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# THE IMPACT OF INTERNATIONAL FISCAL AND MONETARY SPILLOVERS ON SHANGHAI STOCK EXCHANGE RETURNS

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"Let China sleep; when she wakes she will shake the world."

By Napoléon Bonaparte

## Abstract

The impact of international fiscal and monetary spillovers on Shanghai stock exchange returns

by Pedro M. Santos

In responding to subprime crisis with its peak with the bankruptcy of investment bank Lehman brothers in September of 2008, marking the end of the "great moderation", several governments and central banks of developed and emerging economies change the respective fiscal and monetary policies, in order to stimulate the economy, some more than others, creating spillovers and transmit them by different channels through the stocks market worldwide.

Furthermore, due to recent debate of the implementation of similar monetary stimulus program in China, like to the ones implemented in US and in currently in development in Euro Area, is relevant access the f policies consequences in China.

The present work particularly focusses on the consequences of monetary and fiscal policies implemented in the United States, United Kingdom, Euro Area, Japan in China. The results show that the spillovers of the international fiscal and monetary policy are overall nonexistent or weak at best. However, there are significant spillovers of United States and Japan with China, the monetary policy of US has positive impact and the fiscal has negative impact on Shanghai stock returns, the same is true of the Japanese monetary policy.

Key words: Fiscal policy, monetary policy, spillovers, stock returns, Structural Vector Autoregressive Model - SVAR

JEL – Codes: C32, C51, E52, E62

**Resumo**

O impacto dos spillovers provenientes das politicas monetária e fiscal internacional no mercado accionista de Shanghai

por Pedro M. Santos

Na resposta a crise do *subprime* com o seu auge com a falência do banco Lehman Brothers em setembro de 2008, marcando o fim da "grande moderação", vários governos e bancos centrais de países desenvolvidos e em desenvolvimento mudaram as suas respetivas fiscais e monetárias, em ordem a estimular a economia, alguns com maior ímpeto que outas, criando *spillovers* e transmitindo os mesmos por diferentes canais para os mercados acionistas a nível mundial.

Para alem do mais, devido ao recente debate de implementação de um programa de estímulos monetários semelhante na China aos que foram implementados nos EUA e atualmente em desenvolvimento na Área do Euro, é pertinente avaliar se os impactos das consequências destas politicas nos países desenvolvidos nos países emergente e vice-versa.

O presente trabalho foca-se nas consequências das politicas fiscais implementas nos Estados Unidos, Reino Unido, Área do Euro, Japão e China. Os resultados mostram que os *spillovers* das politicas monetária e fiscais seguidas por estes países são nulos ou muito residuais. Contudo, existe spillovers significativos dos Estados Unidos e do Japão com a China, a politica monetária dos Estados Unidos tem um impacto positivo e a politica fiscal tem um impacto negativo nos retornos do mercado acionista de Shanghai, o mesmo é verdade para a politica monetária japonesa.

Palavras-chave: politica fiscal, politica monetária, retornos das ações, Modelo Autorregressivo Estrutural

JEL – códigos: C32, C51, E52, E62

Wpływ międzynarodowej transmisji impulsów polityki pieniężnej I fiskalnej na giełdę papierów wartościowych w Szanghaju.

W odpowiedzi na kryzysu kredytów "subprime", który zapoczątkował upadek banku inwestycyjnego Lehman Brothers we wrześniu 2008, co oznaczało koniec okresu "Wielkiej stabilizacji", wiele rządów i banków centralnych krajów rozwiniętych i wschodzących w różnym stopniu zmieniło politykę fiskalną i pieniężną, próbując pobudzić gospodarkę, których rozprzestrzeniły się w skali międzynarodowej różnymi kanałami, w tym za pośrednictwem giełd papierów wartościowych.

Ponadto, w świetle niedawnej debaty o wdrożeniu polityk stymulujących w Chinach, podobnych do tych stosowanych przez kraje europejskie i USA, warto jest ocenić wpływ konsekwencji polityki chińskiej.

Niniejsza praca koncentruje uwagę na skutkach polityki pieniężnej i fiskalnej Stanów Zjednoczonych, Wielkiej Brytanii, strefy euro oraz Japonii odczuwanych w Chinach. Osiągnięte rezultaty pokazują, że ogólnie międzynarodowe efekty rozprzestrzeniania polityki fiskalnej i monetarnej są nieistniejące, albo co najwyżej słabe. Jednakże, stwierdzono występowanie znaczących efektów rozprzestrzeniania między Stanami Zjednoczonymi I Japonią z jednej strony, a Chinami z drugiej. Polityka pieniężna USA ma pozytywny, a polityka fiskalna negatywny wpływ na stopę zwrotu na giełdzie papierów wartościowych w Szanghaju. Podobny jest wpływ japońskiej polityki pieniężnej.

Key words: Polityka fiskalna, polityka monetarna, efekty rozprzestrzeniania, stopa zwrotu z rynku giełdowego, Strukturalny Model VAR – SVAR

JEL – kody : C32, C51, E52, E62

*To my family and to my friends*

Accomplishing the Double Degree in Economics and International Economics is the first step of a life project in order to follow my dream of be a professional Economist.

First, I want to thank to my supervisor Michał Brzozowski for providing inspiration and support. Moreover, I would like to thank to co-supervisor Rui Menezes for the support and the comments regarding this project.

Doing research, for the first time, I realize all the challenges, difficulties and successes of this process. This work is a special achievement for myself, it was my first estimations of subject (SVAR models) that were not covered in my masters (or very limited) that forced to learn by myself a new subject, challenge myself and put in practice the knowledge acquired in more than these past five years.

Nevertheless.  Is important to note that none of these people are responsible for any mistake or week point(s) of this dissertation, which is my full responsibility.

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## CONTENTS

# 1 INTRODUCTION

The main purpose of this thesis is to analyze the effects of fiscal and monetary policy on stock market returns developments of the United States (US), United Kingdom (UK), Euro area (EA) and Japan in China. In the economic literature, is agreed that monetary policy should not be examined without the fiscal policy, and vice-versa.

Although many studies have concentrated in studying just the effects of monetary policy in stock market returns (see (Tarhan, 1995; Thorbecke, 1997; Darrat, 1988; Donal Bredin et al., 2005; Crowder, 2006; Bohl et al.,2008; Bjørnland & Leitemo, 2009; Don Bredin et al., 2009; Kholodilin et al., 2009; Gregoriou et al., 2009; Aziza, 2010; Laopodis, 2010; Zhang et al., 2011) ), only a few investigate the effects of the fiscal policy on stock market returns [see (Jansen et al., 2008; Antonio et al., 2009; Agnello et al., 2010; Antonio et al., 2011; António et al., 2012; Da et al.,2014)]; and a few investigate the impact of the interaction of both policies, in just one country(for instance (Hsing, 2013) or in a cross-section of countries [see (Van et al.,, 2003; Sun et al., 2013; Mukherji, 2015) ] and even less considering/analyzing the spillovers/spillbacks effects of the expansionary monetary and fiscal policies implemented after the bankruptcy of Lehman Brothers in the end of 2008 on majority of developed economies to developing economies such as or China. The goal of this research is to fill this gap in the literature.

Distinguishing the impact of monetary and fiscal policy in stock markets is extremely relevant once that following (Aziza, 2010) "Stock market indicators such as market capitalization, all-shares index, value and volume of stocks traded in the stock exchange are announced on the news daily. This shows the great importance of the stock markets to any economy in the world. Many African countries are still classified as underdeveloped in economic journals and publications of the IMF and the World Bank because their stock markets are still in their infancy stage."

In (Caporale et al., 2004) the author reinforce the role of the stock market for the policy making process and economic growth of one country: "An efficient stock market provides guidelines as a means to keep appropriate monetary policy through the issuance and repurchase of government securities in liquid market which is an important step towards financial liberalization. Similarly, a well-organized and active stock market could modify patterns of demand for money and would help create liquidity that eventually enhances economic growth."

Furthermore, it is very relevant to assess not only the impact of quantitative easing program of the more developed economies in the developing ones (Bhattarai et al. 2015) as well as the impact of the potential quantitative easing program consequences of developing countries as China in the developed countries, especially after the stock market crash in 2007/2008 (Evans-Pritchard, 2014; Lavigne et al, 2014).

In this work, an attempt will be made to validate research hypothesis/questions defined:

1) There are spillovers impact of foreign fiscal and monetary policy on China stock exchange returns;

2) The spillovers impact of foreign fiscal and monetary policy in China stock exchange returns are positive;

3) There are several monetary channels that conduct the spillovers; their relative strength in each country determines if the impact is strong/weak, negative/positive.

In a nutshell, the results are the spillovers of the international fiscal and monetary policy are overall null or near zero. However, there are significant spillovers of United States and Japan with China, the monetary policy of US has positive impact and the fiscal have negative impact on Shanghai stock returns, in other hand the monetary policy of Japan have as well. Furthermore, regarding the other transmission channels the internal GDP and inflation play the major role determining the stock returns and finally the specific innovations associated with stock market, in a transversal way to all models.

In this work, with the goal of validate the hypothesis is used an SVAR as the one implemented by (Van Aarle et al., 2003; Chatziantoniou et al., 2013) but considering the variables used in (IMF, 2010); this model will be used to assess the foreign spillovers on the Shanghai stock market returns.

Regarding the monetary of aggregate, normally is used the M0 (monetary base to access the impact on money in circulation of the QE programs), however, the definition of the monetary is very mixed all over the world (Lim & Sriram, 2003), is used the money aggregate M2 in the analysis, this is the money in circulation and checkable deposits very liquid; furthermore, M2 reflects the impact on the deposits and M0 not (Dennis, 1983).

The remaining thesis is organized as follows: Section 1 introduces., section 2 the literature review, section 3 shows the data and methodology description, section 4 the outcomes/results, the section 5 concludes, the section 6 the annexes and in the section 7 there is the appendixes.

# 2 LITERATURE REVIEW

## 2.1 THE RECENT DEVELOPMENTS OF ECONOMIC POLICY IN CHINA

Due to fact of being the “factory of the world” (Ngai, 2006), China has consolidated his net lender position after joining the World Trade Organization in December of 2001, in contrast with other countries like Brazil that have a net borrower situation, both of them in “BRICS” club (O’neill & Goldman, 2001); enhancing his economic power to the world and contributing to the global GDP aproximately for 14% of world GDP in 2014 (figure 2-1).

Furthermore, after the asian financial crisis in 1998 and more recently (2011 – nowadays) due to impact of financial crisis and the buble in stock market started in 2015-2016, the chinese government implemented a stimulus program of fiscal and monetary policy.

However, due to big and incrising contribution of China to global liquidity in Asia and in the world (see figure 2-2), what it will be the effects not only of the fiscal but of the monetary policy shocks, not only for these countries but only for the major industrialed countries?

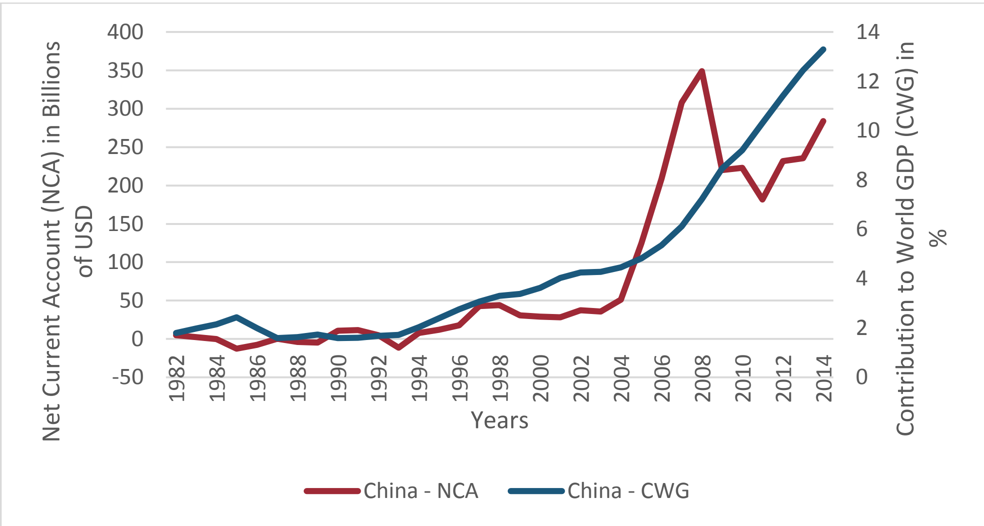


*Figure 2-1 The Role of China in the World*

Source: World Bank – World Development Indicators and International Monetary Fund - Balance of Payments and International Investment Position Statistics [Computations by the author]

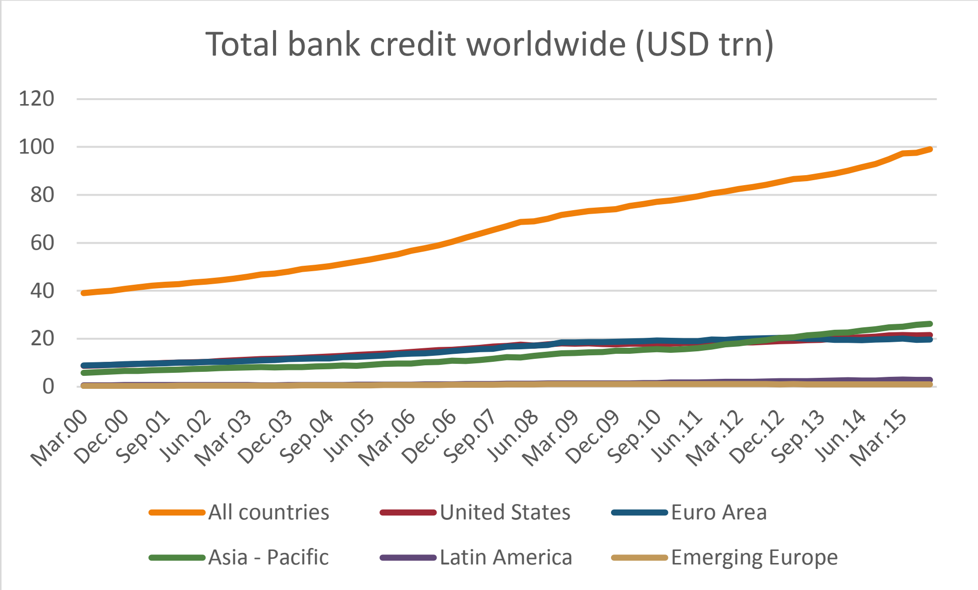


*Figure 2-2 Total bank credit worldwide (USD trn)*

Source: Bank of International Settlements

### 2.1.1 The health of the factory of the world: an overview

Following (Christine Wong, 2011), the subprime crisis have an extreme significant impact on the Chinese industry as the author related “Factories closed seemingly overnight, and workers were laid off. In the coastal export enclave of Dongguan in Guangdong province, so many workers had been sent home by mid-2009 that huge industrial parks resembled ghost towns. Given that exports had comprised one-third of GDP in value, the sharp downturn in exports exerted a drag on GDP growth that was a stunning –41% in 2009”.

Empirical studies like (Li & Zhang, 2014) show that main financial channels of China are (using the example of the recent final crisis of 2007/8), in first place the demand channel [with a sharp fall in the net exports of 9 perceptual points between 2007 to 2008, represented by the current account in graph 2-3]; and financial channel (in a less extent than the previous one), have been an reallocation of the investment and portfolio by investors, cause the first negative growth in the Foreign Direct Investment in China since the country joined the World Trade Organisation and the sharp drop in the portfolio investment liabilities, as consequence of the big depreciation of US financial assets and to the deterioration balance sheet for China banking sector.

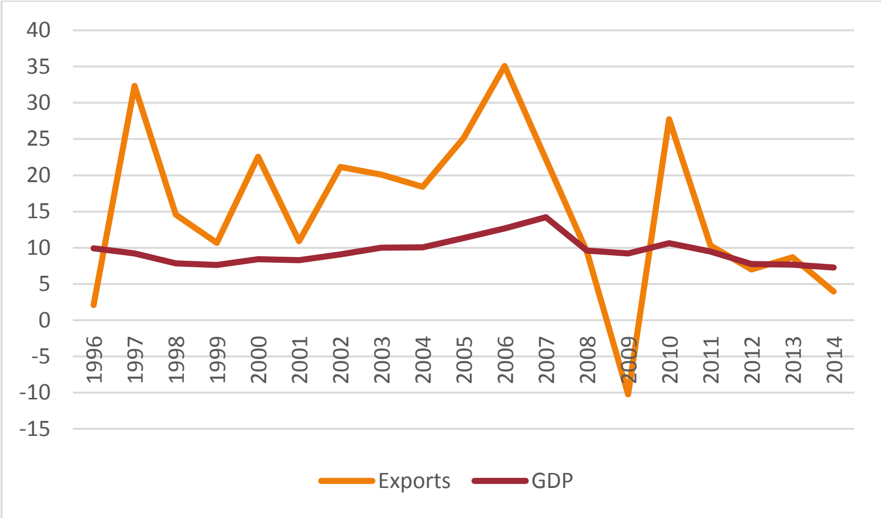


*Figure 2-3 GDP and Exports of China (growth rates)*

Source: World Bank – world Development Indicators


*Figure 2-4 Portfolio Investment Liabilities in China (growth rates)*

Source: FRED of Saint Louis

### 2.1.2 Fiscal policy and the stimulus package

In (Xinhua, 2009; Christine Wong, 2011), refers that "the growth in government revenues had already been declining throughout 2008, but turned steeply downward during the second half of the year, ending in negative growth at year-end. In beginning of 2009, the Minister of Finance was seriously worried about the fiscal balance, as government revenues decrease 17.1% that month from a year earlier. Given the importance for government of maintaining high rates of growth, policy makers became alarmed and determined to do everything necessary to reverse the trend."

Therefore, the government created countercyclical measures to stop the economic slowdown: First, in 1998 it had intervened with a fiscal stimulus programme that was a success in helping China prevent the contagion in the Asian financial crisis (The World Bank, 1999). Second, unlike the first time – when the fiscal stimulus was implement the public finances were fragile, better than in 2008. However, before Asian crisis, in 1994 was implanted a fiscal reform, China had restructured its revenue mechanism with the implementation of a new taxation mechanism, what contributed to face better the storm.


*Figure 2-5 Government expenditures and gross debt in China*

Source: FRED of Saint Louis

Following (Naughton, 2009; Kang, 2010; Li & Zhang, 2014) due to slowdown in chinese economy, consequence of subprime crisis with bankruptcy of Lehman Brothers, the national central government implemented an overall stimulus program from the last quarter of 2008 (5$^{th}$ November) until 2012 can be divided into **three interconnected components**: an investment plan, a set of funding instruments, and a sequence of industrial policies.

First, the investment plan, with a value of 4 trillion RMB or 586 billion U.S dollars, representing 12.5% of China GDP in 2008, this plan was organized by mainly five axes:

A) **Increasing public investments** in 104 billion yuan (from the central government for public investments);

B) **Promoting consumption** by reducing the taxes of the firms and households; creating direct subsidies the products going to the countryside for home purposes (e.g. farming automobiles); reduce the consumption credit lending obstacles; reforming healthcare system and lowering the cost of individual healthcare; raise the pension for retirement and reduce the basic costs of living.

