDL::uecm(ukau, case=2)
summary(ukauuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)       0.003129   0.005664   0.552   0.5810
L(lnukaurer, 1) -0.024333   0.016077  -1.514   0.0311 *
L(lnukauir, 1)    0.008537   0.006037   1.414   0.1583
L(lnukaum3, 1)    0.012417   0.010206   1.217   0.2246
L(lnukaugdp, 1)  0.003043   0.008800   0.346   0.7297
L(lnukauexp, 1) -0.000844   0.004108  -0.205   0.8373
d(lnukauir)       0.253027   0.030344   8.339 2.16e-15 ***
d(lnukaum3)      -0.307734   0.168948  -1.821   0.0695 .
d(lnukaugdp)      0.004078   0.006314   0.646   0.3588 *
d(lnukauexp)     -0.011418   0.008380  -1.363   0.0740
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02372 on 325 degrees of freedom
Multiple R-squared:  0.2103,     Adjusted R-squared:  0.1884
F-statistic: 9.616 on 9 and 325 DF,  p-value: 4.971e-13
```

UK-New Zealand:

uknz <- ARDL::ardl(lnuknzrer ~ lnuknzir + lnuknzm3 + lnuknzgdp + lnuknzexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
uknzuecm <- ARDL::uecm(uknz, case=2)
summary(uknzuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)       0.009870   0.018768   0.526   0.5993
L(lnuknzrer, 1) -0.010743   0.011617  -0.925   0.0358 *
L(lnuknzir, 1)    0.008811   0.005829   1.512   0.0816 .
L(lnuknzm3, 1)    0.012310   0.012681   0.971   0.3324
L(lnuknzgdp, 1) -0.004006   0.002761  -0.457   0.0478 *
L(lnuknzexp, 1)  0.006111   0.003298   1.853   0.0648 .
d(lnuknzir)       0.132265   0.026954   4.907 1.46e-06 ***
d(lnuknzm3)      -0.170928   0.128731  -1.328   0.1852
d(lnuknzgdp)      0.002718   0.002938   0.931   0.0323 *
d(lnuknzexp)      0.006064   0.008261   0.734   0.4635
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02206 on 325 degrees of freedom
Multiple R-squared:  0.09216,    Adjusted R-squared:  0.06702
F-statistic: 3.666 on 9 and 325 DF,  p-value: 0.0002193
```

UK-Sweden:

ukse <- ARDL::ardl(lnukserer ~ lnukseir + lnuksem3 + lnuksegdp + lnukseexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
ukseuecm <- ARDL::uecm(ukse, case=2)
summary(ukseuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)       0.0007135  0.0065788   0.108    0.914
L(lnukserer, 1) -0.0146201  0.0109072  -1.340    0.008 **
L(lnukseir, 1)   0.0041054  0.0033024   1.243    0.215
L(lnuksem3, 1)  -0.0174372  0.0125145  -1.393    0.164
L(lnuksegdp, 1) -0.0004685  0.0086236  -0.054    0.957
L(lnukseexp, 1)  0.0047712  0.0030933   1.542    0.124
d(lnukseir)      0.1182874  0.0204075   5.796  1.6e-08 ***
d(lnuksem3)      0.0155619  0.0919982   0.169    0.866
d(lnuksegdp)     0.0085071  0.0061691   1.379    0.169
d(lnukseexp)    -0.0022833  0.0060895  -0.375    0.708
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01975 on 325 degrees of freedom
Multiple R-squared:  0.1221,     Adjusted R-squared:  0.09778
F-statistic: 5.022 on 9 and 325 DF,  p-value: 2.376e-06
```

Canada-Australia:

caau <- ARDL::ardl(lncaaurer ~ lncaauir + lncaaum3 + lncaaugdp + lncaauexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
caauuecm <- ARDL::uecm(caau, case=2)
summary(caauuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)       0.0001991  0.0028175   0.071 0.943715
L(lncaaurer, 1) -0.0279236  0.0105411  -2.649 0.001203 **
L(lncaauir, 1)   0.0017309  0.0031680   0.546 0.585182
L(lncaaum3, 1)  -0.0043970  0.0064343  -0.683 0.494861
L(lncaaugdp, 1)  0.0002730  0.0063645   0.043 0.965807
L(lncaauexp, 1)  0.0029549  0.0022019   1.342 0.180532
d(lncaauir)      0.0856411  0.0217537   3.937 0.000101 ***
d(lncaaum3)     -0.1569177  0.1574447  -0.997 0.319675
d(lncaaugdp)     0.0027284  0.0048100   0.567 0.570954
d(lncaauexp)    -0.0014883  0.0032334  -0.460 0.645614
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01757 on 325 degrees of freedom
Multiple R-squared:  0.09011,    Adjusted R-squared:  0.06491
```

```
F-statistic: 3.576 on 9 and 325 DF,  p-value: 0.0002941
```

Canada-New Zealand:

canz <- ARDL::ardl(lncanzrer ~ lncanzir + lncanzm3 + lncanzgdp + lncanzexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
canzuecm <- ARDL::uecm(canz, case=2)
summary(canzuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)     -0.0092067  0.0155748  -0.591   0.5548
L(lncanzrer, 1) -0.0131336  0.0107692  -1.220   0.2235
L(lncanzir, 1)  -0.0003686  0.0041590  -0.089   0.9294
L(lncanzm3, 1)  -0.0326008  0.0275805  -1.182   0.2381
L(lncanzgdp, 1)  0.0034590  0.0007498   4.618   0.0049 *
L(lncanzexp, 1)  0.0024236  0.0021998   1.102   0.2714
d(lncanzir)      0.0535189  0.0235237   2.275   0.0236 *
d(lncanzm3)      0.0060557  0.1449786   0.042   0.9667
d(lncanzgdp)     0.0034443  0.0013629   2.527   0.0288 *
d(lncanzexp)     0.0041244  0.0039004   1.057   0.2911
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02031 on 325 degrees of freedom
Multiple R-squared:  0.04449,    Adjusted R-squared:  0.01803
F-statistic: 1.682 on 9 and 325 DF,  p-value: 0.0923
```

Canada-Sweden:

case <- ARDL::ardl(lncaserer ~ lncaseir + lncasem3 + lncasegdp + lncaseexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
caseuecm <- ARDL::uecm(case, case=2)
summary(caseuecm)

```
Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)     -0.001910   0.005790  -0.330   0.7417
L(lncaserer, 1) -0.009738   0.007795  -1.249   0.2125
L(lncaseir, 1)   0.003340   0.002243   1.489   0.1375
L(lncasem3, 1)  -0.023298   0.012866  -1.811   0.0711 .
L(lncasegdp, 1)  0.001789   0.007487   0.239   0.8113
L(lncaseexp, 1)  0.003641   0.002219   1.641   0.1018
d(lncaseir)      0.019914   0.015082   1.320   0.1876
d(lncasem3)     -0.101482   0.083062  -1.222   0.2227
d(lncasegdp)     0.003100   0.005329   0.582   0.5612
d(lncaseexp)     0.003361   0.003654   0.920   0.3584
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01695 on 325 degrees of freedom
Multiple R-squared:  0.04361,    Adjusted R-squared:  0.01713
F-statistic: 1.647 on 9 and 325 DF,  p-value: 0.1011
```

Australia-New Zealand:

aunz <- ARDL::ardl(lnaunzrer ~ lnaunzir + lnaunzm3 + lnaunzgdp + lnaunzexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
aunzuecm <- ARDL::uecm(aunz, case=2)
summary(aunzuecm)

```
Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)     -0.0495231  0.0158973  -3.115 0.002002 **
L(lnaunzrer, 1) -0.0749591  0.0194194  -3.860 0.000137 ***
L(lnaunzir, 1)   0.0175804  0.0092054   1.910 0.057041 .
L(lnaunzm3, 1)   0.0145726  0.0112941   1.290 0.197868
L(lnaunzgdp, 1)  0.0232367  0.0087240   2.664 0.008118 **
L(lnaunzexp, 1) -0.0026814  0.0028672  -0.935 0.350378
d(lnaunzir)      0.1051484  0.0299803   3.507 0.000516 ***
d(lnaunzm3)      0.1449945  0.1470440   0.986 0.324836
d(lnaunzgdp)     0.0137947  0.0059485   2.319 0.021014 *
d(lnaunzexp)    -0.0002882  0.0065526  -0.044 0.964941
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01973 on 325 degrees of freedom
Multiple R-squared:  0.09067,    Adjusted R-squared:  0.06549
F-statistic: 3.601 on 9 and 325 DF,  p-value: 0.0002715
```

Australia-Sweden:

ause <- ARDL::ardl(lnauserer ~ lnauseir + lnausem3 + lnausegdp + lnauseexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
auseuecm <- ARDL::uecm(ause, case=2)
summary(auseuecm)

```
Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)      0.0095169  0.0089453   1.064  0.28817
L(lnauserer, 1) -0.0602031  0.0210319  -2.862  0.00448 **
L(lnauseir, 1)   0.0007496  0.0038677   0.194  0.84646
L(lnausem3, 1)   0.0200272  0.0121069   1.654  0.09905 .
L(lnausegdp, 1)  0.0122484  0.0076403   1.603  0.10988
L(lnauseexp, 1)  0.0018816  0.0022599   0.833  0.40570
d(lnauseir)      0.0558064  0.0221934   2.515  0.01240 *
d(lnausem3)      0.0077686  0.1113095   0.070  0.94440
d(lnausegdp)     0.0081821  0.0053869   1.519  0.12976
d(lnauseexp)    -0.0015907  0.0047173  -0.337  0.73618
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02073 on 325 degrees of freedom
Multiple R-squared:  0.06375,    Adjusted R-squared:  0.03783
F-statistic: 2.459 on 9 and 325 DF,  p-value: 0.0101
```

New Zealand-Sweden:

nzse <- ARDL::ardl(lnnzserer ~ lnnzseir + lnnzsem3 + lnnzsegdp + lnnzseexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
nzseuecm <- ARDL::uecm(nzse, case=2)
summary(nzseuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)      0.0100674  0.0255186   0.395  0.69346
L(lnnzserer, 1) -0.0502242  0.0193015  -2.602  0.00969 **
L(lnnzseir, 1)   0.0006555  0.0035661   0.184  0.85428
L(lnnzsem3, 1)   0.0408931  0.0203514   2.009  0.04533 *
L(lnnzsegdp, 1)  0.0015182  0.0008735   2.174  0.00213 *
L(lnnzseexp, 1)  0.0026211  0.0021632   1.212  0.22651
d(lnnzseir)      0.0252395  0.0201735   1.251  0.21179
d(lnnzsem3)      0.0648272  0.0991289   0.654  0.51359
d(lnnzsegdp)     0.0012001  0.0065775   0.182  0.85534
d(lnnzseexp)     0.0027469  0.0050260   0.547  0.58507
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02034 on 325 degrees of freedom
Multiple R-squared:  0.04093,    Adjusted R-squared:  0.01437
F-statistic: 1.541 on 9 and 325 DF,  p-value: 0.1323
```

US-Euro Area:

useu <- ARDL::ardl(lnuseurer ~ lnuseuir + lnuseum3 + lnuseugdp + lnuseuexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
useuuecm <- ARDL::uecm(useu, case=2)
summary(useuuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)     -0.0059270  0.0060337  -0.982   0.3267
L(lnuseurer, 1) -0.0157569  0.0089240  -1.766   0.0784 .
L(lnuseuir, 1)   0.0005419  0.0030183   0.180   0.8576
L(lnuseum3, 1)  -0.0018752  0.0193754  -0.097   0.9230
L(lnuseugdp, 1)  0.0066251  0.0114263   0.580   0.5624
L(lnuseuexp, 1)  0.0107537  0.0048004   2.240   0.0258 *
d(lnuseuir)      0.0276662  0.0204033   1.356   0.1761
d(lnuseum3)      0.0604724  0.2047717   0.295   0.7679
d(lnuseugdp)     0.0046491  0.0085190   0.546   0.5856
d(lnuseuexp)    -0.0221534  0.0100111  -2.213   0.0276 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02522 on 325 degrees of freedom
Multiple R-squared:  0.05126,    Adjusted R-squared:  0.02499
F-statistic: 1.951 on 9 and 325 DF,  p-value: 0.04442
```

US-Switzerland:

usch <- ARDL::ardl(lnuschrer ~ lnuschir + lnuschm3 + lnuschgdp + lnuschexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
uschuecm <- ARDL::uecm(usch, case=2)
summary(uschuecm)

```
Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)      0.093501   0.036558   2.558   0.0110 *
```

```
L(lnuschrer, 1) -0.008228   0.008375  -0.982   0.3266
L(lnuschir, 1)   0.003205   0.001682   1.905   0.0577 .
L(lnuschm3, 1)  -0.022277   0.010270  -2.169   0.0308 *
L(lnuschgdp, 1) -0.014293   0.009164  -1.560   0.1198
L(lnuschexp, 1)  0.009865   0.004143   2.381   0.0178 *
d(lnuschir)     -0.012904   0.008123  -1.589   0.1131
d(lnuschm3)     -0.405315   0.168989  -2.398   0.0170 *
d(lnuschgdp)    -0.008205   0.006769  -1.212   0.2263
d(lnuschexp)    -0.004401   0.010116  -0.435   0.6638
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.0212 on 325 degrees of freedom
Multiple R-squared:  0.07283,    Adjusted R-squared:  0.04716
F-statistic: 2.837 on 9 and 325 DF,  p-value: 0.003154
```

Euro Area-Switzerland:

euch <- ARDL::ardl(lneuchrer ~ lneuchir + lneuchm3 + lneuchgdp + lneuchexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
euchuecm <- ARDL::uecm(euch, case=2)
summary(euchuecm)

```
Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)     -0.073476   0.026282  -2.796 0.005487 **
L(lneuchrer, 1) -0.010992   0.006721  -1.635 0.102936
L(lneuchir, 1)  -0.001193   0.003204  -0.372 0.709781
L(lneuchm3, 1)  -0.004849   0.006357  -0.763 0.446180
L(lneuchgdp, 1)  0.029882   0.008418   3.550 0.000442 ***
L(lneuchexp, 1)  0.003578   0.002750   1.301 0.194194
d(lneuchir)     -0.040998   0.006740  -6.083 3.31e-09 ***
d(lneuchm3)      0.151013   0.107304   1.407 0.160282
d(lneuchgdp)     0.012670   0.006458   1.962 0.050625 .
d(lneuchexp)    -0.002580   0.005523  -0.467 0.640683
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01592 on 325 degrees of freedom
Multiple R-squared:  0.1604,     Adjusted R-squared:  0.1371
F-statistic: 6.898 on 9 and 325 DF,  p-value: 4.213e-09
```

<u>Linear ARDL Model Results with Survey Expectations:</u>

UK-Canada:

ukcas <- ARDL::ardl(lnukcarer ~ lnukcair + lnukcam3 + lnukcagdp + lnukcasexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
ukcasuecm <- ARDL::uecm(ukcas, case=2)
summary(ukcasuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)       0.004991   0.003369   1.481   0.1394
L(lnukcarer, 1)  -0.013048   0.009198  -1.419   0.1570
```

```
L(lnukcair, 1)     0.008909   0.005568   1.600   0.1105
L(lnukcam3, 1)    -0.019985   0.009916  -2.015   0.0447 *
L(lnukcagdp, 1)   -0.004849   0.009217  -0.526   0.5992
L(lnukcasexp, 1) -0.000720   0.001742  -0.413   0.6797
d(lnukcair)        0.104627   0.020699   5.055 7.21e-07 ***
d(lnukcam3)       -0.372387   0.135162  -2.755   0.0062 **
d(lnukcagdp)       0.011358   0.006964   1.631   0.1039
d(lnukcasexp)     -0.001896   0.001913  -0.991   0.3224
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02012 on 325 degrees of freedom
Multiple R-squared:  0.1312,     Adjusted R-squared:  0.1071
F-statistic: 5.452 on 9 and 325 DF,  p-value: 5.562e-07
```

UK-Australia:

ukaus <- ARDL::ardl(lnukaurer ~ lnukauir + lnukaum3 + lnukaugdp + lnukausexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
ukausuecm <- ARDL::uecm(ukaus, case=2)
summary(ukausuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.003937   0.005053   0.779   0.4365
L(lnukaurer, 1)   -0.031775   0.013263  -2.396   0.0172 *
L(lnukauir, 1)     0.007609   0.004813   1.581   0.1149
L(lnukaum3, 1)     0.017140   0.010373   1.652   0.0994 .
L(lnukaugdp, 1)    0.004469   0.008726   0.512   0.6089
L(lnukausexp, 1) -0.005104   0.003189  -1.601   0.1104
d(lnukauir)        0.251677   0.030163   8.344 2.08e-15 ***
d(lnukaum3)       -0.301762   0.167784  -1.799   0.0730 .
d(lnukaugdp)       0.004483   0.006280   0.714   0.4758
d(lnukausexp)      0.001108   0.002737   0.405   0.6859
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.0236 on 325 degrees of freedom
Multiple R-squared:  0.2185,     Adjusted R-squared:  0.1968
F-statistic: 10.09 on 9 and 325 DF,  p-value: 1.046e-13
```

UK-New Zealand:

uknzs <- ARDL::ardl(lnuknzrer ~ lnuknzir + lnuknzm3 + lnuknzgdp + lnuknzsexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
uknzsuecm <- ARDL::uecm(uknzs, case=2)
summary(uknzsuecm)

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.0041058  0.0185998   0.221   0.8254
L(lnuknzrer, 1)   -0.0279981  0.0134980  -2.074   0.0388 *
L(lnuknzir, 1)     0.0113241  0.0058840   1.925   0.0552 .
L(lnuknzm3, 1)     0.0178464  0.0132284   1.349   0.1782
L(lnuknzgdp, 1)   -0.0006438  0.0086328  -0.075   0.9406
L(lnuknzsexp, 1) -0.0045247  0.0027626  -1.638   0.1024
```

```
d(lnuknzir)        0.1297696  0.0267911   4.844 1.98e-06 ***
d(lnuknzm3)       -0.2067612  0.1279661  -1.616   0.1071
d(lnuknzgdp)       0.0046098  0.0078848   0.585   0.5592
d(lnuknzsexp)      0.0016570  0.0026587   0.623   0.5336
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02199 on 325 degrees of freedom
Multiple R-squared:  0.09836,    Adjusted R-squared:  0.07339
F-statistic: 3.939 on 9 and 325 DF,  p-value: 8.9e-05
```

UK-Sweden:

ukses <- ARDL::ardl(lnukserer ~ lnukseir + lnuksem3 + lnuksegdp + lnuksesexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
uksesuecm <- ARDL::uecm(ukses, case=2)
summary(uksesuecm)

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)        1.505e-03  6.749e-03   0.223    0.824
L(lnukserer, 1)  -1.855e-02  1.167e-02  -1.590    0.113
L(lnukseir, 1)    4.683e-03  3.278e-03   1.429    0.154
L(lnuksem3, 1)   -7.692e-03  1.116e-02  -0.689    0.491
L(lnuksegdp, 1)   4.892e-04  8.637e-03   0.057    0.955
L(lnuksesexp, 1) -1.506e-05  2.961e-03  -0.005    0.996
d(lnukseir)        1.209e-01  2.050e-02   5.897 9.28e-09 ***
d(lnuksem3)       -5.319e-03  9.040e-02  -0.059    0.953
d(lnuksegdp)       8.215e-03  6.205e-03   1.324    0.186
d(lnuksesexp)      3.337e-03  2.692e-03   1.240    0.216
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01978 on 325 degrees of freedom
Multiple R-squared:   0.12,Adjusted R-squared:  0.09558
F-statistic: 4.922 on 9 and 325 DF,  p-value: 3.328e-06
```

Canada-Australia:

caaus <- ARDL::ardl(lncaaurer ~ lncaauir + lncaaum3 + lncaaugdp + lncaausexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
caausuecm <- ARDL::uecm(caaus, case=2)
summary(caausuecm)

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)       -8.941e-06  2.851e-03  -0.003   0.9975
L(lncaaurer, 1)  -3.298e-02  1.671e-02  -1.974   0.0493 *
L(lncaauir, 1)    3.064e-03  3.179e-03   0.964   0.3358
L(lncaaum3, 1)   -5.716e-03  6.819e-03  -0.838   0.4025
L(lncaaugdp, 1)   6.704e-04  6.404e-03   0.105   0.9167
L(lncaausexp, 1) -2.724e-04  1.572e-03  -0.173   0.8625
d(lncaauir)        9.047e-02  2.133e-02   4.242 2.89e-05 ***
d(lncaaum3)       -1.673e-01  1.585e-01  -1.055   0.2920
d(lncaaugdp)       2.884e-03  4.849e-03   0.595   0.5524
d(lncaausexp)     -1.161e-04  1.705e-03  -0.068   0.9458
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01764 on 325 degrees of freedom
Multiple R-squared:  0.08211,    Adjusted R-squared:  0.05669
F-statistic:  3.23 on 9 and 325 DF,  p-value: 0.0009028
```

Canada-New Zealand:

canzs <- ARDL::ardl(lncanzrer ~ lncanzir + lncanzm3 + lncanzgdp + lncanzsexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
canzsuecm <- ARDL::uecm(canzs, case=2)
summary(canzsuecm)

```
Coefficients:
                    Estimate Std. Error t value Pr(>|t|)  
(Intercept)       -0.0075392  0.0159092  -0.474    0.636  
L(lncanzrer, 1)   -0.0175444  0.0108316  -1.620    0.106  
L(lncanzir, 1)     0.0010684  0.0041140   0.260    0.795  
L(lncanzm3, 1)    -0.0399135  0.0271724  -1.469    0.143  
L(lncanzgdp, 1)    0.0022415  0.0077625   0.289    0.773  
L(lncanzsexp, 1)  -0.0017056  0.0019132  -0.891    0.373  
d(lncanzir)        0.0569846  0.0233086   2.445    0.015 *
d(lncanzm3)       -0.0077731  0.1463917  -0.053    0.958  
d(lncanzgdp)       0.0026950  0.0066096   0.408    0.684  
d(lncanzsexp)     -0.0001305  0.0022393  -0.058    0.954  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02033 on 325 degrees of freedom
Multiple R-squared:  0.04196,    Adjusted R-squared:  0.01543
F-statistic: 1.581 on 9 and 325 DF,  p-value: 0.1195
```

Canada-Sweden:

cases <- ARDL::ardl(lncaserer ~ lncaseir + lncasem3 + lncasegdp + lncasesexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
casesuecm <- ARDL::uecm(cases, case=2)
summary(casesuecm)

```
Coefficients:
                    Estimate Std. Error t value Pr(>|t|)  
(Intercept)       -0.0032192  0.0058009  -0.555   0.5793  
L(lncaserer, 1)   -0.0105491  0.0080975  -1.303   0.1936  
L(lncaseir, 1)     0.0038777  0.0023341   1.661   0.0976 .
L(lncasem3, 1)    -0.0259604  0.0127946  -2.029   0.0433 *
L(lncasegdp, 1)    0.0013899  0.0075198   0.185   0.8535  
L(lncasesexp, 1)   0.0004629  0.0017619   0.263   0.7929  
d(lncaseir)        0.0234722  0.0148867   1.577   0.1158  
d(lncasem3)       -0.1080128  0.0830734  -1.300   0.1945  
d(lncasegdp)       0.0029575  0.0053558   0.552   0.5812  
d(lncasesexp)     -0.0007733  0.0019518  -0.396   0.6922  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01701 on 325 degrees of freedom
```

```
Multiple R-squared:  0.03635,    Adjusted R-squared:  0.00966
F-statistic: 1.362 on 9 and 325 DF,  p-value: 0.2044
```

Australia-New Zealand:

aunzs <- ARDL::ardl(lnaunzrer ~ lnaunzir + lnaunzm3 + lnaunzgdp + lnaunzsexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
aunzsuecm <- ARDL::uecm(aunzs, case=2)
summary(aunzsuecm)

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)    
(Intercept)       -0.0469671  0.0154127  -3.047 0.002498 ** 
L(lnaunzrer, 1)   -0.0742182  0.0191646  -3.873 0.000130 ***
L(lnaunzir, 1)     0.0145129  0.0090591   1.602 0.110122    
L(lnaunzm3, 1)     0.0172799  0.0112852   1.531 0.126693    
L(lnaunzgdp, 1)    0.0206154  0.0084045   2.453 0.014696 *  
L(lnaunzsexp, 1)  -0.0050491  0.0025143  -2.008 0.045452 *  
d(lnaunzir)        0.1012949  0.0298192   3.397 0.000766 ***
d(lnaunzm3)        0.1383430  0.1453825   0.952 0.342018    
d(lnaunzgdp)       0.0132209  0.0058277   2.269 0.023947 *  
d(lnaunzsexp)      0.0006058  0.0026902   0.225 0.821984    
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01959 on 325 degrees of freedom
Multiple R-squared:  0.1041,     Adjusted R-squared:  0.07932
F-statistic: 4.197 on 9 and 325 DF,  p-value: 3.78e-05
```

Australia-Sweden:

auses <- ARDL::ardl(lnauserer ~ lnauseir + lnausem3 + lnausegdp + lnausesexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
ausesuecm <- ARDL::uecm(auses, case=2)
summary(ausesuecm)

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)   
(Intercept)        0.0100650  0.0090159   1.116  0.26509   
L(lnauserer, 1)   -0.0611113  0.0207385  -2.947  0.00344 **
L(lnauseir, 1)     0.0008722  0.0038549   0.226  0.82114   
L(lnausem3, 1)     0.0192333  0.0120907   1.591  0.11264   
L(lnausegdp, 1)    0.0132611  0.0077255   1.717  0.08702 . 
L(lnausesexp, 1)  -0.0038091  0.0044227  -0.861  0.38973   
d(lnauseir)        0.0590393  0.0220120   2.682  0.00769 **
d(lnausem3)        0.0049665  0.1097817   0.045  0.96394   
d(lnausegdp)       0.0087505  0.0054043   1.619  0.10638   
d(lnausesexp)     -0.0006309  0.0035909  -0.176  0.86064   
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02073 on 325 degrees of freedom
Multiple R-squared:  0.06355,    Adjusted R-squared:  0.03761
F-statistic:  2.45 on 9 and 325 DF,  p-value: 0.01036
```