C) **Support the export sector** by raising the export rebate rate and distinguishing the rate by industry and product;

D) **Reforms in tax and fee systems** by reforming the value-added tax legislation in order to encourage enterprise expansions; reduce the real estate taxes and fees and providing temporary vehicle tax breaks for standard cars;

E) **Increase the fiscal deficit and government debt**, the State Council, approved local governments to raise 200 billion yuan public debt, however this debt is used by the central government.

| Disbursements | Period | Amount (RMB billion) |
|---|---|---|
| First tranche | 2008 – 4Q | 108 |
| Second tranche | 2009 – 1Q | 130 |
| Third tranche | 2009 – 2Q | 70 |
| Fourth tranche | 2009 – 3Q | 80 |
| Fifth tranche | 2009 - 4Q | 223.8 |
| Final year | 2010 | 992.7 |
| Total injection | | 1604.5 |

*Table 2-1 The phases of central government stimulus spending*

Sources: Website of the NDRC (National Development and Reform Commission),

Regarding the sectoral composition of stimulus investment:

| | |
|---|---|
| Transport and power infrastructure (railroads, roads, airports, electricity grids) | 37,5 |
| Earthquake reconstruction | 25,0 |
| Rural village infrastructure | 9,3 |
| Environment, energy efficiency and carbon emission reduction | 5,3 |
| Affordable housing | 10,0 |
| Technological innovation and restructuring | 9,3 |
| Health and education | 3,8 |

*Table 2-2 Sectoral composition of stimulus investment*

Source: Website of the NDRC (National Development and Reform Commission), China.

Second, the Funding mechanisms was organized as follows: first the center gives the localities attribute to each province/territory an (i) a list of approved investments and quota of the total and (ii) amount that the government want to spend. The main goal of the center distributes significant amounts of money to the localities for these investments.

The central government established three rules according to the financing:

1. The central government borrow the money to be distributed to local government, but the revenue and the repayment is an obligation is of the local government;

2. Implementation of a special program of long-term bank loans to provide capital for investment projects, requiring a minimum of 20 to 35 percent of the funding for investment projects;

3. Allowance of the growth of the issuance of corporate debt by local governments, in order to develop the Corporate bond markets and therefore the Chinese financial system.

Finally, the industrial policy combining investment and restructuring initiatives that the government has launched in response to the economic crisis and to achieve long-held objectives: injecting money in the firms that suffered more with the crisis and by the achievement of some technological upgrading goals in key sectors such as flat-panel displays.

### 2.1.3 The impact of the stimulus package and future challenges

Regarding the impact, (Yongding, 2009; Li & Zhang, 2014) the consequences were very limited and this stimulus package was inefficient, as follows:

First, the GDP growth became a benchmark for the investment/ expenditure level of the government, resulting in an overcapacity of the economy.

Second, the reduction in the investment efficiency because the stimulus package is focused in infrastructure, instead of new factories.

Third, infrastructure investment is long-term investment and will take a long time to being paid, once that is not accompanied by investment in productive capacity.

Fourth, the new responsibility of manage the central government loans by the local governments may worsen the overall fiscal position once that provincial governments were encouraged to raise money to create their own policies/stimulus, complementing the central government plan.

Fifth, the investment capital went to firms that had invested more before the financial crisis but not the ones that were dependent on external capital

Sixth, the state-owned companies are favored in long-term financing in the credit expansion but still underperform non-state-owned companies in the stock market.

Seventh, and regarding the bank credit evolution, there is evidence in (Naughton, 2009; Rawdanowicz et al., 2014) that central government stimulus efforts in order to ease provision of credit, had as consequence the explosive growth of bank credit; furthermore, total assets of banking sector exceed the 200% of GDP by end-2012 due to the “rapid expansion of domestic claims of depositary institutions increasing by 30% of GDP between 2008 and 2012, when they reached 155% of GDP. “

**Total assets of Chinese banking sector (% of GDP)**

| 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| 199.8 | 201.1 | 233.2 | 237.4 | 239.5 | 257.5 | 266.2 |

*Table 2-3 Total assets of Chinese banking sector (% of GDP)*

Source: (Rawdanowicz et al., 2014) (Adapted)

Eight, in the line of showed in (Liang, 2016) this expansion of credit had place also in the regular banking sector, mainly after the 2008 crisis, leading to a rapid expansion of the so-called shadow banking sector with the size of between 44% and 69% of GDP in 2012.

However, the bank system is highly exposed to:

1) Local Government Financing Vehicles (LGFVs), established by local governments to finance infrastructure and public real estate projects;

2) Private real estate projects, and namely the variability of the prices and expected profitability.

And other risks:

3) “panic runs”, once that the majority of products don’t explicit guarantee of the principal;

4) Possible need for liquidity in future in case of bailout, what cannot be compatible with a stimulus program to the real economy.

### 2.1.4 Monetary policy

After 2008 financial crisis the Chinese Central Bank implemented an expansionary monetary policy to support the expansionary fiscal policy, resulting in increase of bank and therefore the money supply, which “grew at a record rate relative to GDP. “ (Yongding, 2009:10), as is possible to see in table 2-5.

With the liquidity increase the inter-bank money market interest rates dropped and forcing the PBOC to intervene in the exchange market, in order to balance the appreciation of the RMB, consequence of the trade and capital account surplus, selling central bank bills in order to “dry the excess liquidity. “

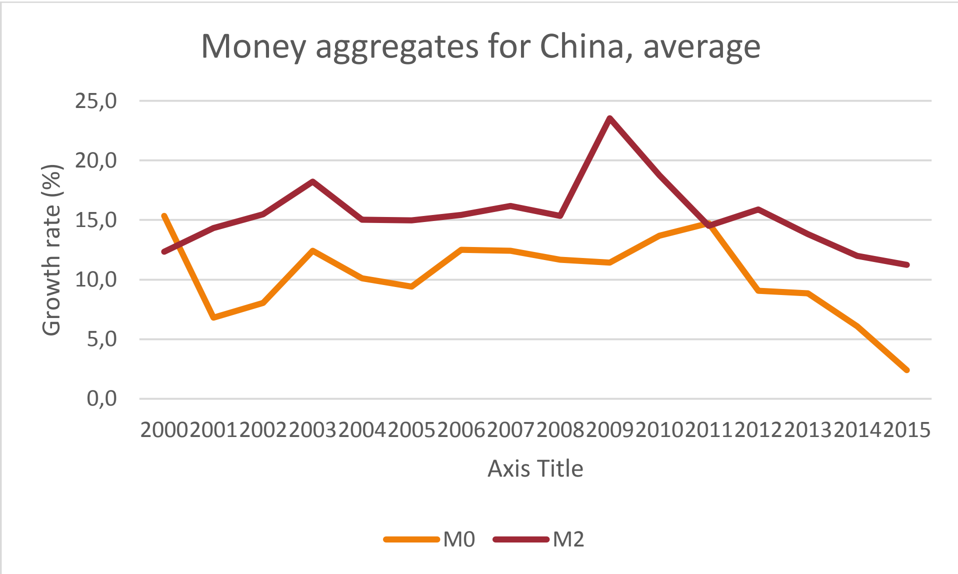


*Table 2-4 Money aggregates for China, average*

Source: FRED

## 2.2 Monetary Policy

### 2.2.1 Introduction

According to (Thorbecke, 1997), the money neutrality has long been debated by financial economists; according to the evidence found in the literature some authors defend that have a positive impact or null/negligible impact.

Regarding the evidence found (Rozeff, 1974) presents evidence that increases in the growth rate of money raises stock returns. In Black (1987), on the other hand, argues that monetary policy cannot affect interest rates, stock returns, investment, or employment.

According to the types of monetary policy, following (Aziza, 2010), the are three as follows: Accommodative, if the interest rate set by the central monetary authority is intended to create economic growth; Neutral, if it is intended neither to create growth nor combat inflation; or Tight if it is intended to reduce inflation.

### 2.2.2 Objectives and limitations of interest rate

According and following (Fawley & Neely, 2013), central banks conduct monetary policy in order to control short-term nominal interest rates that affect the economy via several channels; the assumption is that monetary policy changes real (inflation-adjusted) short-term rates to influence economic decisions through their effect on other asset prices.

Once that depositants hold currency at banks, therefore interest rates cannot go below zero (this is, to a client not to pay to the bank to deposit there his/her money), which constraint the conventional monetary policy.

This unusual situation happened first in the early 2000s in Japan and then after the 2007-09 financial crisis in the United States, United Kingdom, Japan, and the euro area.

With the interest rates approaching zero (as shown in figure 2-6), the big four central banks (FED, ECB, BOE, BOJ) began to introduce unconventional monetary policies—including different forms of quantitative easing (QE)— to stimulate economic growth, this is expanding the monetary base.

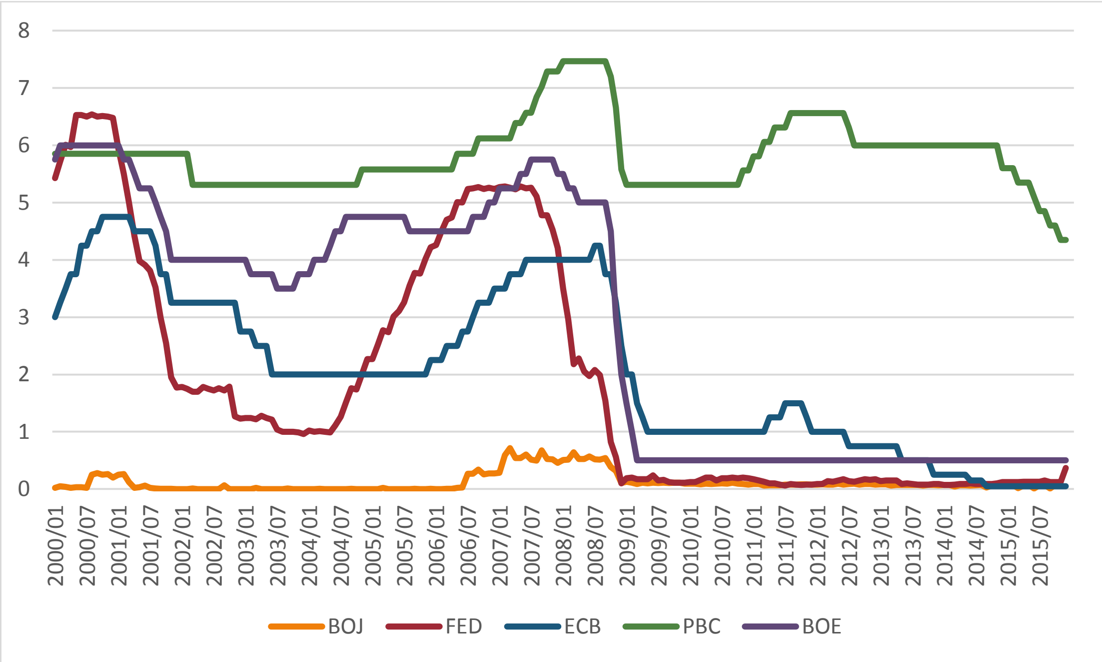


*Figure 2-6 Main interest rates (%)*

Source: Data from the respective central banks

### 2.2.3 Transmission channels of usual monetary policy

In (Mishkin, 1996) has provided evidence that there are the following channels of monetary transmission: (i) interest rate channels, (ii) exchange rate channels; (iii) equity price channels: (iv) tobin's q theory, (v) wealth effects , (vi) housing and land price channels; (vii) credit channels: (viii) bank lending channel, (ix) balance sheet channels, (x) household balance sheet effect and (xi) financial crisis.

Following now onwards the same study, is possible synthetize those channels as follows:

According to the interest channel, an expansion in monetary policy will lead to a fall in real interest rate, decreasing the cost of capital and rising the investment spending and therefore a rise in output as well.

Regarding the interest rate transmission mechanism, the real (long term) interest rate has a major impact on nominal (short run) interest rate; once that the first one which play a major role in the consumer and businessmen decisions.

The real interest rate mechanism in which the central bank can stimulate the economy, even if the nominal interest rates are zero or near zero allow that, an increase in money supply can rise the expected price level and therefore the expected inflation, lowering the real interest rate.

In terms of interest rate channel, an expansion in monetary base has as consequence the raise in expected prices and therefore in expected inflation which decrease nominal interest rise and therefore increase investment which increases the output.

Regarding the exchange rate channel, if there is for instance, a fall in domestic real interest rate, the deposits on the home country become less attractive in relative terms to the foreign ones, leading to a fall in domestic deposits in relation to the deposits in other currencies, this is a depreciation of home currency. Therefore, now the home goods becomes relatively cheaper, causing a rise in the net exports and therefore in the output.

Regarding the equity price channels, namely Tobin's q theory (Tobin, 1969) [ defined as market value of firms divided by the replacement cost of capital] , affect the economy via the valuation of equities. For instance, if q is high, the market price of firms is high in relation to the replacement cost of capital, and the new capital is cheap relative to the market value of firms.

A fall in interest rates from expansionary monetary policy have as consequence bonds less attractive relative to equities, thereby causing the price of equities to rise.

Combining these views with the fact that higher equity prices will lead to a higher output and thus higher investment spending and therefore higher output.

Regarding the wealth effect, the component of financial wealth in stocks play the major role in the household's income, therefore when his prices rise, the value of financial wealth increases, increasing positively the household wealth and have a positive effect on consumption and output.

Regarding the housing and land price channels, an increase in house prices, which raises their prices relative to replacement cost, leads to a rise of the Tobin's q for housing, thereby stimulating its production. As the real estate and lands have a very significative weight in household's assets, when his prices rise, the wealth increases leading to a rise in the consumption, contributing positively to the global output.

**Credit channels**

The balance-sheet channel is related to the asymmetric information problems in credit markets, as follows: The lower the net worth of the firms, the worst the adverse selection and moral hazard problems are in lending to these firms.

In first place, regarding adverse selection, the lower net worth means that lenders (firms) have less collateral for their loans, and the possibly of don't pay the loan is higher, leading to a decrease lending to finance investment spending.

In second place, the moral hazard problem, the lower net worth of business firms means that the owners have a lower equity stake in their firms, giving them more incentive to engage in risky investment projects, being more certain that lenders will not be paid back.

Regarding the transmission mechanism states that nominal interest rates that affect firms' cash flow. The nominal interest rate plays have short-run/immediate impact on interest payments on short-term rather than long-term debt that typically have the greatest impact on firm cash flow.

A related mechanism involving adverse selection and the transmission mechanism under expansionary monetary policy is credit rationing, demonstrated by (Stiglitz & Weiss, 1981), this occurs where borrowers are refused loans even when they are available to pay a higher interest rate (and the interest rate is reducing due to expansionary monetary policy).

Regarding the Bank Lending Channel, the expansionary monetary policy, which increase bank reserves and deposits has as consequence the increase of bank loans available, which will cause investment and consumption spending to rise, have a positive impact on output.

In other hand, in terms of stock market, causes a rise in equity prices, raising the net worth of firms and so leads to higher investment spending and aggregate demand, decreasing the adverse selection and moral hazard problems.

Finally, for firms lowers nominal interest rates, improving their balance sheets due to the increase in cash flow, and therefore reducing adverse selection and moral hazard problems.

A third balance-sheet channel operates through monetary policy effects on the general price level, due to monetary expansion that leads to a rise in the price, this as consequences: (i) as the debt payments are contractually fixed in nominal terms, this lowers the value of firms' liabilities in real terms; and (ii) lowers adverse selection and moral hazard problems, thereby leading to a rise in investment spending and aggregate output.

Regarding the Household Balance-Sheet Effects, Declines in bank lending induced by a monetary contraction should cause a decline in durables and housing purchases by consumers who do not have access to other sources of credit. Similarly, increases in interest rates cause a deterioration in household balance-sheets because consumers' cash flow is adversely affected. Specifically, when consumers have a large amount of financial assets relative to their debts, their estimate of the probability of financial distress is low, and they will be more willing to purchase consumer durables or housing.

When stock prices rise cause also a rise of the value of financial assets, the consumer as higher wealth, will increase consumption and contribute to a higher output.

Regarding the financial crises, is a strong disturbance to financial markets, this have as consequence sharply and severely increases asymmetric information problems as mentioned before, so that financial markets are no longer able to efficiently channel funds to those who have the most productive investment opportunities. According to the evidence presented in (Mishkin, 1994) there are five factors that can promote a financial crisis: 1) increases in interest rates, 2) stock market declines, 3) an unanticipated decline in the price level, 4) increases in uncertainty, and 5) bank panics.

#### 2.2.4 Transmission channels under unusual monetary policy

Research by (Krishnamurthy & Vissing-Jorgensen, 2011) has provided evidence that channels through which QE may be expected to operate, which are: (i) Signaling Channel, (ii) Duration Risk Channel, (iii) Liquidity Channel, (iv) Safety Premium Channel, (v) Prepayment Risk Premium Channel, (vi) Default Risk Channel, (vii) Inflation Channel.

Following now onwards the same study, is possible synthetize those channels as follows:

Regarding the Signaling Channel, the central bank buys assets in QE giving a signal of credible commitment to preserve interest rates low; affecting the bond market interest rates (depending on bond maturity) since lower funds rates, through the expectations hypothesis, can be expected to affect all interest rates, however should have a larger impact in lowering intermediate maturity rates rather than long maturity rates.

Regarding the Duration Risk Channel, QE decreases the yield on all long-term nominal assets, for instance Treasuries, or corporate bonds. The effect is longer as longer is the duration of the asset.

Regarding the Liquidity Channel, The QE includes purchasing long-term securities and pay the same by the increase of reserve balances. As reserve balances are a more liquid asset than long-term securities there is an increase of liquidity in the hands of investors and thereby decreases the liquidity premium on the majority of the bonds.

Regarding the Safety Premium Channel, according to evidence of (Krishnamurthy & Vissing-Jorgensen, 2011) that there are significant demand for safe assets that lower the yields on such assets, for instance QE involving Treasuries and Agencies lowers the yields on very safe assets such as Treasuries, Agencies, and possible high-grade corporate bonds, relative to less safe assets such as lower-grade corporate bonds.

Regarding Prepayment Risk Premium Channel, the mortgage prepayment risk has a positive risk premium, and that this premium depends on the quantity of prepayment risk borne by mortgage investors.

Regarding the Default Risk Channel means that lower grade bonds have higher default risk than Treasury bonds. QE programs affect the default risk as well the risk premium, when this programs are successfully implemented, the default risk of firms will fall: furthermore, standard asset pricing models predict that investor risk aversion will fall as the output rises, decreasing the default risk premium.

Regarding the Inflation Channel, as QE programs expand the money supply, it increases inflation expectations, affecting the interest rates. This channel predicts: (i) QE increases the rate of inflation as well inflation expectations; (ii) QE may increase or decrease interest rate uncertainty.

### 2.2.5 Quantitative Easing versus Credit Easing

According to the evidence presented in (Fawley & Neely, 2013), credit easing policies have the goal of reduce specific interest rates, in other hand, QE is any policy that unusually increases the central bank liabilities (currency and bank reserves) when the official rate hits the zero bound (see figure 2-7); for further details about the QE evolution please see Appendix A.

With the bankruptcy of Lehman Brothers and the financial market chaos and the lack of liquidity in the commercial banks were assisted by national authorities in order to provide liquidity to banks and firms.

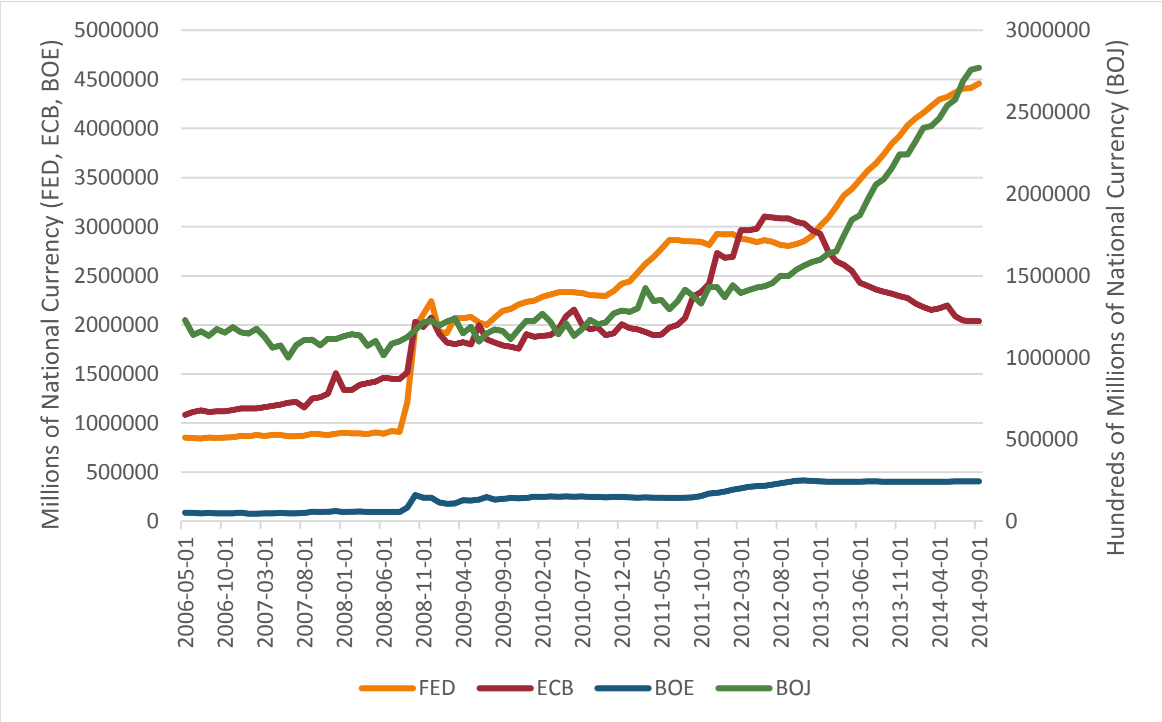


*Figure 2-7 Total assets of Central Banks*

Source: Federal Bank of Saint Louis

### 2.2.6 Empirical studies

One of the first studies to assess the impact of monetary policy  is (Darrat, 1988) who assess the stock market efficiency hypothesis, or in other words, if the markets reflect all the publicity available information (which is validated); in this case in Canada in the period of 1st quarter of 1960 to the last quarter of 1984; regressing a model of growth rate of stock prices in terms of growth rate on money stock, the change in the real employment budget deficits relative to real potential GNP, these two variable with 2 lags to the past.

Studying the United States (Thorbecke, 1997), employ a VAR approach to evaluate the impact of FED funds rate changes in Dow Jones Industrial Average and Dow Jones Composite average, the results indicate that positive monetary policy shocks have increase stock returns; in other hand, the results are subscribed also by  (Crowder, 2006) using a structural VAR to estimate the response of the stock market returns to innovations in the federal funds rate; regarding the results, specifically an unanticipated increase in the federal funds rate leads to an increase in equity returns, but a fall in the federal funds rate if the increase is unanticipated; in (Ozdagli & Yu, 2011) , the stock prices of firms with higher external finance cost are more responsive to monetary policy shocks than the ones that are more financially constraint.

Regarding United Kingdom, In (Don Bredin et al., 2009), analyze  the impact of changes in the UK and Euro area policy rates on the UK and German aggregate and sectoral equity returns in an event study; is found that UK monetary policy surprises have an insignificant influence on both aggregate and industry level returns on those countries; in (Gregoriou et al., 2009) this findings are also in line with previous study, this is, analyzing stock returns dataset covers 70 FTSE industrial subsectors that form the 10 basic UK industries, in which h expansionary monetary policy did not reverse the negative trend in stock prices.

Regarding Euro Area, In (Bohl et al.,, 2008), is analyzed the reaction of European stock market returns to unexpected interest rate decisions by the European Central Bank (ECB) and is found a negative relation between unexpected ECB decisions and European stock market returns; however in (Semeniuk, 2012) or in (Filbien & Fabien, 2011) is found that the stock market there is “no significant response” to changes in  monetary policy.

Finally, in Japanese case in (Ioannidis & Kontonikas, 2006) , and confirmed by (Shibamoto & Tachibana, 2014) a positive relation between the decrease in interest rate and the increase in stock market returns.

## 2.3 FISCAL POLICY

According to (Agnello & Sousa, 2010), refers that "over the history, there have been important historical events regarding the use, effectiveness and limits of fiscal policy. Namely, the tax cuts during Reagan's presidency in the U.S. and the fiscal consolidations in Europe linked to the Maastricht convergence criteria, the Economic Growth and Stability Pact are just a few examples of the renewed interest on the role of fiscal policy as a tool for stabilizing the economy and its potential effects on asset markets."

Due to financial crisis discussed previously, some governments like in the United States, China and some Euro Area adopted an expansionist fiscal policy in order to stimulate the respective economies.

However, in (Chatziantoniou et al., 2013) refers in a nutshell that "economic effects of fiscal policy on the stock market may be positive, negative or inconsequential depending on whether one is to take a Keynesian, Classical or Ricardian view, respectively" (my own words).

### 2.3.1 Empirical studies

The first study assessing the effects of fiscal policy on the stock market (or asset prices/returns) by Tobin (1969), estimating an equilibrium approach of the financial sector, emphasized the role of stock returns as the relationship between the real and the financial areas of the economy. More precisely, he underlined both money growth and budget deficits as having an important impact on stock returns.

The impact is also later confirmed in (Blanchard, 1981) the author augmented the IS-LM model and distinguish the effects if the shock in fiscal or monetary variables is anticipated or not under flexible or fixed prices.

Later, with the contribution of (Barro, 1974, p. 197) with the assumption of Ricardian Equivalence (or debt-neutrality) the empirical front on the issue has been lagging. However, some studies question this assumption, while some studies have shown that budget deficits do not matter, that is, they support the proposition (Boothe & Reid, 1989), other studies have gathered opposite results (Darrat & Mukherjee, 1986; Frenkel & Razin, 1986; Zahid, 1988) .

Research by (Darrat, 1988) provide evidence that fiscal deficit employs a negative effect on current stock prices using a regression of stock prices in order of fiscal policy, growth rate of money stock and short term interest rates, lagged values of inflation, real

GNP and a time trend; in the same line, using Canadian data (Darrat, 1990) provided also evidence that fiscal policy plays an important role in determining stock market returns.

In (Tavares & Valkanov, 2001) employing and VAR model using US data from 1960 to 2000 in variables such Net tax receipts (excluding transfers) and Government purchases (net of transfers) as a share of GDP; Log stock return of the S&P 500 index portfolio in excess of the 3-month Treasury bill rate; federal funds rate, inflation rate; Rate of per capita output growth; Rate of per capita consumption growth; Term spread (of 10-year bond minus 3-month bill); and conclude “that fiscal policy is at least as important a source of return variability as is the policy of the Federal Reserve” and confirm the Ricardian equivalence, or by other words, unanticipated increase in the government spending will result in higher future taxes imply lower market returns, as individuals expected pay-off net of taxes decreases.

In (Jansen et al., 2008), using semiparametric models with the variable of S&P 500 stock price index, U.S.  10-year Treasury bond yield, Federal funds rate, industrial production (IP), CPI, and the U.S. government budget, with the data from July 1954 to December 2005. The conclusion is to maintain that the impact of monetary policy on the stock market varies, depending on fiscal policy stance.

In (Antonio Afonso & Sousa, 2009) is employed an Bayesian VAR Structural model to assess the relation between fiscal policy shocks and movements in asset markets, using the following variables: GDP, the GDP deflator, the unemployment rate, the average cost of financing the debt, and the housing price index; is used quarterly fiscal data to analyze empirical evidence from the U.S., the U.K., Germany, and Italy in different periods; the evidence found is that fiscal policies have a negative effect on stock prices, although the time of reaction is faster than for real estate market.

In (Ardagna, 2009), using several regressions, with a time span from 1960 to 2002 and with a panel of countries included in the sample are: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Spain, Sweden, the United Kingdom, and the United States; this research concludes that fiscal adjustments based on expenditure reductions are related to an increase in stock market prices.

As for the link between fiscal policy and stock prices, fiscal consolidations that lead to a permanent and substantial fall in government debt are typically related with increases in stock market prices.

In (Agnello & Sousa, 2010), employing a Panel Vector Auto-Regression (PVAR) with quarterly data and using a panel of countries (Belgium, Finland, France, Germany, Italy, the Netherlands, Portugal, Spain, the U.K. and the U.S), the vector of endogenous variables includes the property price index, the Gross Domestic Product, the price level, the primary government deficit, the interest rate, and the equity price index; is provided evidence positive fiscal shock has a negative impact in both stock, a contractionary effect of fiscal policy on output in line with the existence of crowding-out effects.

In (Antonio Afonso & Sousa, 2011), employing a VAR, is showed that spending shocks have a negative effect on stock prices; the VAR counter-factual exercise suggests that fiscal shocks play a minor role in the asset markets of the U.S. and Germany; in other hand, the government revenue shocks have increased volatility in Italy.

In (António Afonso & Sousa, 2012) employing an Bayesian Structural Vector Auto regression (B-SVAR) approach, analyze empirical evidence from the US, the UK, Germany and Italy, using the following variables: log real GDP, the GDP deflator, and the unemployment rate, the average cost of financing the debt, he housing price index and the stock price. The results show that government spending shocks leads to important 'crowding-out' effects namely to a fall in stock returns.

### 2.4 INTERACTIONS OF FISCAL AND MONETARY POLICIES

There is a strong and intrinsically connection between the fiscal and monetary policies of a country, as (Laopodis, 2010) refers "actions by the government authorities that increase spending (and add to existing debt) are likely to increase the interest rate. To the extent that a higher interest rate will put a pressure on economic growth, the Central Bank will be forced to reverse (or ease) that pressure by increasing money supply (or decreasing its main policy tool, the federal funds rate). Therefore, it is necessary to explicitly include a monetary policy variable in the investigation of the dynamics between fiscal policy and the stock market."

Regarding the literature studying the interaction between fiscal and monetary policy spillovers on stock returns,

In (Singh & Talwar, 1982), using bivariate and multivariate modeling with data from 1956 to 1977 in order to investigate the causal linkages between monetary and fiscal policy (variables) and the stock market for Canada, is found evidence that these policies affect significally the stock market returns in Canada.

In (Jansen et al., 2008) employing a flexible semiparametric varying coefficient model specification, analyses the impact of fiscal policy on the U.S. asset markets (stocks, corporate and treasury bonds), considering two possible roles of fiscal deficits (or surpluses). Is found evidence that the increase in the deficit leads to lower stock returns, this is justified once that large increases in the fiscal deficit will lead to higher inflation rates in the future higher funds rate, in order to decrease inflation).

In (Chatziantoniou et al., 2013) is used a Structural VAR model is order to analyze the effects of monetary and fiscal policy shocks on stock market performance in Germany, UK and the US; is considered the following variables in our model: global economic activity, GDP, inflation, government spending, money supply (M1), interest rates and stock market returns. Regarding the results, the fiscal and monetary policies as well as their interaction, directly affect the UK stock market returns, in Germany, there is no evidence found that fiscal policy affect stock returns, but the monetary policy affects positively; regarding the US there is a negative effect of the monetary policy and no effect of fiscal policy.

Summing up, it is possible to synthetize in the following graph, in the next page.

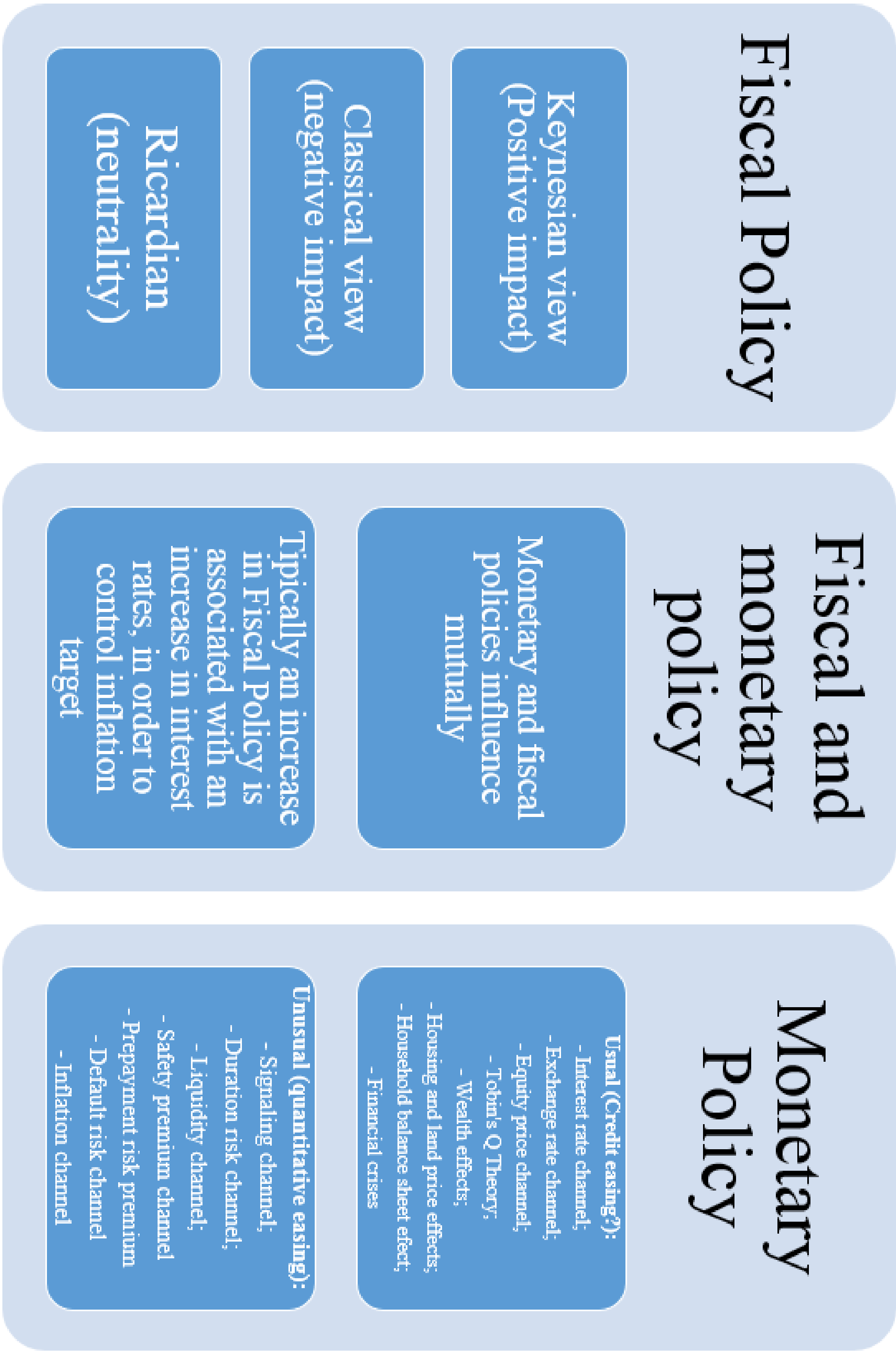


*Figure 2-8 Synthesis of literature review*

## 2.5 SPILLOVERS

### 2.5.1 Monetary policy

Regarding the impact of quantitative of external of quantitative easing programs / monetary policy, we have the following evidence of impact in the Shanghai stock exchange:

First, in global terms (Fic, 2013) examines the impact of unconventional monetary policy measures adopted in developed countries (the US, UK, Euro Area and Japan) on developing economies (Brazil, China, India and Russia), applying a NIGEM with about 40 countries (both developed and developing); regarding China, this study concludes that there are positive spillovers between these countries and China stock exchange returns.

Second regarding United States (and also Euro Area in this study), in (Chen et al.,2012), using a global vector error-correcting model (GVECM). is analyzed the cross-border impact of quantitative easing (QE) in the major advanced economies, especially on emerging market economies; in this study China is positively affected.

In line with the results of the previous study, (Moessner, 2015) quantified the international spillovers of explicit Federal Open Market Committee (FOMC) policy rate guidance used as an unconventional monetary policy tool at the zero lower bound of the policy rate on international equity markets, considering equity indices of both advanced and emerging economies. Regarding the dataset, is used the following indicators: CPI inflation, GDP, hourly earnings, housing starts, industrial production, the ISM manufacturing index, nonfarm payrolls, PPI inflation, retail sales, the trade balance and the unemployment rate. Regarding the results found that explicit FOMC policy rate guidance announcements at the zero lower bound led to higher equity prices in China.

In other hand (Chen et al., 2015) shows negative spillovers for China after analyzed and compared using an estimated global vector error-correction model (GVECM) in terms of the domestic and cross-border effects of US and euro area unconventional monetary policy measures on 24 major advanced and emerging economies, based on Unconventional monetary policies are measured using shadow interest rates. Is taking into account the international interdependences and feedbacks manifested in the growing macro-financial linkages among 24 economies. The sample includes six advanced economies (the United States, euro area, Japan, Sweden, Switzerland and the United Kingdom); nine emerging economies in Asia, four economies in Latin America, three emerging European economies and Saudi Arabia and South Africa.

In (Kishor & Marfatia, 2013) is used a TVP-GARCH model to assess the change stock returns due to U.S. monetary policy surprises; The sample period for our study uses daily data from May 1994 through June 2008. It is examined all the Federal Open Market Committee (FOMC) meetings for the whole sample period. The impact in Shanghai stock returns are null.

Third, regarding Japan in (Ganeli & Tawk, 2016) is used a Global VAR model to study spillovers from the Bank of Japan's quantitative and qualitative easing (QQE) on emerging Asia that allows examining the propagation of shocks through various macroeconomic linkages between countries. The methodology involves setting up country specific individual VARs, and then linking them through the inclusion of foreign variables; the results shows positive spillovers on Shanghai stock returns due to Japanese monetary policies.

In addition to Japan, we include in our sample five ASEAN economies including China, the variables used are real GDP, CPI inflation, the exchange rate, claims on the private sector, equity prices, capital inflows, short-term interest rates and the monetary base, from January 2000 up to December 2014. Finally, the price of oil is used as a global variable. Regarding the results, there is positive spillovers of Japanese monetary policy over Shanghai stock returns.

In contrast with last study, (IMF, 2011) using an event study examines the external effects of domestic policies in five systemic economies, i.e., the S5, comprising China, Euro Area, Japan, United Kingdom, and the United States; regarding the results, there are negligible spillovers with Shanghai stock index returns.

We can synthetize this review, as follows:

| **Type of Q.E. program / Effect** | **Global** | **US** | **UK** | **EA** | **JP** |
|---|---|---|---|---|---|
| Positive | (Fic, 2013) | (Chen, Filardo, He, & Zhu, 2012), (Moessner, 2015) | | | (Ganeli & Tawk, 2016), |
| Negligible, near zero | | (Fratzscher, Lo Duca, & Straub, 2013) ,(Kishor & Marfatia, 2013) | | | (IMF, 2011) |
| Negative | | (Chen, Lombardi, et al., 2015) | | (Chen, Lombardi, Ross, & Zhu, 2015) | |

*Table 2-5 Monetary spillovers over China*

As it is evident on these tables, there is a gap in the literature in the impact of monetary and even a bigger one in the fiscal policies spillovers on China stock exchange that must be filled.

### 2.5.2 Excess of liquidity

The excess of liquidity is defined in (Rueffer & Stracca, 2006, p. 8) as ”aggregation of broad money in the G5 countries (Canada, euro area, Japan, United Kingdom and United States) unadjusted for nominal GDP “, normally used as an indicator of inflationary pressure at global level.

In (Borja & Goyeau, 2011) determine if international liquidity affects asset prices in three particular markets, namely: the United States (U.S.), the Euro area and the ASEAN (5 countries) region, using a standard regression of money growth and asset prices through a real asset return, using quarterly data covering these markets from 1995 to 2005 . Is found monetary spillovers from one market to another that affect asset prices, furthermore there is evidence of excess liquidity in the US and Euro area had contributed to inflationate asset prices of both markets; however, the asset prices in the ASEAN 5 region are unaffected by international liquidity.

In (Brana et al.,, 2012) is accessed the impact of global excess liquidity on goods and asset prices for a set of 16 emerging market countries in Asia and Latin America by a estimation of a panel VAR model. The impact on share prices in emerging countries is weak.

In (Brana & Prat, 2016) examines the impact of global excess liquidity on asset prices for a set of seventeen emerging market countries taking into account nonlinearity by using a panel threshold model. Is found that global excess liquidity is a positive determinant of asset prices in emerging market countries.