New Zealand-Sweden:

nzses <- ARDL::ardl(lnnzserer ~ lnnzseir + lnnzsem3 + lnnzsegdp + lnnzsesexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
nzsesuecm <- ARDL::uecm(nzses, case=2)
summary(nzsesuecm)

```
Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)      -0.006286   0.025686  -0.245 0.806839
L(lnnzserer, 1)  -0.077699   0.020387  -3.811 0.000165 ***
L(lnnzseir, 1)    0.004033   0.003633   1.110 0.267777
L(lnnzsem3, 1)    0.049970   0.020029   2.495 0.013096 *
L(lnnzsegdp, 1)  -0.005782   0.008918  -0.648 0.517223
L(lnnzsesexp, 1) -0.012719   0.003738  -3.403 0.000750 ***
d(lnnzseir)       0.026200   0.019768   1.325 0.185974
d(lnnzsem3)       0.020291   0.097372   0.208 0.835055
d(lnnzsegdp)     -0.002340   0.006565  -0.356 0.721792
d(lnnzsesexp)    -0.002799   0.004046  -0.692 0.489540
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02001 on 325 degrees of freedom
Multiple R-squared:  0.07238,    Adjusted R-squared:  0.04669
F-statistic: 2.817 on 9 and 325 DF,  p-value: 0.00335
```

US-Euro Area:

useus <- ARDL::ardl(lnuseurer ~ lnuseuir + lnuseum3 + lnuseugdp + lnuseusexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
useusuecm <- ARDL::uecm(useus, case=2)
summary(useusuecm)

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)       0.0003882  0.0068743   0.056    0.955
L(lnuseurer, 1)  -0.0109425  0.0093997  -1.164    0.245
L(lnuseuir, 1)    0.0026645  0.0030105   0.885    0.377
L(lnuseum3, 1)   -0.0091332  0.0198023  -0.461    0.645
L(lnuseugdp, 1)   0.0069565  0.0116875   0.595    0.552
L(lnuseusexp, 1)  0.0013257  0.0023257   0.570    0.569
d(lnuseuir)       0.0261479  0.0207960   1.257    0.210
d(lnuseum3)       0.0711982  0.2095281   0.340    0.734
d(lnuseugdp)      0.0040790  0.0086914   0.469    0.639
d(lnuseusexp)     0.0022560  0.0034785   0.649    0.517

Residual standard error: 0.02568 on 325 degrees of freedom
Multiple R-squared:  0.01617,    Adjusted R-squared:  -0.01107
F-statistic: 0.5936 on 9 and 325 DF,  p-value: 0.8023
```

US-Switzerland:

uschs <- ARDL::ardl(lnuschrer ~ lnuschir + lnuschm3 + lnuschgdp + lnuschsexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
uschsuecm <- ARDL::uecm(uschs, case=2)
summary(uschsuecm)

```
Coefficients:
```

```
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.1019408  0.0368562   2.766   0.0060 **
L(lnuschrer, 1)   -0.0137119  0.0088576  -1.548   0.1226
L(lnuschir, 1)     0.0036999  0.0016943   2.184   0.0297 *
L(lnuschm3, 1)    -0.0230370  0.0110458  -2.086   0.0378 *
L(lnuschgdp, 1)   -0.0142468  0.0093387  -1.526   0.1281
L(lnuschsexp, 1)   0.0005340  0.0033971   0.157   0.8752
d(lnuschir)       -0.0120570  0.0081733  -1.475   0.1411
d(lnuschm3)       -0.3504322  0.1675321  -2.092   0.0372 *
d(lnuschgdp)      -0.0079769  0.0068696  -1.161   0.2464
d(lnuschsexp)      0.0004221  0.0025527   0.165   0.8688
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.02142 on 325 degrees of freedom
Multiple R-squared:  0.05365,    Adjusted R-squared:  0.02744
F-statistic: 2.047 on 9 and 325 DF,  p-value: 0.0339
```

Euro Area-Switzerland:

euchs <- ARDL::ardl(lneuchrer ~ lneuchir + lneuchm3 + lneuchgdp + lneuchsexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
euchsuecm <- ARDL::uecm(euchs, case=2)
summary(euchsuecm)

```
Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -6.798e-02  2.646e-02  -2.569  0.01064 *
L(lneuchrer, 1)   -1.351e-02  6.266e-03  -2.156  0.03180 *
L(lneuchir, 1)     2.021e-04  3.352e-03   0.060  0.95195
L(lneuchm3, 1)    -2.683e-03  6.480e-03  -0.414  0.67909
L(lneuchgdp, 1)    2.665e-02  8.658e-03   3.078  0.00226 **
L(lneuchsexp, 1)   2.820e-03  1.627e-03   1.733  0.08397 .
d(lneuchir)       -3.991e-02  6.938e-03  -5.751 2.04e-08 ***
d(lneuchm3)        1.425e-01  1.067e-01   1.335  0.18283
d(lneuchgdp)       1.085e-02  6.528e-03   1.662  0.09745 .
d(lneuchsexp)      3.415e-05  1.646e-03   0.021  0.98346
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01588 on 325 degrees of freedom
Multiple R-squared:  0.1645,    Adjusted R-squared:  0.1414
F-statistic: 7.112 on 9 and 325 DF,  p-value: 2.05e-09
```

Breusch-Pagan Test for ARDL Model with Market Expectations:

UK-Canada: lmtest::bptest(ukcares)
```
BP = 13.128, df = 9, p-value = 0.1569
```

UK-Australia: lmtest::bptest(ukaures)
```
BP = 37.534, df = 9, p-value = 2.113e-05
```
UK-New Zealand: lmtest::bptest(uknzres)

BP = 19.145, df = 9, p-value = 0.02399
UK-Sweden: lmtest::bptest(ukseres)
BP = 6.6732, df = 9, p-value = 0.6711
Canada-Australia: lmtest::bptest(caaures)
BP = 21.724, df = 9, p-value = 0.009796
Canada-New Zealand: lmtest::bptest(canzres)
BP = 13.18, df = 9, p-value = 0.1546
Canada-Sweden: lmtest::bptest(caseres)
BP = 4.3382, df = 9, p-value = 0.8878
Australia-New Zealand: lmtest::bptest(aunzres)
BP = 14.202, df = 9, p-value = 0.1153
Australia-Sweden: lmtest::bptest(auseres)
BP = 10.803, df = 9, p-value = 0.2895
New Zealand-Sweden: lmtest::bptest(nzseres)
BP = 4.2419, df = 9, p-value = 0.8948
US-Euro Area: lmtest::bptest(useures)
BP = 15.541, df = 9, p-value = 0.0859
US-Switzerland: lmtest::bptest(uschres)
BP = 11.73, df = 9, p-value = 0.214
Euro Area-Switzerland: lmtest::bptest(euchres)
BP = 31.487, df = 9, p-value = 0.0002442

Breusch-Pagan Test for ARDL Model with Survey Expectations:

UK-Canada: lmtest::bptest(ukcasres)
BP = 12.197, df = 9, p-value = 0.2024
UK-Australia: lmtest::bptest(ukausres)
BP = 36.592, df = 9, p-value = 3.112e-05
UK-New Zealand: lmtest::bptest(uknzsres)
BP = 18.724, df = 9, p-value = 0.0244
UK-Sweden: lmtest::bptest(uksesres)
BP = 8.8989, df = 9, p-value = 0.4467
Canada-Australia: lmtest::bptest(caausres)
BP = 19.068, df = 9, p-value = 0.0221
Canada-New Zealand: lmtest::bptest(canzsres)
BP = 11.702, df = 9, p-value = 0.3022
Canada-Sweden: lmtest::bptest(casesres)
BP = 4.6751, df = 9, p-value = 0.8617
Australia-New Zealand: lmtest::bptest(aunzsres)
BP = 18.412, df = 9, p-value = 0.0247
Australia-Sweden: lmtest::bptest(ausesres)
BP = 10.84, df = 9, p-value = 0.2837
New Zealand-Sweden: lmtest::bptest(nzsesres)
BP = 6.036, df = 9, p-value = 0.791
US-Euro Area: lmtest::bptest(useusres)
BP = 23.685, df = 9, p-value = 0.003729
US-Switzerland: lmtest::bptest(uschsres)
BP = 12.384, df = 9, p-value = 0.3119
Euro Area-Switzerland: lmtest::bptest(euchsres)
BP = 31.436, df = 9, p-value = 0.0007491

Breusch-Godfrey Test for ARDL Model with Market Expectations:

UK-Canada: lmtest::bgtest(ukcares)
`LM test = 10.292, df = 1, p-value = 0.001336`
UK-Australia: lmtest::bgtest(ukaures)
`LM test = 6.8235, df = 1, p-value = 0.008997`
UK-New Zealand: lmtest::bgtest(uknzres)
`LM test = 6.2554, df = 1, p-value = 0.01238`
UK-Sweden: lmtest::bgtest(ukseres)
`LM test = 2.1319, df = 1, p-value = 0.1443`
Canada-Australia: lmtest::bgtest(caaures)
`LM test = 9.4753, df = 1, p-value = 0.002083`
Canada-New Zealand: lmtest::bgtest(canzres)
`LM test = 12.042, df = 1, p-value = 0.0005202`
Canada-Sweden: lmtest::bgtest(caseres)
`LM test = 4.3482, df = 1, p-value = 0.03705`
Australia-New Zealand: lmtest::bgtest(aunzres)
`LM test = 21.338, df = 1, p-value = 3.849e-06`
Australia-Sweden: lmtest::bgtest(auseres)
`LM test = 15.792, df = 1, p-value = 7.071e-05`
New Zealand-Sweden: lmtest::bgtest(nzseres)
`LM test = 17.766, df = 1, p-value = 2.498e-05`
US-Euro Area: lmtest::bgtest(useures)
`LM test = 26.368, df = 1, p-value = 2.822e-07`
US-Switzerland: lmtest::bgtest(uschres)
`LM test = 12.219, df = 1, p-value = 0.0004731`
Euro Area-Switzerland: lmtest::bgtest(euchres)
`LM test = 13.012, df = 1, p-value = 0.0003095`

Breusch-Godfrey Test for ARDL Model with Market Expectations:

UK-Canada: lmtest::bgtest(ukcasres)
`LM test = 10.346, df = 1, p-value = 0.001298`
UK-Australia: lmtest::bgtest(ukausres)
`LM test = 8.3342, df = 1, p-value = 0.005639`
UK-New Zealand: lmtest::bgtest(uknzsres)
`LM test = 7.583, df = 1, p-value = 0.002392`
UK-Sweden: lmtest::bgtest(uksesres)
`LM test = 3.5662, df = 1, p-value = 0.05897`
Canada-Australia: lmtest::bgtest(caausres)
`LM test = 10.731, df = 1, p-value = 0.001054`
Canada-New Zealand: lmtest::bgtest(canzsres)
`LM test = 12.486, df = 1, p-value = 0.00104`
Canada-Sweden: lmtest::bgtest(casesres)
`LM test = 4.6384, df = 1, p-value = 0.03126`
Australia-New Zealand: lmtest::bgtest(aunzsres)
`LM test = 20.413, df = 1, p-value = 6.242e-06`
Australia-Sweden: lmtest::bgtest(ausesres)
`LM test = 16.047, df = 1, p-value = 6.179e-05`
New Zealand-Sweden: lmtest::bgtest(nzsesres)
`LM test = 16.598, df = 1, p-value = 4.619e-05`

US-Euro Area: lmtest::bgtest(useusres)

```
LM test = 34.083, df = 1, p-value = 5.28e-09
```

US-Switzerland: lmtest::bgtest(uschsres)

```
LM test = 13.973, df = 1, p-value = 0.001085
```

Euro Area-Switzerland: lmtest::bgtest(euchsres)

```
LM test = 13.108, df = 1, p-value = 0.0002941
```

Nonlinear ARDL Model Results with Market Expectations (including Bounds Test, Wald Test for Parameter Symmetry, ARCH-LM Test, Jarque-Bera Test and LM Test for Serial Correlation):

UK-Canada:

nukca <- nardl::nardl(lnukcarer ~ lnukcaexp | lnukcairp + lnukcairn + lnukcam3p + lnukcam3n + lnukcagdpp + lnukcagdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nukca)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.057382 -0.011856  0.000613  0.011173  0.075039

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.0105608  0.0062571   1.688 0.092445 .
L(lnukcarer, 1)    0.1477265  0.0537932   2.746 0.006378 **
L(l2lnukcarer, 1) -0.1675230  0.0529350  -3.165 0.001705 **
L(lnukcairp, 1)    0.0058708  0.0085085   0.690 0.490709
L(lnukcairn, 1)    0.0219782  0.0117214   1.875 0.061717 .
L(lnukcam3p, 1)   -0.0516739  0.0178086  -2.902 0.003976 **
L(lnukcam3n, 1)    0.0673501  0.0367497   1.833 0.067801 .
L(lnukcagdpp, 1)   0.0348761  0.0170108   2.050 0.041174 *
L(lnukcagdpn, 1)  -0.0457726  0.0159498  -2.870 0.004387 **
L(lnukcaexpp, 1)   0.0003651  0.0033137   0.110 0.912333
L(lnukcaexpn, 1)   0.0077257  0.0078046   0.990 0.322994
d(l2lnukcarer)    -0.2226312  0.0800874  -2.780 0.005767 **
d(lnukcairp)       0.1139751  0.0293639   3.881 0.000127 ***
d(lnukcairn)       0.0858785  0.0332669   2.582 0.010292 *
d(lnukcam3p)      -0.3143443  0.1455560  -2.160 0.031562 *
d(lnukcam3n)      -0.6282778  0.2877576  -2.183 0.029752 *
d(lnukcagdpp)      0.0287179  0.0118293   2.428 0.015759 *
d(lnukcagdpn)     -0.0072448  0.0114769  -0.631 0.528338
d(lnukcaexpp)      0.0051793  0.0025763   2.132 0.028600 *
d(lnukcaexpn)     -0.0082907  0.0150248  -0.552 0.581479
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '
1Residual standard error: 0.01912 on 317 degrees of freedom
```

```
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.1736


 model diagnostic tests:
         JB test   LM test ARCH test
Stat   0.9931675 5.8669328 0.1985709
Pvalue 0.1333161 0.2492598 0.6558768
lags   0.0000000 1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 12.829347 Pvalue: 0.0006473
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 4.37940696312586

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                 Estimate  Std. Error t value Pr(>|t|)
lnukcaexp_p    -0.1325550   0.0611968  2.1685 0.001987 **
lnukcaexp_n     0.1386490   0.2092264  1.1154 0.004699 **
lnukcairp       2.6087083   1.1159605  2.3376 0.009406 **
lnukcairn       2.3465314   1.0274873  2.2838 0.002386 **
lnukcam3p      -7.6591667   4.4443148 -1.7234 0.004823 **
lnukcam3n     -22.7937058   8.9423795 -2.5490 0.000805 **
lnukcagdpp      0.6571159   0.3582592  1.8342 0.006626 **
lnukcagdpn     -0.1252707   0.2957760 -0.4235 0.001907 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 1208.417 Pvalue: 3.9407e-263
==============================================================
```

UK-Australia:

nukau <- nardl::nardl(lnukaurer ~ lnukauexp | lnukauirp + lnukauirn + lnukaum3p + lnukaum3n + lnukaugdpp + lnukaugdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nukau)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max 
-0.074076 -0.014376 -0.000196  0.014759  0.075168 

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)    
(Intercept)        0.001643   0.005884   0.279 0.780256    
L(lnukaurer, 1)    0.097953   0.053359   1.836 0.067345 .  
L(l2lnukaurer, 1) -0.134294   0.052170  -2.574 0.010508 *  
L(lnukauirp, 1)    0.004801   0.026091   0.184 0.854125    
L(lnukauirn, 1)    0.008991   0.006152   1.462 0.144878    
L(lnukaum3p, 1)    0.017797   0.011169   1.593 0.112075    
L(lnukaum3n, 1)    0.164101   0.625141   0.263 0.793107    
L(lnukaugdpp, 1)   0.001361   0.011249   0.121 0.903762    
L(lnukaugdpn, 1)   0.001930   0.037729   0.051 0.959235    
L(lnukauexpp, 1)   0.010468   0.003628   2.882 0.017097 *  
L(lnukauexpn, 1)  -0.013101   0.007589  -1.726 0.085266 .  
d(l2lnukaurer)    -0.273680   0.078254  -3.497 0.000538 ***
d(lnukauirp)       0.105516   0.051469   2.050 0.041187 *  
d(lnukauirn)       0.300780   0.038667   7.779 1.07e-13 ***
d(lnukaum3p)      -0.215961   0.168135  -1.284 0.199935    
d(lnukaum3n)      -2.269823   1.206975  -1.881 0.060956 .  
d(lnukaugdpp)      0.007008   0.007936   0.883 0.377886    
d(lnukaugdpn)     -0.013586   0.026263  -0.517 0.605325    
d(lnukauexpp)     -0.006306   0.001666  -3.937 0.589172 *  
d(lnukauexpn)     -0.017474   0.015719  -1.112 0.267139    
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02324 on 317 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.2095 


 model diagnostic tests:
        JB test   LM test ARCH test
Stat   0.9963565 7.2375939 0.1386983
Pvalue 0.6452851 0.2265616 0.7095785
lags   0.0000000 1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 13.497103 Pvalue: 0.001740258
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST
```

```
 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 6.1500696219502193

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                 Estimate  Std. Error t value Pr(>|t|)
lnukauexp_p      0.150138    0.059415 -3.0974   0.0035 **
lnukauexp_n     -0.139336    0.068329 -2.1652   0.0054 **
lnukauirp        6.596803    2.236298  2.9516   0.0020 **
lnukauirn       18.597831    7.380167  2.5765   0.0072 **
lnukaum3p      -12.472564    5.091558 -2.7751   0.0083 **
lnukaum3n      116.833243   35.485471 -3.3123   0.0085 **
lnukaugdpp       0.305602    0.115176  2.7260   0.0051 **
lnukaugdpn      -0.692689    0.258763 -2.7641   0.0062 **
==============================================================
 Long Run Asymmety test
 W-stat: 11087.8 Pvalue: 0
==============================================================
```

UK-New Zealand:

nuknz <- nardl::nardl(lnuknzrer ~ lnuknzexp | lnuknzirp + lnuknzirn + lnuknzm3p + lnuknzm3n + Dlnuknzgdpp + Dlnuknzgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nuknz)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = 
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max 
-0.058543 -0.013392 -0.001055  0.013258  0.063684 

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.0094528  0.0047819   1.977   0.0489 *
L(lnuknzrer, 1)   -0.1228442  0.0555201  -2.213   0.0276 *
```

```
L(lnuknzirp, 1)   -0.0208446  0.0322669  -0.646   0.5187
L(lnuknzirn, 1)    0.0147584  0.0062118   2.376   0.0181 *
L(lnuknzm3p, 1)    0.0016766  0.0139910   0.120   0.9047
L(lnuknzm3n, 1)    0.2589498  0.1090149   2.375   0.0181 *
L(Dlnuknzgdpp, 1) -0.0062572  0.0177471  -0.353   0.7246
L(Dlnuknzgdpn, 1) -0.0055599  0.0174970  -0.318   0.7509
L(lnuknzexpp, 1)   0.0036117  0.0011905   3.276   0.0171 *
L(lnuknzexpn, 1)   0.0060943  0.0099062   0.615   0.5389
d(l2lnuknzrer)    -0.1373416  0.0825098  -1.665   0.0970 .
d(lnuknzirp)       0.0274971  0.0604329   0.455   0.6494
d(lnuknzirn)       0.1561571  0.0326117   4.788  2.6e-06 ***
d(lnuknzm3p)      -0.0862700  0.1375021  -0.627   0.5308
d(lnuknzm3n)      -0.3929278  0.3343790  -1.175   0.2408
d(Dlnuknzgdpp)     0.0028069  0.0132794   0.211   0.8327
d(Dlnuknzgdpn)     0.0006369  0.0117483   0.054   0.9568
d(lnuknzexpp)     -0.0015916  0.0006973  -2.501   0.0448 *
d(lnuknzexpn)      0.0175300  0.0151767   1.155   0.2489
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02162 on 318 degrees of freedom
Adjusted R-squared:  0.1330


 model diagnostic tests:
        JB test   LM test  ARCH test
Stat   0.9955182 3.7454539 3.09535269
Pvalue 0.4538410 0.3036211 0.07851614
lags   0.0000000 1.0000000 1.00000000
==============================================================
 Short Run Asymmety test
 W-stat: 8.784942 Pvalue: 0.04096422
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.46197815051125

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                Estimate Std. Error t value Pr(>|t|)
```

```
lnuknzexp_p    -0.039459   0.013919  3.0508  0.00249 **
lnuknzexp_n    -0.044322   0.016187  2.7641  0.00281 **
lnuknzirp       0.890035   0.256010  3.5691  0.00734 **
lnuknzirn       7.393748   2.023290  3.6577  0.00066 **
lnuknzm3p      -4.116098   1.340813 -3.0691  0.00516 **
lnuknzm3n      16.135259   5.093737 -3.2039  0.00345 **
Dlnuknzgdpp     0.218681   0.086784  2.6227  0.00709 **
Dlnuknzgdpn     0.022153   0.006377  3.6631  0.00965 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 3391.967 Pvalue: 0
==============================================================
```

UK-Sweden:

nukse <- nardl::nardl(lnukserer ~ lnukseexp | lnukseirp + lnukseirn + lnuksem3p + lnuksem3n + Dlnuksegdpp + Dlnuksegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nukse)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.054848 -0.011123  0.000328  0.012647  0.060162

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)        -0.0000306  0.0046699  -0.007  0.99478
L(lnukserer, 1)    -0.0927613  0.0541503  -1.713  0.08770 .
L(lnukseirp, 1)     0.0006634  0.0065676   0.101  0.91960
L(lnukseirn, 1)     0.0109532  0.0113859   0.962  0.33679
L(lnuksem3p, 1)    -0.0102947  0.0278863  -0.369  0.71225
L(lnuksem3n, 1)    -0.0129320  0.0258747  -0.500  0.61757
L(Dlnuksegdpp, 1)   0.0312637  0.0116239   2.690  0.00754 **
L(Dlnuksegdpn, 1)  -0.0006186  0.0125649  -0.049  0.96076
L(lnukseexpp, 1)    0.0038021  0.0013556   2.873  0.03833 *
L(lnukseexpn, 1)    0.0059686  0.0073574   0.811  0.41784
d(l2lnukserer)     -0.1583617  0.0796363  -1.989  0.04762 *
d(lnukseirp)        0.1107334  0.0246378   4.494 9.83e-06 ***
d(lnukseirn)        0.1291168  0.0450897   2.864  0.00447 **
d(lnuksem3p)        0.1103405  0.1310227   0.842  0.40035
d(lnuksem3n)       -0.1011982  0.1351406  -0.749  0.45452
d(Dlnuksegdpp)      0.0282591  0.0083974   3.365  0.00086 ***
d(Dlnuksegdpn)     -0.0065277  0.0093443  -0.699  0.48534
d(lnukseexpp)       0.0025152  0.0071579   0.351  0.72553
d(lnukseexpn)      -0.0086455  0.0126784  -0.682  0.49580
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 0.01941 on 316 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.1169



 model diagnostic tests:
         JB test   LM test ARCH test
Stat   0.9963764 2.0903804 0.2555515
Pvalue 0.6523892 0.3852192 0.6131930
lags   0.0000000 1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 15.164802 Pvalue: 0.0055054811
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 333
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37



 F-statistic = 3.74753119719458

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
              Estimate Std. Error t value Pr(>|t|)
lnukseexp_p  -0.094886    0.03081 -3.1344   0.0032 **
lnukseexp_n  -0.099620    0.03207  3.1125   0.0038 **
lnukseirp      5.45248    1.32232  4.1215   0.0020 **
lnukseirn      5.99089    1.94743  3.0809   0.0022 **
lnuksem3p      6.03784    2.04256  2.9599   0.0044 **
lnuksem3n     -5.11274    1.30172 -3.9302   0.0048 **
Dlnuksegdpp    1.31388    0.27086  4.8519   0.0021 **
Dlnuksegdpn   -0.33370    0.12755 -2.7525   0.0052 **
==============================================================
 Long Run Asymmety test
 W-stat: 7291.844 Pvalue: 0
==============================================================
```

Canada-Australia:

ncaau <- nardl::nardl(lncaaurer ~ lncaauexp | lncaauirp + lncaauirn + lncaaum3p + lncaaum3n + lncaaugdpp + lncaaugdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(ncaau)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max 
-0.051706 -0.011405 -0.000628  0.012346  0.042538 

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)    
(Intercept)        2.125e-03  3.778e-03   0.563 0.574112    
L(lncaaurer, 1)   -1.772e-01  5.569e-02  -3.182 0.001609 ** 
L(lncaauirp, 1)   -3.634e-03  1.545e-02  -0.235 0.814162    
L(lncaauirn, 1)    2.562e-03  3.993e-03   0.642 0.521623    
L(lncaaum3p, 1)   -3.719e-03  7.570e-03  -0.491 0.623542    
L(lncaaum3n, 1)   -3.087e-02  2.364e-01  -0.131 0.896192    
L(lncaaugdpp, 1)  -2.660e-03  7.798e-03  -0.341 0.733248    
L(lncaaugdpn, 1)   3.224e-02  3.644e-02   0.885 0.377025    
L(lncaauexpp, 1)   9.941e-04  5.439e-03   0.183 0.855094    
L(lncaauexpn, 1)   3.750e-03  2.832e-03   1.324 0.186365    
d(l2lncaaurer)    -3.174e-01  8.343e-02  -3.805 0.000171 ***
d(lncaauirp)       3.032e-02  5.071e-02   0.598 0.550292    
d(lncaauirn)       9.447e-02  2.550e-02   3.704 0.000251 ***
d(lncaaum3p)      -1.182e-01  1.634e-01  -0.723 0.470013    
d(lncaaum3n)       1.568e-01  7.682e-01   0.204 0.838348    
d(lncaaugdpp)     -3.131e-04  5.710e-03  -0.055 0.956306    
d(lncaaugdpn)      3.182e-02  2.610e-02   1.219 0.223672    
d(lncaauexpp)     -3.218e-05  9.312e-03  -0.003 0.997245    
d(lncaauexpn)     -2.280e-03  3.767e-03  -0.605 0.545506    
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01755 on 319 degrees of freedom
Adjusted R-squared:  0.1081 


 model diagnostic tests:
        JB test  LM test ARCH test
Stat   0.9955631 8.974111 1.3833196
Pvalue 0.4607828 0.205108 0.2395365
lags   0.0000000 1.000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 5.229839 Pvalue: 0.07317367
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 335
```

```
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 5.37142085237467

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
             Estimate Std. Error t value Pr(>|t|)
lncaauexp_p  -0.019247   0.004284  4.6321  0.00732 **
lncaauexp_n  -0.011082   0.003481  3.2535  0.00209 **
lncaauirp     1.007207   0.217996  4.7669  0.00827 **
lncaauirn     2.471350   0.724947  3.3375  0.00364 **
lncaaum3p    -3.962200   1.252266 -3.1685  0.00370 **
lncaaum3n     4.608256   1.486419  3.1085  0.00214 **
lncaaugdpp    0.017192   0.004130  4.2518  0.00513 **
lncaaugdpn    0.700369   0.259679  2.8117  0.00838 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 2669.555 Pvalue: 0
==============================================================
```

Canada-New Zealand:

ncanz <- nardl::nardl(lncanzrer ~ lncanzexp | lncanzirp + lncanzirn + lncanzm3p + lncanzm3n + Dlncanzgdpp + Dlncanzgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(ncanz)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.060478 -0.013041  0.000564  0.012546  0.063051

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -2.004e-03  4.703e-03  -0.426 0.670265
L(lncanzrer, 1)   -1.883e-01  5.634e-02  -3.343 0.000929 ***
```

```
L(lncanzirp, 1)   -1.343e-02  2.994e-02  -0.448 0.654129
L(lncanzirn, 1)    9.492e-04  5.755e-03   0.165 0.869096
L(lncanzm3p, 1)   -3.014e-02  3.138e-02  -0.961 0.337437
L(lncanzm3n, 1)    1.893e-01  2.337e-01   0.810 0.418718
L(Dlncanzgdpp, 1) -1.089e-02  1.611e-02  -0.676 0.499720
L(Dlncanzgdpn, 1)  5.050e-03  1.566e-02   0.322 0.747342
L(lncanzexpp, 1)   3.050e-03  4.461e-03   0.684 0.494647
L(lncanzexpn, 1)   4.943e-05  3.199e-03   0.015 0.987681
d(l2lncanzrer)    -1.730e-01  8.645e-02  -2.001 0.046256 *
d(lncanzirp)       3.904e-03  6.569e-02   0.059 0.952648
d(lncanzirn)       6.095e-02  2.608e-02   2.337 0.020062 *
d(lncanzm3p)      -7.988e-03  1.584e-01  -0.050 0.959820
d(lncanzm3n)       4.799e-02  4.802e-01   0.100 0.920454
d(Dlncanzgdpp)     4.922e-03  1.109e-02   0.444 0.657530
d(Dlncanzgdpn)    -4.606e-03  1.039e-02  -0.443 0.657958
d(lncanzexpp)      2.450e-04  9.492e-03   0.026 0.979422
d(lncanzexpn)      2.966e-03  4.595e-03   0.646 0.519069
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02042 on 324 degrees of freedom
Adjusted R-squared:  0.03593


 model diagnostic tests:
         JB test    LM test ARCH test
Stat   0.9955116 11.8928883 2.4643831
Pvalue 0.4524668  0.1796743 0.1164534
lags   0.0000000  1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 11.181865 Pvalue: 0.005638107
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 6.517162355179704

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
            Estimate Std. Error t value Pr(>|t|)
```

```
lncanzexp_p -0.07360    0.01868  3.8888   0.0048 **
lncanzexp_n -0.06881    0.01949  3.6255   0.0082 **
lncanzirp   -0.67945    0.11902 -5.7709   0.0088 **
lncanzirn    0.34211    0.11864  3.0916   0.0074 **
lncanzm3p   -5.77682    1.22403 -4.7281   0.0033 **
lncanzm3n    9.38647    2.38083  3.9443   0.0082 **
Dlncanzgdpp  0.53348    0.13274  4.0766   0.0055 **
Dlncanzgdpn -0.22192    0.06457 -3.4367   0.0074 **
==============================================================
 Long Run Asymmety test
 W-stat: 7686.973 Pvalue: 0
==============================================================
```

Canada-Sweden:

ncase <- nardl::nardl(lncaserer ~ lncaseexp | lncaseirp + lncaseirn + lncasem3p + lncasem3n + Dlncasegdpp + Dlncasegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(ncase)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.052775 -0.010877 -0.000199  0.010573  0.047314

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -0.0015883  0.0031684  -0.501   0.6165
L(lncaserer, 1)   -0.0997442  0.0556549  -1.792   0.0741 .
L(lncaseirp, 1)    0.0022229  0.0034422   0.646   0.5189
L(lncaseirn, 1)    0.0092507  0.0076394   1.211   0.2268
L(lncasem3p, 1)   -0.4633969  0.5928852  -0.782   0.4350
L(lncasem3n, 1)   -0.0205094  0.0142763  -1.437   0.1518
L(Dlncasegdpp, 1)  0.0009268  0.0108463   0.085   0.9320
L(Dlncasegdpn, 1)  0.0067906  0.0104815   0.648   0.5175
L(lncaseexpp, 1)   0.0037196  0.0062546   0.595   0.5525
L(lncaseexpn, 1)   0.0030133  0.0032580   0.925   0.3557
d(l2lncaserer)    -0.1835073  0.0818955  -2.241   0.0257 *
d(lncaseirp)       0.0442412  0.0209183   2.115   0.0352 *
d(lncaseirn)       0.0131770  0.0227660   0.579   0.5631
d(lncasem3p)      -1.1808771  0.7533488  -1.568   0.1180
d(lncasem3n)      -0.0853544  0.0846898  -1.008   0.3143
d(Dlncasegdpp)     0.0046428  0.0076730   0.605   0.5456
d(Dlncasegdpn)     0.0003026  0.0078507   0.039   0.9693
d(lncaseexpp)      0.0093470  0.0032772   2.906   0.0199 *
d(lncaseexpn)      0.0006249  0.0044933   0.139   0.8895
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01685 on 324 degrees of freedom
Adjusted R-squared:  0.04669
```

```
 model diagnostic tests:
         JB test   LM test ARCH test
Stat   0.9974547 3.6031056 0.2226636
Pvalue 0.8885663 0.3086791 0.6370178
lags   0.0000000 1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 12.05698029 Pvalue: 0.0019719119
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 5.16108737259667

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
              Estimate Std. Error t value Pr(>|t|)
lncaseexp_p  -0.007402   0.002634  2.8496   0.0024 **
lncaseexp_n   0.010273   0.003176  3.2934   0.0031 **
lncaseirp     0.347322   0.129188  2.8333   0.0039 **
lncaseirn     0.792638   0.282831  2.8232   0.0065 **
lncasem3p   -87.785981  27.980204 -3.2259   0.0028 **
lncasem3n    -1.725676   0.578186 -3.0175   0.0081 **
Dlncasegdpp   0.264927   0.044548  6.0237   0.0038 **
Dlncasegdpn  -0.098602   0.018168 -5.4484   0.0079 **
==============================================================
 Long Run Asymmety test
 W-stat: 656.4691 Pvalue: 2.815455e-143
==============================================================
```

<u>Australia-New Zealand:</u>

naunz <- nardl::nardl(lnaunzrer ~ lnaunzexp | lnaunzirp + lnaunzirn + lnaunzm3p + lnaunzm3n + Dlnaunzgdpp + Dlnaunzgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(naunz)

```
NARDL model:
```

```
Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.092978 -0.011791  0.000663  0.013452  0.048512

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -0.0202323  0.0051281  -3.945 9.84e-05 ***
L(lnaunzrer, 1)   -0.2753452  0.0548405  -5.021 8.65e-07 ***
L(lnaunzirp, 1)    0.0430249  0.0194582   2.211 0.027748 *
L(lnaunzirn, 1)    0.0023991  0.0137531   0.174 0.861634
L(lnaunzm3p, 1)    0.2881483  0.1876987   1.535 0.125754
L(lnaunzm3n, 1)   -0.0167810  0.0096790  -1.734 0.083948 .
L(Dlnaunzgdpp, 1) -0.0038237  0.0109924  -0.348 0.728184
L(Dlnaunzgdpn, 1)  0.0169058  0.0121736   1.389 0.165903
L(lnaunzexpp, 1)   0.0065689  0.0024691   2.756 0.001217 **
L(lnaunzexpn, 1)  -0.0002634  0.0060489  -0.044 0.965293
d(l2lnaunzrer)    -0.3479166  0.0843042  -4.127 4.72e-05 ***
d(lnaunzirp)       0.2275446  0.0674431   3.374 0.000834 ***
d(lnaunzirn)       0.0568879  0.0338368   1.681 0.093713 .
d(lnaunzm3p)       0.1853649  0.5690797   0.326 0.744848
d(lnaunzm3n)       0.2504033  0.1472974   1.700 0.090127 .
d(Dlnaunzgdpp)    -0.0026282  0.0076487  -0.344 0.731368
d(Dlnaunzgdpn)     0.0119449  0.0086028   1.388 0.165975
d(lnaunzexpp)     -0.0074566  0.0030909  -2.465 0.012712 **
d(lnaunzexpn)      0.0024928  0.0103666   0.240 0.810125
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.0195 on 318 degrees of freedom
Adjusted R-squared:  0.1308


 model diagnostic tests:
          JB test    LM test ARCH test
Stat   3.281713412 27.9573293 2.2040604
Pvalue 0.894702638  0.1189961 0.1376477
lags   0.000000000  1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 13.915968 Pvalue: 0.00560735
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
```

```
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.91033416333063

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                Estimate Std. Error t value Pr(>|t|)
lnaunzexp_p   -0.0402860  0.0112499  3.6368 0.003588 **
lnaunzexp_n    0.0356260  0.0070678  5.1449 0.002255 **
lnaunzirp      2.1195480  0.7403239  2.8630 0.004196 **
lnaunzirn      0.6228775  0.3060886  2.0350 0.041855 *
lnaunzm3p     -0.7984895  0.2466379 -3.2414 0.001762 **
lnaunzm3n      1.8116616  0.6130212  2.9598 0.007659 **
Dlnaunzgdpp   -0.0376514  0.0072174 -5.2851 0.005381 **
Dlnaunzgdpn    0.0854952  0.0269912  3.1745 0.006803 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 351.5059 Pvalue: 4.693192e-77
==============================================================
```

Australia-Sweden:

nause <- nardl::nardl(lnauserer ~ lnauseexp | lnauseirp + lnauseirn + lnausem3p + lnausem3n + Dlnausegdpp + Dlnausegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nause)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.097689 -0.011612  0.002035  0.012106  0.056004

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)       -0.004829   0.004982  -0.969  0.33319
L(lnauserer, 1)   -0.216094   0.054031  -3.999 7.93e-05 ***
L(lnauseirp, 1)    0.006503   0.004355   1.493  0.13640
L(lnauseirn, 1)   -0.009843   0.012703  -0.775  0.43899
L(lnausem3p, 1)   -0.819633   0.796429  -1.029  0.30421
L(lnausem3n, 1)    0.009514   0.012691   0.750  0.45403
```

```
L(Dlnausegdpp, 1) -0.009492   0.011614  -0.817  0.41437
L(Dlnausegdpn, 1)  0.014875   0.010507   1.416  0.15786
L(lnauseexpp, 1)   0.004650   0.003902   1.192  0.23426
L(lnauseexpn, 1)   0.002172   0.004252   0.511  0.60985
d(l2lnauserer)    -0.441528   0.081098  -5.444 1.05e-07 ***
d(lnauseirp)       0.072643   0.023934   3.035  0.00261 **
d(lnauseirn)      -0.007939   0.068511  -0.116  0.90782
d(lnausem3p)      -0.091928   1.742220  -0.053  0.95795
d(lnausem3n)      -0.005507   0.106576  -0.052  0.95882
d(Dlnausegdpp)    -0.003068   0.007666  -0.400  0.68929
d(Dlnausegdpn)     0.006189   0.007763   0.797  0.42593
d(lnauseexpp)      0.001073   0.003217   3.343  0.00836 **
d(lnauseexpn)     -0.002330   0.007759  -0.300  0.76421
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02053 on 322 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.06381


 model diagnostic tests:
           JB test    LM test    ARCH test
Stat   5.2854980476 15.7242422 0.0009180311
Pvalue 0.9837002245  0.1572653 0.9758285719
lags   0.0000000000  1.0000000 1.0000000000
==============================================================
 Short Run Asymmety test
 W-stat: 14.439044 Pvalue: 0.0053714
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 333
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.97486072422903

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
               Estimate Std. Error t value Pr(>|t|)
lnauseexp_p    -0.043744   0.014503 -3.0714   0.0034 **
lnauseexp_n    -0.048025   0.012145  3.3396   0.0070 **
lnauseirp       0.107705   0.034493  3.1358   0.0082 **
```

```
lnauseirn      -0.224435   0.070136 -3.1435   0.0086 **
lnausem3p     -10.606197   3.789060 -2.8293   0.0069 **
lnausem3n       0.229855   0.049226  4.4823   0.0064 **
Dlnausegdpp    -0.082738   0.024326 -3.3355   0.0057 **
Dlnausegdpn     0.165901   0.047368  3.5125   0.0027 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 584.9256 Pvalue: 9.66095e-128
==============================================================
```

New Zealand-Sweden:

nnzse <- nardl::nardl(lnnzserer ~ lnnzseexp | lnnzseirp + lnnzseirn + lnnzsem3p + lnnzsem3n + Dlnnzsegdpp + Dlnnzsegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nnzse)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.054023 -0.014071  0.000417  0.013140  0.054237

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.0012409  0.0040882   0.304 0.761680
L(lnnzserer, 1)   -0.2103898  0.0557278  -3.775 0.000191 ***
L(lnnzseirp, 1)    0.0011161  0.0041595   0.268 0.788622
L(lnnzseirn, 1)   -0.0133518  0.0202643  -0.659 0.510455
L(lnnzsem3p, 1)    0.9435038  0.9673881   0.975 0.330159
L(lnnzsem3n, 1)    0.0382217  0.0206616   1.850 0.065273 .
L(Dlnnzsegdpp, 1)  0.0004964  0.0133654   0.037 0.970396
L(Dlnnzsegdpn, 1) -0.0250523  0.0132275  -1.894 0.059153 .
L(lnnzseexpp, 1)   0.0076443  0.0040625   1.882 0.060809 .
L(lnnzseexpn, 1)   0.0013175  0.0042674   0.309 0.757726
d(l2lnnzserer)    -0.2614283  0.0848439  -3.081 0.002244 **
d(lnnzseirp)       0.0283048  0.0215203   1.315 0.189385
d(lnnzseirn)      -0.0122116  0.0605663  -0.202 0.840341
d(lnnzsem3p)      -1.1515842  1.3938519  -0.826 0.409327
d(lnnzsem3n)       0.0847825  0.0974406   0.870 0.384916
d(Dlnnzsegdpp)    -0.0019248  0.0090511  -0.213 0.831734
d(Dlnnzsegdpn)    -0.0072493  0.0099727  -0.727 0.467824
d(lnnzseexpp)      0.0088936  0.0025291   3.521 0.004128 **
d(lnnzseexpn)     -0.0020311  0.0006030  -3.336 0.003518 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02011 on 324 degrees of freedom
Adjusted R-squared:  0.06224
```

```
 model diagnostic tests:
         JB test    LM test ARCH test
Stat   0.9972125 19.2845022 1.6738893
Pvalue 0.8424272  0.1425386 0.1957384
lags   0.0000000  1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 6.331568 Pvalue: 0.04218105
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 -------------------------------------------------------
 -                       F-test                        -
 -------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.52449551246047

 -------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
             Estimate Std. Error t value Pr(>|t|)
lnnzseexp_p  0.057924   0.011822  5.1815 0.008031 **
lnnzseexp_n -0.121848   0.031511  3.8709 0.007185 **
lnnzseirp    0.019645   0.006862  2.7992 0.005065 **
lnnzseirn   -0.458710   0.146525 -3.2607 0.002786 **
lnnzsem3p    6.235738   1.614168  3.8669 0.001331 **
lnnzsem3n    0.563278   0.204987  2.7479 0.005998 **
Dlnnzsegdpp  0.035550   0.006968  5.0724 0.009631 **
Dlnnzsegdpn -0.025944   0.007019 -3.5724 0.008455 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 921.3733 Pvalue: 8.439685e-201
==============================================================
```

US-Euro Area:

nuseu <- nardl::nardl(lnuseurer ~ lnuseuexp | lnuseuirp + lnuseuirn + lnuseum3p + lnuseum3n + lnuseugdpp + lnuseugdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nuseu)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.079797 -0.014617  0.000415  0.014325  0.102125

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.0040721  0.0077895   0.523  0.60151
L(lnuseurer, 1)   -0.3240652  0.0564217  -5.744 2.21e-08 ***
L(lnuseuirp, 1)    0.0007506  0.0043278   0.173  0.86242
L(lnuseuirn, 1)    0.0066978  0.0081010   0.827  0.40899
L(lnuseum3p, 1)   -0.0228954  0.0340707  -0.672  0.50209
L(lnuseum3n, 1)    0.0612494  0.0470669   1.301  0.19411
L(lnuseugdpp, 1)   0.0021349  0.0115616   0.185  0.85362
L(lnuseugdpn, 1)   0.1667881  0.3596907   0.464  0.64319
L(lnuseuexpp, 1)   0.0076803  0.0055712   1.379  0.16902
L(lnuseuexpn, 1)   0.0199596  0.0334790   0.596  0.55149
d(l2lnuseurer)    -0.4164561  0.0901214  -4.621 5.60e-06 ***
d(lnuseuirp)      -0.0453209  0.0277381  -1.634  0.10330
d(lnuseuirn)       0.0860412  0.0329113   2.614  0.00938 **
d(lnuseum3p)      -0.3894274  0.3822289  -1.019  0.30907
d(lnuseum3n)      -0.0094266  0.2452712  -0.038  0.96937
d(lnuseugdpp)      0.0011327  0.0084469   0.134  0.89341
d(lnuseugdpn)      0.2045867  0.2510992   0.815  0.41583
d(lnuseuexpp)     -0.0134043  0.0105893  -1.266  0.20652
d(lnuseuexpn)     -0.0004951  0.0368165  -0.013  0.98928
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02511 on 323 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.06469


 model diagnostic tests:
          JB test   LM test  ARCH test
Stat   0.98988658 30.809483 3.76657561
Pvalue 0.02086845  0.113476 0.05228657
lags   0.00000000  1.000000 1.00000000
==============================================================
 Short Run Asymmety test
 W-stat: 9.457517 Pvalue: 0.008137434
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
```

```
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 4.86216187003682

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
               Estimate Std. Error t value Pr(>|t|)
lnuseuexp_p    0.196367   0.140109  1.3014  0.19313
lnuseuexp_n   -1.293814   0.572904 -2.2523  0.02431 *
lnuseuirp      0.075033   0.111750  0.6686  0.50377
lnuseuirn      0.271485   0.222016  1.2410  0.21460
lnuseum3p     -0.349680   1.169600 -0.3125  0.75466
lnuseum3n      2.628722   1.011151  2.5710  0.01014 *
lnuseugdpp     0.063757   0.228190  0.2889  0.77263
lnuseugdpn     6.180549   6.969888  0.8956  0.37047
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 6328.571 Pvalue: 0
==============================================================
```

US-Switzerland:

nusch <- nardl::nardl(lnuschrer ~ lnuschexp | Dlnuschirp + Dlnuschirn + Dlnuschm3p + Dlnuschm3n + Dlnuschgdpp + Dlnuschgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nusch)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.075044 -0.013407  0.001164  0.014660  0.103139

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -0.0018181  0.0046745  -0.389 0.697589
L(lnuschrer, 1)   -0.2086530  0.0575676  -3.624 0.000338 ***
L(lnuschirp, 1)    0.0017685  0.0017296   1.023 0.307335
L(lnuschirn, 1)   -0.0020208  0.0252908  -0.080 0.936365
L(Dlnuschm3p, 1)  -0.4107485  0.2902796  -1.415 0.158066
L(Dlnuschm3n, 1)  -0.3356176  0.5187539  -0.647 0.518129
L(Dlnuschgdpp, 1) -0.0218580  0.0146022  -1.497 0.135434
```

```
L(Dlnuschgdpn, 1) -0.0007266  0.0146520  -0.050 0.960482
L(lnuschexpp, 1)   0.0047193  0.0053500   0.882 0.378401
L(lnuschexpn, 1)   0.0509898  0.0255331   1.997 0.046695 *
d(l2lnuschrer)    -0.2709125  0.0879438  -3.081 0.002251 **
d(lnuschirp)      -0.0168856  0.0083218  -2.029 0.043300 *
d(lnuschirn)       0.1059592  0.1403421   0.755 0.450816
d(Dlnuschm3p)     -0.5055811  0.2563977  -1.972 0.049511 *
d(Dlnuschm3n)     -0.5308772  0.3805385  -1.395 0.163991
d(Dlnuschgdpp)    -0.0107347  0.0108105  -0.993 0.321491
d(Dlnuschgdpn)    -0.0016713  0.0101156  -0.165 0.868882
d(lnuschexpp)     -0.0067639  0.0118041  -0.573 0.567051
d(lnuschexpn)      0.0360772  0.0342024   1.055 0.292329
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02156 on 324 degrees of freedom
Adjusted R-squared:  0.04372


 model diagnostic tests:
            JB test    LM test   ARCH test
Stat   0.9803023378 14.1832166 27.71935129
Pvalue 0.0001536857  0.1652285 0.544137231
lags   0.0000000000  1.0000000 1.000000000
==============================================================
 Short Run Asymmety test
 W-stat: 6.205061 Pvalue: 0.0418246
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37



 F-statistic = 4.112590409686438

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
             Estimate Std. Error t value Pr(>|t|)
lnuschexp_p   1.27874   1.74723  0.6882   0.4913
lnuschexp_n   1.35208   1.78880  0.7120   0.4765
Dlnuschirp   -1.61790   2.40442 -0.6618   0.5081
Dlnuschirn   -0.88279   2.29892 -0.3693   0.7119
```

```
Dlnuschm3p  -38.59336  63.00535 -0.5931   0.5531
Dlnuschm3n  -67.02351  97.99772 -0.6780   0.4978
Dlnuschgdpp  -0.47158   1.35015 -0.3522   0.7247
Dlnuschgdpn   0.28373   1.22052  0.2459   0.8058
==============================================================
 Long Run Asymmety test
 W-stat: 17483.64 Pvalue: 0
==============================================================
```

Euro Area-Switzerland:

neuch <- nardl::nardl(lneuchrer ~ lneuchexp | Dlneuchirp + Dlneuchirn + Dlneuchm3p + Dlneuchm3n + Dlneuchgdpp + Dlneuchgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(neuch)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.066719 -0.008241  0.000143  0.008885  0.065115

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.001446   0.002196   0.658   0.5107
L(lneuchrer, 1)   -0.264967   0.056312  -4.705 3.81e-06 ***
L(Dlneuchirp, 1)  -0.058633   0.011475  -5.110 5.63e-07 ***
L(Dlneuchirn, 1)   0.002234   0.020450   0.109   0.9131
L(Dlneuchm3p, 1)   0.140998   0.248382   0.568   0.5707
L(Dlneuchm3n, 1)   0.241394   0.270356   0.893   0.3726
L(Dlneuchgdpp, 1) -0.004652   0.013470  -0.345   0.7301
L(Dlneuchgdpn, 1)  0.007441   0.013348   0.557   0.5776
L(lneuchexpp, 1)   0.001989   0.004221   0.471   0.6378
L(lneuchexpn, 1)   0.003030   0.005703   0.531   0.5955
d(l2lneuchrer)    -0.381200   0.085737  -4.446 1.22e-05 ***
d(Dlneuchirp)     -0.060466   0.007819  -7.733 1.45e-13 ***
d(Dlneuchirn)      0.015772   0.014369   1.098   0.2732
d(Dlneuchm3p)     -0.078312   0.179112  -0.437   0.6622
d(Dlneuchm3n)      0.489548   0.207950   2.354   0.0192 *
d(Dlneuchgdpp)    -0.001717   0.009829  -0.175   0.8614
d(Dlneuchgdpn)     0.003963   0.009340   0.424   0.6716
d(lneuchexpp)     -0.008853   0.008288  -1.068   0.2863
d(lneuchexpn)      0.001496   0.008777   0.170   0.8648
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01567 on 324 degrees of freedom
Adjusted R-squared:  0.1893


 model diagnostic tests:
            JB test    LM test    ARCH test
```

```
Stat   9.6072930254 19.0302194 0.1280430175
Pvalue 0.0000001624  0.1434561 0.3458235545
lags   1.0000000000  1.0000000 1.0000000000
==============================================================
 Short Run Asymmety test
 W-stat: 6.125081 Pvalue: 0.045576842
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 8.40633738554273

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
            Estimate Std. Error t value Pr(>|t|)
lneuchexp_p  0.11750    0.17983  0.6534  0.51348
lneuchexp_n  0.14088    0.18134  0.7769  0.43723
Dlneuchirp  -3.45195    1.86713 -1.8488  0.06449 .
Dlneuchirn   1.15096    0.94592  1.2168  0.22370
Dlneuchm3p  -0.14935    9.92581 -0.0150  0.98800
Dlneuchm3n  19.77484   16.31006  1.2124  0.22535
Dlneuchgdpp -0.46807    0.55809 -0.8387  0.40163
Dlneuchgdpn  0.27227    0.51960  0.5240  0.60028
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 6645.329 Pvalue: 0
==============================================================
```

Nonlinear ARDL Model Results with Survey Expectations (including Bounds Test, Wald Test for Parameter Symmetry, ARCH-LM Test, Jarque-Bera Test and LM Test for Serial Correlation):

UK-Canada:

nukcas <- nardl::nardl(lnukcarer ~ lnukcasexp | lnukcairp + lnukcairn + lnukcam3p + lnukcam3n + lnukcagdpp + lnukcagdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nukcas)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = 
na.exclude)

Residuals:
     Min       1Q   Median       3Q      Max 
-0.05388 -0.01096  0.00016  0.01152  0.07659 

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)    
(Intercept)        0.008662   0.006205   1.396  0.16372    
L(lnukcarer, 1)   -0.174787   0.052672  -3.318  0.00101 ** 
L(lnukcairp, 1)    0.012352   0.007932   1.557  0.12042    
L(lnukcairn, 1)    0.019721   0.011809   1.670  0.09590 .  
L(lnukcam3p, 1)   -0.056600   0.018617  -3.040  0.00256 ** 
L(lnukcam3n, 1)    0.064165   0.037908   1.693  0.09151 .  
L(lnukcagdpp, 1)   0.033896   0.016951   2.000  0.04640 *  
L(lnukcagdpn, 1)  -0.047245   0.015900  -2.971  0.00319 ** 
L(lnukcasexpp, 1)  0.002588   0.001230   2.121  0.02630 ** 
L(lnukcasexpn, 1) -0.003119   0.002104  -1.560  0.07781 .  
d(l2lnukcarer)    -0.232809   0.079786  -2.918  0.00378 ** 
d(lnukcairp)       0.118986   0.028740   4.140 4.47e-05 ***
d(lnukcairn)       0.087912   0.033366   2.635  0.00884 ** 
d(lnukcam3p)      -0.319110   0.145345  -2.196  0.02886 *  
d(lnukcam3n)      -0.589341   0.283891  -2.076  0.03872 *  
d(lnukcagdpp)      0.028712   0.011822   2.429  0.01572 *  
d(lnukcagdpn)     -0.007380   0.011430  -0.646  0.51897    
d(lnukcasexpp)     0.001450   0.002578   0.563  0.57409    
d(lnukcasexpn)    -0.004517   0.003325  -1.358  0.17530    
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01885 on 316 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.1965 


 model diagnostic tests:
          JB test   LM test ARCH test
Stat   0.99234407 3.4514725 0.0165047
Pvalue 0.08389916 0.3143568 0.8977766
lags   0.00000000 1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 7.59735 Pvalue: 0.02240043
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST
```

```
 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37



 F-statistic = 4.3451110657504

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                 Estimate Std. Error t value Pr(>|t|)
lnukcasexp_p    -0.233361   0.070472  3.2858 0.009588 **
lnukcasexp_n    -0.657115   0.069874 -2.4300 0.015100 *
lnukcairp        2.337193   0.933716  2.5031 0.012311 *
lnukcairn        2.198646   0.906189  2.4263 0.015255 *
lnukcam3p       -5.582271   1.774044 -3.1591 0.001391 **
lnukcam3n      -21.046177   7.622623 -2.7610 0.005762 **
lnukcagdpp       0.620016   0.311531  1.9902 0.046566 *
lnukcagdpn      -0.107006   0.025930 -4.0024 0.007400 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 4186.91 Pvalue: 0
==============================================================
```