# 3 DATA AND METHODOLOGY DESCRIPTION

## 3.1 DATA DESCRIPTION

In this work it is used quarterly data from 1996.q2 until 2015.q2 of five countries, United States, United Kingdom, Euro Area, China and Japan. The variables under consideration (gathered from OECD) are GDP, consumer price index, government expenditure, M2 money aggregate, 24 hours' interbank rate and the stock market returns (computed from Yahoo Finance) for these six countries, which are S&P 500 for United States, FTSE 100 for United Kingdom, Euro Stoxx 50 index for Euro Area, Shanghai index for China, and Nikkei 225 index for Japan.

All variables are real, seasonally adjusted by X-12 Arima method and are expressed in growth rates.

For further information regarding data definitions and sources, please check the respective section with the same name in the annexes.

Regarding the difficulties in this research I had very difficulty in find the most recent data in some time series such as government expenditure, GDP or M2 for some countries that fit in the same period than the reaming series (as for previous periods than 1995,as for more recent periods (2015 to 2016), therefore this could influence in the model estimation, once that I had a lot of attempts with autocorrelation (Some of them could be corrected, increasing the number of lags, others not like the models C2-EA and C2-JP).

## 3.2 METHODOLOGY

In the estimation of this SVAR is followed by close the models implemented by (Van Aarle et al., 2003; Chatziantoniou et al., 2013) and considered the variables used in (IMF, 2010).

According to (Fernández et al.,, 2001), the SVAR methodology have the main advantages:

1) the methodology is widely implemented in econometric software packages;
2) relatively simple to estimate and interpret;
3) is a popular approach, therefore there are many routines available on internet;
4) is possible identify assumptions to isolate estimates;
5) allow to justify the model / the variables included on it.

Regarding the monetary of aggregate, normally is used the M0 (monetary base to access the impact on money in circulation of the QE programs), however, the definition of the monetary is very mixed all over the world (Lim & Sriram, 2003), is used the money aggregate M2 in the analysis, this is the money in circulation and checkable deposits very liquid; furthermore, M2 reflects the impact on the deposits and M0 not (Dennis, 1983).

The structural representation of the VAR model o order p takes the following general form:

$$A_0 y_t = c_0 + \sum_{i=1}^{p} A_i y_{t-i} + \varepsilon_t \tag{1}$$

Where $y_t$ is an 8x1 vector or endogenous variables, i.e. $y_t = [govx_t msx_t, \pi_t, gov_t, ms_t, i_t, sm_t]$ , $A_0$ represents the 8x8 contemporaneous matrix, $A_i$ are 8x8 autoregressive coefficient matrices, $\varepsilon_t$ is an 8x1 vector of structural disturbances, assumed to have zero covariance. The covariance matrix of the structural disturbances takes the following form $E[\varepsilon_t \varepsilon_t'] = D = [\sigma_1^2 \quad \sigma_2^2 \quad \sigma_3^2 \quad \sigma_4^2 \quad \sigma_5^2 \quad \sigma_6^2 \quad \sigma_7^2 \quad \sigma_8^2] \times I$. In order to get the reduced form of our structural model (1) we multiply both sides with $A_0^{-1}$, such as that:

$$y_t = a_0 + \sum_{i=1}^{p} B_i y_{t-i} + e_t \tag{2}$$

Where, $a_0 = A_0^{-1} c_0, B_i = A_0^{-1} A_i,$ and $e_y = A_0^{-1} \varepsilon_t,$ i.e. $\varepsilon_t = A_0 e_t$. The reduced form errors $e_t$ are linear combinations of the structural errors $\varepsilon_t$, with a covariance matrix of the form $E[\varepsilon_t \varepsilon_t'] = A_0^{-1} A D_0^{-1\prime}$.

The structural disturbances can be derived by imposing suitable restrictions on $A_0$. The short-run restrictions that are applied in this model as the following:

$$\begin{bmatrix} \varepsilon_{1,t}^{exs} \\ \varepsilon_{2,t}^{mxs} \\ \varepsilon_{3,t}^{is} \\ \varepsilon_{4,t}^{ps} \\ \varepsilon_{5,t}^{es} \\ \varepsilon_{6,t}^{mss} \\ \varepsilon_{7,t}^{mpt} \\ \varepsilon_{8,t}^{ss} \end{bmatrix} = \begin{bmatrix} a_{11} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & a_{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 & 0 & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & a_{53} & a_{54} & a_{55} & 0 & 0 & 0 \\ 0 & 0 & a_{63} & a_{64} & a_{65} & a_{66} & 0 & 0 \\ a_{71} & a_{72} & 0 & 0 & a_{75} & a_{76} & a_{77} & a_{78} \\ a_{81} & a_{82} & a_{83} & a_{84} & a_{85} & a_{86} & a_{87} & a_{88} \end{bmatrix} \times \begin{bmatrix} \varepsilon_{1,t}^{govx} \\ \varepsilon_{2,t}^{msx} \\ \varepsilon_{3,t}^{y} \\ \varepsilon_{4,t}^{\pi} \\ \varepsilon_{5,t}^{gov} \\ \varepsilon_{6,t}^{ms} \\ \varepsilon_{7,t}^{i} \\ \varepsilon_{8,t}^{sm} \end{bmatrix} \tag{3}$$

where, exist = government expenditure shock in country i, exs = M2 money agregate shock in country i, is = income shock in China, ps = price shock in China, es = government expenditure shock in China, mss = M2 money aggregate shock in China, mpt = interest rate shock in China and ss = stock market shock in China; country I can be United States, Euro Area, United Kingdom or Japan.

The main focus of this analysis will be the interaction/comparison between the macroeconomic policies and stock market developments, and in other plan the impact of the other channels on stock market returns. As in  (Bjørnland & Leitemo, 2009), is identified the global demand shock, the income shock and the price shock; however their are uninterpreted.

The restrictions in this model can be explained, as follows: Income influenced by an exogenous global shock, which is denoted by the foreign fiscal and monetary policies (of US, UK, EA and JP). However, GDP cannot be influenced by any other variable, as the evidence presented in (Kim & Roubini, 2000). Despite this, it can contemporaneously influence all other variables. Furthermore, according to the evidence presented (Kim & Roubini, 2000); (Bjørnland et al.,, 2008)), the inflation reacts only to imported inflation (income and foreign monetary and fiscal policies shocks).

Both monetary and fiscal policies react to income and price shocks, according to ((Kim & Roubini, 2000; Antonio Afonso & Sousa, 2011); regarding monetary policy is also influenced by the government expenditure due to the interaction between the two policies in reaction to income and price shocks (Wyplosz, 1999; Melitz, 2000). Interest rates are influenced by the foreign fiscal and monetary policies (global) shock, the national public expenditure shock and the national money supply shock (Elbourne, 2008; Kim & Roubini, 2000; Sims & Zha, 2006a, 2006b; Van Aarle et al., 2003) and the stock market shock(Bjørnland & Leitemo, 2009). Finally, stock market returns are influenced by all variables (Bjørnland et al., 2008).

To proceed to the estimation of the reduced form of model, it is first necessary to ensure that all variables used are stationary. The ADF and PP unit root tests suggest that all variables are I(1) and some I(2) (government expenditures of US and UK and all interest rates), as shown in the annexes; all models residuals are I(0).

The order of the (S)VAR models was identified using the best criteria according to the Lag length test and in order to validate the models. The models are validated does not have autocorrelation or heteroscedasticity, as showed by the serial autocorrelation LM test, portmanteau joint test and White heteroscedasticity test.

For further information / details regarding the models validation and tests results please check the annexes section.

However, note that the models C2-EA and C2-JP, are not fully validated once that have correlation in three and one lag respectively.

# 4 EMPIRICAL RESULTS

## 4.1 CONTEMPORANEOUS RELATIONSHIPS

The following table should be interpreted as follows: it was estimated a model with c1 (end of month returns of Shanghai stock index) or with c2 (simple average of month returns), to assess the fiscal and monetary policies spillovers of US, UK, EA and JP over China.

In respect of restrictions imposed on SVAR model, visible on matrix (3), should be interpret as follows, for instance in the model C1-US, this is considering the close returns of the final of the month and the fiscal and monetary spillovers of US over China (Shanghai stock returns): the external monetary innovations depends of its own, and not of another variables [for instance, there is a “shock” (an abrupt increase or decrease) in M2 of US], this in the first line of the matrix; in the second line, the external innovations depends of its own (for instance an [for instance, there is a “shock” (an abrupt increase or decrease) in government spending of US]; in the third line, the income in shock in china is dependent of monetary and fiscal policy in US and other innovations in income in China; in the last line, the stock returns of Shanghai stock index are dependent of all variables listed and specific shocks/innovations of the stock market ($a_{88}$).

As the last equation is the one who represents the Shanghai stock index returns, it will be focus in the analysis of the coefficients of the last line of the matrix [this is from coefficients $a_{81}$ to $a_{88}$, or respectively to 23 to 30 (external monetary policy, external fiscal policy, national income, national prices, national government expenditure, national monetary policy, national interest rate and national stock index)], in terms of the restriction inserted of the econometric software).

Note that coefficients 23 and 24 represents the foreign monetary and fiscal policy, or by other words, the spillovers that these variables have on Shanghai Stock Exchange returns.

| Coef. | C1-US | C1-UK | C1-EA | C1-JP | C2-US | C2-UK | C2-EA | C2-JP |
|---|---|---|---|---|---|---|---|---|
| 1 | -0.003154* | -0.005430* | 0.004300* | -0.007135* | -0.003189* | 0.005050* | -0.004468* | -0.008297* |
| 2 | -0.009742* | -0.015111* | -0.006160* | 0.006359* | -0.011435* | 0.016675* | 0.006396* | -0.005096* |
| 3 | 0.052049 | 0.378720* | 0.468883* | -0.108970 | 0.320937 | 0.237315 | 0.546402* | 0.053505 |
| 4 | -0.268269* | 0.118112** | 0.024354 | -0.093091 | -0.310541* | 0.107235** | 0.037254 | -0.126654 |
| 5 | -0.007013* | -0.006743* | -0.006886* | 0.006389* | 0.007161* | -0.006875* | 0.006554* | 0.008246* |
| 6 | -0.422893* | -0.099743 | 0.120816 | -0.030898 | -0.393945* | -0.172735*** | 0.034831 | -0.167612** |
| 7 | -0.001343 | -0.121425* | -0.085453 | -0.146044** | 0.004048 | -0.083081* | -0.132507*** | -0.098964 |
| 8 | 0.040334 | 0.023734 | -0.075087 | -0.168236* | -0.052512 | -0.021441 | -0.075518 | -0.062956 |
| 9 | 0.004511* | 0.003707* | -0.004110* | -0.003468* | 0.004041* | -0.004272* | -0.004419* | -0.005121* |
| 10 | 1.437155*** | -1.267615*** | -1.000198 | 0.674437 | 0.509295 | -0.335557 | -1.467975** | 0.231420 |
| 11 | -3.375394* | -2.188171 | -3.538459* | -4.356286* | -6.064632* | -3.664817* | -3.882301* | -2.721849** |
| 12 | 0.052285* | 0.046872* | 0.045145* | -0.040023* | -0.042920* | -0.046913* | 0.045377* | 0.059974* |
| 13 | 0.039053 | -0.190676 | 0.015223 | -0.280131 | 0.020741 | -0.102245 | -0.115496 | 0.049667 |
| 14 | -0.647279* | 0.007085 | -0.530163 | 0.180477 | -0.867429** | -1.045078* | -0.990138* | -0.830900* |
| 15 | 0.032257 | -0.007990 | 0.008811 | 0.015403 | 0.023580 | 0.004540 | -0.026386 | 0.005111 |
| 16 | -0.009748* | -0.011248* | -0.011423* | 0.013312* | 0.011370* | 0.011479* | -0.011900* | 0.013488* |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 17 | 0.752007 | 0.613272 | 420006.3 | -0.967359 | -1.029942 | -533928.7 | 1.716240 | -1.547364 |
| 18 | -2.689145** | -2.440339* | -270676.4 | -4.152965 | -2.079344* | 5506.692 | -2.957913 | -2.925869 |
| 19 | -0.317031 | 0.379342*** | -9169.171 | -0.180025** | -0.137574 | 1205.936 | -0.427078*** | -0.184195 |
| 20 | -0.678543 | -2.403088* | -10764.53 | -0.859157 | -1.120930 | 59228.06 | -1.912690*** | -1.298025*** |
| 21 | -0.106011* | -0.073271* | 12192.76 | -0.104448* | -0.070075* | 6029.847 | 0.110629* | -0.088661* |
| 22 | 0.350782 | 0.154254 | 83034.61 | 0.371441 | -0.053453 | -60621.76 | 0.661921** | 0.457671 |
| 23 - gov ext | -4.788787 | -4.376683 | -105479.2 | 2.680520 | -7.044663** | 100824.6 | 0.231298 | 0.372082 |
| 24 - m2 ext | -5.335892 | 0.730398 | 147537.3 | -2.717216 | 2.533947** | -57789.48 | 0.160610 | -7.226825** |
| 25-gdp | 1.818504 | 5.979614** | -421833.8 | 9.656377* | 4.136133* | -99507.87 | 5.618782* | 4.296103* |
| 26-dt | 10.33242** | 11.21663** | -919143.2 | 14.83509* | 7.921941* | 355290.6 | 16.29583* | 6.650070** |
| 27-gov | -0.194007 | -0.221651 | 33589.36 | 1.194849* | 0.171846 | -4067.062 | -0.109053 | -0.077615 |
| 28-m2 | -1.264397 | 1.647491 | 36946.88 | 0.762035 | 0.044708 | -128577.8 | 1.009676 | 0.002478 |
| 29-ir | -1.784228*** | -1.064409 | 140343.1 | -1.557812* | 0.000145 | -80153.96 | -1.159843* | -1.010410*** |
| 30 | -0.167433* | 0.149985* | 10480.97 | 0.125255* | -0.081423* | 5523.656 | -0.113208* | 0.111896* |

*Table 4-1 Contemporaneous relationships*

*significant at 1% significance level (p-value less than 0.01) ; **significant at 5% level (more than 0.01 but less 0.05); ***significant at 10% level (more than 0.05 but less 0.10);

However, note that the models C2-EA and C2-JP, are not fully validated once that have correlation in three and one lag respectively.

The results show that the spillovers of the international fiscal and monetary policy are overall null or near zero. However, there are significant spillovers of United States and Japan with China, the monetary policy of US has positive impact and the fiscal have negative impact on Shanghai stock returns, in other hand the monetary policy of Japan have as well. Furthermore, regarding the other transmission channels the internal GDP and inflation play the major role determining the stock returns and finally the specific innovations associated with stock market, in a transversal way to all models.

# 5 CONCLUDING REMARKS

The results show that the spillovers of the international fiscal and monetary policy are overall nonexistent or weak at best. However, there are significant spillovers of United States and Japan with China, the monetary policy of US has positive impact and the fiscal has negative impact on Shanghai stock returns, the same is true of the Japanese monetary policy.

In other hand, the average of stock returns is better explained by the regressors than just the end of the month of the stock returns.

The conclusions validate the research hypothesis/questions defined:

1) There are spillovers impact of external fiscal and monetary policy in China stock exchange returns;

2) The spillovers impact of external fiscal and monetary policy in China stock exchange returns are positive;

3) There are several monetary channels that conduct the spillovers; their relative strength in each country determines if the impact is strong/weak, negative/positive.

And validate the research question that is to verify if there are spillovers of fiscal and monetary policy.

These results seem consistent with the recent literature and with the empirical results suggested by several authors in their studies.

Regarding future research, i believe there are three main paths to follow.

Firstly, is investigate further the impact of external fiscal policies of Shanghai stock returns; the second to investigate further the impact of monetary policies of Euro Area and United Kingdom in the same stock market returns, and the final one is the estimate models with both policies, like this work.

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# 7 ANNEXES

## 7.1 DATA DEFINITIONS AND SOURCES

| Variable[1] | Definition | Unit | Source / Formula |
|---|---|---|---|
| GDP_(country) | Gross Domestic Product, current prices | National currency | OECD – Main Economic Indicators , China Bureau of Statistics |
| CPI_(country) | Consumer Price Index (all items) | Index 2010=100 | OECD – Main Economic Indicators |
| IR_(country) | Short term interest rate [ Interbank rate (< 24 hrs)] | % | OECD – Main Economic Indicators |
| GOV_(country) | Government final consumption expenditure | National currency | OECD – Main Economic Indicators , China Bureau of Statistics |
| C_(country)* | Close of the stock index | | Yahoo Finance |
| M2_(country) | M2 monetary aggregate | National currency[2] | FRED of Saint Louis (Federal Reserve) |
| GDP_(country)_sag ( | Real Gross Domestic Product growth rate | % | $\Delta y = \frac{\frac{y_t}{CPI_t} - \frac{y_{t-1}}{CPI_{t-1}}}{\frac{y_{t-1}}{CPI_{t-1}}}$ |
| CPI_(country)_sag | Inflation | % | $\Delta cpi = \frac{cpi_t - cpi_{t-1}}{cpi_{t-1}}$ |
| IR_(country)_sag | Short term interest rate | % | $\Delta ir = ir_t - \frac{cpi_{t-1} - cpi_t}{cpi_{t-1}}$ |
| GOV_(country)_sag | Real government final consumption expenditure growth | % | $\Delta g = \frac{\frac{g_t}{CPI_t} - \frac{g_{t-1}}{CPI_{t-1}}}{\frac{g_{t-1}}{CPI_{t-1}}}$ |
| C_(country)_sag | Real stock exchange returns | % | $\Delta close = \frac{\frac{close_t}{CPI_t} - \frac{close_{t-1}}{CPI_{t-1}}}{\frac{close_{t-1}}{CPI_{t-1}}}$ |
| M2_(country)_sag | M2 monetary aggregate growth rate | % | $\Delta M2 = \frac{m2_{t-1} - m2_t}{m2_{t-1}} / CPI_t$ |

*c1-means the last close of last day of the quarter; c2-means the average close of the quarter

$$\Delta c = \frac{\frac{close_t}{CPI_t} - \frac{close_{t-1}}{CPI_{t-1}}}{\frac{close_{t-1}}{CPI_{t-1}}}$$

[1] "_sag" means **S**easonaly **A**djusted in **G**rowth rate.

[2] Sterling millions for UK

## 7.2 Synthesis of Unit Root and seasonality Tests

| Variable / test | | Stationarity tests | | | | Trend tests | | | | Correlogram |
|---|---|---|---|---|---|---|---|---|---|---|
| | | DF | PP | KPSS | decision | DF | PP | KPSS | decision | Seasonality |
| C1 | China | S | S | S | S | D,D | D,D | D | D | NO |
| | EA | S | S | S | S | D,D | D,D | D | D | NO |
| | US | S | S | S | S | D,D | D,D | D | D | NO |
| | UK | S | S | S | S | D,D | D,D | D | D | NO |
| | Japan | S | S | S | S | D,D | D,D | D | D | NO |
| C2 | China | S | S | S | S | D,D | D,D | D | D | NO |
| | EA | S | S | S | S | D,D | D,D | D | D | NO |
| | US | S | S | NS | S | D,D | D,D | D | D | NO |
| | UK | S | S | S | S | D,D | D,D | D | D | NO |
| | Japan | S | S | S | S | D,D | D,D | D | D | NO |
| CPI | China | S | S | S | S | D,D | D,D | D | D | NO |
| | EA | S | S | S | S | D,D | D,D | D | D | NO |
| | US | S | S | S | S | D,D | D,D | D | D | NO |
| | UK | S | S | NS | S | D,D | D,D | D | D | NO |
| | Japan | S | S | S | S | D,D | D,D | D | D | NO |
| GDP | China | S | S | NS | S | D,D | D,D | S | D | NO |
| | EA | S | S | S | S | D,D | D,D | S | D | NO |
| | US | S | S | S | S | D,D | D,D | S | D | NO |
| | UK | S | S | S | S | D,D | D,D | S | D | NO |
| | Japan | S | S | S | S | D,D | D,D | D | D | NO |
| Gov | China | S | S | NS | S | D,S | D,S | S | S | NO |
| | EA | S | S | S | S | D,D | D,D | S | D | NO |
| | US* | S | S | S | S | D,D | D,D | D | D | NO |
| | UK* | S | S | S | S | D,D | D,D | D | D | NO |
| | Japan | S | S | S | S | D,D | D,D | S | D | NO |
| IR | China* | S | S | S | S | D,S | D,S | S | S | NO |
| | EA* | S | S | S | S | D,D | D,D | D | D | NO |
| | US* | NS | S | S | S | D,D | D,D | D | D | NO |
| | UK* | S | S | S | S | D,D | D,D | D | D | NO |
| | Japan* | S | S | S | S | D,D | D,D | D | D | NO |
| M2 | China | S | S | S | S | D,D | D,D | S | D | NO |
| | EA | NS | S | S | S | D,D | D,D | D | D | NO |
| | US | S | S | S | S | D,D | D,D | D | D | NO |
| | UK | S | S | NS | S | D,S | D,S | S | S | NO |
| | Japan | S | S | S | S | D,D | D,D | D | D | NO |

**Legend:** S- Stationary; NS- Not stationary; D- Deterministic trend; S- Stockastic trend

## 7.3 STATIONARITY TESTS

| Test | Null hypothesis |
|---|---|
| **Stationarity tests** | |
| Dickey-Fuller (DF) | $H_0$: *There is a unit root in the series* |
| Phillips-Perron (PP) | $H_0$: *There is a unit root in the series* |
| Kwiatkowski, Phillips, Schmidt e Shin (KPSS) | $H_0$: *There is not a unit root in the series* |
| **Trend tests** | |
| SERIES(-1) | $H_0$: *Stockastic trend* |
| @TREND | $H_0$: *Deterministic trend* |

Decision rule: p-value < significance level (0,05), the null hyphotesis is rejected

### 7.3.1 Close 1

**China - DF**

Null Hypothesis: C1_CHN_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.959383 | 0.0006 |
| Test critical values: | 1% level | -4.081666 | |
| | 5% level | -3.469235 | |
| | 10% level | -3.161518 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C1_CHN_GNSA_SAF)
Method: Least Squares
Date: 12/24/16 Time: 22:29
Sample (adjusted): 1996Q2 2015Q2
Included observations: 77 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_CHN_GNSA_SAF(-1) | -0.855446 | 0.172490 | -4.959383 | 0.0000 |
| D(C1_CHN_GNSA_SAF(-1)) | 0.168299 | 0.165858 | 1.014715 | 0.3137 |
| D(C1_CHN_GNSA_SAF(-2)) | 0.137791 | 0.140345 | 0.981801 | 0.3295 |
| D(C1_CHN_GNSA_SAF(-3)) | 0.416297 | 0.107737 | 3.864000 | 0.0002 |
| C | 0.045146 | 0.035577 | 1.268972 | 0.2086 |
| @TREND("1995Q2") | -0.000425 | 0.000732 | -0.580356 | 0.5635 |

| | | | |
|---|---|---|---|
| R-squared | 0.516040 | Mean dependent var | 0.003222 |
| Adjusted R-squared | 0.481958 | S.D. dependent var | 0.195602 |
| S.E. of regression | 0.140785 | Akaike info criterion | -1.008453 |
| Sum squared resid | 1.407241 | Schwarz criterion | -0.825819 |
| Log likelihood | 44.82544 | Hannan-Quinn criter. | -0.935401 |
| F-statistic | 15.14124 | Durbin-Watson stat | 2.094473 |
| Prob(F-statistic) | 0.000000 | | |

**China - PP**

Null Hypothesis: C1_CHN_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.187823 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.023514 |
| HAC corrected variance (Bartlett kernel) | 0.023727 |

Phillips-Perron Test Equation
Dependent Variable: D(C1_CHN_GNSA_SAF)
Method: Least Squares
Date: 12/24/16 Time: 22:31
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_CHN_GNSA_SAF(-1) | -0.799260 | 0.111306 | -7.180764 | 0.0000 |
| C | 0.035932 | 0.035539 | 1.011032 | 0.3152 |
| @TREND("1995Q2") | -0.000226 | 0.000757 | -0.298165 | 0.7664 |

| | | | |
|---|---|---|---|
| R-squared | 0.401082 | Mean dependent var | 0.003883 |
| Adjusted R-squared | 0.385526 | S.D. dependent var | 0.199395 |
| S.E. of regression | 0.156302 | Akaike info criterion | -0.837270 |
| Sum squared resid | 1.881144 | Schwarz criterion | -0.747944 |
| Log likelihood | 36.49078 | Hannan-Quinn criter. | -0.801456 |
| F-statistic | 25.78259 | Durbin-Watson stat | 1.956449 |
| Prob(F-statistic) | 0.000000 | | |

**China - KPSS**

Null Hypothesis: C1_CHN_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.050833 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.024609 |
| HAC corrected variance (Bartlett kernel) | 0.034180 |

KPSS Test Equation
Dependent Variable: C1_CHN_GNSA_SAF
Method: Least Squares
Date: 12/24/16 Time: 22:32
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.034662 | 0.034975 | 0.991048 | 0.3247 |
| @TREND("1995Q2") | -0.000107 | 0.000755 | -0.141565 | 0.8878 |

| | | | |
|---|---|---|---|
| R-squared | 0.000254 | Mean dependent var | 0.030387 |
| Adjusted R-squared | -0.012401 | S.D. dependent var | 0.157871 |
| S.E. of regression | 0.158847 | Akaike info criterion | -0.817375 |
| Sum squared resid | 1.993345 | Schwarz criterion | -0.758253 |
| Log likelihood | 35.10370 | Hannan-Quinn criter. | -0.793655 |
| F-statistic | 0.020041 | Durbin-Watson stat | 1.576334 |
| Prob(F-statistic) | 0.887784 | | |

## EA - DF

Null Hypothesis: C1_EURO_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.416874 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C1_EURO_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:13
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_EURO_GNSA_SAF(-1) | -0.833608 | 0.112393 | -7.416874 | 0.0000 |
| C | 0.032745 | 0.022288 | 1.469199 | 0.1459 |
| @TREND("1995Q2") | -0.000523 | 0.000473 | -1.104796 | 0.2727 |

| | | | |
|---|---|---|---|
| R-squared | 0.416712 | Mean dependent var | -0.001053 |
| Adjusted R-squared | 0.401562 | S.D. dependent var | 0.124992 |
| S.E. of regression | 0.096692 | Akaike info criterion | -1.797790 |
| Sum squared resid | 0.719902 | Schwarz criterion | -1.708464 |
| Log likelihood | 74.91158 | Hannan-Quinn criter. | -1.761976 |
| F-statistic | 27.50514 | Durbin-Watson stat | 2.021111 |
| Prob(F-statistic) | 0.000000 | | |

## EA - PP

Null Hypothesis: C1_EURO_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.518690 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.008999 |
| HAC corrected variance (Bartlett kernel) | 0.010191 |

Phillips-Perron Test Equation
Dependent Variable: D(C1_EURO_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:14
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_EURO_GNSA_SAF(-1) | -0.833608 | 0.112393 | -7.416874 | 0.0000 |
| C | 0.032745 | 0.022288 | 1.469199 | 0.1459 |
| @TREND("1995Q2") | -0.000523 | 0.000473 | -1.104796 | 0.2727 |

| | | | |
|---|---|---|---|
| R-squared | 0.416712 | Mean dependent var | -0.001053 |
| Adjusted R-squared | 0.401562 | S.D. dependent var | 0.124992 |
| S.E. of regression | 0.096692 | Akaike info criterion | -1.797790 |
| Sum squared resid | 0.719902 | Schwarz criterion | -1.708464 |
| Log likelihood | 74.91158 | Hannan-Quinn criter. | -1.761976 |
| F-statistic | 27.50514 | Durbin-Watson stat | 2.021111 |
| Prob(F-statistic) | 0.000000 | | |

## EA - KPSS

Null Hypothesis: C1_EURO_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.109072 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.009143 |
| HAC corrected variance (Bartlett kernel) | 0.013619 |

KPSS Test Equation
Dependent Variable: C1_EURO_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:15
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.040075 | 0.021318 | 1.879859 | 0.0638 |
| @TREND("1995Q2") | -0.000638 | 0.000460 | -1.386071 | 0.1696 |

| | | | |
|---|---|---|---|
| R-squared | 0.023742 | Mean dependent var | 0.014565 |
| Adjusted R-squared | 0.011384 | S.D. dependent var | 0.097376 |
| S.E. of regression | 0.096820 | Akaike info criterion | -1.807536 |
| Sum squared resid | 0.740561 | Schwarz criterion | -1.748414 |
| Log likelihood | 75.20522 | Hannan-Quinn criter. | -1.783816 |
| F-statistic | 1.921193 | Durbin-Watson stat | 1.666611 |
| Prob(F-statistic) | 0.169625 | | |

## JAPAN - DF

Null Hypothesis: C1_JP_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.133122 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C1_JP_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:17
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_JP_GNSA_SAF(-1) | -0.786689 | 0.110287 | -7.133122 | 0.0000 |
| C | -0.003271 | 0.022735 | -0.143856 | 0.8860 |
| @TREND("1995Q2") | 0.000292 | 0.000490 | 0.595831 | 0.5530 |

| | | | |
|---|---|---|---|
| R-squared | 0.398020 | Mean dependent var | 0.002514 |
| Adjusted R-squared | 0.382384 | S.D. dependent var | 0.127958 |
| S.E. of regression | 0.100561 | Akaike info criterion | -1.719334 |
| Sum squared resid | 0.778657 | Schwarz criterion | -1.630008 |
| Log likelihood | 71.77335 | Hannan-Quinn criter. | -1.683520 |
| F-statistic | 25.45563 | Durbin-Watson stat | 1.727657 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - PP

Null Hypothesis: C1_JP_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.225044 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.009733 |
| HAC corrected variance (Bartlett kernel) | 0.010835 |

Phillips-Perron Test Equation
Dependent Variable: D(C1_JP_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:18
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_JP_GNSA_SAF(-1) | -0.786689 | 0.110287 | -7.133122 | 0.0000 |
| C | -0.003271 | 0.022735 | -0.143856 | 0.8860 |
| @TREND("1995Q2") | 0.000292 | 0.000490 | 0.595831 | 0.5530 |

| | | | |
|---|---|---|---|
| R-squared | 0.398020 | Mean dependent var | 0.002514 |
| Adjusted R-squared | 0.382384 | S.D. dependent var | 0.127958 |
| S.E. of regression | 0.100561 | Akaike info criterion | -1.719334 |
| Sum squared resid | 0.778657 | Schwarz criterion | -1.630008 |
| Log likelihood | 71.77335 | Hannan-Quinn criter. | -1.683520 |
| F-statistic | 25.45563 | Durbin-Watson stat | 1.727657 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - KPSS

Null Hypothesis: C1_JP_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.066585 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.010281 |
| HAC corrected variance (Bartlett kernel) | 0.014037 |

KPSS Test Equation
Dependent Variable: C1_JP_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:18
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.012100 | 0.022606 | -0.535237 | 0.5940 |
| @TREND("1995Q2") | 0.000512 | 0.000488 | 1.048941 | 0.2974 |

| | | | |
|---|---|---|---|
| R-squared | 0.013736 | Mean dependent var | 0.008372 |
| Adjusted R-squared | 0.001252 | S.D. dependent var | 0.102734 |
| S.E. of regression | 0.102670 | Akaike info criterion | -1.690216 |
| Sum squared resid | 0.832746 | Schwarz criterion | -1.631094 |
| Log likelihood | 70.45376 | Hannan-Quinn criter. | -1.666496 |
| F-statistic | 1.100278 | Durbin-Watson stat | 1.553673 |
| Prob(F-statistic) | 0.297404 | | |

## UK - DF

Null Hypothesis: C1_UK_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -8.162681 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C1_UK_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:20
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_UK_GNSA_SAF(-1) | -0.923568 | 0.113145 | -8.162681 | 0.0000 |
| C | 0.015947 | 0.016004 | 0.996450 | 0.3222 |
| @TREND("1995Q2") | -0.000251 | 0.000342 | -0.734029 | 0.4652 |

| | | | |
|---|---|---|---|
| R-squared | 0.463969 | Mean dependent var | -0.001106 |
| Adjusted R-squared | 0.450047 | S.D. dependent var | 0.094595 |
| S.E. of regression | 0.070151 | Akaike info criterion | -2.439562 |
| Sum squared resid | 0.378927 | Schwarz criterion | -2.350236 |
| Log likelihood | 100.5825 | Hannan-Quinn criter. | -2.403749 |
| F-statistic | 33.32426 | Durbin-Watson stat | 2.022513 |
| Prob(F-statistic) | 0.000000 | | |

## UK - PP

Null Hypothesis: C1_UK_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -8.213233 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.004737 |
| HAC corrected variance (Bartlett kernel) | 0.005276 |

Phillips-Perron Test Equation
Dependent Variable: D(C1_UK_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:20
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_UK_GNSA_SAF(-1) | -0.923568 | 0.113145 | -8.162681 | 0.0000 |
| C | 0.015947 | 0.016004 | 0.996450 | 0.3222 |
| @TREND("1995Q2") | -0.000251 | 0.000342 | -0.734029 | 0.4652 |

| | | | |
|---|---|---|---|
| R-squared | 0.463969 | Mean dependent var | -0.001106 |
| Adjusted R-squared | 0.450047 | S.D. dependent var | 0.094595 |
| S.E. of regression | 0.070151 | Akaike info criterion | -2.439562 |
| Sum squared resid | 0.378927 | Schwarz criterion | -2.350236 |
| Log likelihood | 100.5825 | Hannan-Quinn criter. | -2.403749 |
| F-statistic | 33.32426 | Durbin-Watson stat | 2.022513 |
| Prob(F-statistic) | 0.000000 | | |

## UK - KPSS

Null Hypothesis: C1_UK_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.087408 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.004746 |
| HAC corrected variance (Bartlett kernel) | 0.005959 |

KPSS Test Equation
Dependent Variable: C1_UK_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:21
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.020361 | 0.015360 | 1.325610 | 0.1888 |
| @TREND("1995Q2") | -0.000328 | 0.000332 | -0.990605 | 0.3249 |

| | | | |
|---|---|---|---|
| R-squared | 0.012269 | Mean dependent var | 0.007225 |
| Adjusted R-squared | -0.000234 | S.D. dependent var | 0.069752 |
| S.E. of regression | 0.069760 | Akaike info criterion | -2.463131 |
| Sum squared resid | 0.384450 | Schwarz criterion | -2.404009 |
| Log likelihood | 101.7568 | Hannan-Quinn criter. | -2.439410 |
| F-statistic | 0.981298 | Durbin-Watson stat | 1.838888 |
| Prob(F-statistic) | 0.324903 | | |

## US- DF

Null Hypothesis: C1_US_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.977055 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C1_US_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:23
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_US_GNSA_SAF(-1) | -0.773545 | 0.110870 | -6.977055 | 0.0000 |
| C | 0.017287 | 0.016869 | 1.024803 | 0.3087 |
| @TREND("1995Q2") | -0.000144 | 0.000358 | -0.401688 | 0.6890 |

| | | | |
|---|---|---|---|
| R-squared | 0.387371 | Mean dependent var | -0.000564 |
| Adjusted R-squared | 0.371458 | S.D. dependent var | 0.093004 |
| S.E. of regression | 0.073734 | Akaike info criterion | -2.339915 |
| Sum squared resid | 0.418631 | Schwarz criterion | -2.250589 |
| Log likelihood | 96.59658 | Hannan-Quinn criter. | -2.304101 |
| F-statistic | 24.34387 | Durbin-Watson stat | 2.005737 |
| Prob(F-statistic) | 0.000000 | | |

## US - PP

Null Hypothesis: C1_US_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.025749 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.005233 |
| HAC corrected variance (Bartlett kernel) | 0.005521 |

Phillips-Perron Test Equation
Dependent Variable: D(C1_US_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:23
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C1_US_GNSA_SAF(-1) | -0.773545 | 0.110870 | -6.977055 | 0.0000 |
| C | 0.017287 | 0.016869 | 1.024803 | 0.3087 |
| @TREND("1995Q2") | -0.000144 | 0.000358 | -0.401688 | 0.6890 |

| | | | |
|---|---|---|---|
| R-squared | 0.387371 | Mean dependent var | -0.000564 |
| Adjusted R-squared | 0.371458 | S.D. dependent var | 0.093004 |
| S.E. of regression | 0.073734 | Akaike info criterion | -2.339915 |
| Sum squared resid | 0.418631 | Schwarz criterion | -2.250589 |
| Log likelihood | 96.59658 | Hannan-Quinn criter. | -2.304101 |
| F-statistic | 24.34387 | Durbin-Watson stat | 2.005737 |
| Prob(F-statistic) | 0.000000 | | |

## US - KPSS

Null Hypothesis: C1_US_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.136061 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.005461 |
| HAC corrected variance (Bartlett kernel) | 0.008084 |

KPSS Test Equation
Dependent Variable: C1_US_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:24
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.024472 | 0.016475 | 1.485405 | 0.1414 |
| @TREND("1995Q2") | -0.000225 | 0.000356 | -0.631934 | 0.5293 |

| | | | |
|---|---|---|---|
| R-squared | 0.005030 | Mean dependent var | 0.015484 |
| Adjusted R-squared | -0.007565 | S.D. dependent var | 0.074544 |
| S.E. of regression | 0.074826 | Akaike info criterion | -2.322930 |
| Sum squared resid | 0.442312 | Schwarz criterion | -2.263808 |
| Log likelihood | 96.07867 | Hannan-Quinn criter. | -2.299210 |
| F-statistic | 0.399340 | Durbin-Watson stat | 1.544939 |
| Prob(F-statistic) | 0.529255 | | |

### 7.3.2 Close 2

**China - DF**

Null Hypothesis: C2_CHN_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.149382 | 0.0081 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C2_CHN_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:28
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_CHN_GNSA_SAF(-1) | -0.405281 | 0.097673 | -4.149382 | 0.0001 |
| C | 0.010852 | 0.024910 | 0.435624 | 0.6643 |
| @TREND("1995Q2") | 8.94E-05 | 0.000529 | 0.168831 | 0.8664 |

| | | | |
|---|---|---|---|
| R-squared | 0.184623 | Mean dependent var | 0.004974 |
| Adjusted R-squared | 0.163444 | S.D. dependent var | 0.119233 |
| S.E. of regression | 0.109055 | Akaike info criterion | -1.557156 |
| Sum squared resid | 0.915755 | Schwarz criterion | -1.467830 |
| Log likelihood | 65.28625 | Hannan-Quinn criter. | -1.521343 |
| F-statistic | 8.717419 | Durbin-Watson stat | 1.828111 |
| Prob(F-statistic) | 0.000387 | | |

**China - PP**

Null Hypothesis: C2_CHN_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -4.351109 | 0.0044 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.011447 |
| HAC corrected variance (Bartlett kernel) | 0.012791 |

Phillips-Perron Test Equation
Dependent Variable: D(C2_CHN_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:29
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_CHN_GNSA_SAF(-1) | -0.405281 | 0.097673 | -4.149382 | 0.0001 |
| C | 0.010852 | 0.024910 | 0.435624 | 0.6643 |
| @TREND("1995Q2") | 8.94E-05 | 0.000529 | 0.168831 | 0.8664 |

| | | | |
|---|---|---|---|
| R-squared | 0.184623 | Mean dependent var | 0.004974 |
| Adjusted R-squared | 0.163444 | S.D. dependent var | 0.119233 |
| S.E. of regression | 0.109055 | Akaike info criterion | -1.557156 |
| Sum squared resid | 0.915755 | Schwarz criterion | -1.467830 |
| Log likelihood | 65.28625 | Hannan-Quinn criter. | -1.521343 |
| F-statistic | 8.717419 | Durbin-Watson stat | 1.828111 |
| Prob(F-statistic) | 0.000387 | | |