UK-Australia:

nukaus <- nardl::nardl(lnukaurer ~ lnukausexp | lnukauirp + lnukauirn + lnukaum3p + lnukaum3n + lnukaugdpp + lnukaugdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nukaus)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.072899 -0.014605 -0.000499  0.015744  0.078824
```

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.002634   0.005726   0.460 0.645876
L(lnukaurer, 1)   -0.166325   0.052626  -3.160 0.001730 **
L(lnukauirp, 1)    0.022275   0.016931   1.316 0.189267
L(lnukauirn, 1)    0.004426   0.005755   0.769 0.442417
L(lnukaum3p, 1)    0.021499   0.011596   1.854 0.064689 .
L(lnukaum3n, 1)    0.045953   0.642741   0.071 0.943049
L(lnukaugdpp, 1)   0.005895   0.011119   0.530 0.596352
L(lnukaugdpn, 1)   0.001582   0.037756   0.042 0.966598
L(lnukausexpp, 1) -0.008772   0.002424  -3.617 0.006813 **
L(lnukausexpn, 1) -0.005444   0.005973  -1.011 0.062789 .
d(l2lnukaurer)    -0.301356   0.078785  -3.825 0.000158 ***
d(lnukauirp)       0.117010   0.049457   2.366 0.018599 *
d(lnukauirn)       0.308911   0.040553   7.617 3.14e-13 ***
d(lnukaum3p)      -0.165488   0.167115  -0.990 0.322816
d(lnukaum3n)      -3.358131   1.221844  -2.748 0.006338 **
d(lnukaugdpp)      0.006853   0.007919   0.865 0.387459
d(lnukaugdpn)     -0.010450   0.026234  -0.398 0.690662
d(lnukausexpp)    -0.006286   0.002459  -2.567 0.027698 **
d(lnukausexpn)     0.004434   0.004448   0.997 0.319589
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02318 on 317 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.2138


 model diagnostic tests:
        JB test  LM test    ARCH test
Stat   0.9967016 7.603377 0.9395822105
Pvalue 0.7282229 0.221484 0.9873583800
lags   0.0000000 1.000000 1.0000000000
==============================================================
 Short Run Asymmety test
 W-stat: 12.395272 Pvalue: 0.00731110654
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 6.51432425474445

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.
```

```
==============================================================

Long-run coefficients
                 Estimate Std. Error t value Pr(>|t|)
lnukausexp_p    -1.564427   0.154655 10.1560  0.00416 **
lnukausexp_n     0.305602   0.094026 -3.3338  0.00508 **
lnukauirp        4.247641   1.207800  3.4608  0.00408 **
lnukauirn       11.338851   3.075355  3.6904  0.00199 **
lnukaum3p       -6.705832   1.932515 -3.4713  0.00339 **
lnukaum3n      -79.366110  24.218983 -3.2938  0.00325 **
lnukaugdpp       0.211434   0.079642  2.6710  0.00748 **
lnukaugdpn      -0.442732   0.148514 -3.1466  0.00067 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 5254.587 Pvalue: 0
=============================================================
```

UK-New Zealand:

nuknzs <- nardl::nardl(lnuknzrer ~ lnuknzsexp | lnuknzirp + lnuknzirn + lnuknzm3p + lnuknzm3n + Dlnuknzgdpp + Dlnuknzgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nuknzs)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.057481 -0.013160 -0.000854  0.012759  0.065327

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)        0.009595   0.004670   2.055  0.04077 *
L(lnuknzrer, 1)   -0.137014   0.053781  -2.548  0.01134 *
L(lnuknzirp, 1)   -0.021403   0.029180  -0.733  0.46383
L(lnuknzirn, 1)    0.020265   0.006363   3.185  0.00160 **
L(lnuknzm3p, 1)    0.006695   0.014341   0.467  0.64091
L(lnuknzm3n, 1)    0.299889   0.103118   2.908  0.00390 **
L(Dlnuknzgdpp, 1) -0.001898   0.017468  -0.109  0.91353
L(Dlnuknzgdpn, 1)  0.001204   0.017285   0.070  0.94451
L(lnuknzsexpp, 1)  0.002350   0.007902   0.297  0.76640
L(lnuknzsexpn, 1) -0.009981   0.003977  -2.510  0.01261 *
d(l2lnuknzrer)    -0.107363   0.081005  -1.325  0.18603
d(lnuknzirp)       0.016132   0.058500   0.276  0.78291
d(lnuknzirn)       0.144255   0.032673   4.415  1.4e-05 ***
d(lnuknzm3p)      -0.147176   0.135509  -1.086  0.27829
d(lnuknzm3n)      -1.167940   0.417420  -2.798  0.00547 **
d(Dlnuknzgdpp)     0.001639   0.012970   0.126  0.89955
```

```
d(Dlnuknzgdpn)     0.005521   0.011737   0.470  0.63840
d(lnuknzsexpp)    -0.005522   0.001669  -2.420  0.04720 **
d(lnuknzsexpn)     0.001482   0.003212   0.461  0.64489
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02172 on 318 degrees of freedom
Adjusted R-squared:  0.1252


 model diagnostic tests:
         JB test   LM test ARCH test
Stat   0.9958698 4.2479777 2.4738659
Pvalue 0.5306039 0.2875783 0.1157529
lags   0.0000000 1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 14.9232996 Pvalue: 0.001430243
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 4.073414362369411

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                 Estimate  Std. Error t value Pr(>|t|)
lnuknzsexp_p   -0.2402410   0.0689169 -4.0737  0.00050 **
lnuknzsexp_n   -0.2186810   0.0687383 -3.0640  0.00488 **
lnuknzirp       0.5101466   0.1399425  3.9230  0.00257 **
lnuknzirn       5.4609576   2.5205860  2.1665  0.03027 *
lnuknzm3p      -3.8892355   1.3308012 -2.8221  0.00101 **
lnuknzm3n     -12.9153859   2.2144667 -5.8474  0.00000 ***
Dlnuknzgdpp     0.1996052   0.0350896  5.4288  0.00040 ***
Dlnuknzgdpn     0.0052462   0.0017368  3.0538  0.00898 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 958.1452 Pvalue: 8.738149e-209
==============================================================
```

UK-Sweden:

nukses <- nardl::nardl(lnukserer ~ lnuksesexp | lnukseirp + lnukseirn + lnuksem3p + lnuksem3n + Dlnuksegdpp + Dlnuksegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nukses)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max 
-0.056187 -0.011479  0.000357  0.013207  0.058237 

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)    
(Intercept)        0.0029933  0.0046052   0.650  0.51618    
L(lnukserer, 1)   -0.1049076  0.0538656  -1.948  0.04236 *  
L(lnukseirp, 1)    0.0001031  0.0063088   0.016  0.98697    
L(lnukseirn, 1)    0.0129487  0.0111155   1.165  0.24493    
L(lnuksem3p, 1)    0.0074972  0.0252358   0.297  0.76660    
L(lnuksem3n, 1)   -0.0039597  0.0262641  -0.151  0.88026    
L(Dlnuksegdpp, 1)  0.0277861  0.0115981   2.396  0.01717 *  
L(Dlnuksegdpn, 1) -0.0007716  0.0124406  -0.062  0.95059    
L(lnuksesexpp, 1) -0.0065172  0.0054683  -1.192  0.23423    
L(lnuksesexpn, 1)  0.0048000  0.0050701   0.947  0.34451    
d(l2lnukserer)    -0.1533994  0.0796757  -1.925  0.05510 .  
d(lnukseirp)       0.1177245  0.0248660   4.734 3.33e-06 ***
d(lnukseirn)       0.1357804  0.0448615   3.027  0.00268 ** 
d(lnuksem3p)       0.0920614  0.1282116   0.718  0.47327    
d(lnuksem3n)      -0.1332890  0.1355336  -0.983  0.32615    
d(Dlnuksegdpp)     0.0258871  0.0084348   3.069  0.00233 ** 
d(Dlnuksegdpn)    -0.0066994  0.0093174  -0.719  0.47266    
d(lnuksesexpp)     0.0033393  0.0059916   0.557  0.57770    
d(lnuksesexpn)     0.0039919  0.0038313   1.042  0.29825    
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01942 on 316 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.116 


 model diagnostic tests:
        JB test   LM test ARCH test
Stat   0.9964437 3.9456522 0.0937213
Pvalue 0.6685904 0.2969126 0.7594985
lags   0.0000000 1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 13.659346 Pvalue: 0.004645637
```

```
======================================================================
 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 333
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.72184553483291

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

======================================================================

Long-run coefficients
                Estimate Std. Error t value Pr(>|t|)
lnuksesexp_p    0.277870   0.080778 -3.3756  0.00014 ***
lnuksesexp_n   -1.313880   0.095168 14.2468  0.00020 ***
lnukseirp       2.933303   1.357028  2.1616  0.03065 *
lnukseirn       3.216596   1.087834 29.7292  0.00009 ***
lnuksem3p       2.359674   0.452914  5.2234  0.00436 **
lnuksem3n      -3.826521   0.678672 -5.0402  0.00025 ***
Dlnuksegdpp     0.663830   0.143161  4.7145  0.00306 **
Dlnuksegdpn    -0.167705   0.046975 -4.0679  0.00711 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
======================================================================
 Long Run Asymmety test
 W-stat: 1709.6 Pvalue: 0
======================================================================
```

Canada-Australia:

ncaaus <- nardl::nardl(lncaaurer ~ lncaausexp | lncaauirp + lncaauirn + lncaaum3p + lncaaum3n + lncaaugdpp + lncaaugdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(ncaaus)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.056457 -0.012590 -0.000357  0.012673  0.043274
```

```
Coefficients:
                     Estimate Std. Error t value Pr(>|t|)
(Intercept)         6.440e-03  4.324e-03   1.489 0.137381
L(lncaaurer, 1)    -1.857e-01  5.471e-02  -3.395 0.000775 ***
L(lncaauirp, 1)    -1.116e-02  1.665e-02  -0.670 0.503393
L(lncaauirn, 1)     4.604e-03  4.357e-03   1.057 0.291493
L(lncaaum3p, 1)    -1.050e-02  8.161e-03  -1.286 0.199282
L(lncaaum3n, 1)    -5.110e-02  2.332e-01  -0.219 0.826676
L(lncaaugdpp, 1)   -2.559e-03  7.646e-03  -0.335 0.738077
L(lncaaugdpn, 1)    3.283e-02  3.621e-02   0.906 0.365379
L(lncaausexpp, 1)  -1.254e-02  4.854e-03  -2.583 0.010247 *
L(lncaausexpn, 1)   3.160e-03  2.216e-03   1.426 0.154920
d(l2lncaaurer)     -3.112e-01  8.306e-02  -3.746 0.000214 ***
d(lncaauirp)        2.877e-02  5.025e-02   0.573 0.567324
d(lncaauirn)        9.993e-02  2.520e-02   3.965 9.11e-05 ***
d(lncaaum3p)       -8.768e-02  1.628e-01  -0.538 0.590621
d(lncaaum3n)        7.920e-02  7.621e-01   0.104 0.917298
d(lncaaugdpp)       6.006e-06  5.688e-03   0.001 0.999158
d(lncaaugdpn)       3.068e-02  2.603e-02   1.179 0.239488
d(lncaausexpp)     -2.960e-03  3.860e-04  -1.767 0.043774 *
d(lncaausexpn)     -4.919e-04  2.491e-03  -0.197 0.843580
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01763 on 319 degrees of freedom
Adjusted R-squared:  0.1004


 model diagnostic tests:
        JB test    LM test ARCH test
Stat   0.9958406 10.0990514 1.9709376
Pvalue 0.5215086  0.1940821 0.1603484
lags   0.0000000  1.0000000 1.0000000
==============================================================
 Short Run Asymmety test
 W-stat: 13.229159 Pvalue: 0.003689744
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 335
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 5.7927727505782

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.
```

```
==============================================================

Long-run coefficients
               Estimate Std. Error t value Pr(>|t|)
lncaausexp_p -0.0626660  0.0131477 -5.1611  0.00029 ***
lncaausexp_n -0.0171920  0.0062908 -2.8333  0.00230 **
lncaauirp     1.0124120  0.1745227  5.8920  0.00870 **
lncaauirn     2.4967145  1.1882557  2.1012  0.03563 *
lncaaum3p    -3.7476286  1.6765049 -2.1233  0.01804 *
lncaaum3n     4.4718150  1.8851585  2.3348  0.01114 *
lncaaugdpp    0.0043898  0.0012527  4.0350  0.00205 **
lncaaugdpn    0.7296179  0.3295316  2.2590  0.01646 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 1525.908 Pvalue: 0
==============================================================
```

<u>Canada-New Zealand:</u>

ncanzs <- nardl::nardl(lncanzrer ~ lncanzsexp | lncanzirp + lncanzirn + lncanzm3p + lncanzm3n + Dlncanzgdpp + Dlncanzgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(ncanzs)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = 
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.059639 -0.013108  0.000429  0.012938  0.063543

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -0.0029620  0.0045479  -0.651  0.51534
L(lncanzrer, 1)   -0.1799177  0.0567700  -3.169  0.00168 **
L(lncanzirp, 1)   -0.0186611  0.0295164  -0.632  0.52771
L(lncanzirn, 1)    0.0038130  0.0056215   0.678  0.49811
L(lncanzm3p, 1)   -0.0389829  0.0301042  -1.295  0.19632
L(lncanzm3n, 1)    0.1837410  0.2421671   0.759  0.44860
L(Dlncanzgdpp, 1) -0.0116907  0.0160510  -0.728  0.46696
L(Dlncanzgdpn, 1)  0.0073321  0.0156644   0.468  0.64007
L(lncanzsexpp, 1)  0.0068337  0.0023940   3.151  0.00178 ***
L(lncanzsexpn, 1) -0.0032181  0.0021821  -1.475  0.14131
d(l2lncanzrer)    -0.1582062  0.0864878  -1.829  0.06834 .
d(lncanzirp)      -0.0040106  0.0658859  -0.061  0.95150
d(lncanzirn)       0.0627987  0.0261115   2.405  0.01677 *
d(lncanzm3p)      -0.0436683  0.1602358  -0.273  0.78540
d(lncanzm3n)      -0.2023401  0.5516272  -0.367  0.71402
d(Dlncanzgdpp)     0.0052410  0.0110851   0.473  0.63669
```

```
d(Dlncanzgdpn)    -0.0027996  0.0104724  -0.267  0.78939
d(lncanzsexpp)     0.0018884  0.0091144   0.207  0.83600
d(lncanzsexpn)    -0.0007974  0.0025876  -0.308  0.75818
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02045 on 324 degrees of freedom
Adjusted R-squared:  0.03289


 model diagnostic tests:
        JB test    LM test  ARCH test
Stat   0.9960398 12.5030401 2.96315704
Pvalue 0.5698465  0.1754594 0.08518147
lags   0.0000000  1.0000000 1.00000000
==============================================================
 Short Run Asymmety test
 W-stat: 5.6144141 Pvalue: 0.0209354983
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37



 F-statistic = 6.48011700846762

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
              Estimate Std. Error t value Pr(>|t|)
lncanzsexp_p -0.18054    0.069806 -2.5863   0.0577 .
lncanzsexp_n -0.19550    0.087230 -2.2412   0.0884 .
lncanzirp    -0.875659   0.293917 -2.9863   0.0344 *
lncanzirn     0.396846   0.122465  3.2513   0.0496 *
lncanzm3p    -5.187279   1.351792 -3.8370   0.0225 *
lncanzm3n     4.308215   1.427557  3.0185   0.0104 *
Dlncanzgdpp   0.616504   0.206449  2.9862   0.0377 *
Dlncanzgdpn  -0.358002   0.126360 -2.8421   0.0332 *
==============================================================
 Long Run Asymmety test
 W-stat: 2342.679 Pvalue: 0
==============================================================
```

Canada-Sweden:

ncases <- nardl::nardl(lncaserer ~ lncasesexp | lncaseirp + lncaseirn + lncasem3p + lncasem3n + Dlncasegdpp + Dlncasegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(ncases)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max 
-0.054153 -0.010962  0.000047  0.010693  0.047315 

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)  
(Intercept)       -0.0017152  0.0033219  -0.516   0.6060  
L(lncaserer, 1)   -0.1039129  0.0554634  -1.874   0.0419 *
L(lncaseirp, 1)    0.0013567  0.0033736   0.402   0.6878  
L(lncaseirn, 1)    0.0137663  0.0072318   1.904   0.0579 .
L(lncasem3p, 1)   -0.5127060  0.5963797  -0.860   0.3906  
L(lncasem3n, 1)   -0.0200445  0.0140079  -1.431   0.1534  
L(Dlncasegdpp, 1)  0.0011598  0.0108319   0.107   0.9148  
L(Dlncasegdpn, 1)  0.0069123  0.0105342   0.656   0.5122  
L(lncasesexpp, 1)  0.0006265  0.0071585   0.088   0.9303  
L(lncasesexpn, 1) -0.0002302  0.0021461  -0.107   0.9146  
d(l2lncaserer)    -0.1892350  0.0820875  -2.305   0.0218 *
d(lncaseirp)       0.0467152  0.0211540   2.208   0.0279 *
d(lncaseirn)       0.0143349  0.0226820   0.632   0.5279  
d(lncasem3p)      -1.2218840  0.7587960  -1.610   0.1083  
d(lncasem3n)      -0.0725261  0.0837255  -0.866   0.3870  
d(Dlncasegdpp)     0.0044913  0.0076025   0.591   0.5551  
d(Dlncasegdpn)     0.0008107  0.0078423   0.103   0.9177  
d(lncasesexpp)     0.0001902  0.0051470   0.037   0.9705  
d(lncasesexpn)    -0.0012048  0.0005577  -2.171   0.0379 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01692 on 324 degrees of freedom
Adjusted R-squared:  0.03917 


 model diagnostic tests:
         JB test  LM test  ARCH test
Stat   0.9969421 4.186159 0.05691391
Pvalue 0.7840719 0.289415 0.81144184
lags   0.0000000 1.000000 1.00000000
==============================================================
 Short Run Asymmety test
 W-stat: 13.1776996 Pvalue: 0.004914983
==============================================================
```

```
 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 5.33951649584119

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
               Estimate Std. Error t value Pr(>|t|)
lncasesexp_p   0.408486   0.142484 -2.8732   0.0162 *
lncasesexp_n  -0.414639   0.133002 -3.1538   0.0120 *
lncaseirp      0.055414   0.016105  3.4352   0.0018 **
lncaseirn      0.659625   0.210510  3.0984   0.0032 **
lncasem3p    -46.786807  14.080122 -2.5813   0.0003 **
lncasem3n     -1.119979   0.425972 -2.6428   0.0050 **
Dlncasegdpp    0.239424   0.056164  4.2678   0.0007 **
Dlncasegdpn   -0.141120   0.045360 -3.1147   0.0095 **
==============================================================
 Long Run Asymmety test
 W-stat: 608.0187 Pvalue: 9.341486e-133
==============================================================
```

<u>Australia-New Zealand:</u>

naunzs <- nardl::nardl(lnaunzrer ~ lnaunzsexp | lnaunzirp + lnaunzirn + lnaunzm3p + lnaunzm3n + Dlnaunzgdpp + Dlnaunzgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(naunzs)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.091759 -0.011566  0.000257  0.013201  0.047013

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -0.0232283  0.0050904  -4.563 7.33e-06 ***
```

```
L(lnaunzrer, 1) -0.2501664  0.0546931  -4.574 6.98e-06 ***
L(lnaunzirp, 1)    0.0307657  0.0180900   1.701 0.090026 .
L(lnaunzirn, 1)    0.0073606  0.0118068   0.623 0.533478
L(lnaunzm3p, 1)    0.3468703  0.1868234   1.857 0.064328 .
L(lnaunzm3n, 1)   -0.0044005  0.0110831  -0.397 0.691612
L(Dlnaunzgdpp, 1) -0.0021145  0.0111020  -0.190 0.849074
L(Dlnaunzgdpn, 1)  0.0179121  0.0122287   1.465 0.144023
L(lnaunzsexpp, 1)  0.0157432  0.0104941   1.500 0.134606
L(lnaunzsexpn, 1) -0.0115457  0.0038543  -2.996 0.002966 **
d(l2lnaunzrer)    -0.3130834  0.0845975  -3.701 0.000255 ***
d(lnaunzirp)       0.2126384  0.0690846   3.078 0.002275 **
d(lnaunzirn)       0.0479708  0.0338926   1.415 0.157985
d(lnaunzm3p)       0.2523139  0.5672621   0.445 0.656787
d(lnaunzm3n)       0.2195276  0.1593793   1.377 0.169408
d(Dlnaunzgdpp)    -0.0006302  0.0077194  -0.082 0.934988
d(Dlnaunzgdpn)     0.0138200  0.0088157   1.568 0.118003
d(lnaunzsexpp)     0.0190216  0.0103732   1.834 0.047676 *
d(lnaunzsexpn)    -0.0034415  0.0034556  -0.996 0.320075
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01918 on 316 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.1617


 model diagnostic tests:
           JB test    LM test  ARCH test
Stat  15.032180881 31.5131377 5.58782969
Pvalue 0.897503183  0.1122283 0.07750421
lags   0.000000000  1.0000000 1.00000000
==============================================================
 Short Run Asymmety test
 W-stat: 5.257129 Pvalue: 0.033378059
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 333
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37

 F-statistic = 3.70619686432147

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
```

```
                Estimate Std. Error t value Pr(>|t|)
lnaunzsexp_p   -0.008797  0.002938 -2.9994 0.005786 **
lnaunzsexp_n   -0.030989  0.007343  4.2197 0.000566 **
lnaunzirp       1.506530  0.387223  3.8906 0.003845 **
lnaunzirn       0.579444  0.180208  3.2154 0.006736 **
lnaunzm3p      -0.584855  0.143315 -4.0809 0.005505 **
lnaunzm3n       0.656714  0.113659  5.7779 0.000621 **
Dlnaunzgdpp    -0.017802  0.003949 -4.5070 0.000164 **
Dlnaunzgdpn     0.085864  0.019446  4.4154 0.000965 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 316.9234 Pvalue: 1.516916e-69
==============================================================
```

<u>Australia-Sweden:</u>

nauses <- nardl::nardl(lnauserer ~ lnausesexp | lnauseirp + lnauseirn + lnausem3p + lnausem3n + Dlnausegdpp + Dlnausegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nauses)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.097633 -0.012663  0.001232  0.012818  0.058011

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)       -0.005926   0.004947  -1.198 0.231899
L(lnauserer, 1)   -0.235332   0.054111  -4.349 1.86e-05 ***
L(lnauseirp, 1)    0.006659   0.004329   1.538 0.125051
L(lnauseirn, 1)   -0.006953   0.012245  -0.568 0.570543
L(lnausem3p, 1)   -0.785762   0.795896  -0.987 0.324279
L(lnausem3n, 1)    0.009405   0.012725   0.739 0.460426
L(Dlnausegdpp, 1) -0.010420   0.011624  -0.896 0.370684
L(Dlnausegdpn, 1)  0.016106   0.010546   1.527 0.127732
L(lnausesexpp, 1)  0.001282   0.008048   0.159 0.873501
L(lnausesexpn, 1) -0.010173   0.007646  -1.331 0.184326
d(l2lnauserer)    -0.451274   0.082066  -5.499 7.98e-08 ***
d(lnauseirp)       0.080162   0.023660   3.388 0.000794 ***
d(lnauseirn)      -0.020835   0.068330  -0.305 0.760637
d(lnausem3p)      -0.005652   1.746695  -0.003 0.997420
d(lnausem3n)       0.013023   0.105809   0.123 0.902123
d(Dlnausegdpp)    -0.003158   0.007661  -0.412 0.680465
d(Dlnausegdpn)     0.005957   0.007831   0.761 0.447389
d(lnausesexpp)     0.006994   0.003615   1.936 0.025699 *
d(lnausesexpn)    -0.009696   0.006084  -1.594 0.112057
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 0.02065 on 322 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.05287


 model diagnostic tests:
           JB test    LM test    ARCH test
Stat   11.26712874 17.1232148 0.0008876852
Pvalue 0.985723355  0.1509523 0.9762313074
lags   0.000000000  1.0000000 1.0000000000
==============================================================
 Short Run Asymmety test
 W-stat: 20.246896 Pvalue: 0.000360928
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 333
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.90047479831319

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                Estimate Std. Error t value Pr(>|t|)
lnausesexp_p  -0.104073  0.028821  3.6109   0.0012 **
lnausesexp_n   0.079901  0.021012 -3.8026   0.0022 **
lnauseirp      0.112743  0.031092  3.6260   0.0040 **
lnauseirn     -0.105258  0.029266 -3.5965   0.0009 **
lnausem3p     -8.717218  2.327446 -3.7454   0.0060 **
lnausem3n      0.301618  0.090532  3.3316   0.0030 **
Dlnausegdpp   -0.087677  0.023428 -3.7424   0.0078 **
Dlnausegdpn    0.164897  0.049195  3.3519   0.0064 **
==============================================================
 Long Run Asymmety test
 W-stat: 255.6296 Pvalue: 3.095611e-56
==============================================================
```

<u>New Zealand-Sweden:</u>

nnzses <- nardl::nardl(lnnzserer ~ lnnzsesexp | lnnzseirp + lnnzseirn + lnnzsem3p + lnnzsem3n + Dlnnzsegdpp + Dlnnzsegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)

summary(nnzses)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.054279 -0.015304  0.000046  0.014116  0.058152

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)         0.0107501  0.0050657   2.122  0.03463 *
L(lnnzserer, 1)    -0.2361071  0.0555121  -4.253 2.81e-05 ***
L(lnnzseirp, 1)     0.0033861  0.0042127   0.804  0.42214
L(lnnzseirn, 1)     0.0348825  0.0217235   1.606  0.10936
L(lnnzsem3p, 1)     0.1191399  0.9429584   0.126  0.89954
L(lnnzsem3n, 1)     0.0523389  0.0204666   2.557  0.01103 *
L(Dlnnzsegdpp, 1) -0.0050767  0.0132551  -0.383  0.70199
L(Dlnnzsegdpn, 1) -0.0197537  0.0132048  -1.496  0.13570
L(lnnzsesexpp, 1) -0.0151360  0.0046678  -3.243  0.00132 **
L(lnnzsesexpn, 1) -0.0178322  0.0236136  -0.755  0.45073
d(l2lnnzserer)     -0.2627018  0.0854388  -3.075  0.00230 **
d(lnnzseirp)        0.0304490  0.0224947   1.354  0.17686
d(lnnzseirn)        0.0048222  0.0600073   0.080  0.93600
d(lnnzsem3p)       -1.3036722  1.3833988  -0.942  0.34675
d(lnnzsem3n)       -0.0045377  0.1009554  -0.045  0.96418
d(Dlnnzsegdpp)     -0.0019579  0.0091786  -0.213  0.83123
d(Dlnnzsegdpn)     -0.0070503  0.0099717  -0.707  0.48009
d(lnnzsesexpp)     -0.0007143  0.0047219  -0.151  0.87986
d(lnnzsesexpn)     -0.0268887  0.0183090  -1.469  0.14297
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.0202 on 324 degrees of freedom
Adjusted R-squared:  0.05404


 model diagnostic tests:
        JB test   LM test ARCH test
Stat   0.9976475 20.224768 1.1465161
Pvalue 0.9199602  0.139293 0.2842796
lags   0.0000000  1.000000 1.0000000
==============================================================
 Short Run Asymmetry test
 W-stat: 5.77003 Pvalue: 0.03832708
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 334
 Number of Regressors (k): 2
 Case: 3
```

```
 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.50475278415778

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
               Estimate Std. Error t value Pr(>|t|)
lnnzsesexp_p -0.060318   0.0014513 -4.1558 0.000225 **
lnnzsesexp_n -0.052265   0.0135329 -3.8620 0.006230 **
lnnzseirp     0.0208087  0.0070135  2.9669 0.009102 **
lnnzseirn     0.2006298  0.0501500 -4.0005 0.001670 **
lnnzsem3p     2.4964354  0.8834337  2.8258 0.008052 **
lnnzsem3n     0.5529628  0.2012966  2.8086 0.004975 **
Dlnnzsegdpp   0.0151036  0.0035412 -4.2651 0.000237 **
Dlnnzsegdpn   0.0065565  0.0021669  3.0253 0.007679 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 230.6857 Pvalue: 8.076602e-51
==============================================================
```

US-Euro Area:

nuseus <- nardl::nardl(lnuseurer ~ lnuseusexp | lnuseuirp + lnuseuirn + lnuseum3p + lnuseum3n + lnuseugdpp + lnuseugdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nuseus)

```
NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action = 
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max 
-0.080328 -0.015560  0.001343  0.014783  0.105493 

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)        8.787e-03  8.829e-03   0.995   0.3204
L(lnuseurer, 1)   -3.190e-01  5.743e-02  -5.555 6.05e-08 ***
L(lnuseuirp, 1)    2.581e-03  4.584e-03   0.563   0.5739
L(lnuseuirn, 1)    1.031e-02  7.759e-03   1.329   0.1848
L(lnuseum3p, 1)   -3.904e-02  3.597e-02  -1.085   0.2786
```

```
L(lnuseum3n, 1)     6.944e-02  4.738e-02   1.466   0.1438
L(lnuseugdpp, 1)    1.808e-03  1.157e-02   0.156   0.8760
L(lnuseugdpn, 1)    2.076e-01  3.611e-01   0.575   0.5658
L(lnuseusexpp, 1)  2.101e-02  8.839e-03   2.377   0.0181 *
L(lnuseusexpn, 1) -6.289e-05  3.470e-03  -0.018   0.9856
d(l2lnuseurer)    -4.310e-01  9.154e-02  -4.708 3.81e-06 ***
d(lnuseuirp)      -4.565e-02  2.779e-02  -1.642   0.1015
d(lnuseuirn)       8.286e-02  3.372e-02   2.457   0.0146 *
d(lnuseum3p)      -4.379e-01  3.860e-01  -1.134   0.2575
d(lnuseum3n)       1.094e-01  2.473e-01   0.442   0.6585
d(lnuseugdpp)      1.970e-04  8.503e-03   0.023   0.9815
d(lnuseugdpn)      2.289e-01  2.529e-01   0.905   0.3662
d(lnuseusexpp)     1.163e-02  5.380e-03   2.161   0.0314 *
d(lnuseusexpn)    -4.274e-03  7.385e-03  -0.579   0.5632
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02537 on 325 degrees of freedom
Adjusted R-squared:  0.03944


 model diagnostic tests:
          JB test    LM test   ARCH test
Stat    0.99216899 35.4344792 1.059753650
Pvalue 0.07505497  0.1258073 0.519861455
lags   0.00000000  1.0000000 1.000000000
==============================================================
 Short Run Asymmety test
 W-stat: 15.501457 Pvalue: 0.005147206
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 335
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                      F-test                        -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 4.7895560904417

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
              Estimate Std. Error t value Pr(>|t|)
lnuseusexp_p  0.059211   0.075487  1.1721  0.24115
lnuseusexp_n  0.070376   0.078216  1.2738  0.20272
lnuseuirp     0.126354   0.135660  0.9701  0.33199
```

```
lnuseuirn     0.389150   0.259738  1.5887  0.11212
lnuseum3p    -0.665856   1.403990 -0.4909  0.62350
lnuseum3n     2.798504   1.190734  2.5709  0.01014 *
lnuseugdpp    0.210890   0.263769  0.2316  0.81683
lnuseugdpn    6.451833   8.153497  0.8880  0.37453
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 1314.796 Pvalue: 3.131001e-286
==============================================================
```

US-Switzerland:

nuschs <- nardl::nardl(lnuschrer ~ lnuschsexp | Dlnuschirp + Dlnuschirn + Dlnuschm3p + Dlnuschm3n + Dlnuschgdpp + Dlnuschgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nuschs)

```
 NARDL model:

Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.074458 -0.014349 -0.000002  0.013735  0.104389

Coefficients:
                     Estimate Std. Error t value Pr(>|t|)
(Intercept)         0.0037350  0.0035449   1.054 0.292896
L(lnuschrer, 1)    -0.2276664  0.0587393  -3.876 0.000130 ***
L(lnuschirp, 1)     0.0008968  0.0017394   0.516 0.606535
L(lnuschirn, 1)     0.0124597  0.0238602   0.522 0.601918
L(Dlnuschm3p, 1)   -0.2472707  0.2853700  -0.866 0.386911
L(Dlnuschm3n, 1)   -0.1702819  0.5161619  -0.330 0.741705
L(Dlnuschgdpp, 1)  -0.0157043  0.0145326  -1.081 0.280729
L(Dlnuschgdpn, 1)  -0.0018881  0.0145949  -0.129 0.897156
L(Dlnuschsexpp, 1) -0.0087813  0.0072110  -1.218 0.224270
L(Dlnuschsexpn, 1)  0.0057297  0.0076044   0.753 0.451752
d(l2lnuschrer)     -0.2927140  0.0897109  -3.263 0.001230 **
d(lnuschirp)       -0.0177624  0.0083379  -2.130 0.033956 *
d(lnuschirn)        0.0490077  0.1398090   0.351 0.726184
d(Dlnuschm3p)      -0.5213364  0.2602675  -2.003 0.046065 *
d(Dlnuschm3n)      -0.3322174  0.3812086  -0.871 0.384184
d(Dlnuschgdpp)     -0.0064204  0.0107872  -0.595 0.552164
d(Dlnuschgdpn)     -0.0022102  0.0101033  -0.219 0.826984
d(Dlnuschsexpp)    -0.0052304  0.0043065  -1.215 0.225488
d(Dlnuschsexpn)     0.0049142  0.0062899   0.781 0.435245
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.02147 on 321 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.05987
```

```
 model diagnostic tests:
            JB test   LM test  ARCH test
Stat   0.9826514098 12.139842 6.26349328
Pvalue 0.0004789273  0.177932 0.05771727
lags   0.0000000000  1.000000 1.00000000
==============================================================
 Short Run Asymmety test
 W-stat: 9.73731 Pvalue: 0.008126669
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 333
 Number of Regressors (k): 2
 Case: 3

 ------------------------------------------------------
 -                       F-test                       -
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 3.80348777424456

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                 Estimate Std. Error t value Pr(>|t|)
lnuschsexp_p      1.42498    1.31450 -0.5289   0.5968
lnuschsexp_n      1.43065    5.25259  0.5096   0.6103
Dlnuschirp       -3.79496    5.96245 -0.4944   0.6210
Dlnuschirn       -2.89670    3.79540 -0.3680   0.7129
Dlnuschm3p      -61.92131   73.44909 -0.3744   0.7081
Dlnuschm3n     -130.20431  231.52184 -0.4936   0.6216
Dlnuschgdpp     -0.328976    2.13742 -0.2947   0.7682
Dlnuschgdpn       0.11671    1.76554  0.1680   0.8666
==============================================================
 Long Run Asymmety test
 W-stat: 347580.4 Pvalue: 0
==============================================================
```

<u>Euro Area-Switzerland:</u>

neuchs <- nardl::nardl(lneuchrer ~ lneuchsexp | Dlneuchirp + Dlneuchirn + Dlneuchm3p + Dlneuchm3n + Dlneuchgdpp + Dlneuchgdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(neuchs)

```
NARDL model:
```

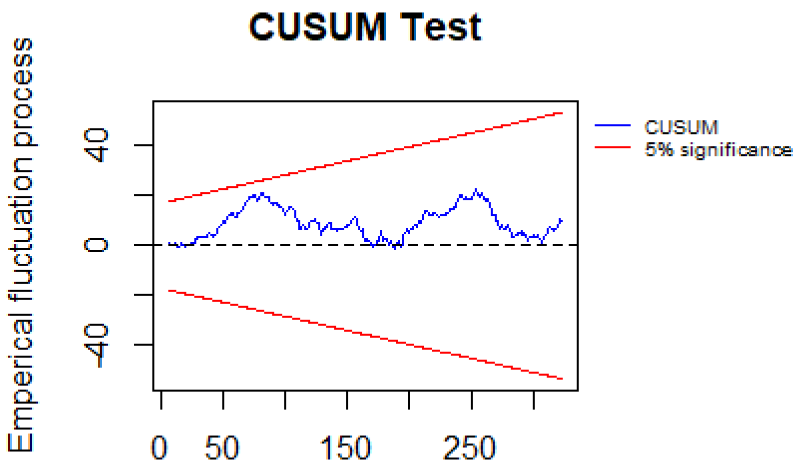
```
Call:
lm(formula = dy ~ lay + lxp + lxn + lagh1, na.action =
na.exclude)

Residuals:
      Min        1Q    Median        3Q       Max
-0.065434 -0.008282  0.000095  0.008391  0.063936

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)         0.005175   0.002455   2.108   0.0359 *
L(lneuchrer, 1)    -0.292545   0.060905  -4.803 2.48e-06 ***
L(Dlneuchirp, 1)   -0.052819   0.011951  -4.420 1.39e-05 ***
L(Dlneuchirn, 1)    0.010830   0.019969   0.542   0.5880
L(Dlneuchm3p, 1)    0.040469   0.244549   0.165   0.8687
L(Dlneuchm3n, 1)    0.191299   0.266303   0.718   0.4731
L(Dlneuchgdpp, 1) -0.004412   0.013302  -0.332   0.7404
L(Dlneuchgdpn, 1)  0.005916   0.013112   0.451   0.6522
L(lneuchsexpp, 1) -0.009055   0.011380  -0.796   0.4269
L(lneuchsexpn, 1)  0.003526   0.001606   2.196   0.0289 *
d(l2lneuchrer)     -0.418437   0.094964  -4.406 1.47e-05 ***
d(Dlneuchirp)      -0.065858   0.008308  -7.927 4.60e-14 ***
d(Dlneuchirn)       0.021755   0.014507   1.500   0.1348
d(Dlneuchm3p)      -0.133987   0.175438  -0.764   0.4456
d(Dlneuchm3n)       0.422971   0.206606   2.047   0.0415 *
d(Dlneuchgdpp)     -0.006564   0.009651  -0.680   0.4970
d(Dlneuchgdpn)      0.006826   0.009157   0.746   0.4566
d(lneuchsexpp)     -0.008251   0.008316  -0.992   0.3220
d(lneuchsexpn)     -0.003463   0.002230  -1.553   0.1214
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 0.01542 on 322 degrees of freedom
  (1 observation deleted due to missingness)
Adjusted R-squared:  0.1953


 model diagnostic tests:
            JB test    LM test    ARCH test
Stat   9.620067e-01 15.8831331 12.652234547
Pvalue 1.289311e-07  0.1875481 0.6332857401
lags   0.000000e+00  1.0000000 1.000000e+00
==============================================================
 Short Run Asymmety test
 W-stat: 10.38103 Pvalue: 0.0285569124
==============================================================

 PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

 Observations: 333
 Number of Regressors (k): 2
 Case: 3


 -----------------------------------------------------
 -                      F-test                       -
```

```
 ------------------------------------------------------
 10% critical value       3.09
 5% critical value        3.49
 1% critical value        4.37


 F-statistic = 8.104193687331189

 ------------------------------------------------------
 F-statistic note: Asymptotic critical values used.

==============================================================

Long-run coefficients
                Estimate Std. Error t value Pr(>|t|)
lneuchsexp_p    0.270376   0.113844  2.0332 0.042034 *
lneuchsexp_n    0.158854   0.053423  1.3497 0.177101
Dlneuchirp     -2.036370   0.804687 -2.6033 0.009233 **
Dlneuchirn      0.634899   0.524350  1.2652 0.205784
Dlneuchm3p      1.136382   6.247341 -0.2748 0.783437
Dlneuchm3n      9.889844   8.701718  1.4071 0.159383
Dlneuchgdpp    -0.328976   0.337360 -1.0700 0.284619
Dlneuchgdpn     0.116710   0.317649  0.6091 0.542429
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
==============================================================
 Long Run Asymmety test
 W-stat: 12875.31 Pvalue: 0
==============================================================
```

CUSUM Test for NARDL Model with Market Expectations:

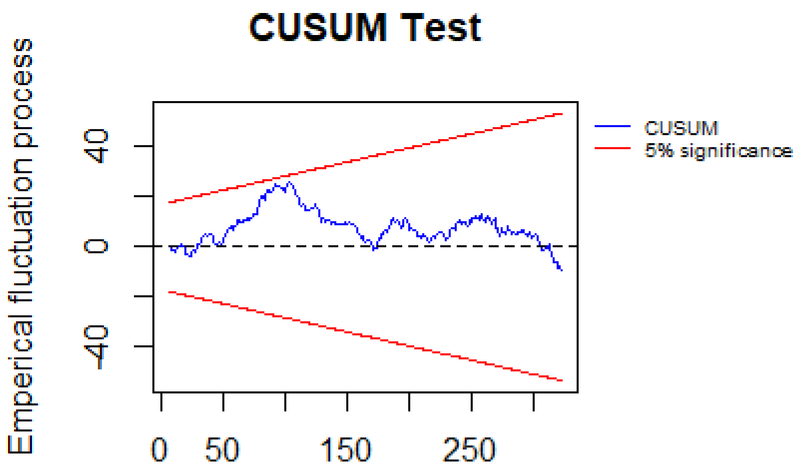
UK-Canada:

```
nukca <- nardl::nardl(lnukcarer ~ lnukcaexp | lnukcairp +
lnukcairn + lnukcam3p + lnukcam3n + lnukcagdpp + lnukcagdpn ,
data=New_Monthly_Dataset_1993,     ic=c("aic"),     maxlag=1,
graph=FALSE, case=3)
summary(nukca)
e<-nukca$rece
k<-nukca$k
n<-nukca$n
nardl::cusum(e=e,k=k,n=n)
```



UK-Australia:

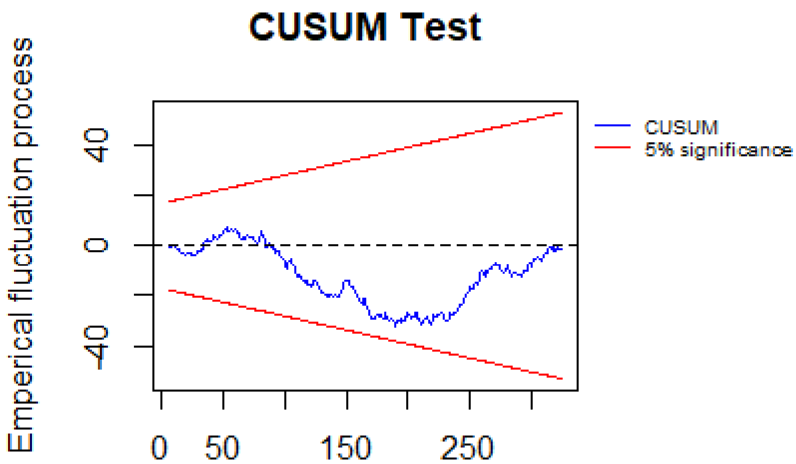
```
nukau <- nardl::nardl(lnukaurer ~ lnukauexp | lnukauirp +
lnukauirn + lnukaum3p + lnukaum3n + lnukaugdpp + lnukaugdpn ,
data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(nukau)
e<-nukau$rece
k<-nukau$k
n<-nukau$n
nardl::cusum(e=e,k=k,n=n)
```



UK-New Zealand:

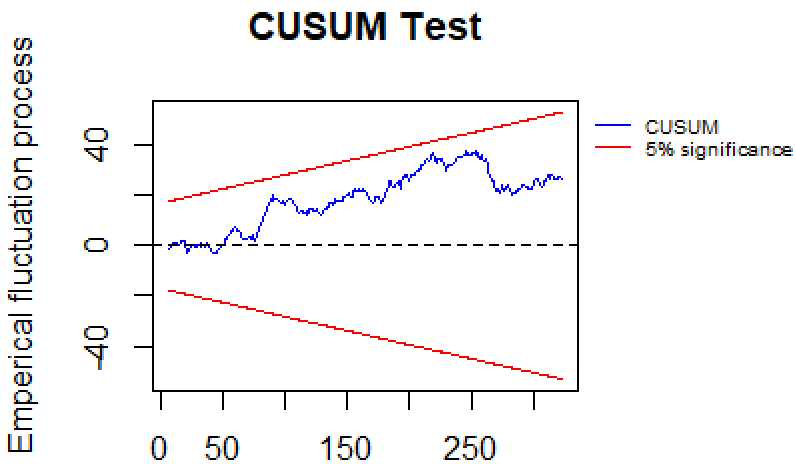
```
nuknz <- nardl::nardl(lnuknzrer ~ lnuknzexp | lnuknzirp +
lnuknzirn + lnuknzm3p + lnuknzm3n + Dlnuknzgdpp + Dlnuknzgdpn
```

```
,   data=New_Monthly_Dataset_1993,   ic=c("aic"),   maxlag=1,
graph=FALSE, case=3)
summary(nuknz)
e<-nuknz$rece
k<-nuknz$k
n<-nuknz$n
nardl::cusum(e=e,k=k,n=n)
```



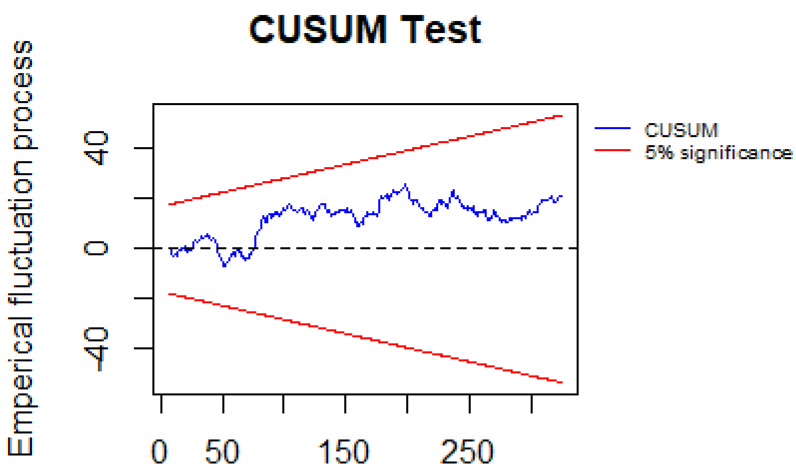
UK-Sweden:

```
nukse  <-  nardl::nardl(lnukserer  ~  lnukseexp  |  lnukseirp  +
lnukseirn + lnuksem3p + lnuksem3n + Dlnuksegdpp + Dlnuksegdpn
,   data=New_Monthly_Dataset_1993,   ic=c("aic"),   maxlag=1,
graph=FALSE, case=3)
summary(nukse)
e<-nukse$rece
k<-nukse$k
n<-nukse$n
nardl::cusum(e=e,k=k,n=n)
```



Canada-Australia:

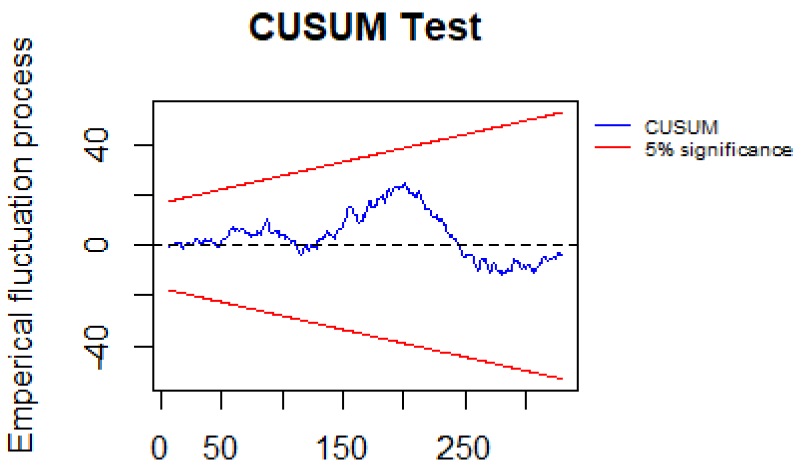
```
ncaau <- nardl::nardl(lncaaurer ~ lncaauexp | lncaauirp +
lncaauirn + lncaaum3p + lncaaum3n + lncaaugdpp + lncaaugdpn ,
data=New_Monthly_Dataset_1993,     ic=c("aic"),     maxlag=1,
graph=FALSE, case=3)
summary(ncaau)
e<-ncaau$rece
k<-ncaau$k
n<-ncaau$n
nardl::cusum(e=e,k=k,n=n)
```



Canada-New Zealand:

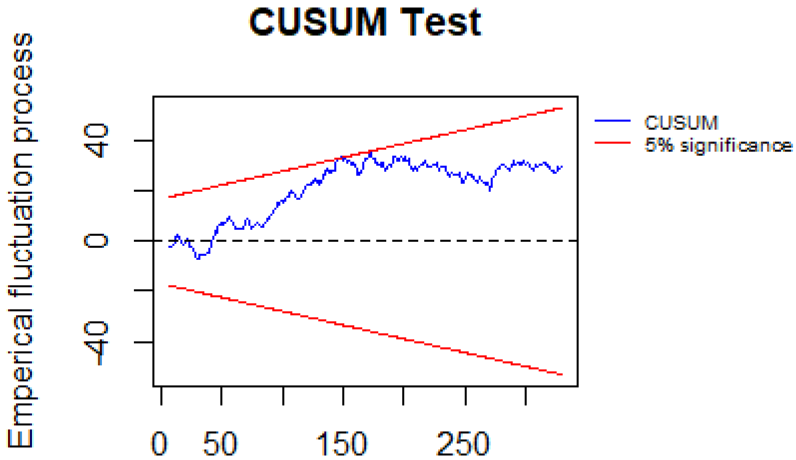
```
ncanz <- nardl::nardl(lncanzrer ~ lncanzexp | lncanzirp +
lncanzirn + lncanzm3p + lncanzm3n + Dlncanzgdpp + Dlncanzgdpn
```

```
,    data=New_Monthly_Dataset_1993,    ic=c("aic"),    maxlag=1,
graph=FALSE, case=3)
summary(ncanz)
e<-ncanz$rece
k<-ncanz$k
n<-ncanz$n
nardl::cusum(e=e,k=k,n=n)
```



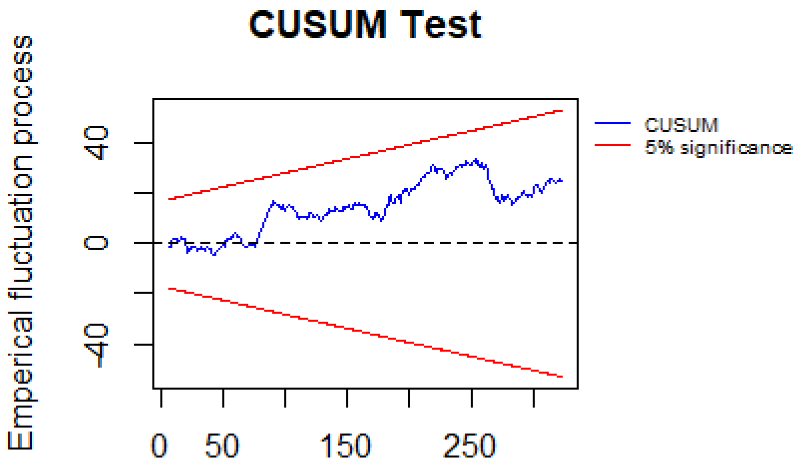
<u>Canada-Sweden:</u>

```
ncase  <-  nardl::nardl(lncaserer  ~  lncaseexp  |  lncaseirp  +
lncaseirn + lncasem3p + lncasem3n + Dlncasegdpp + Dlncasegdpn
,    data=New_Monthly_Dataset_1993,    ic=c("aic"),    maxlag=1,
graph=FALSE, case=3)
summary(ncase)
e<-ncase$rece
k<-ncase$k
n<-ncase$n
nardl::cusum(e=e,k=k,n=n)
```