**China - KPSS**

Null Hypothesis: C2_CHN_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.050954 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.016817 |
| HAC corrected variance (Bartlett kernel) | 0.035046 |

KPSS Test Equation
Dependent Variable: C2_CHN_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:29
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.030433 | 0.028912 | 1.052602 | 0.2957 |
| @TREND("1995Q2") | -7.23E-05 | 0.000624 | -0.115836 | 0.9081 |

| | | | |
|---|---|---|---|
| R-squared | 0.000170 | Mean dependent var | 0.02754 |
| Adjusted R-squared | -0.012486 | S.D. dependent var | 0.13049 |
| S.E. of regression | 0.131311 | Akaike info criterion | -1.19812 |
| Sum squared resid | 1.362157 | Schwarz criterion | -1.13899 |
| Log likelihood | 50.52387 | Hannan-Quinn criter. | -1.17440 |
| F-statistic | 0.013418 | Durbin-Watson stat | 0.82600 |
| Prob(F-statistic) | 0.908076 | | |

## EA - DF

Null Hypothesis: C2_EURO_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.019886 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C2_EURO_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:31
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_EURO_GNSA_SAF(-1) | -0.782537 | 0.111474 | -7.019886 | 0.0000 |
| C | 0.026364 | 0.020281 | 1.299931 | 0.1975 |
| @TREND("1995Q2") | -0.000409 | 0.000432 | -0.947423 | 0.3464 |

| | | | |
|---|---|---|---|
| R-squared | 0.390265 | Mean dependent var | 0.000396 |
| Adjusted R-squared | 0.374428 | S.D. dependent var | 0.111497 |
| S.E. of regression | 0.088186 | Akaike info criterion | -1.981954 |
| Sum squared resid | 0.598814 | Schwarz criterion | -1.892628 |
| Log likelihood | 82.27815 | Hannan-Quinn criter. | -1.946140 |
| F-statistic | 24.64223 | Durbin-Watson stat | 2.055417 |
| Prob(F-statistic) | 0.000000 | | |

## EA - PP

Null Hypothesis: C2_EURO_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.208200 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.007485 |
| HAC corrected variance (Bartlett kernel) | 0.008992 |

Phillips-Perron Test Equation
Dependent Variable: D(C2_EURO_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:31
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_EURO_GNSA_SAF(-1) | -0.782537 | 0.111474 | -7.019886 | 0.0000 |
| C | 0.026364 | 0.020281 | 1.299931 | 0.1975 |
| @TREND("1995Q2") | -0.000409 | 0.000432 | -0.947423 | 0.3464 |

| | | | |
|---|---|---|---|
| R-squared | 0.390265 | Mean dependent var | 0.000396 |
| Adjusted R-squared | 0.374428 | S.D. dependent var | 0.111497 |
| S.E. of regression | 0.088186 | Akaike info criterion | -1.981954 |
| Sum squared resid | 0.598814 | Schwarz criterion | -1.892628 |
| Log likelihood | 82.27815 | Hannan-Quinn criter. | -1.946140 |
| F-statistic | 24.64223 | Durbin-Watson stat | 2.055417 |
| Prob(F-statistic) | 0.000000 | | |

## EA - KPSS

Null Hypothesis: C2_EURO_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.113999 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.007763 |
| HAC corrected variance (Bartlett kernel) | 0.013889 |

KPSS Test Equation
Dependent Variable: C2_EURO_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:32
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.032950 | 0.019644 | 1.677376 | 0.0974 |
| @TREND("1995Q2") | -0.000513 | 0.000424 | -1.209840 | 0.2299 |

| | | | |
|---|---|---|---|
| R-squared | 0.018191 | Mean dependent var | 0.012432 |
| Adjusted R-squared | 0.005763 | S.D. dependent var | 0.089475 |
| S.E. of regression | 0.089217 | Akaike info criterion | -1.971120 |
| Sum squared resid | 0.628807 | Schwarz criterion | -1.911998 |
| Log likelihood | 81.83035 | Hannan-Quinn criter. | -1.947399 |
| F-statistic | 1.463713 | Durbin-Watson stat | 1.561935 |
| Prob(F-statistic) | 0.229948 | | |

## JAPAN - DF

Null Hypothesis: C2_JP_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.171606 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C2_JP_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:33
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_JP_GNSA_SAF(-1) | -0.654610 | 0.106068 | -6.171606 | 0.0000 |
| C | -0.007712 | 0.018962 | -0.406742 | 0.6853 |
| @TREND("1995Q2") | 0.000328 | 0.000409 | 0.801521 | 0.4253 |

| | | | |
|---|---|---|---|
| R-squared | 0.331023 | Mean dependent var | 0.002872 |
| Adjusted R-squared | 0.313647 | S.D. dependent var | 0.100827 |
| S.E. of regression | 0.083531 | Akaike info criterion | -2.090409 |
| Sum squared resid | 0.537268 | Schwarz criterion | -2.001083 |
| Log likelihood | 86.61634 | Hannan-Quinn criter. | -2.054595 |
| F-statistic | 19.05058 | Durbin-Watson stat | 1.852250 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - PP

Null Hypothesis: C2_JP_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -6.230940 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.006716 |
| HAC corrected variance (Bartlett kernel) | 0.007082 |

Phillips-Perron Test Equation
Dependent Variable: D(C2_JP_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:34
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_JP_GNSA_SAF(-1) | -0.654610 | 0.106068 | -6.171606 | 0.0000 |
| C | -0.007712 | 0.018962 | -0.406742 | 0.6853 |
| @TREND("1995Q2") | 0.000328 | 0.000409 | 0.801521 | 0.4253 |

| | | | |
|---|---|---|---|
| R-squared | 0.331023 | Mean dependent var | 0.002872 |
| Adjusted R-squared | 0.313647 | S.D. dependent var | 0.100827 |
| S.E. of regression | 0.083531 | Akaike info criterion | -2.090409 |
| Sum squared resid | 0.537268 | Schwarz criterion | -2.001083 |
| Log likelihood | 86.61634 | Hannan-Quinn criter. | -2.054595 |
| F-statistic | 19.05058 | Durbin-Watson stat | 1.852250 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - KPSS

Null Hypothesis: C2_JP_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.061839 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.007713 |
| HAC corrected variance (Bartlett kernel) | 0.012134 |

KPSS Test Equation
Dependent Variable: C2_JP_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:34
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.020035 | 0.019580 | -1.023239 | 0.3093 |
| @TREND("1995Q2") | 0.000632 | 0.000423 | 1.495667 | 0.1387 |

| | | | |
|---|---|---|---|
| R-squared | 0.027537 | Mean dependent var | 0.005248 |
| Adjusted R-squared | 0.015227 | S.D. dependent var | 0.089613 |
| S.E. of regression | 0.088929 | Akaike info criterion | -1.977586 |
| Sum squared resid | 0.624754 | Schwarz criterion | -1.918464 |
| Log likelihood | 82.09225 | Hannan-Quinn criter. | -1.953866 |
| F-statistic | 2.237021 | Durbin-Watson stat | 1.286137 |
| Prob(F-statistic) | 0.138725 | | |

## UK - DF

Null Hypothesis: C2_UK_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.643027 | 0.0001 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C2_UK_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:35
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_UK_GNSA_SAF(-1) | -0.580700 | 0.102906 | -5.643027 | 0.0000 |
| C | 0.008059 | 0.011507 | 0.700311 | 0.4858 |
| @TREND("1995Q2") | -0.000119 | 0.000245 | -0.485649 | 0.6286 |

| | | | |
|---|---|---|---|
| R-squared | 0.293029 | Mean dependent var | -0.000661 |
| Adjusted R-squared | 0.274666 | S.D. dependent var | 0.058938 |
| S.E. of regression | 0.050196 | Akaike info criterion | -3.109003 |
| Sum squared resid | 0.194008 | Schwarz criterion | -3.019677 |
| Log likelihood | 127.3601 | Hannan-Quinn criter. | -3.073190 |
| F-statistic | 15.95767 | Durbin-Watson stat | 2.001755 |
| Prob(F-statistic) | 0.000002 | | |

## UK - PP

Null Hypothesis: C2_UK_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -5.637685 | 0.0001 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.002425 |
| HAC corrected variance (Bartlett kernel) | 0.002414 |

Phillips-Perron Test Equation
Dependent Variable: D(C2_UK_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:35
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_UK_GNSA_SAF(-1) | -0.580700 | 0.102906 | -5.643027 | 0.0000 |
| C | 0.008059 | 0.011507 | 0.700311 | 0.4858 |
| @TREND("1995Q2") | -0.000119 | 0.000245 | -0.485649 | 0.6286 |

| | | | |
|---|---|---|---|
| R-squared | 0.293029 | Mean dependent var | -0.000661 |
| Adjusted R-squared | 0.274666 | S.D. dependent var | 0.058938 |
| S.E. of regression | 0.050196 | Akaike info criterion | -3.109003 |
| Sum squared resid | 0.194008 | Schwarz criterion | -3.019677 |
| Log likelihood | 127.3601 | Hannan-Quinn criter. | -3.073190 |
| F-statistic | 15.95767 | Durbin-Watson stat | 2.001755 |
| Prob(F-statistic) | 0.000002 | | |

## UK - KPSS

Null Hypothesis: C2_UK_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.103694 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.002942 |
| HAC corrected variance (Bartlett kernel) | 0.005297 |

KPSS Test Equation
Dependent Variable: C2_UK_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:36
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.018742 | 0.012094 | 1.549701 | 0.1252 |
| @TREND("1995Q2") | -0.000298 | 0.000261 | -1.142909 | 0.2565 |

| | | | |
|---|---|---|---|
| R-squared | 0.016266 | Mean dependent var | 0.006809 |
| Adjusted R-squared | 0.003813 | S.D. dependent var | 0.055032 |
| S.E. of regression | 0.054927 | Akaike info criterion | -2.941247 |
| Sum squared resid | 0.238340 | Schwarz criterion | -2.882125 |
| Log likelihood | 121.1205 | Hannan-Quinn criter. | -2.917527 |
| F-statistic | 1.306240 | Durbin-Watson stat | 1.151434 |
| Prob(F-statistic) | 0.256528 | | |

## US- DF

Null Hypothesis: C2_US_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.220332 | 0.0003 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(C2_US_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:38
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_US_GNSA_SAF(-1) | -0.517049 | 0.099045 | -5.220332 | 0.0000 |
| C | 0.009685 | 0.012584 | 0.769641 | 0.4439 |
| @TREND("1995Q2") | -7.12E-05 | 0.000266 | -0.267769 | 0.7896 |

| | | | |
|---|---|---|---|
| R-squared | 0.261709 | Mean dependent var | -0.000957 |
| Adjusted R-squared | 0.242533 | S.D. dependent var | 0.062814 |
| S.E. of regression | 0.054669 | Akaike info criterion | -2.938274 |
| Sum squared resid | 0.230127 | Schwarz criterion | -2.848948 |
| Log likelihood | 120.5310 | Hannan-Quinn criter. | -2.902460 |
| F-statistic | 13.64746 | Durbin-Watson stat | 1.939806 |
| Prob(F-statistic) | 0.000008 | | |

## US - PP

Null Hypothesis: C2_US_GNSA_SAF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -5.220332 | 0.0003 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.002877 |
| HAC corrected variance (Bartlett kernel) | 0.002877 |

Phillips-Perron Test Equation
Dependent Variable: D(C2_US_GNSA_SAF)
Method: Least Squares
Date: 12/25/16 Time: 00:38
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C2_US_GNSA_SAF(-1) | -0.517049 | 0.099045 | -5.220332 | 0.0000 |
| C | 0.009685 | 0.012584 | 0.769641 | 0.4439 |
| @TREND("1995Q2") | -7.12E-05 | 0.000266 | -0.267769 | 0.7896 |

| | | | |
|---|---|---|---|
| R-squared | 0.261709 | Mean dependent var | -0.000957 |
| Adjusted R-squared | 0.242533 | S.D. dependent var | 0.062814 |
| S.E. of regression | 0.054669 | Akaike info criterion | -2.938274 |
| Sum squared resid | 0.230127 | Schwarz criterion | -2.848948 |
| Log likelihood | 120.5310 | Hannan-Quinn criter. | -2.902460 |
| F-statistic | 13.64746 | Durbin-Watson stat | 1.939806 |
| Prob(F-statistic) | 0.000008 | | |

## US - KPSS

Null Hypothesis: C2_US_GNSA_SAF is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.153606 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.003761 |
| HAC corrected variance (Bartlett kernel) | 0.007742 |

KPSS Test Equation
Dependent Variable: C2_US_GNSA_SAF
Method: Least Squares
Date: 12/25/16 Time: 00:39
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.024630 | 0.013673 | 1.801362 | 0.0755 |
| @TREND("1995Q2") | -0.000244 | 0.000295 | -0.825124 | 0.4118 |

| | | | |
|---|---|---|---|
| R-squared | 0.008544 | Mean dependent var | 0.014890 |
| Adjusted R-squared | -0.004006 | S.D. dependent var | 0.061976 |
| S.E. of regression | 0.062100 | Akaike info criterion | -2.695762 |
| Sum squared resid | 0.304656 | Schwarz criterion | -2.636640 |
| Log likelihood | 111.1784 | Hannan-Quinn criter. | -2.672042 |
| F-statistic | 0.680829 | Durbin-Watson stat | 1.023263 |
| Prob(F-statistic) | 0.411786 | | |

### 7.3.3 CPI

**China - DF**

Null Hypothesis: CPI_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.275773 | 0.0056 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CPI_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:40
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_CHINA_SARG(-1) | -0.328866 | 0.076914 | -4.275773 | 0.0001 |
| C | 0.000790 | 0.001340 | 0.589103 | 0.5575 |
| @TREND("1995Q2") | 2.21E-05 | 2.71E-05 | 0.813158 | 0.4186 |

| | | | |
|---|---|---|---|
| R-squared | 0.196754 | Mean dependent var | -0.00026 |
| Adjusted R-squared | 0.175890 | S.D. dependent var | 0.00617 |
| S.E. of regression | 0.005604 | Akaike info criterion | -7.49390 |
| Sum squared resid | 0.002418 | Schwarz criterion | -7.40457 |
| Log likelihood | 302.7560 | Hannan-Quinn criter. | -7.45808 |
| F-statistic | 9.430495 | Durbin-Watson stat | 2.24779 |
| Prob(F-statistic) | 0.000217 | | |

**China - PP**

Null Hypothesis: CPI_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -4.211796 | 0.0067 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 3.02E-05 |
| HAC corrected variance (Bartlett kernel) | 2.80E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(CPI_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:41
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_CHINA_SARG(-1) | -0.328866 | 0.076914 | -4.275773 | 0.0001 |
| C | 0.000790 | 0.001340 | 0.589103 | 0.5575 |
| @TREND("1995Q2") | 2.21E-05 | 2.71E-05 | 0.813158 | 0.4186 |

| | | | |
|---|---|---|---|
| R-squared | 0.196754 | Mean dependent var | -0.000269 |
| Adjusted R-squared | 0.175890 | S.D. dependent var | 0.006173 |
| S.E. of regression | 0.005604 | Akaike info criterion | -7.493900 |
| Sum squared resid | 0.002418 | Schwarz criterion | -7.404574 |
| Log likelihood | 302.7560 | Hannan-Quinn criter. | -7.458086 |
| F-statistic | 9.430495 | Durbin-Watson stat | 2.247792 |
| Prob(F-statistic) | 0.000217 | | |

**China - KPSS**

Null Hypothesis: CPI_CHINA_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.101703 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 6.55E-05 |
| HAC corrected variance (Bartlett kernel) | 0.000219 |

KPSS Test Equation
Dependent Variable: CPI_CHINA_SARG
Method: Least Squares
Date: 12/25/16 Time: 00:42
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.005766 | 0.001805 | 3.194745 | 0.0020 |
| @TREND("1995Q2") | 4.27E-06 | 3.90E-05 | 0.109730 | 0.9129 |

| | | | |
|---|---|---|---|
| R-squared | 0.000152 | Mean dependent var | 0.005937 |
| Adjusted R-squared | -0.012504 | S.D. dependent var | 0.008147 |
| S.E. of regression | 0.008197 | Akaike info criterion | -6.745604 |
| Sum squared resid | 0.005309 | Schwarz criterion | -6.686482 |
| Log likelihood | 275.1970 | Hannan-Quinn criter. | -6.721883 |
| F-statistic | 0.012041 | Durbin-Watson stat | 0.568212 |
| Prob(F-statistic) | 0.912902 | | |

## EA - DF

Null Hypothesis: CPI_EA_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.637419 | 0.0001 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CPI_EA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:42
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_EA_SARG(-1) | -0.588042 | 0.104311 | -5.637419 | 0.0000 |
| C | 0.003195 | 0.000841 | 3.798683 | 0.0003 |
| @TREND("1995Q2") | -1.22E-05 | 1.32E-05 | -0.922355 | 0.3592 |

| | | | |
|---|---|---|---|
| R-squared | 0.292365 | Mean dependent var | 1.28E-06 |
| Adjusted R-squared | 0.273984 | S.D. dependent var | 0.003150 |
| S.E. of regression | 0.002684 | Akaike info criterion | -8.966196 |
| Sum squared resid | 0.000555 | Schwarz criterion | -8.876870 |
| Log likelihood | 361.6478 | Hannan-Quinn criter. | -8.930383 |
| F-statistic | 15.90654 | Durbin-Watson stat | 2.021710 |
| Prob(F-statistic) | 0.000002 | | |

## EA - PP

Null Hypothesis: CPI_EA_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -5.762337 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 6.93E-06 |
| HAC corrected variance (Bartlett kernel) | 7.61E-06 |

Phillips-Perron Test Equation
Dependent Variable: D(CPI_EA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:43
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_EA_SARG(-1) | -0.588042 | 0.104311 | -5.637419 | 0.0000 |
| C | 0.003195 | 0.000841 | 3.798683 | 0.0003 |
| @TREND("1995Q2") | -1.22E-05 | 1.32E-05 | -0.922355 | 0.3592 |

| | | | |
|---|---|---|---|
| R-squared | 0.292365 | Mean dependent var | 1.28E-06 |
| Adjusted R-squared | 0.273984 | S.D. dependent var | 0.003150 |
| S.E. of regression | 0.002684 | Akaike info criterion | -8.966196 |
| Sum squared resid | 0.000555 | Schwarz criterion | -8.876870 |
| Log likelihood | 361.6478 | Hannan-Quinn criter. | -8.930383 |
| F-statistic | 15.90654 | Durbin-Watson stat | 2.021710 |
| Prob(F-statistic) | 0.000002 | | |

## EA - KPSS

Null Hypothesis: CPI_EA_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.115649 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 8.24E-06 |
| HAC corrected variance (Bartlett kernel) | 1.80E-05 |

KPSS Test Equation
Dependent Variable: CPI_EA_SARG
Method: Least Squares
Date: 12/25/16 Time: 00:44
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.005513 | 0.000640 | 8.615642 | 0.000 |
| @TREND("1995Q2") | -2.27E-05 | 1.38E-05 | -1.642895 | 0.104 |

| | | | |
|---|---|---|---|
| R-squared | 0.033037 | Mean dependent var | 0.00460 |
| Adjusted R-squared | 0.020797 | S.D. dependent var | 0.00293 |
| S.E. of regression | 0.002906 | Akaike info criterion | -8.81966 |
| Sum squared resid | 0.000667 | Schwarz criterion | -8.76053 |
| Log likelihood | 359.1963 | Hannan-Quinn criter. | -8.79594 |
| F-statistic | 2.699106 | Durbin-Watson stat | 1.17504 |
| Prob(F-statistic) | 0.104379 | | |

## JAPAN - DF

Null Hypothesis: CPI_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.172819 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CPI_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:46
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_JP_SARG(-1) | -0.796716 | 0.111074 | -7.172819 | 0.0000 |
| C | -0.000264 | 0.000973 | -0.271563 | 0.7867 |
| @TREND("1995Q2") | 1.36E-05 | 2.09E-05 | 0.647605 | 0.5192 |

| | | | |
|---|---|---|---|
| R-squared | 0.400585 | Mean dependent var | 9.47E-05 |
| Adjusted R-squared | 0.385016 | S.D. dependent var | 0.005484 |
| S.E. of regression | 0.004301 | Akaike info criterion | -8.023200 |
| Sum squared resid | 0.001424 | Schwarz criterion | -7.933874 |
| Log likelihood | 323.9280 | Hannan-Quinn criter. | -7.987387 |
| F-statistic | 25.72930 | Durbin-Watson stat | 2.015293 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - PP

Null Hypothesis: CPI_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.300129 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 1.78E-05 |
| HAC corrected variance (Bartlett kernel) | 2.05E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(CPI_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:47
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_JP_SARG(-1) | -0.796716 | 0.111074 | -7.172819 | 0.0000 |
| C | -0.000264 | 0.000973 | -0.271563 | 0.7867 |
| @TREND("1995Q2") | 1.36E-05 | 2.09E-05 | 0.647605 | 0.5192 |

| | | | |
|---|---|---|---|
| R-squared | 0.400585 | Mean dependent var | 9.47E-05 |
| Adjusted R-squared | 0.385016 | S.D. dependent var | 0.005484 |
| S.E. of regression | 0.004301 | Akaike info criterion | -8.023200 |
| Sum squared resid | 0.001424 | Schwarz criterion | -7.933874 |
| Log likelihood | 323.9280 | Hannan-Quinn criter. | -7.987387 |
| F-statistic | 25.72930 | Durbin-Watson stat | 2.015293 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - KPSS

Null Hypothesis: CPI_JP_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.109804 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 1.86E-05 |
| HAC corrected variance (Bartlett kernel) | 2.95E-05 |

KPSS Test Equation
Dependent Variable: CPI_JP_SARG
Method: Least Squares
Date: 12/25/16 Time: 00:48
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.000580 | 0.000960 | -0.603685 | 0.5478 |
| @TREND("1995Q2") | 2.13E-05 | 2.07E-05 | 1.028444 | 0.3069 |

| | | | |
|---|---|---|---|
| R-squared | 0.013212 | Mean dependent var | 0.000273 |
| Adjusted R-squared | 0.000721 | S.D. dependent var | 0.004363 |
| S.E. of regression | 0.004362 | Akaike info criterion | -8.007460 |
| Sum squared resid | 0.001503 | Schwarz criterion | -7.948338 |
| Log likelihood | 326.3021 | Hannan-Quinn criter. | -7.983739 |
| F-statistic | 1.057696 | Durbin-Watson stat | 1.581229 |
| Prob(F-statistic) | 0.306880 | | |

## UK - DF

Null Hypothesis: CPI_UK_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.347962 | 0.0002 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CPI_UK_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:49
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_UK_SARG(-1) | -0.537193 | 0.100448 | -5.347962 | 0.0000 |
| C | 0.001959 | 0.000801 | 2.445439 | 0.0168 |
| @TREND("1995Q2") | 1.72E-05 | 1.53E-05 | 1.122205 | 0.2653 |

| | | | |
|---|---|---|---|
| R-squared | 0.270865 | Mean dependent var | -7.62E-05 |
| Adjusted R-squared | 0.251926 | S.D. dependent var | 0.003591 |
| S.E. of regression | 0.003106 | Akaike info criterion | -8.674255 |
| Sum squared resid | 0.000743 | Schwarz criterion | -8.584929 |
| Log likelihood | 349.9702 | Hannan-Quinn criter. | -8.638442 |
| F-statistic | 14.30227 | Durbin-Watson stat | 1.954040 |
| Prob(F-statistic) | 0.000005 | | |

## UK - PP

Null Hypothesis: CPI_UK_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -5.375466 | 0.0001 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 9.28E-06 |
| HAC corrected variance (Bartlett kernel) | 9.49E-06 |

Phillips-Perron Test Equation
Dependent Variable: D(CPI_UK_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:50
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_UK_SARG(-1) | -0.537193 | 0.100448 | -5.347962 | 0.0000 |
| C | 0.001959 | 0.000801 | 2.445439 | 0.0168 |
| @TREND("1995Q2") | 1.72E-05 | 1.53E-05 | 1.122205 | 0.2653 |

| | | | |
|---|---|---|---|
| R-squared | 0.270865 | Mean dependent var | -7.62E-05 |
| Adjusted R-squared | 0.251926 | S.D. dependent var | 0.003591 |
| S.E. of regression | 0.003106 | Akaike info criterion | -8.674255 |
| Sum squared resid | 0.000743 | Schwarz criterion | -8.584929 |
| Log likelihood | 349.9702 | Hannan-Quinn criter. | -8.638442 |
| F-statistic | 14.30227 | Durbin-Watson stat | 1.954040 |
| Prob(F-statistic) | 0.000005 | | |

## UK - KPSS

Null Hypothesis: CPI_UK_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.163600 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 1.20E-05 |
| HAC corrected variance (Bartlett kernel) | 2.51E-05 |

KPSS Test Equation
Dependent Variable: CPI_UK_SARG
Method: Least Squares
Date: 12/25/16 Time: 00:50
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.003980 | 0.000772 | 5.158685 | 0.0000 |
| @TREND("1995Q2") | 2.69E-05 | 1.67E-05 | 1.613596 | 0.1106 |

| | | | |
|---|---|---|---|
| R-squared | 0.031907 | Mean dependent var | 0.005055 |
| Adjusted R-squared | 0.019652 | S.D. dependent var | 0.003539 |
| S.E. of regression | 0.003504 | Akaike info criterion | -8.445471 |
| Sum squared resid | 0.000970 | Schwarz criterion | -8.386349 |
| Log likelihood | 344.0416 | Hannan-Quinn criter. | -8.421751 |
| F-statistic | 2.603693 | Durbin-Watson stat | 1.051173 |
| Prob(F-statistic) | 0.110603 | | |

## US- DF

Null Hypothesis: CPI_US_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.819047 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CPI_US_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:54
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_US_SARG(-1) | -0.755325 | 0.110767 | -6.819047 | 0.0000 |
| C | 0.005337 | 0.001371 | 3.892716 | 0.0002 |
| @TREND("1995Q2") | -2.77E-05 | 2.43E-05 | -1.139027 | 0.2582 |

| | | | |
|---|---|---|---|
| R-squared | 0.376588 | Mean dependent var | -1.68E-06 |
| Adjusted R-squared | 0.360395 | S.D. dependent var | 0.006168 |
| S.E. of regression | 0.004933 | Akaike info criterion | -7.748946 |
| Sum squared resid | 0.001874 | Schwarz criterion | -7.659620 |
| Log likelihood | 312.9578 | Hannan-Quinn criter. | -7.713133 |
| F-statistic | 23.25691 | Durbin-Watson stat | 1.912465 |
| Prob(F-statistic) | 0.000000 | | |

## US - PP

Null Hypothesis: CPI_US_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -6.604556 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 2.34E-05 |
| HAC corrected variance (Bartlett kernel) | 1.70E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(CPI_US_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:55
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CPI_US_SARG(-1) | -0.755325 | 0.110767 | -6.819047 | 0.0000 |
| C | 0.005337 | 0.001371 | 3.892716 | 0.0002 |
| @TREND("1995Q2") | -2.77E-05 | 2.43E-05 | -1.139027 | 0.2582 |

| | | | |
|---|---|---|---|
| R-squared | 0.376588 | Mean dependent var | -1.68E-06 |
| Adjusted R-squared | 0.360395 | S.D. dependent var | 0.006168 |
| S.E. of regression | 0.004933 | Akaike info criterion | -7.748946 |
| Sum squared resid | 0.001874 | Schwarz criterion | -7.659620 |
| Log likelihood | 312.9578 | Hannan-Quinn criter. | -7.713133 |
| F-statistic | 23.25691 | Durbin-Watson stat | 1.912465 |
| Prob(F-statistic) | 0.000000 | | |

## US - KPSS

Null Hypothesis: CPI_US_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.081050 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 2.46E-05 |
| HAC corrected variance (Bartlett kernel) | 3.15E-05 |

KPSS Test Equation
Dependent Variable: CPI_US_SARG
Method: Least Squares
Date: 12/25/16 Time: 00:53
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.007108 | 0.001106 | 6.427849 | 0.0000 |
| @TREND("1995Q2") | -3.76E-05 | 2.39E-05 | -1.577183 | 0.1187 |

| | | | |
|---|---|---|---|
| R-squared | 0.030526 | Mean dependent var | 0.005602 |
| Adjusted R-squared | 0.018254 | S.D. dependent var | 0.005069 |
| S.E. of regression | 0.005022 | Akaike info criterion | -7.725542 |
| Sum squared resid | 0.001993 | Schwarz criterion | -7.666420 |
| Log likelihood | 314.8845 | Hannan-Quinn criter. | -7.701822 |
| F-statistic | 2.487505 | Durbin-Watson stat | 1.508534 |
| Prob(F-statistic) | 0.118750 | | |

### 7.3.4 GDP

**China - DF**

Null Hypothesis: GDP_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.451034 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:57
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_CHINA_SARG(-1) | -0.656419 | 0.101754 | -6.451034 | 0.000 |
| C | 0.023712 | 0.004358 | 5.441313 | 0.000 |
| @TREND("1995Q2") | -5.04E-05 | 4.42E-05 | -1.140443 | 0.257 |

| | | | |
|---|---|---|---|
| R-squared | 0.351967 | Mean dependent var | -0.00048 |
| Adjusted R-squared | 0.335135 | S.D. dependent var | 0.01085 |
| S.E. of regression | 0.008853 | Akaike info criterion | -6.57932 |
| Sum squared resid | 0.006035 | Schwarz criterion | -6.48999 |
| Log likelihood | 266.1730 | Hannan-Quinn criter. | -6.54351 |
| F-statistic | 20.91052 | Durbin-Watson stat | 2.00757 |
| Prob(F-statistic) | 0.000000 | | |

**China - PP**

Null Hypothesis: GDP_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -6.448001 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 7.54E-05 |
| HAC corrected variance (Bartlett kernel) | 7.51E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GDP_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 00:57
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_CHINA_SARG(-1) | -0.656419 | 0.101754 | -6.451034 | 0.000 |
| C | 0.023712 | 0.004358 | 5.441313 | 0.000 |
| @TREND("1995Q2") | -5.04E-05 | 4.42E-05 | -1.140443 | 0.257 |

| | | | |
|---|---|---|---|
| R-squared | 0.351967 | Mean dependent var | -0.00048 |
| Adjusted R-squared | 0.335135 | S.D. dependent var | 0.01085 |
| S.E. of regression | 0.008853 | Akaike info criterion | -6.57932 |
| Sum squared resid | 0.006035 | Schwarz criterion | -6.48999 |
| Log likelihood | 266.1730 | Hannan-Quinn criter. | -6.54351 |
| F-statistic | 20.91052 | Durbin-Watson stat | 2.00757 |
| Prob(F-statistic) | 0.000000 | | |

**China - KPSS**

Null Hypothesis: GDP_CHINA_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.240592 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 9.37E-05 |
| HAC corrected variance (Bartlett kernel) | 0.000178 |

KPSS Test Equation
Dependent Variable: GDP_CHINA_SARG
Method: Least Squares
Date: 12/25/16 Time: 00:58
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.038069 | 0.002159 | 17.63594 | 0.000 |
| @TREND("1995Q2") | -0.000111 | 4.66E-05 | -2.379060 | 0.019 |

| | | | |
|---|---|---|---|
| R-squared | 0.066855 | Mean dependent var | 0.03363 |
| Adjusted R-squared | 0.055043 | S.D. dependent var | 0.01008 |
| S.E. of regression | 0.009804 | Akaike info criterion | -6.38773 |
| Sum squared resid | 0.007593 | Schwarz criterion | -6.32861 |
| Log likelihood | 260.7031 | Hannan-Quinn criter. | -6.36401 |
| F-statistic | 5.659925 | Durbin-Watson stat | 1.22798 |
| Prob(F-statistic) | 0.019770 | | |

## EA - DF

Null Hypothesis: GDP_EU_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.398266 | 0.0038 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP_EU_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:03
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_EU_SARG(-1) | -0.403563 | 0.091755 | -4.398266 | 0.000 |
| C | 0.004630 | 0.001587 | 2.916974 | 0.004 |
| @TREND("1995Q2") | -4.07E-05 | 2.63E-05 | -1.547782 | 0.125 |

| | | | |
|---|---|---|---|
| R-squared | 0.201160 | Mean dependent var | -8.40E-0 |
| Adjusted R-squared | 0.180411 | S.D. dependent var | 0.00550 |
| S.E. of regression | 0.004988 | Akaike info criterion | -7.72686 |
| Sum squared resid | 0.001916 | Schwarz criterion | -7.63754 |
| Log likelihood | 312.0746 | Hannan-Quinn criter. | -7.69105 |
| F-statistic | 9.694899 | Durbin-Watson stat | 2.01181 |
| Prob(F-statistic) | 0.000176 | | |

## EA - PP

Null Hypothesis: GDP_EU_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -4.398266 | 0.0038 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 2.39E-05 |
| HAC corrected variance (Bartlett kernel) | 2.39E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GDP_EU_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:04
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_EU_SARG(-1) | -0.403563 | 0.091755 | -4.398266 | 0.000 |
| C | 0.004630 | 0.001587 | 2.916974 | 0.004 |
| @TREND("1995Q2") | -4.07E-05 | 2.63E-05 | -1.547782 | 0.125 |

| | | | |
|---|---|---|---|
| R-squared | 0.201160 | Mean dependent var | -8.40E-0 |
| Adjusted R-squared | 0.180411 | S.D. dependent var | 0.00550 |
| S.E. of regression | 0.004988 | Akaike info criterion | -7.72686 |
| Sum squared resid | 0.001916 | Schwarz criterion | -7.63754 |
| Log likelihood | 312.0746 | Hannan-Quinn criter. | -7.69105 |
| F-statistic | 9.694899 | Durbin-Watson stat | 2.01181 |
| Prob(F-statistic) | 0.000176 | | |

## EA - KPSS

Null Hypothesis: GDP_EU_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.06053 |
| Asymptotic critical values*: | 1% level | 0.21600 |
| | 5% level | 0.14600 |
| | 10% level | 0.11900 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 3.67E-0 |
| HAC corrected variance (Bartlett kernel) | 9.53E-0 |

KPSS Test Equation
Dependent Variable: GDP_EU_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:05
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob |
|---|---|---|---|---|
| C | 0.011989 | 0.001350 | 8.881205 | 0.000 |
| @TREND("1995Q2") | -0.000110 | 2.91E-05 | -3.776131 | 0.000 |

| | | | |
|---|---|---|---|
| R-squared | 0.152898 | Mean dependent var | 0.0075 |
| Adjusted R-squared | 0.142175 | S.D. dependent var | 0.0066 |
| S.E. of regression | 0.006131 | Akaike info criterion | -7.3264 |
| Sum squared resid | 0.002970 | Schwarz criterion | -7.2673 |
| Log likelihood | 298.7224 | Hannan-Quinn criter. | -7.3027 |
| F-statistic | 14.25917 | Durbin-Watson stat | 0.8075 |
| Prob(F-statistic) | 0.000307 | | |

## JAPAN - DF

Null Hypothesis: GDP_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.345658 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:07
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_JP_SARG(-1) | -0.814346 | 0.110861 | -7.345658 | 0.0000 |
| C | -0.000344 | 0.002244 | -0.153426 | 0.8785 |
| @TREND("1995Q2") | 6.80E-06 | 4.81E-05 | 0.141372 | 0.8879 |

| | | | |
|---|---|---|---|
| R-squared | 0.412233 | Mean dependent var | -0.000175 |
| Adjusted R-squared | 0.396966 | S.D. dependent var | 0.012798 |
| S.E. of regression | 0.009939 | Akaike info criterion | -6.347986 |
| Sum squared resid | 0.007606 | Schwarz criterion | -6.258660 |
| Log likelihood | 256.9194 | Hannan-Quinn criter. | -6.312173 |
| F-statistic | 27.00210 | Durbin-Watson stat | 2.018392 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - PP

Null Hypothesis: GDP_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.351195 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 9.51E-05 |
| HAC corrected variance (Bartlett kernel) | 9.58E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GDP_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:08
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_JP_SARG(-1) | -0.814346 | 0.110861 | -7.345658 | 0.0000 |
| C | -0.000344 | 0.002244 | -0.153426 | 0.8785 |
| @TREND("1995Q2") | 6.80E-06 | 4.81E-05 | 0.141372 | 0.8879 |

| | | | |
|---|---|---|---|
| R-squared | 0.412233 | Mean dependent var | -0.000175 |
| Adjusted R-squared | 0.396966 | S.D. dependent var | 0.012798 |
| S.E. of regression | 0.009939 | Akaike info criterion | -6.347986 |
| Sum squared resid | 0.007606 | Schwarz criterion | -6.258660 |
| Log likelihood | 256.9194 | Hannan-Quinn criter. | -6.312173 |
| F-statistic | 27.00210 | Durbin-Watson stat | 2.018392 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - KPSS

Null Hypothesis: GDP_JP_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.101783 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 9.92E-05 |
| HAC corrected variance (Bartlett kernel) | 0.000118 |

KPSS Test Equation
Dependent Variable: GDP_JP_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:08
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000333 | 0.002221 | 0.150059 | 0.8811 |
| @TREND("1995Q2") | -5.56E-06 | 4.79E-05 | -0.116037 | 0.9079 |

| | | | |
|---|---|---|---|
| R-squared | 0.000170 | Mean dependent var | 0.000111 |
| Adjusted R-squared | -0.012486 | S.D. dependent var | 0.010025 |
| S.E. of regression | 0.010088 | Akaike info criterion | -6.330622 |
| Sum squared resid | 0.008039 | Schwarz criterion | -6.271499 |
| Log likelihood | 258.3902 | Hannan-Quinn criter. | -6.306901 |
| F-statistic | 0.013464 | Durbin-Watson stat | 1.609942 |
| Prob(F-statistic) | 0.907918 | | |

## UK - DF

Null Hypothesis: GDP_UK_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.287852 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP_UK_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:10
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_UK_SARG(-1) | -0.816384 | 0.112020 | -7.287852 | 0.0000 |
| C | 0.012130 | 0.002460 | 4.930252 | 0.0000 |
| @TREND("1995Q2") | -7.75E-05 | 4.02E-05 | -1.928248 | 0.0575 |

| | | | |
|---|---|---|---|
| R-squared | 0.408206 | Mean dependent var | -3.83E-05 |
| Adjusted R-squared | 0.392834 | S.D. dependent var | 0.010276 |
| S.E. of regression | 0.008007 | Akaike info criterion | -6.780239 |
| Sum squared resid | 0.004937 | Schwarz criterion | -6.690913 |
| Log likelihood | 274.2095 | Hannan-Quinn criter. | -6.744425 |
| F-statistic | 26.55640 | Durbin-Watson stat | 2.032298 |
| Prob(F-statistic) | 0.000000 | | |

## UK - PP

Null Hypothesis: GDP_UK_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.323102 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 6.17E-05 |
| HAC corrected variance (Bartlett kernel) | 6.45E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GDP_UK_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:11
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_UK_SARG(-1) | -0.816384 | 0.112020 | -7.287852 | 0.0000 |
| C | 0.012130 | 0.002460 | 4.930252 | 0.0000 |
| @TREND("1995Q2") | -7.75E-05 | 4.02E-05 | -1.928248 | 0.0575 |

| | | | |
|---|---|---|---|
| R-squared | 0.408206 | Mean dependent var | -3.83E-05 |
| Adjusted R-squared | 0.392834 | S.D. dependent var | 0.010276 |
| S.E. of regression | 0.008007 | Akaike info criterion | -6.780239 |
| Sum squared resid | 0.004937 | Schwarz criterion | -6.690913 |
| Log likelihood | 274.2095 | Hannan-Quinn criter. | -6.744425 |
| F-statistic | 26.55640 | Durbin-Watson stat | 2.032298 |
| Prob(F-statistic) | 0.000000 | | |