Australia-New Zealand:

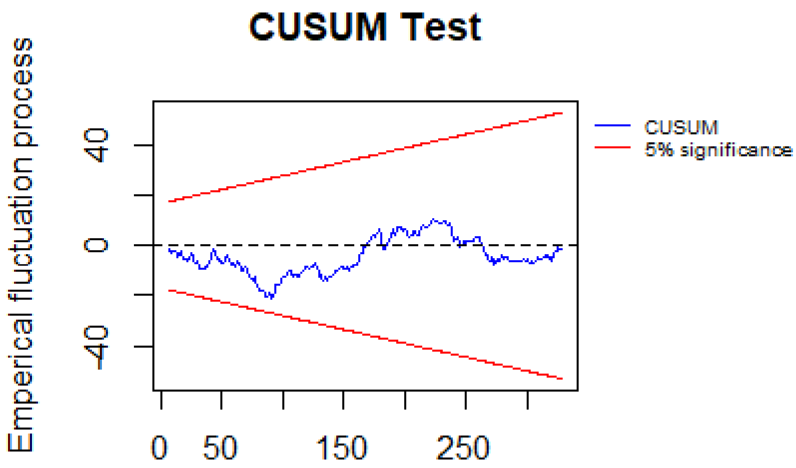
```
naunz <- nardl::nardl(lnaunzrer ~ lnaunzexp | lnaunzirp +
lnaunzirn + lnaunzm3p + lnaunzm3n + Dlnaunzgdpp + Dlnaunzgdpn
, data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(naunz)
e<-naunz$rece
k<-naunz$k
n<-naunz$n
nardl::cusum(e=e,k=k,n=n)
```



Australia-Sweden:

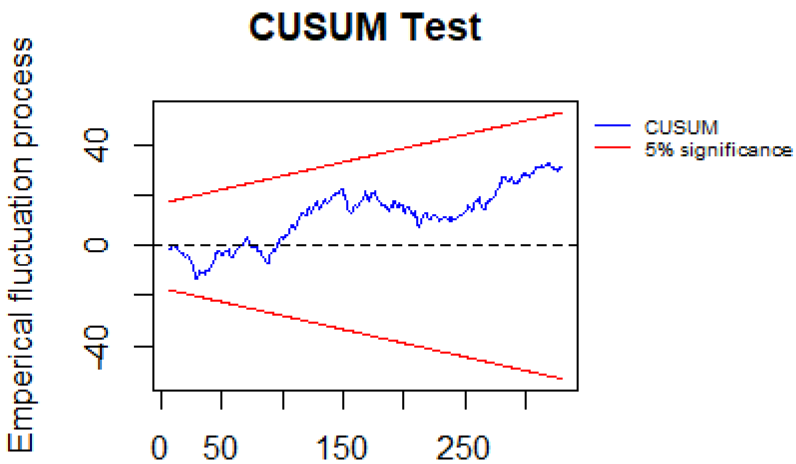
```
nause <- nardl::nardl(lnauserer ~ lnauseexp | lnauseirp +
lnauseirn + lnausem3p + lnausem3n + Dlnausegdpp + Dlnausegdpn
```

```
,    data=New_Monthly_Dataset_1993,    ic=c("aic"),    maxlag=1,
graph=FALSE, case=3)
summary(nause)
e<-nause$rece
k<-nause$k
n<-nause$n
nardl::cusum(e=e,k=k,n=n)
```



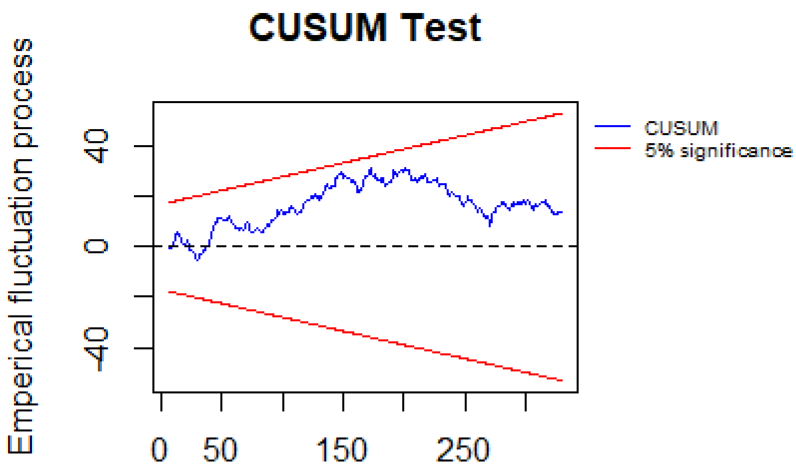
New Zealand-Sweden:

```
nnzse <- nardl::nardl(lnnzserer ~ lnnzseexp | lnnzseirp +
lnnzseirn + lnnzsem3p + lnnzsem3n + Dlnnzsegdpp + Dlnnzsegdpn
, data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(nnzse)
e<-nnzse$rece
k<-nnzse$k
n<-nnzse$n
nardl::cusum(e=e,k=k,n=n)
```



US-Euro Area:

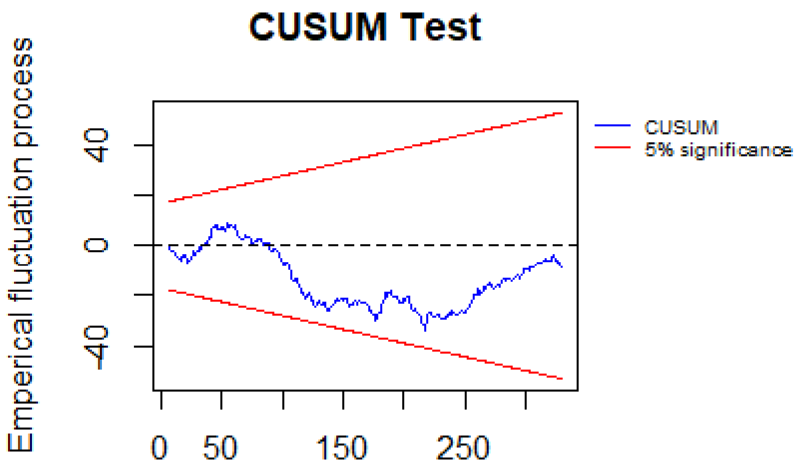
```
nuseu  <-  nardl::nardl(lnuseurer  ~  lnuseuexp  |  lnuseuirp  +
lnuseuirn + lnuseum3p + lnuseum3n + Dlnuseugdpp + Dlnuseugdpn
,    data=New_Monthly_Dataset_1993,    ic=c("aic"),    maxlag=1,
graph=FALSE, case=3)
summary(nuseu)
e<-nuseu$rece
k<-nuseu$k
n<-nuseu$n
nardl::cusum(e=e,k=k,n=n)
```



US-Switzerland:

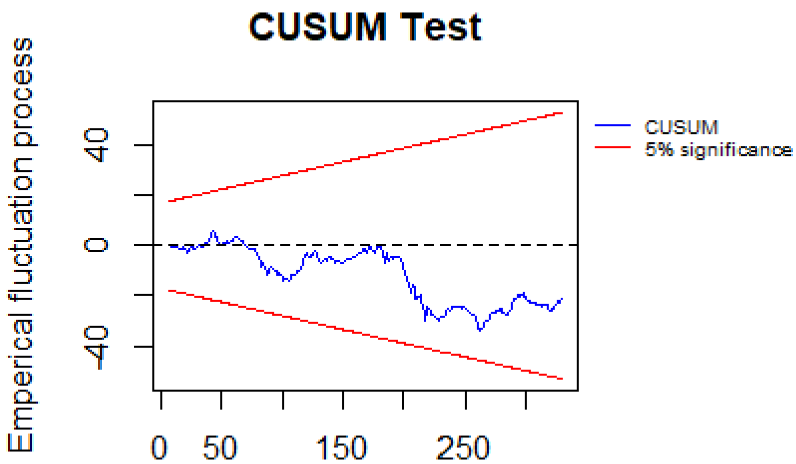
```
nusch  <-  nardl::nardl(lnuschrer  ~  lnuschexp  |  lnuschirp  +
lnuschirn + lnuschm3p + lnuschm3n + Dlnuschgdpp + Dlnuschgdpn
```

```
,    data=New_Monthly_Dataset_1993,    ic=c("aic"),    maxlag=1,
graph=FALSE, case=3)
summary(nusch)
e<-nusch$rece
k<-nusch$k
n<-nusch$n
nardl::cusum(e=e,k=k,n=n)
```



__Euro Area-Switzerland:__

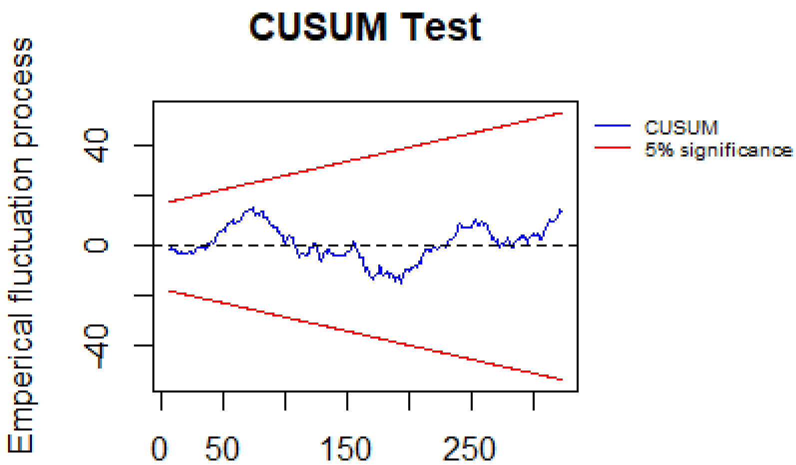
```
neuch  <-  nardl::nardl(lneuchrer  ~  lneuchexp  |  lneuchirp  +
lneuchirn + lneuchm3p + lneuchm3n + Dlneuchgdpp + Dlneuchgdpn
,    data=New_Monthly_Dataset_1993,    ic=c("aic"),    maxlag=1,
graph=FALSE, case=3)
summary(neuch)
e<-neuch$rece
k<-neuch$k
n<-neuch$n
nardl::cusum(e=e,k=k,n=n)
```



CUSUM Test for NARDL Model with Survey Expectations:

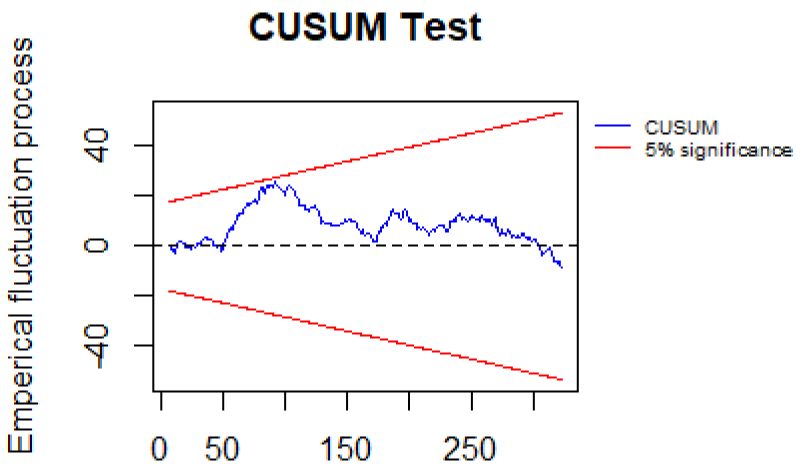
UK-Canada:

```
nukcas <- nardl::nardl(lnukcarer ~ lnukcasexp | lnukcairp +
lnukcairn + lnukcam3p + lnukcam3n + lnukcagdpp + lnukcagdpn ,
data=New_Monthly_Dataset_1993,       ic=c("aic"),       maxlag=1,
graph=FALSE, case=3)
summary(nukcas)
e<-nukcas$rece
k<-nukcas$k
n<-nukcas$n
nardl::cusum(e=e,k=k,n=n)
```



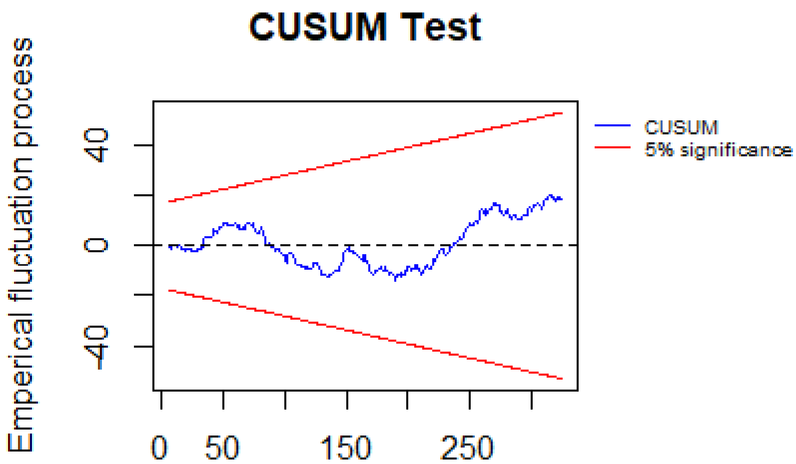
UK-Australia:

```
nukaus <- nardl::nardl(lnukaurer ~ lnukausexp | lnukauirp +
lnukauirn + lnukaum3p + lnukaum3n + lnukaugdpp + lnukaugdpn ,
data=New_Monthly_Dataset_1993,      ic=c("aic"),      maxlag=1,
graph=FALSE, case=3)
summary(nukaus)
e<-nukaus$rece
k<-nukaus$k
n<-nukaus$n
nardl::cusum(e=e,k=k,n=n)
```



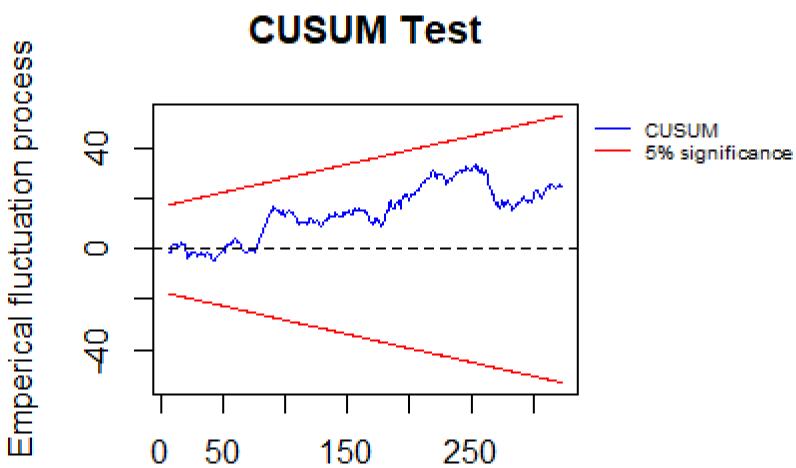
UK-New Zealand:

```
nuknzs <- nardl::nardl(lnuknzrer ~ lnuknzsexp | lnuknzirp +
lnuknzirn + lnuknzm3p + lnuknzm3n + Dlnuknzgdpp + Dlnuknzgdpn
,    data=New_Monthly_Dataset_1993,    ic=c("aic"),    maxlag=1,
graph=FALSE, case=3)
summary(nuknzs)
e<-nuknzs$rece
k<-nuknzs$k
n<-nuknzs$n
nardl::cusum(e=e,k=k,n=n)
```



UK-Sweden:

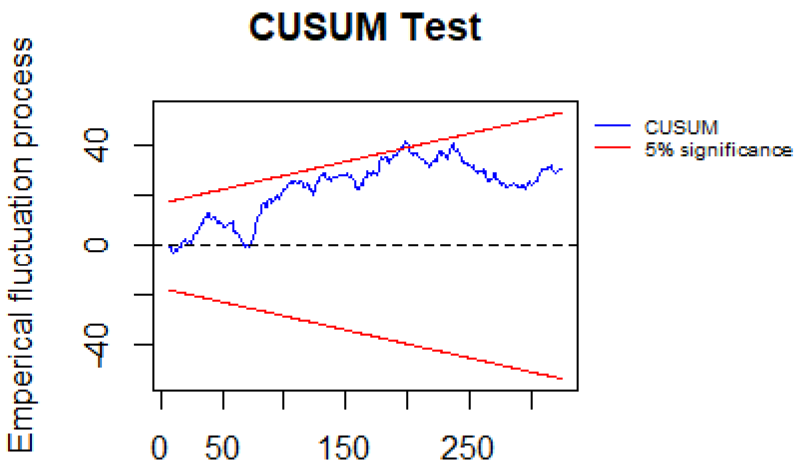
```
nukses <- nardl::nardl(lnukserer ~ lnuksesexp | lnukseirp + lnukseirn + lnuksem3p + lnuksem3n + Dlnuksegdpp + Dlnuksegdpn , data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1, graph=FALSE, case=3)
summary(nukses)
e<-nukses$rece
k<-nukses$k
n<-nukses$n
nardl::cusum(e=e,k=k,n=n)
```



Canada-Australia:

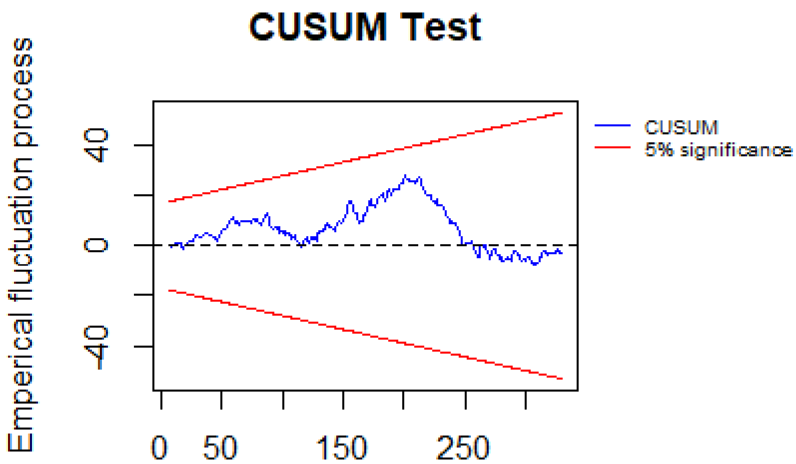
```
ncaaus <- nardl::nardl(lncaaurer ~ lncaausexp | lncaauirp + lncaauirn + lncaaum3p + lncaaum3n + lncaaugdpp + lncaaugdpn ,
```

```
data=New_Monthly_Dataset_1993,      ic=c("aic"),      maxlag=1,
graph=FALSE, case=3)
summary(ncaaus)
e<-ncaaus$rece
k<-ncaaus$k
n<-ncaaus$n
nardl::cusum(e=e,k=k,n=n)
```



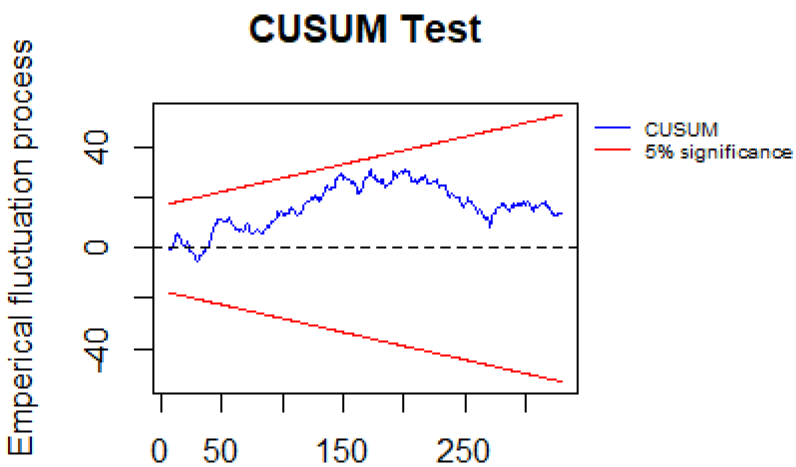
__Canada-New Zealand:__

```
ncanzs <- nardl::nardl(lncanzrer ~ lncanzsexp | lncanzirp +
lncanzirn + lncanzm3p + lncanzm3n + Dlncanzgdpp + Dlncanzgdpn
,   data=New_Monthly_Dataset_1993,   ic=c("aic"),   maxlag=1,
graph=FALSE, case=3)
summary(ncanzs)
e<-ncanzs$rece
k<-ncanzs$k
n<-ncanzs$n
nardl::cusum(e=e,k=k,n=n)
```



Canada-Sweden:

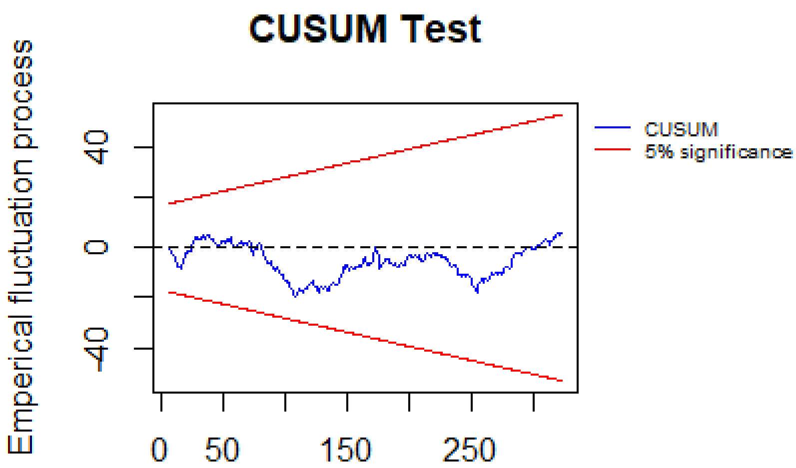
```
ncases <- nardl::nardl(lncaserer ~ lncasesexp | lncaseirp +
lncaseirn + lncasem3p + lncasem3n + Dlncasegdpp + Dlncasegdpn
,   data=New_Monthly_Dataset_1993,   ic=c("aic"),   maxlag=1,
graph=FALSE, case=3)
summary(ncases)
e<-ncases$rece
k<-ncases$k
n<-ncases$n
nardl::cusum(e=e,k=k,n=n)
```



Australia-New Zealand:

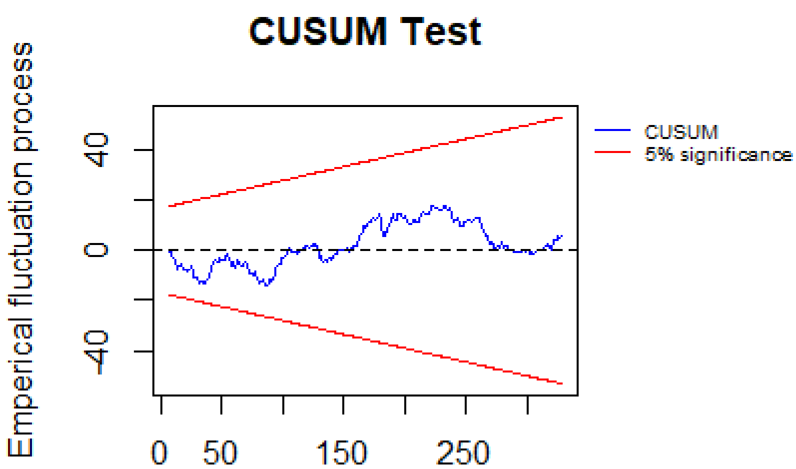
```
naunzs <- nardl::nardl(lnaunzrer ~ lnaunzsexp | lnaunzirp +
lnaunzirn + lnaunzm3p + lnaunzm3n + Dlnaunzgdpp + Dlnaunzgdpn
,   data=New_Monthly_Dataset_1993,   ic=c("aic"),   maxlag=1,
graph=FALSE, case=3)
summary(naunzs)
e<-naunzs$rece
```

```
k<-naunzs$k
n<-naunzs$n
nardl::cusum(e=e,k=k,n=n)
```



Australia-Sweden:

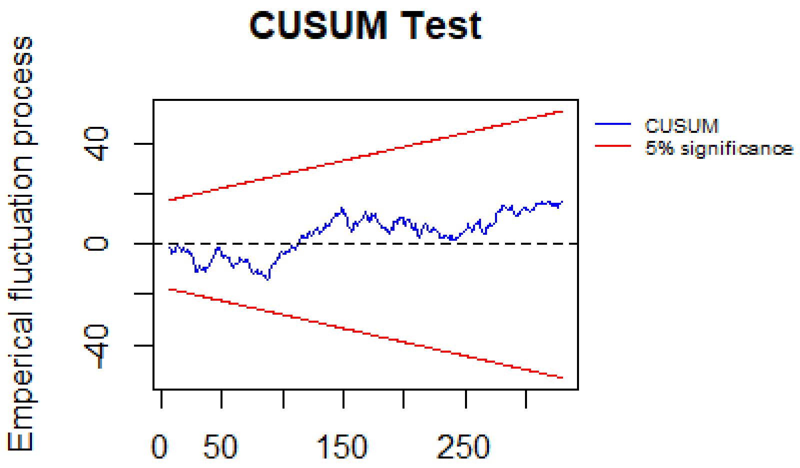
```
nauses <- nardl::nardl(lnauserer ~ lnausesexp | lnauseirp +
lnauseirn + lnausem3p + lnausem3n + Dlnausegdpp + Dlnausegdpn
, data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(nauses)
e<-nauses$rece
k<-nauses$k
n<-nauses$n
nardl::cusum(e=e,k=k,n=n)
```



New Zealand-Sweden:

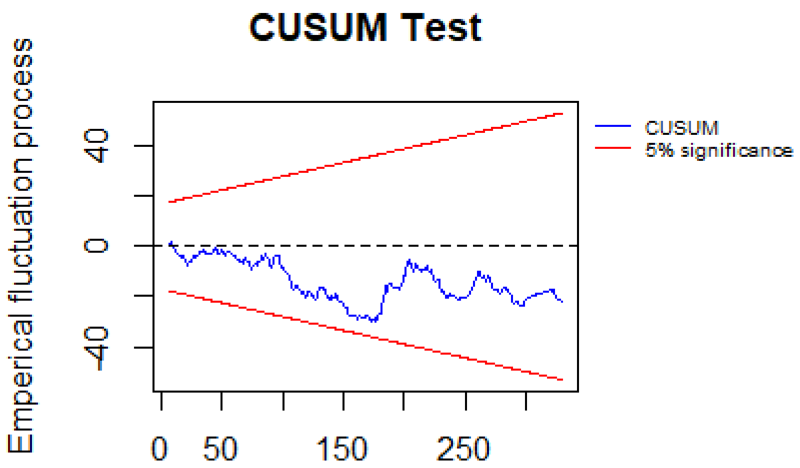
```
nnzses <- nardl::nardl(lnnzserer ~ lnnzsesexp | lnnzseirp +
lnnzseirn + lnnzsem3p + lnnzsem3n + Dlnnzsegdpp + Dlnnzsegdpn
```

```
, data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(nnzses)
e<-nnzses$rece
k<-nnzses$k
n<-nnzses$n
nardl::cusum(e=e,k=k,n=n)
```



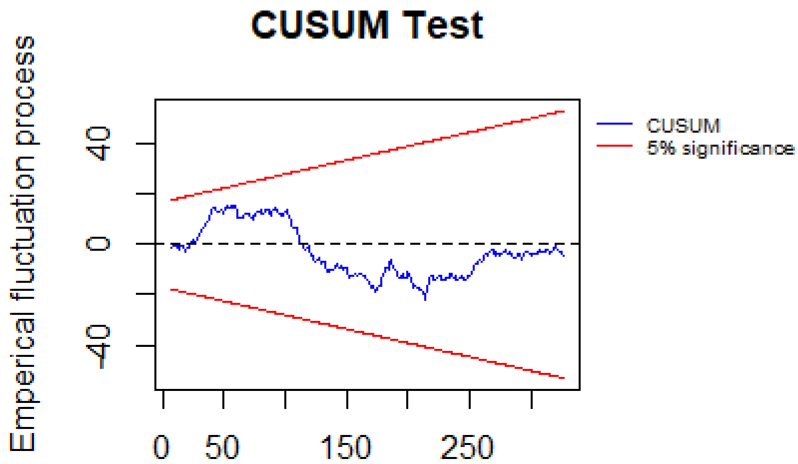
US-Euro Area:

```
nuseus <- nardl::nardl(lnuseurer ~ lnuseusexp | lnuseuirp +
lnuseuirn + lnuseum3p + lnuseum3n + Dlnuseugdpp + Dlnuseugdpn
, data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(nuseus)
e<-nuseus$rece
k<-nuseus$k
n<-nuseus$n
nardl::cusum(e=e,k=k,n=n)
```



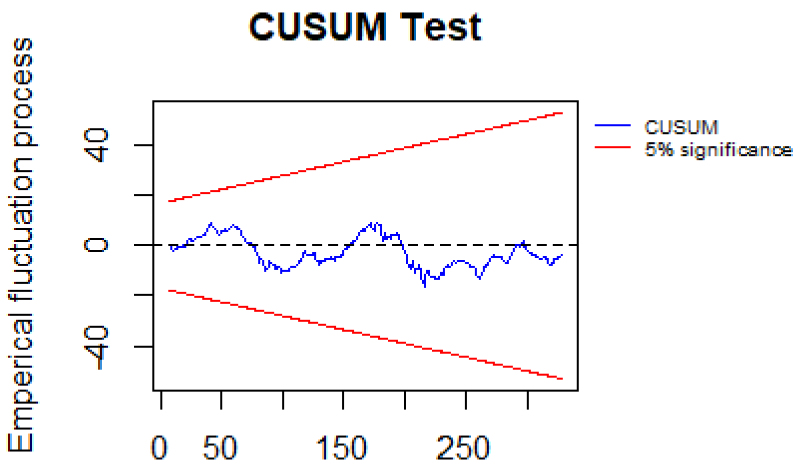
US-Switzerland:

```
nuschs <- nardl::nardl(lnuschrer ~ lnuschsexp | lnuschirp +
lnuschirn + lnuschm3p + lnuschm3n + Dlnuschgdpp + Dlnuschgdpn
, data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(nuschs)
e<-nuschs$rece
k<-nuschs$k
n<-nuschs$n
nardl::cusum(e=e,k=k,n=n)
```



Euro Area-Switzerland:

```
neuchs <- nardl::nardl(lneuchrer ~ lneuchsexp | lneuchirp +
lneuchirn + lneuchm3p + lneuchm3n + Dlneuchgdpp + Dlneuchgdpn
, data=New_Monthly_Dataset_1993, ic=c("aic"), maxlag=1,
graph=FALSE, case=3)
summary(neuchs)
e<-neuchs$rece
k<-neuchs$k
n<-neuchs$n
nardl::cusum(e=e,k=k,n=n)
```



Clark-West Statistic - In-sample Performance in ARDL Models with Market Expectations

UK-Canada:

```
ukcalm2 <- lm(lnukcarer ~ lnukcaexp + lnukcair + lnukcam3 + lnukcagdp,
data=New_Monthly_Dataset_1993)
predictednl2 <- predict(ukcalm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukcarer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
```

```
   lnukcarer
 Min.    :0.000000
 1st Qu.:0.001696
 Median :0.007636
 Mean    :0.015823
 3rd Qu.:0.025336
 Max.    :0.112407
```

UK-Australia:

```
ukaulm2 <- lm(lnukaurer ~ lnukauir + lnukaum3 + lnukaugdp + lnukauexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(ukaulm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnukaurer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnukaurer
 Min.    :0.000000
 1st Qu.:0.005858
 Median :0.022921
 Mean    :0.038947
 3rd Qu.:0.061347
```

```
 Max.   :0.177291
```

UK-New Zealand:

```
uknzlm2 <- lm(lnuknzrer ~ lnuknzir + lnuknzm3 + lnuknzgdp + lnuknzexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(uknzlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnuknzrer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
  lnuknzrer
 Min.   :0.000000
 1st Qu.:0.007992
 Median :0.036523
 Mean   :0.059185
 3rd Qu.:0.103557
 Max.   :0.219207
```

UK-Sweden:

```
ukselm2 <- lm(lnukserer ~ lnukseir + lnuksem3 + lnuksegdp + lnukseexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(ukselm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnukserer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnukserer
 Min.   :0.000000
 1st Qu.:0.001874
 Median :0.007302
 Mean   :0.021594
 3rd Qu.:0.037923
 Max.   :0.116876
```

Canada-Australia:

```
caaulm2 <- lm(lncaaurer ~ lncaauir + lncaaum3 + lncaaugdp + lncaauexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(caaulm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lncaaurer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lncaaurer
 Min.   :0.000000
 1st Qu.:0.001022
 Median :0.004302
 Mean   :0.007235
 3rd Qu.:0.010261
 Max.   :0.047008
```

Canada-New Zealand:

canzlm2 <- lm(lncanzrer ~ lncanzir + lncanzm3 + lncanzgdp + lncanzexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(canzlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lncanzrer"]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)

```
lncanzrer
 Min.   :0.000000
 1st Qu.:0.005416
 Median :0.039929
 Mean   :0.039240
 3rd Qu.:0.063340
```

Canada-Sweden:

caselm2 <- lm(lncaserer ~ lncaseir + lncasem3 + lncasegdp + lncaseexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(caselm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lncaserer"]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)

```
lncaserer
 Min.   :0.000000
 1st Qu.:0.003037
 Median :0.012832
 Mean   :0.022031
 3rd Qu.:0.033834
 Max.   :0.096646
```

Australia-New Zealand:

aunzlm2 <- lm(lnaunzrer ~ lnaunzir + lnaunzm3 + lnaunzgdp + lnaunzexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(aunzlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnaunzrer"]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)

```
lnaunzrer
 Min.   :0.000000
 1st Qu.:0.004452
 Median :0.015721
 Mean   :0.017940
 3rd Qu.:0.028335
 Max.   :0.066461
```

Australia-Sweden:

auselm2 <- lm(lnauserer ~ lnauseir + lnausem3 + lnausegdp + lnauseexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(auselm2, data=New_Monthly_Dataset_1993, type="response")

```
actual2 <- New_Monthly_Dataset_1993[, "lnauserer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnauserer
 Min.   :0.000000
 1st Qu.:0.003059
 Median :0.021357
 Mean   :0.029866
 3rd Qu.:0.049045
 Max.   :0.112580
```

New Zealand-Sweden:

```
nzselm2 <- lm(lnnzserer ~ lnnzseir + lnnzsem3 + lnnzsegdp + lnnzseexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(nzselm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnnzserer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnnzserer
 Min.   :0.00000
 1st Qu.:0.02987
 Median :0.06265
 Mean   :0.07413
 3rd Qu.:0.10660
 Max.   :0.20919
```

US-Euro Area:

```
useulm2 <- lm(lnuseurer ~ lnuseuir + lnuseum3 + lnuseugdp + lnuseuexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(useulm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnuseurer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnuseurer
 Min.   :0.000000
 1st Qu.:0.002747
 Median :0.012801
 Mean   :0.028863
 3rd Qu.:0.034107
 Max.   :0.193852
```

US-Switzerland:

```
uschlm2 <- lm(lnuschrer ~ lnuschir + lnuschm3 + lnuschgdp + lnuschexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(uschlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnuschrer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnuschrer
```

```
 Min.   :0.000000
 1st Qu.:0.007342
 Median :0.052812
 Mean   :0.105756
 3rd Qu.:0.190776
 Max.   :0.502402
```

Euro Area-Switzerland:

euchlm2 <- lm(lneuchrer ~ lneuchir + lneuchm3 + lneuchgdp + lneuchexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(euchlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lneuchrer"]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)

```
   lneuchrer
 Min.   :0.00000
 1st Qu.:0.02203
 Median :0.04837
 Mean   :0.11354
 3rd Qu.:0.19384
 Max.   :0.42415
```

Clark-West Statistic - Out-of-sample Performance in ARDL Models with Market Expectations

UK-Canada:

ukcalm <- lm(lnukcarer ~ lnukcaexp + lnukcair + lnukcam3 + lnukcagdp, data=New_Monthly_Dataset_1993[1:120,], order(2,1,1,1,1))
predicted <- predict(ukcalm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnukcarer"]
difference <- ((predicted - actual)^2)
summary(difference)

```
 lnukcarer
 Min.   :9.890e-06
 1st Qu.:8.918e-03
 Median :1.919e-02
 Mean   :3.219e-02
 3rd Qu.:5.336e-02
 Max.   :1.318e-01
```

UK-Australia:

ukaulm <- lm(lnukaurer ~ lnukauir + lnukaum3 + lnukaugdp + lnukauexp, data=New_Monthly_Dataset_1993[1:120,], order(2,1,1,1,1))
predicted <- predict(ukaulm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnukaurer"]
difference <- ((predicted - actual)^2)
summary(difference)

UK-New Zealand:

```
uknzlm <- lm(lnuknzrer ~ lnuknzir + lnuknzm3 + lnuknzgdp + lnuknzexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(uknzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnuknzrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
 lnukaurer
 Min.   :4.212e-05
 1st Qu.:8.158e-03
 Median :3.202e-02
 Mean   :4.393e-02
 3rd Qu.:6.651e-02
 Max.   :1.773e-01
```

UK-Sweden:

```
ukselm <- lm(lnukserer ~ lnukseir + lnuksem3 + lnuksegdp + lnukseexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(ukselm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnukserer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
 lnukserer
 Min.   :0.000000
 1st Qu.:0.001317
 Median :0.005611
 Mean   :0.015635
 3rd Qu.:0.027678
 Max.   :0.062767
```

Canada-Australia:

```
caaulm <- lm(lncaaurer ~ lncaauir + lncaaum3 + lncaaugdp + lncaauexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(caaulm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lncaaurer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
 lncaaurer
 Min.   :4.000e-09
 1st Qu.:9.441e-04
 Median :3.514e-03
 Mean   :4.901e-03
 3rd Qu.:7.111e-03
 Max.   :2.551e-02
```

Canada-New Zealand:

```
canzlm <- lm(lncanzrer ~ lncanzir + lncanzm3 + lncanzgdp + lncanzexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(canzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lncanzrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
   lncanzrer
 Min.   :1.000e-08
 1st Qu.:1.214e-03
 Median :3.830e-02
 Mean   :3.714e-02
 3rd Qu.:6.290e-02
 Max.   :1.166e-01
```

Canada-Sweden:

```
caselm <- lm(lncaserer ~ lncaseir + lncasem3 + lncasegdp + lncaseexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(caselm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lncaserer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
   lncaserer
 Min.   :2.510e-06
 1st Qu.:1.163e-02
 Median :2.910e-02
 Mean   :3.171e-02
 3rd Qu.:5.130e-02
 Max.   :9.665e-02
```

Australia-New Zealand:

```
aunzlm <- lm(lnaunzrer ~ lnaunzir + lnaunzm3 + lnaunzgdp + lnaunzexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(aunzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnaunzrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
 lnaunzrer
 Min.   :4.300e-07
 1st Qu.:4.844e-03
 Median :2.065e-02
 Mean   :2.102e-02
 3rd Qu.:3.388e-02
 Max.   :6.646e-02
```

Australia-Sweden:

auselm <- lm(lnauserer ~ lnauseir + lnausem3 + lnausegdp + lnauseexp, data=New_Monthly_Dataset_1993[1:120,], order(2,1,1,1,1))
predicted <- predict(auselm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnauserer"]
difference <- ((predicted - actual)^2)
summary(difference)

```
  lnauserer
 Min.   :9.170e-06
 1st Qu.:2.337e-02
 Median :4.391e-02
 Mean   :4.432e-02
 3rd Qu.:5.822e-02
 Max.   :1.126e-01
```

New Zealand-Sweden:
nzselm <- lm(lnnzserer ~ lnnzseir + lnnzsem3 + lnnzsegdp + lnnzseexp, data=New_Monthly_Dataset_1993[1:120,], order(2,1,1,1,1))
predicted <- predict(nzselm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnnzserer"]
difference <- ((predicted - actual)^2)
summary(difference)

```
 lnnzserer
 Min.   :0.02272
 1st Qu.:0.06269
 Median :0.08646
 Mean   :0.10183
 3rd Qu.:0.14379
 Max.   :0.20919
```

US-Euro Area:
useulm <- lm(lnuseurer ~ lnuseuir + lnuseum3 + lnuseugdp + lnuseuexp, data=New_Monthly_Dataset_1993[1:120,], order(2,1,1,1,1))
predicted <- predict(useulm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnuseurer"]
difference <- ((predicted - actual)^2)
summary(difference)

```
  lnuseurer
 Min.   :6.200e-07
 1st Qu.:3.242e-03
 Median :1.213e-02
 Mean   :1.705e-02
 3rd Qu.:2.275e-02
 Max.   :9.121e-02
```

US-Switzerland:
uschlm <- lm(lnuschrer ~ lnuschir + lnuschm3 + lnuschgdp + lnuschexp, data=New_Monthly_Dataset_1993[1:120,], order(2,1,1,1,1))

predicted <- predict(uschlm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnuschrer"]
difference <- ((predicted - actual)^2)
summary(difference)

```
  lnuschrer
 Min.   :0.003428
 1st Qu.:0.050265
 Median :0.174000
 Mean   :0.157542
 3rd Qu.:0.230637
 Max.   :0.502402
```

Euro Area-Switzerland:

euchlm <- lm(lneuchrer ~ lneuchir + lneuchm3 + lneuchgdp + lneuchexp, data=New_Monthly_Dataset_1993[1:120,], order(2,1,1,1,1))
predicted <- predict(euchlm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lneuchrer"]
difference <- ((predicted - actual)^2)
summary(difference)

```
lneuchrer
 Min.   :0.002213
 1st Qu.:0.029350
 Median :0.159515
 Mean   :0.153451
 3rd Qu.:0.255658
 Max.   :0.424148
```

Clark-West Statistic - In-sample Performance in NARDL Models with Market Expectations

UK-Canada:

nukcalm2 <- lm(lnukcarer ~ lnukcaexpp + lnukcaexpn + lnukcairp + lnukcairn + lnukcam3p + lnukcam3n + lnukcagdpp + lnukcagdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nukcalm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukcarer"]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)

```
  lnukcarer
 Min.   :5.000e-08
 1st Qu.:1.512e-03
 Median :5.796e-03
 Mean   :1.135e-02
 3rd Qu.:1.573e-02
 Max.   :7.701e-02
[1] 0.02692173
```

UK-Australia:

```
nukaulm2 <- lm(lnukaurer ~ lnukauexpp + lnukauexpn + lnukauirp + lnukauirn + lnukaum3p
+ lnukaum3n + lnukaugdpp + lnukaugdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nukaulm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukaurer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
   lnukaurer
 Min.   :6.000e-08
 1st Qu.:4.281e-04
 Median :1.905e-03
 Mean   :5.420e-03
 3rd Qu.:5.456e-03
 Max.   :7.291e-02
 [1] 0.03111267
```

UK-New Zealand:

```
nuknzlm2 <- lm(lnuknzrer ~ lnuknzexpp + lnuknzexpn + lnuknzirp + lnuknzirn + lnuknzm3p +
lnuknzm3n + lnuknzgdpp + lnuknzgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nuknzlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnuknzrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
   lnuknzrer
 Min.   :2.800e-07
 1st Qu.:7.821e-04
 Median :3.544e-03
 Mean   :9.333e-03
 3rd Qu.:1.188e-02
 Max.   :9.912e-02
 [1] 0.02509374
```

UK-Sweden:

```
nukselm2 <- lm(lnukserer ~ lnukseexpp + lnukseexpn + lnukseirp + lnukseirn + lnuksem3p +
lnuksem3n + lnuksegdpp + lnuksegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nukselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
   lnukserer
 Min.   :0.0000000
 1st Qu.:0.0008124
 Median :0.0046898
 Mean   :0.0069968
 3rd Qu.:0.0109508
 Max.   :0.0413347
 [1] 0.00627549
```

Canada-Australia:

```
ncaaulm2 <- lm(lncaaurer ~ lncaauexpp + lncaauexpn + lncaauirp + lncaauirn + lncaaum3p + lncaaum3n + lncaaugdpp + lncaaugdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(ncaaulm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lncaaurer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lncaaurer
 Min.   :9.000e-09
 1st Qu.:2.176e-04
 Median :1.299e-03
 Mean   :3.298e-03
 3rd Qu.:4.374e-03
 Max.   :2.331e-02
 [1] 0.0006611496
```

Canada-New Zealand:

```
ncanzlm2 <- lm(lncanzrer ~ lncanzexpp + lncanzexpn + lncanzirp + lncanzirn + lncanzm3p + lncanzm3n + lncanzgdpp + lncanzgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(ncanzlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lncanzrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
  lncanzrer
 Min.   :0.0000001
 1st Qu.:0.0020699
 Median :0.0075259
 Mean   :0.0106013
 3rd Qu.:0.0174172
 Max.   :0.0575521
 [1] 0.00149543
```

Canada-Sweden:

```
ncaselm2 <- lm(lncaserer ~ lncaseexpp + lncaseexpn + lncaseirp + lncaseirn + lncasem3p + lncasem3n + lncasegdpp + lncasegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(ncaselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lncaserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
  lncaserer
 Min.   :0.000000
 1st Qu.:0.002005
 Median :0.008967
 Mean   :0.013936
 3rd Qu.:0.021917
```

```
 Max.   :0.138606
 [1] 0.001018182
```

Australia-New Zealand:

```
naunzlm2 <- lm(lnaunzrer ~ lnaunzexpp + lnaunzexpn + lnaunzirp + lnaunzirn + lnaunzm3p
+ lnaunzm3n + lnaunzgdpp + lnaunzgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(naunzlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnaunzrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
  lnaunzrer
 Min.   :2.960e-07
 1st Qu.:2.678e-04
 Median :1.292e-03
 Mean   :2.447e-03
 3rd Qu.:3.241e-03
 Max.   :3.101e-02
 [1] 0.003944737
```

Australia-Sweden:

```
nauselm2 <- lm(lnauserer ~ lnauseexpp + lnauseexpn + lnauseirp + lnauseirn + lnausem3p +
lnausem3n + lnausegdpp + lnausegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nauselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnauserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
  lnauserer
 Min.   :1.430e-07
 1st Qu.:2.951e-04
 Median :1.570e-03
 Mean   :2.953e-03
 3rd Qu.:4.606e-03
 Max.   :1.814e-02
 [1] 0.006943286
```

New Zealand-Sweden:

```
nnzselm2 <- lm(lnnzserer ~ lnnzseexpp + lnnzseexpn + lnnzseirp + lnnzseirn + lnnzsem3p +
lnnzsem3n + lnnzsegdpp + lnnzsegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nnzselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnnzserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lnnzserer
 Min.   :0.0000000
 1st Qu.:0.0002296
 Median :0.0012754
 Mean   :0.0035627
```

```
 3rd Qu.:0.0038466
 Max.   :0.0381270
 [1] 0.008636167
```

US-Euro Area:

```
nuseulm2 <- lm(lnuseurer ~ lnuseuexpp + lnuseuexpn + lnuseuirp + lnuseuirn + lnuseum3p
+ lnuseum3n + lnuseugdpp + lnuseugdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nuseulm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnuseurer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
  lnuseurer
 Min.   :2.620e-06
 1st Qu.:1.429e-03
 Median :5.492e-03
 Mean   :1.531e-02
 3rd Qu.:1.824e-02
 Max.   :1.189e-01
 [1] 0.01205107
```

US-Switzerland:

```
nuschlm2 <- lm(lnuschrer ~ lnuschexpp + lnuschexpn + lnuschirp + lnuschirn + lnuschm3p +
lnuschm3n + lnuschgdpp + lnuschgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nuschlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnuschrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
   lnuschrer
 Min.   :0.000000
 1st Qu.:0.002318
 Median :0.008021
 Mean   :0.020538
 3rd Qu.:0.029322
 Max.   :0.247548
 [1] 0.0237401
```

Euro Area-Switzerland:

```
neuchlm2 <- lm(lneuchrer ~ lneuchexpp + lneuchexpn + lneuchirp + lneuchirn + lneuchm3p
+ lneuchm3n + lneuchgdpp + lneuchgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(neuchlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lneuchrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lneuchrer
 Min.   :2.100e-07
 1st Qu.:4.025e-03
 Median :1.204e-02
```

```
 Mean   :1.772e-02
 3rd Qu.:2.483e-02
 Max.   :9.892e-02
 [1] 0.01163468
```

Clark-West Statistic - Out-of-sample Performance in NARDL Models with Market Expectations

UK-Canada:

nukcalm <- lm(lnukcarer ~ lnukcaexpp + lnukcaexpn + lnukcairp + lnukcairn + lnukcam3p + lnukcam3n + lnukcagdpp + lnukcagdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nukcalm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnukcarer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(predictednl)

```
lnukcarer
 Min.   :0.0000848
 1st Qu.:0.0164281
 Median :0.0890624
 Mean   :0.1257371
 3rd Qu.:0.1716383
 Max.   :0.4995806
 [1] 0.0142979
```

UK-Australia:

nukaulm <- lm(lnukaurer ~ lnukauexpp + lnukauexpn + lnukauirp + lnukauirn + lnukaum3p + lnukaum3n + lnukaugdpp + lnukaugdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nukaulm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnukaurer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
lnukaurer
 Min.   :0.0000002
 1st Qu.:0.0108373
 Median :0.0519615
 Mean   :0.0991404
 3rd Qu.:0.1434184
 Max.   :0.6017564
[1] 0.01515461
```

UK-New Zealand:

nuknzlm <- lm(lnuknzrer ~ lnuknzexpp + lnuknzexpn + lnuknzirp + lnuknzirn + lnuknzm3p + lnuknzm3n + lnuknzgdpp + lnuknzgdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nuknzlm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnuknzrer"]

differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
lnuknzrer
 Min.   :0.0000001
 1st Qu.:0.0099289
 Median :0.0746538
 Mean   :0.0997804
 3rd Qu.:0.1720368
 Max.   :0.4340237
[1]  0.009859042
```

UK-Sweden:

nukselm <- lm(lnukserer ~ lnukseexpp + lnukseexpn + lnukseirp + lnukseirn + lnuksem3p + lnuksem3n + lnuksegdpp + lnuksegdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nukselm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnukserer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
lnukserer
 Min.   :4.500e-07
 1st Qu.:6.705e-03
 Median :2.340e-02
 Mean   :3.391e-02
 3rd Qu.:5.418e-02
 Max.   :1.509e-01
[1] 0.001146449
```

Canada-Australia:

ncaaulm <- lm(lncaaurer ~ lncaauexpp + lncaauexpn + lncaauirp + lncaauirn + lncaaum3p + lncaaum3n + lncaaugdpp + lncaaugdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(ncaaulm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lncaaurer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
lncaaurer
 Min.   :1.800e-07
 1st Qu.:2.960e-04
 Median :1.268e-03
 Mean   :5.947e-03
 3rd Qu.:5.785e-03
 Max.   :5.513e-02
[1]  0.0001083414
```

Canada-New Zealand:

```
ncanzlm <- lm(lncanzrer ~ lncanzexpp + lncanzexpn + lncanzirp + lncanzirn + lncanzm3p +
lncanzm3n + lncanzgdpp + lncanzgdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(ncanzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lncanzrer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lncanzrer
 Min.   :1.150e-06
 1st Qu.:2.832e-03
 Median :1.397e-02
 Mean   :2.007e-02
 3rd Qu.:3.239e-02
 Max.   :1.005e-01
[1]  0.0004417656
```

Canada-Sweden:

```
ncaselm <- lm(lncaserer ~ lncaseexpp + lncaseexpn + lncaseirp + lncaseirn + lncasem3p +
lncasem3n + lncasegdpp + lncasegdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(ncaselm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lncaserer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
   lncaserer
 Min.   :3.220e-06
 1st Qu.:2.548e-02
 Median :4.567e-02
 Mean   :5.302e-02
 3rd Qu.:7.494e-02
 Max.   :1.452e-01
[1]  0.001367491
```

Australia-New Zealand:

```
naunzlm <- lm(lnaunzrer ~ lnaunzexpp + lnaunzexpn + lnaunzirp + lnaunzirn + lnaunzm3p +
lnaunzm3n + lnaunzgdpp + lnaunzgdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(naunzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnaunzrer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lnaunzrer
 Min.   :0.000000
 1st Qu.:0.001346
 Median :0.004856
 Mean   :0.008145
```

```
 3rd Qu.:0.012303
 Max.   :0.036752
[1]  7.706571e-05
```

Australia-Sweden:

```
nauselm <- lm(lnauserer ~ lnauseexpp + lnauseexpn + lnauseirp + lnauseirn + lnausem3p + lnausem3n + lnausegdpp + lnausegdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(nauselm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnauserer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lnauserer
 Min.   :0.0000178
 1st Qu.:0.0145457
 Median :0.0257718
 Mean   :0.0308619
 3rd Qu.:0.0417432
 Max.   :0.1080039
[1]  0.0005549849
```

New Zealand-Sweden:

```
nnzselm <- lm(lnnzserer ~ lnnzseexpp + lnnzseexpn + lnnzseirp + lnnzseirn + lnnzsem3p + lnnzsem3n + lnnzsegdpp + lnnzsegdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(nnzselm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnnzserer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lnnzserer
 Min.   :1.186e-05
 1st Qu.:1.265e-02
 Median :2.289e-02
 Mean   :3.540e-02
 3rd Qu.:4.861e-02
 Max.   :1.286e-01
[1]  0.001083927
```

US-Euro Area:

```
nuseulm <- lm(lnuseurer ~ lnuseuexpp + lnuseuexpn + lnuseuirp + lnuseuirn + lnuseum3p + lnuseum3n + lnuseugdpp + lnuseugdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(nuseulm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnuseurer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lnuseurer
```

```
 Min.   :0.0000049
 1st Qu.:0.0077602
 Median :0.0250524
 Mean   :0.0732335
 3rd Qu.:0.1081868
 Max.   :0.4313846
[1]  0.009104887
```

US-Switzerland:

nuschlm <- lm(lnuschrer ~ lnuschexpp + lnuschexpn + lnuschirp + lnuschirn + lnuschm3p + lnuschm3n + lnuschgdpp + lnuschgdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nuschlm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnuschrer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
lnuschrer
 Min.   :0.0000003
 1st Qu.:0.0174272
 Median :0.1184891
 Mean   :0.1408632
 3rd Qu.:0.1890213
 Max.   :0.6084069
[1]  0.01653402
```

Euro Area-Switzerland:

neuchlm <- lm(lneuchrer ~ lneuchexpp + lneuchexpn + lneuchirp + lneuchirn + lneuchm3p + lneuchm3n + lneuchgdpp + lneuchgdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(neuchlm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lneuchrer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
lneuchrer
 Min.   :3.380e-06
 1st Qu.:3.003e-03
 Median :1.530e-02
 Mean   :6.294e-02
 3rd Qu.:1.031e-01
 Max.   :2.610e-01
[1] 0.005533991
```

Clark-West Statistic - In-sample Performance in ARDL Models with Survey Expectations

UK-Canada:

ukcalm2 <- lm(lnukcarer ~ lnukcasexp + lnukcair + lnukcam3 + lnukcagdp, data=New_Monthly_Dataset_1993)

```
predictednl2 <- predict(ukcalm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukcarer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
```

```
lnukcarer
 Min.   :5.000e-08
 1st Qu.:2.172e-03
 Median :7.952e-03
 Mean   :1.527e-02
 3rd Qu.:2.147e-02
 Max.   :1.844e-01
```

UK-Australia:

```
ukaulm2 <- lm(lnukaurer ~ lnukauir + lnukaum3 + lnukaugdp + lnukausexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(ukaulm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnukaurer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnukaurer
 Min.   :0.000000
 1st Qu.:0.005858
 Median :0.022921
 Mean   :0.038947
 3rd Qu.:0.061347
 Max.   :0.177291
```

UK-New Zealand:

```
uknzlm2 <- lm(lnuknzrer ~ lnuknzir + lnuknzm3 + lnuknzgdp + lnuknzsexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(uknzlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnuknzrer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnuknzrer
 Min.   :0.000000
 1st Qu.:0.007992
 Median :0.036523
 Mean   :0.059185
 3rd Qu.:0.103557
 Max.   :0.219207
```

UK-Sweden:

```
ukselm2 <- lm(lnukserer ~ lnukseir + lnuksem3 + lnuksegdp + lnuksesexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(ukselm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnukserer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnukserer
 Min.   :0.000000
 1st Qu.:0.001874
 Median :0.007302
 Mean   :0.021594
 3rd Qu.:0.037923
 Max.   :0.116876
```

Canada-Australia:

caaulm2 <- lm(lncaaurer ~ lncaauir + lncaaum3 + lncaaugdp + lncaausexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(caaulm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lncaaurer"]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)

```
lncaaurer
 Min.   :0.000000
 1st Qu.:0.001022
 Median :0.004302
 Mean   :0.007235
 3rd Qu.:0.010261
 Max.   :0.047008
```

Canada-New Zealand:

canzlm2 <- lm(lncanzrer ~ lncanzir + lncanzm3 + lncanzgdp + lncanzsexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(canzlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lncanzrer"]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)

```
lncanzrer
 Min.   :0.000000
 1st Qu.:0.005416
 Median :0.039929
 Mean   :0.039240
 3rd Qu.:0.063340
 Max.   :0.121841
```

Canada-Sweden:

caselm2 <- lm(lncaserer ~ lncaseir + lncasem3 + lncasegdp + lncasesexp, data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(caselm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lncaserer"]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)

```
lncaserer
 Min.   :0.000000
 1st Qu.:0.003037
 Median :0.012832
 Mean   :0.022031
```

```
 3rd Qu.:0.033834
 Max.   :0.096646
```

Australia-New Zealand:

```
aunzlm2 <- lm(lnaunzrer ~ lnaunzir + lnaunzm3 + lnaunzgdp + lnaunzsexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(aunzlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnaunzrer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnaunzrer
 Min.   :0.000000
 1st Qu.:0.004452
 Median :0.015721
 Mean   :0.017940
 3rd Qu.:0.028335
 Max.   :0.066461
```

Australia-Sweden:

```
auselm2 <- lm(lnauserer ~ lnauseir + lnausem3 + lnausegdp + lnausesexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(auselm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnauserer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnauserer
 Min.   :0.000000
 1st Qu.:0.003059
 Median :0.021357
 Mean   :0.029866
 3rd Qu.:0.049045
 Max.   :0.112580
```

New Zealand-Sweden:

```
nzselm2 <- lm(lnnzserer ~ lnnzseir + lnnzsem3 + lnnzsegdp + lnnzsesexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(nzselm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnnzserer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnnzserer
 Min.   :0.00000
 1st Qu.:0.02987
 Median :0.06265
 Mean   :0.07413
 3rd Qu.:0.10660
 Max.   :0.20919
```

US-Euro Area:

```
useulm2 <- lm(lnuseurer ~ lnuseuir + lnuseum3 + lnuseugdp + lnuseusexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(useulm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnuseurer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnuseurer
 Min.   :0.000000
 1st Qu.:0.002747
 Median :0.012801
 Mean   :0.028863
 3rd Qu.:0.034107
 Max.   :0.193852
```

US-Switzerland:

```
uschlm2 <- lm(lnuschrer ~ lnuschir + lnuschm3 + lnuschgdp + lnuschsexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(uschlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lnuschrer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lnuschrer
 Min.   :0.000000
 1st Qu.:0.007342
 Median :0.052812
 Mean   :0.105756
 3rd Qu.:0.190776
 Max.   :0.502402
```

Euro Area-Switzerland:

```
euchlm2 <- lm(lneuchrer ~ lneuchir + lneuchm3 + lneuchgdp + lneuchsexp,
data=New_Monthly_Dataset_1993, order(2,1,1,1,1))
predicted2 <- predict(euchlm2, data=New_Monthly_Dataset_1993, type="response")
actual2 <- New_Monthly_Dataset_1993[, "lneuchrer" ]
difference2 <- ((predicted2 - actual2)^2)
summary(difference2)
```

```
lneuchrer
 Min.   :0.00000
 1st Qu.:0.02203
 Median :0.04837
 Mean   :0.11354
 3rd Qu.:0.19384
 Max.   :0.42415
```

Clark-West Statistic - Out-of-sample Performance in ARDL Models with Survey Expectations

UK-Canada:

```
ukcalm <- lm(lnukcarer ~ lnukcasexp + lnukcair + lnukcam3 + lnukcagdp, data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(ukcalm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnukcarer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnukcarer
 Min.   :9.890e-06
 1st Qu.:8.918e-03
 Median :1.919e-02
 Mean   :3.219e-02
 3rd Qu.:5.336e-02
 Max.   :1.318e-01
```

UK-Australia:

```
ukaulm <- lm(lnukaurer ~ lnukauir + lnukaum3 + lnukaugdp + lnukausexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(ukaulm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnukaurer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
 lnukaurer
 Min.   :4.212e-05
 1st Qu.:8.158e-03
 Median :3.202e-02
 Mean   :4.393e-02
 3rd Qu.:6.651e-02
 Max.   :1.773e-01
```

UK-New Zealand:

```
uknzlm <- lm(lnuknzrer ~ lnuknzir + lnuknzm3 + lnuknzgdp + lnuknzsexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(uknzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnuknzrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnuknzrer
 Min.   :4.370e-06
 1st Qu.:1.174e-02
 Median :7.647e-02
 Mean   :7.865e-02
 3rd Qu.:1.346e-01
 Max.   :2.192e-01
```

UK-Sweden:

```
ukselm <- lm(lnukserer ~ lnukseir + lnuksem3 + lnuksegdp + lnuksesexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(ukselm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnukserer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnukserer
 Min.   :0.000000
 1st Qu.:0.001317
 Median :0.005611
 Mean   :0.015635
 3rd Qu.:0.027678
 Max.   :0.062767
```

Canada-Australia:

```
caaulm <- lm(lncaaurer ~ lncaauir + lncaaum3 + lncaaugdp + lncaausexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(caaulm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lncaaurer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lncaaurer
 Min.   :4.000e-09
 1st Qu.:9.441e-04
 Median :3.514e-03
 Mean   :4.901e-03
 3rd Qu.:7.111e-03
 Max.   :2.551e-02
```

Canada-New Zealand:

```
canzlm <- lm(lncanzrer ~ lncanzir + lncanzm3 + lncanzgdp + lncanzsexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(canzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lncanzrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lncanzrer
 Min.   :1.000e-08
 1st Qu.:1.214e-03
 Median :3.830e-02
 Mean   :3.714e-02
 3rd Qu.:6.290e-02
 Max.   :1.166e-01
```

Canada-Sweden:

```
caselm <- lm(lncaserer ~ lncaseir + lncasem3 + lncasegdp + lncasesexp, data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(caselm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lncaserer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lncaserer
 Min.   :2.510e-06
 1st Qu.:1.163e-02
 Median :2.910e-02
 Mean   :3.171e-02
 3rd Qu.:5.130e-02
 Max.   :9.665e-02
```

Australia-New Zealand:

```
aunzlm <- lm(lnaunzrer ~ lnaunzir + lnaunzm3 + lnaunzgdp + lnaunzsexp, data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(aunzlm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnaunzrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnaunzrer
 Min.   :4.300e-07
 1st Qu.:4.844e-03
 Median :2.065e-02
 Mean   :2.102e-02
 3rd Qu.:3.388e-02
 Max.   :6.646e-02
```

Australia-Sweden:

```
auselm <- lm(lnauserer ~ lnauseir + lnausem3 + lnausegdp + lnausesexp, data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(auselm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnauserer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnauserer
 Min.   :9.170e-06
 1st Qu.:2.337e-02
 Median :4.391e-02
 Mean   :4.432e-02
 3rd Qu.:5.822e-02
 Max.   :1.126e-01
```

New Zealand-Sweden:

```
nzselm <- lm(lnnzserer ~ lnnzseir + lnnzsem3 + lnnzsegdp + lnnzsesexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(nzselm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnnzserer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnnzserer
 Min.   :0.02272
 1st Qu.:0.06269
 Median :0.08646
 Mean   :0.10183
 3rd Qu.:0.14379
 Max.   :0.20919
```

US-Euro Area:

```
useulm <- lm(lnuseurer ~ lnuseuir + lnuseum3 + lnuseugdp + lnuseusexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(useulm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnuseurer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnuseurer
 Min.   :6.200e-07
 1st Qu.:3.242e-03
 Median :1.213e-02
 Mean   :1.705e-02
 3rd Qu.:2.275e-02
 Max.   :9.121e-02
```

US-Switzerland:

```
uschlm <- lm(lnuschrer ~ lnuschir + lnuschm3 + lnuschgdp + lnuschsexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(uschlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lnuschrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lnuschrer
 Min.   :0.003428
 1st Qu.:0.050265
 Median :0.174000
 Mean   :0.157542
 3rd Qu.:0.230637
 Max.   :0.502402
```

Euro Area-Switzerland:

```
euchlm <- lm(lneuchrer ~ lneuchir + lneuchm3 + lneuchgdp + lneuchsexp,
data=New_Monthly_Dataset_1993[1:120, ], order(2,1,1,1,1))
predicted <- predict(euchlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actual <- New_Monthly_Dataset_1993[121:336, "lneuchrer" ]
difference <- ((predicted - actual)^2)
summary(difference)
```

```
lneuchrer
 Min.   :0.002213
 1st Qu.:0.029350
 Median :0.159515
 Mean   :0.153451
 3rd Qu.:0.255658
 Max.   :0.424148
```

Clark-West Statistic - In-sample Performance in NARDL Models with Survey Expectations

UK-Canada:

```
nukcalm2 <- lm(lnukcarer ~ lnukcasexpp + lnukcasexpn + lnukcairp + lnukcairn + lnukcam3p
+ lnukcam3n + lnukcagdpp + lnukcagdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nukcalm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukcarer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
  lnukcarer
 Min.   :2.000e-08
 1st Qu.:1.549e-03
 Median :6.958e-03
 Mean   :1.236e-02
 3rd Qu.:1.815e-02
 Max.   :1.279e-01
 [1] 0.02590619
```

UK-Australia:

```
nukaulm2 <- lm(lnukaurer ~ lnukausexpp + lnukausexpn + lnukauirp + lnukauirn +
lnukaum3p + lnukaum3n + lnukaugdpp + lnukaugdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nukaulm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukaurer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lnukaurer
 Min.   :0.0000003
 1st Qu.:0.0008823
 Median :0.0037335
 Mean   :0.0089933
 3rd Qu.:0.0122161
```

```
 Max.   :0.0759041
 [1] 0.02769951
```

UK-New Zealand:

```
nuknzlm2 <- lm(lnuknzrer ~ lnuknzsexpp + lnuknzsexpn + lnuknzirp + lnuknzirn + lnuknzm3p
+ lnuknzm3n + lnuknzgdpp + lnuknzgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nuknzlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnuknzrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lnuknzrer
 Min.   :2.000e-08
 1st Qu.:6.848e-04
 Median :3.064e-03
 Mean   :9.166e-03
 3rd Qu.:9.771e-03
 Max.   :1.178e-01
 [1] 0.02629519
```

UK-Sweden:

```
nukselm2 <- lm(lnukserer ~ lnuksesexpp + lnuksesexpn + lnukseirp + lnukseirn + lnuksem3p
+ lnuksem3n + lnuksegdpp + lnuksegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nukselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnukserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lnukserer
 Min.   :0.0000000
 1st Qu.:0.0009535
 Median :0.0042407
 Mean   :0.0071639
 3rd Qu.:0.0099084
 Max.   :0.0466576
[1] 0.006107912
```

Canada-Australia:

```
ncaaulm2 <- lm(lncaaurer ~ lncaausexpp + lncaausexpn + lncaauirp + lncaauirn + lncaaum3p
+ lncaaum3n + lncaaugdpp + lncaaugdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(ncaaulm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lncaaurer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lncaaurer
 Min.   :6.170e-07
 1st Qu.:2.916e-04
 Median :1.403e-03
```

```
 Mean   :3.383e-03
 3rd Qu.:4.441e-03
 Max.   :3.131e-02
 [1] 0.0005679703
```

Canada-New Zealand:

```
ncanzlm2 <- lm(lncanzrer ~ lncanzsexpp + lncanzsexpn + lncanzirp + lncanzirn + lncanzm3p
+ lncanzm3n + lncanzgdpp + lncanzgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(ncanzlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lncanzrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lncanzrer
 Min.   :2.000e-08
 1st Qu.:2.128e-03
 Median :6.803e-03
 Mean   :1.048e-02
 3rd Qu.:1.673e-02
 Max.   :6.158e-02
 [1] 0.001504751
```

Canada-Sweden:

```
ncaselm2 <- lm(lncaserer ~ lncasesexpp + lncasesexpn + lncaseirp + lncaseirn + lncasem3p +
lncasem3n + lncasegdpp + lncasegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(ncaselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lncaserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lncaserer
 Min.   :9.000e-08
 1st Qu.:1.440e-03
 Median :9.431e-03
 Mean   :1.344e-02
 3rd Qu.:2.327e-02
 Max.   :6.743e-02
 [1] 0.001515381
```

Australia-New Zealand:

```
naunzlm2 <- lm(lnaunzrer ~ lnaunzsexpp + lnaunzsexpn + lnaunzirp + lnaunzirn +
lnaunzm3p + lnaunzm3n + lnaunzgdpp + lnaunzgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(naunzlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnaunzrer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
   lnaunzrer
 Min.   :2.600e-08
 1st Qu.:3.784e-04
```

```
 Median :1.404e-03
 Mean   :2.638e-03
 3rd Qu.:3.301e-03
 Max.   :2.526e-02
[1] 0.003934066
```

Australia-Sweden:

```
nauselm2 <- lm(lnauserer ~ lnausesexpp + lnausesexpn + lnauseirp + lnauseirn + lnausem3p + lnausem3n + lnausegdpp + lnausegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nauselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnauserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lnauserer
 Min.   :1.800e-08
 1st Qu.:3.069e-04
 Median :1.409e-03
 Mean   :3.011e-03
 3rd Qu.:4.682e-03
 Max.   :2.202e-02
[1] 0.006937875
```

New Zealand-Sweden:

```
nnzselm2 <- lm(lnnzserer ~ lnnzsesexpp + lnnzsesexpn + lnnzseirp + lnnzseirn + lnnzsem3p + lnnzsem3n + lnnzsegdpp + lnnzsegdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nnzselm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnnzserer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lnnzserer
 Min.   :0.0000000
 1st Qu.:0.0002595
 Median :0.0011782
 Mean   :0.0042641
 3rd Qu.:0.0040353
 Max.   :0.0905356
[1] 0.008967823
```

US-Euro Area:

```
nuseulm2 <- lm(lnuseurer ~ lnuseusexpp + lnuseusexpn + lnuseuirp + lnuseuirn + lnuseum3p + lnuseum3n + lnuseugdpp + lnuseugdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nuseulm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnuseurer" ]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)
```

```
lnuseurer
 Min.   :0.000000
```

```
 1st Qu.:0.001367
 Median :0.006255
 Mean   :0.016204
 3rd Qu.:0.021747
 Max.   :0.113193
[1] 0.0114016
```

US-Switzerland:

nuschlm2 <- lm(lnuschrer ~ lnuschsexpp + lnuschsexpn + lnuschirp + lnuschirn + lnuschm3p + lnuschm3n + lnuschgdpp + lnuschgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(nuschlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lnuschrer"]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)

```
lnuschrer
 Min.   :1.700e-07
 1st Qu.:2.832e-03
 Median :1.087e-02
 Mean   :2.212e-02
 3rd Qu.:2.870e-02
 Max.   :3.049e-01
[1] 0.02461345
```

Euro Area-Switzerland:

neuchlm2 <- lm(lneuchrer ~ lneuchsexpp + lneuchsexpn + lneuchirp + lneuchirn + lneuchm3p + lneuchm3n + lneuchgdpp + lneuchgdpn, data=New_Monthly_Dataset_1993)
predictednl2 <- predict(neuchlm2, data=New_Monthly_Dataset_1993, type="response")
actualnl2 <- New_Monthly_Dataset_1993[, "lneuchrer"]
differencenl2 <- ((predictednl2 - actualnl2)^2)
summary(differencenl2)
var(predictednl2)

```
lneuchrer
 Min.   :0.0000002
 1st Qu.:0.0054267
 Median :0.0148408
 Mean   :0.0267827
 3rd Qu.:0.0352478
 Max.   :0.2462630
[1] 0.009045649
```

Clark-West Statistic - Out-of-sample Performance in NARDL Models with Survey Expectations

UK-Canada:

nukcalm <- lm(lnukcarer ~ lnukcasexpp + lnukcasexpn + lnukcairp + lnukcairn + lnukcam3p + lnukcam3n + lnukcagdpp + lnukcagdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nukcalm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnukcarer"]

```
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(predictednl)
```

```
lnukcarer
 Min.   :0.000014
 1st Qu.:0.016283
 Median :0.091133
 Mean   :0.125487
 3rd Qu.:0.176565
 Max.   :0.500230
[1] 0.01423076
```

UK-Australia:

```
nukaulm <- lm(lnukaurer ~ lnukausexpp + lnukausexpn + lnukauirp + lnukauirn +
lnukaum3p + lnukaum3n + lnukaugdpp + lnukaugdpn,
data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(nukaulm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnukaurer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lnukaurer
 Min.   :0.0000155
 1st Qu.:0.0090978
 Median :0.0737335
 Mean   :0.0959234
 3rd Qu.:0.1452507
 Max.   :0.4664096
[1]  0.01035811
```

UK-New Zealand:

```
nuknzlm <- lm(lnuknzrer ~ lnuknzsexpp + lnuknzsexpn + lnuknzirp + lnuknzirn + lnuknzm3p
+ lnuknzm3n + lnuknzgdpp + lnuknzgdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(nuknzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnuknzrer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
  lnuknzrer
 Min.   :0.0000008
 1st Qu.:0.0100041
 Median :0.0707379
 Mean   :0.1032522
 3rd Qu.:0.1840801
 Max.   :0.4339077
[1]  0.01045951
```

UK-Sweden:

```
nukselm <- lm(lnukserer ~ lnuksesexpp + lnuksesexpn + lnukseirp + lnukseirn + lnuksem3p + lnuksem3n + lnuksegdpp + lnuksegdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(nukselm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnukserer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lnukserer
 Min.   :5.940e-06
 1st Qu.:8.681e-03
 Median :2.197e-02
 Mean   :3.185e-02
 3rd Qu.:5.000e-02
 Max.   :1.163e-01
[1]  0.0008386415
```

Canada-Australia:

```
ncaaulm <- lm(lncaaurer ~ lncaausexpp + lncaausexpn + lncaauirp + lncaauirn + lncaaum3p + lncaaum3n + lncaaugdpp + lncaaugdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(ncaaulm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lncaaurer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lncaaurer
 Min.   :1.360e-06
 1st Qu.:3.309e-04
 Median :1.443e-03
 Mean   :5.617e-03
 3rd Qu.:6.413e-03
 Max.   :4.178e-02
[1]  8.06897e-05
```

Canada-New Zealand:

```
ncanzlm <- lm(lncanzrer ~ lncanzsexpp + lncanzsexpn + lncanzirp + lncanzirn + lncanzm3p + lncanzm3n + lncanzgdpp + lncanzgdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(ncanzlm, data=New_Monthly_Dataset_1993[121:336, ], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lncanzrer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lncanzrer
 Min.   :3.000e-08
 1st Qu.:3.015e-03
 Median :1.189e-02
 Mean   :1.965e-02
 3rd Qu.:3.165e-02
```

```
 Max.   :1.075e-01
[1]  0.0004360954
```

Canada-Sweden:

```
ncaselm <- lm(lncaserer ~ lncasesexpp + lncasesexpn + lncaseirp + lncaseirn + lncasem3p +
lncasem3n + lncasegdpp + lncasegdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(ncaselm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lncaserer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
lncaserer
 Min.   :0.0000027
 1st Qu.:0.0214832
 Median :0.0480827
 Mean   :0.0524932
 3rd Qu.:0.0733358
 Max.   :0.1465759
[1]  0.001347972
```

Australia-New Zealand:

```
naunzlm <- lm(lnaunzrer ~ lnaunzsexpp + lnaunzsexpn + lnaunzirp + lnaunzirn + lnaunzm3p
+ lnaunzm3n + lnaunzgdpp + lnaunzgdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(naunzlm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnaunzrer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
  lnaunzrer
 Min.   :1.010e-06
 1st Qu.:2.099e-03
 Median :5.404e-03
 Mean   :8.366e-03
 3rd Qu.:1.244e-02
 Max.   :4.061e-02
[1]  6.849759e-05
```

Australia-Sweden:

```
nauselm <- lm(lnauserer ~ lnausesexpp + lnausesexpn + lnauseirp + lnauseirn + lnausem3p
+ lnausem3n + lnausegdpp + lnausegdpn, data=New_Monthly_Dataset_1993[1:120, ])
predictednl <- predict(nauselm, data=New_Monthly_Dataset_1993[121:336, ],
type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnauserer" ]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)
```

```
   lnauserer
```

```
 Min.   :5.000e-08
 1st Qu.:1.108e-02
 Median :2.842e-02
 Mean   :3.112e-02
 3rd Qu.:4.159e-02
 Max.   :9.592e-02
[1]  0.0005815332
```

New Zealand-Sweden:

nnzselm <- lm(lnnzserer ~ lnnzsesexpp + lnnzsesexpn + lnnzseirp + lnnzseirn + lnnzsem3p + lnnzsem3n + lnnzsegdpp + lnnzsegdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nnzselm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnnzserer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
   lnnzserer
 Min.   :1.869e-05
 1st Qu.:1.207e-02
 Median :2.330e-02
 Mean   :3.556e-02
 3rd Qu.:4.804e-02
 Max.   :1.509e-01
[1]  0.001193001
```

US-Euro Area:

nuseulm <- lm(lnuseurer ~ lnuseusexpp + lnuseusexpn + lnuseuirp + lnuseuirn + lnuseum3p + lnuseum3n + lnuseugdpp + lnuseugdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nuseulm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnuseurer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
lnuseurer
 Min.   :0.000000
 1st Qu.:0.004947
 Median :0.019834
 Mean   :0.068996
 3rd Qu.:0.111314
 Max.   :0.385652
[1]  0.008890634
```

US-Switzerland:

nuschlm <- lm(lnuschrer ~ lnuschsexpp + lnuschsexpn + lnuschirp + lnuschirn + lnuschm3p + lnuschm3n + lnuschgdpp + lnuschgdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(nuschlm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lnuschrer"]
differencenl <- ((predictednl - actualnl)^2)

summary(differencenl)
var(differencenl)

```
lnuschrer
 Min.   :0.0000039
 1st Qu.:0.0197261
 Median :0.1165382
 Mean   :0.1399100
 3rd Qu.:0.2023709
 Max.   :0.5930345
[1]  0.01648004
```

Euro Area-Switzerland:

neuchlm <- lm(lneuchrer ~ lneuchsexpp + lneuchsexpn + lneuchirp + lneuchirn + lneuchm3p + lneuchm3n + lneuchgdpp + lneuchgdpn, data=New_Monthly_Dataset_1993[1:120,])
predictednl <- predict(neuchlm, data=New_Monthly_Dataset_1993[121:336,], type="response")
actualnl <- New_Monthly_Dataset_1993[121:336, "lneuchrer"]
differencenl <- ((predictednl - actualnl)^2)
summary(differencenl)
var(differencenl)

```
   lneuchrer
 Min.   :2.360e-06
 1st Qu.:2.689e-03
 Median :1.347e-02
 Mean   :6.275e-02
 3rd Qu.:1.058e-01
 Max.   :2.554e-01
[1]  0.005447129
```