## UK - KPSS

Null Hypothesis: GDP_UK_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.057735 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 6.31E-05 |
| HAC corrected variance (Bartlett kernel) | 9.06E-05 |

KPSS Test Equation
Dependent Variable: GDP_UK_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:12
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.014753 | 0.001772 | 8.328133 | 0.0000 |
| @TREND("1995Q2") | -9.28E-05 | 3.82E-05 | -2.427824 | 0.0175 |

| | | | |
|---|---|---|---|
| R-squared | 0.069431 | Mean dependent var | 0.011040 |
| Adjusted R-squared | 0.057652 | S.D. dependent var | 0.008288 |
| S.E. of regression | 0.008046 | Akaike info criterion | -6.782973 |
| Sum squared resid | 0.005114 | Schwarz criterion | -6.723851 |
| Log likelihood | 276.7104 | Hannan-Quinn criter. | -6.759252 |
| F-statistic | 5.894329 | Durbin-Watson stat | 1.631205 |
| Prob(F-statistic) | 0.017464 | | |

## US- DF

Null Hypothesis: GDP_US_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.716020 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP_US_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:13
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_US_SARG(-1) | -0.598962 | 0.104786 | -5.716020 | 0.000 |
| C | 0.008998 | 0.002087 | 4.311115 | 0.000 |
| @TREND("1995Q2") | -6.17E-05 | 3.15E-05 | -1.956156 | 0.054 |

| | | | |
|---|---|---|---|
| R-squared | 0.297925 | Mean dependent var | 8.85E-0 |
| Adjusted R-squared | 0.279689 | S.D. dependent var | 0.00719 |
| S.E. of regression | 0.006103 | Akaike info criterion | -7.32323 |
| Sum squared resid | 0.002868 | Schwarz criterion | -7.23390 |
| Log likelihood | 295.9294 | Hannan-Quinn criter. | -7.28742 |
| F-statistic | 16.33741 | Durbin-Watson stat | 2.11924 |
| Prob(F-statistic) | 0.000001 | | |

## US - PP

Null Hypothesis: GDP_US_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -5.796905 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 3.59E-05 |
| HAC corrected variance (Bartlett kernel) | 3.82E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GDP_US_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:14
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GDP_US_SARG(-1) | -0.598962 | 0.104786 | -5.716020 | 0.0000 |
| C | 0.008998 | 0.002087 | 4.311115 | 0.0000 |
| @TREND("1995Q2") | -6.17E-05 | 3.15E-05 | -1.956156 | 0.0541 |

| | | | |
|---|---|---|---|
| R-squared | 0.297925 | Mean dependent var | 8.85E-05 |
| Adjusted R-squared | 0.279689 | S.D. dependent var | 0.007191 |
| S.E. of regression | 0.006103 | Akaike info criterion | -7.323234 |
| Sum squared resid | 0.002868 | Schwarz criterion | -7.233908 |
| Log likelihood | 295.9294 | Hannan-Quinn criter. | -7.287421 |
| F-statistic | 16.33741 | Durbin-Watson stat | 2.119244 |
| Prob(F-statistic) | 0.000001 | | |

## US - KPSS

Null Hypothesis: GDP_US_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.063924 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 4.27E-05 |
| HAC corrected variance (Bartlett kernel) | 0.000103 |

KPSS Test Equation
Dependent Variable: GDP_US_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:16
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.014654 | 0.001458 | 10.05403 | 0.0000 |
| @TREND("1995Q2") | -9.75E-05 | 3.15E-05 | -3.097958 | 0.0027 |

| | | | |
|---|---|---|---|
| R-squared | 0.108325 | Mean dependent var | 0.010756 |
| Adjusted R-squared | 0.097038 | S.D. dependent var | 0.006966 |
| S.E. of regression | 0.006620 | Akaike info criterion | -7.173181 |
| Sum squared resid | 0.003462 | Schwarz criterion | -7.114059 |
| Log likelihood | 292.5138 | Hannan-Quinn criter. | -7.149461 |
| F-statistic | 9.597345 | Durbin-Watson stat | 1.180926 |
| Prob(F-statistic) | 0.002698 | | |

### 7.3.5 GOV

**China - DF**

Null Hypothesis: GOV_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -9.206949 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GOV_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:17
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_CHINA_SARG(-1) | -1.030824 | 0.111962 | -9.206949 | 0.0000 |
| C | 0.199793 | 0.024916 | 8.018621 | 0.0000 |
| @TREND("1995Q2") | -0.001079 | 0.000297 | -3.637620 | 0.0005 |

| | | | |
|---|---|---|---|
| R-squared | 0.524131 | Mean dependent var | 0.000803 |
| Adjusted R-squared | 0.511771 | S.D. dependent var | 0.081263 |
| S.E. of regression | 0.056781 | Akaike info criterion | -2.862448 |
| Sum squared resid | 0.248255 | Schwarz criterion | -2.773122 |
| Log likelihood | 117.4979 | Hannan-Quinn criter. | -2.826634 |
| F-statistic | 42.40465 | Durbin-Watson stat | 2.017256 |
| Prob(F-statistic) | 0.000000 | | |

**China - PP**

Null Hypothesis: GOV_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -9.235874 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.003103 |
| HAC corrected variance (Bartlett kernel) | 0.004082 |

Phillips-Perron Test Equation
Dependent Variable: D(GOV_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:18
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_CHINA_SARG(-1) | -1.030824 | 0.111962 | -9.206949 | 0.0000 |
| C | 0.199793 | 0.024916 | 8.018621 | 0.0000 |
| @TREND("1995Q2") | -0.001079 | 0.000297 | -3.637620 | 0.0005 |

| | | | |
|---|---|---|---|
| R-squared | 0.524131 | Mean dependent var | 0.000803 |
| Adjusted R-squared | 0.511771 | S.D. dependent var | 0.081263 |
| S.E. of regression | 0.056781 | Akaike info criterion | -2.862448 |
| Sum squared resid | 0.248255 | Schwarz criterion | -2.773122 |
| Log likelihood | 117.4979 | Hannan-Quinn criter. | -2.826634 |
| F-statistic | 42.40465 | Durbin-Watson stat | 2.017256 |
| Prob(F-statistic) | 0.000000 | | |

**China - KPSS**

Null Hypothesis: GOV_CHINA_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.223163 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.003197 |
| HAC corrected variance (Bartlett kernel) | 0.004125 |

KPSS Test Equation
Dependent Variable: GOV_CHINA_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:18
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.188830 | 0.012606 | 14.97958 | 0.0000 |
| @TREND("1995Q2") | -0.000953 | 0.000272 | -3.503877 | 0.0008 |

| | | | |
|---|---|---|---|
| R-squared | 0.134504 | Mean dependent var | 0.150697 |
| Adjusted R-squared | 0.123549 | S.D. dependent var | 0.061155 |
| S.E. of regression | 0.057252 | Akaike info criterion | -2.858315 |
| Sum squared resid | 0.258949 | Schwarz criterion | -2.799193 |
| Log likelihood | 117.7618 | Hannan-Quinn criter. | -2.834595 |
| F-statistic | 12.27716 | Durbin-Watson stat | 2.015594 |
| Prob(F-statistic) | 0.000758 | | |

## EA - DF

Null Hypothesis: GOV_EA_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.567744 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GOV_EA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:19
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_EA_SARG(-1) | -0.852096 | 0.112596 | -7.567744 | 0.0000 |
| C | 0.005480 | 0.001623 | 3.377150 | 0.0012 |
| @TREND("1995Q2") | -5.95E-05 | 3.19E-05 | -1.863276 | 0.0662 |

| | | | |
|---|---|---|---|
| R-squared | 0.426542 | Mean dependent var | -0.000119 |
| Adjusted R-squared | 0.411647 | S.D. dependent var | 0.008317 |
| S.E. of regression | 0.006379 | Akaike info criterion | -7.234710 |
| Sum squared resid | 0.003134 | Schwarz criterion | -7.145384 |
| Log likelihood | 292.3884 | Hannan-Quinn criter. | -7.198897 |
| F-statistic | 28.63655 | Durbin-Watson stat | 2.053588 |
| Prob(F-statistic) | 0.000000 | | |

## EA - PP

Null Hypothesis: GOV_EA_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.908189 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 3.92E-05 |
| HAC corrected variance (Bartlett kernel) | 5.56E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GOV_EA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:20
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_EA_SARG(-1) | -0.852096 | 0.112596 | -7.567744 | 0.0000 |
| C | 0.005480 | 0.001623 | 3.377150 | 0.0012 |
| @TREND("1995Q2") | -5.95E-05 | 3.19E-05 | -1.863276 | 0.0662 |

| | | | |
|---|---|---|---|
| R-squared | 0.426542 | Mean dependent var | -0.000119 |
| Adjusted R-squared | 0.411647 | S.D. dependent var | 0.008317 |
| S.E. of regression | 0.006379 | Akaike info criterion | -7.234710 |
| Sum squared resid | 0.003134 | Schwarz criterion | -7.145384 |
| Log likelihood | 292.3884 | Hannan-Quinn criter. | -7.198897 |
| F-statistic | 28.63655 | Durbin-Watson stat | 2.053588 |
| Prob(F-statistic) | 0.000000 | | |

## EA - KPSS

Null Hypothesis: GOV_EA_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.079740 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 3.96E-05 |
| HAC corrected variance (Bartlett kernel) | 7.34E-05 |

KPSS Test Equation
Dependent Variable: GOV_EA_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:21
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.006598 | 0.001404 | 4.699836 | 0.0000 |
| @TREND("1995Q2") | -7.26E-05 | 3.03E-05 | -2.395644 | 0.0190 |

| | | | |
|---|---|---|---|
| R-squared | 0.067727 | Mean dependent var | 0.003694 |
| Adjusted R-squared | 0.055926 | S.D. dependent var | 0.006562 |
| S.E. of regression | 0.006376 | Akaike info criterion | -7.248271 |
| Sum squared resid | 0.003211 | Schwarz criterion | -7.189148 |
| Log likelihood | 295.5550 | Hannan-Quinn criter. | -7.224550 |
| F-statistic | 5.739108 | Durbin-Watson stat | 1.701692 |
| Prob(F-statistic) | 0.018957 | | |

## JAPAN - DF

Null Hypothesis: GOV_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -8.152868 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GOV_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:21
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_JP_SARG(-1) | -0.924315 | 0.113373 | -8.152868 | 0.0000 |
| C | 0.005971 | 0.001996 | 2.991534 | 0.0037 |
| @TREND("1995Q2") | -6.91E-05 | 4.04E-05 | -1.707412 | 0.0918 |

| | | | |
|---|---|---|---|
| R-squared | 0.463541 | Mean dependent var | -0.000108 |
| Adjusted R-squared | 0.449607 | S.D. dependent var | 0.010932 |
| S.E. of regression | 0.008110 | Akaike info criterion | -6.754637 |
| Sum squared resid | 0.005065 | Schwarz criterion | -6.665311 |
| Log likelihood | 273.1855 | Hannan-Quinn criter. | -6.718824 |
| F-statistic | 33.26695 | Durbin-Watson stat | 1.997327 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - PP

Null Hypothesis: GOV_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -8.181247 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 6.33E-05 |
| HAC corrected variance (Bartlett kernel) | 6.75E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GOV_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:22
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_JP_SARG(-1) | -0.924315 | 0.113373 | -8.152868 | 0.0000 |
| C | 0.005971 | 0.001996 | 2.991534 | 0.0037 |
| @TREND("1995Q2") | -6.91E-05 | 4.04E-05 | -1.707412 | 0.0918 |

| | | | |
|---|---|---|---|
| R-squared | 0.463541 | Mean dependent var | -0.000108 |
| Adjusted R-squared | 0.449607 | S.D. dependent var | 0.010932 |
| S.E. of regression | 0.008110 | Akaike info criterion | -6.754637 |
| Sum squared resid | 0.005065 | Schwarz criterion | -6.665311 |
| Log likelihood | 273.1855 | Hannan-Quinn criter. | -6.718824 |
| F-statistic | 33.26695 | Durbin-Watson stat | 1.997327 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - KPSS

Null Hypothesis: GOV_JP_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.061468 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 6.34E-05 |
| HAC corrected variance (Bartlett kernel) | 7.81E-05 |

KPSS Test Equation
Dependent Variable: GOV_JP_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:23
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.006823 | 0.001775 | 3.843401 | 0.0002 |
| @TREND("1995Q2") | -8.15E-05 | 3.83E-05 | -2.127588 | 0.0365 |

| | | | |
|---|---|---|---|
| R-squared | 0.054194 | Mean dependent var | 0.003562 |
| Adjusted R-squared | 0.042222 | S.D. dependent var | 0.008239 |
| S.E. of regression | 0.008063 | Akaike info criterion | -6.778717 |
| Sum squared resid | 0.005136 | Schwarz criterion | -6.719595 |
| Log likelihood | 276.5380 | Hannan-Quinn criter. | -6.754996 |
| F-statistic | 4.526629 | Durbin-Watson stat | 1.838246 |
| Prob(F-statistic) | 0.036490 | | |

## UK - DF

Null Hypothesis: GOV_UK_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -8.012504 | 0.0000 |
| Test critical values: | 1% level | -4.085092 | |
| | 5% level | -3.470851 | |
| | 10% level | -3.162458 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GOV_UK_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:52
Sample (adjusted): 1996Q4 2015Q2
Included observations: 75 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_UK_SARG_2(-1) | -4.802911 | 0.599427 | -8.012504 | 0.0000 |
| D(GOV_UK_SARG_2(-1)) | 2.699522 | 0.520983 | 5.181598 | 0.0000 |
| D(GOV_UK_SARG_2(-2)) | 1.706495 | 0.405573 | 4.207614 | 0.0001 |
| D(GOV_UK_SARG_2(-3)) | 0.989432 | 0.254921 | 3.881327 | 0.0002 |
| D(GOV_UK_SARG_2(-4)) | 0.280828 | 0.116565 | 2.409203 | 0.0187 |
| C | 0.000944 | 0.001593 | 0.592879 | 0.5552 |
| @TREND("1995Q2") | -1.45E-05 | 3.31E-05 | -0.439081 | 0.6620 |

| | | | |
|---|---|---|---|
| R-squared | 0.891075 | Mean dependent var | 7.22E-05 |
| Adjusted R-squared | 0.881464 | S.D. dependent var | 0.017980 |
| S.E. of regression | 0.006190 | Akaike info criterion | -7.242918 |
| Sum squared resid | 0.002606 | Schwarz criterion | -7.026619 |
| Log likelihood | 278.6094 | Hannan-Quinn criter. | -7.156552 |
| F-statistic | 92.71422 | Durbin-Watson stat | 2.052260 |
| Prob(F-statistic) | 0.000000 | | |

## UK - PP

Null Hypothesis: GOV_UK_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -30.60093 | 0.0001 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 6.56E-05 |
| HAC corrected variance (Bartlett kernel) | 1.42E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GOV_UK_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:52
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_UK_SARG_2(-1) | -1.584438 | 0.092847 | -17.06503 | 0.0000 |
| C | 4.83E-05 | 0.001911 | 0.025299 | 0.9799 |
| @TREND("1995Q2") | 3.73E-06 | 4.07E-05 | 0.091547 | 0.9273 |

| | | | |
|---|---|---|---|
| R-squared | 0.793037 | Mean dependent var | 0.000237 |
| Adjusted R-squared | 0.787591 | S.D. dependent var | 0.017912 |
| S.E. of regression | 0.008255 | Akaike info criterion | -6.718656 |
| Sum squared resid | 0.005180 | Schwarz criterion | -6.628677 |
| Log likelihood | 268.3869 | Hannan-Quinn criter. | -6.682607 |
| F-statistic | 145.6081 | Durbin-Watson stat | 2.608958 |
| Prob(F-statistic) | 0.000000 | | |

## UK - KPSS

Null Hypothesis: GOV_UK_SARG_2 is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.066599 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 9.97E-05 |
| HAC corrected variance (Bartlett kernel) | 1.37E-05 |

KPSS Test Equation
Dependent Variable: GOV_UK_SARG_2
Method: Least Squares
Date: 12/25/16 Time: 22:53
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.000367 | 0.002283 | -0.160814 | 0.8727 |
| @TREND("1995Q2") | 1.12E-05 | 4.90E-05 | 0.229092 | 0.8194 |

| | | | |
|---|---|---|---|
| R-squared | 0.000672 | Mean dependent var | 8.72E-05 |
| Adjusted R-squared | -0.012139 | S.D. dependent var | 0.010052 |
| S.E. of regression | 0.010113 | Akaike info criterion | -6.325337 |
| Sum squared resid | 0.007977 | Schwarz criterion | -6.265786 |
| Log likelihood | 255.0135 | Hannan-Quinn criter. | -6.301461 |
| F-statistic | 0.052483 | Durbin-Watson stat | 3.137830 |
| Prob(F-statistic) | 0.819397 | | |

## US- DF

Null Hypothesis: GOV_US_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -13.14922 | 0.0001 |
| Test critical values: | 1% level | -4.080021 | |
| | 5% level | -3.468459 | |
| | 10% level | -3.161067 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GOV_US_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:53
Sample (adjusted): 1996Q1 2015Q2
Included observations: 78 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_US_SARG_2(-1) | -2.437928 | 0.185405 | -13.14922 | 0.000 |
| D(GOV_US_SARG_2(-1)) | 0.465513 | 0.101549 | 4.584105 | 0.000 |
| C | 0.000732 | 0.000758 | 0.965470 | 0.337 |
| @TREND("1995Q2") | -1.52E-05 | 1.61E-05 | -0.945937 | 0.347 |

| | | | |
|---|---|---|---|
| R-squared | 0.872497 | Mean dependent var | 4.25E-0 |
| Adjusted R-squared | 0.867328 | S.D. dependent var | 0.00875 |
| S.E. of regression | 0.003189 | Akaike info criterion | -8.60845 |
| Sum squared resid | 0.000752 | Schwarz criterion | -8.48759 |
| Log likelihood | 339.7298 | Hannan-Quinn criter. | -8.56007 |
| F-statistic | 168.7936 | Durbin-Watson stat | 1.92912 |
| Prob(F-statistic) | 0.000000 | | |

## US - PP

Null Hypothesis: GOV_US_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -19.64083 | 0.0001 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 1.25E-05 |
| HAC corrected variance (Bartlett kernel) | 1.25E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(GOV_US_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:54
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GOV_US_SARG_2(-1) | -1.670598 | 0.085057 | -19.64083 | 0.0000 |
| C | 0.000302 | 0.000835 | 0.362198 | 0.7182 |
| @TREND("1995Q2") | -6.69E-06 | 1.78E-05 | -0.376026 | 0.7079 |

| | | | |
|---|---|---|---|
| R-squared | 0.835413 | Mean dependent var | -8.79E-05 |
| Adjusted R-squared | 0.831082 | S.D. dependent var | 0.008775 |
| S.E. of regression | 0.003607 | Akaike info criterion | -8.374918 |
| Sum squared resid | 0.000989 | Schwarz criterion | -8.284939 |
| Log likelihood | 333.8093 | Hannan-Quinn criter. | -8.338870 |
| F-statistic | 192.8811 | Durbin-Watson stat | 2.583085 |
| Prob(F-statistic) | 0.000000 | | |

## US - KPSS

Null Hypothesis: GOV_US_SARG_2 is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.052952 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 2.26E-05 |
| HAC corrected variance (Bartlett kernel) | 3.19E-06 |

KPSS Test Equation
Dependent Variable: GOV_US_SARG_2
Method: Least Squares
Date: 12/25/16 Time: 22:54
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000315 | 0.001087 | 0.289619 | 0.772 |
| @TREND("1995Q2") | -7.12E-06 | 2.33E-05 | -0.305594 | 0.760 |

| | | | |
|---|---|---|---|
| R-squared | 0.001196 | Mean dependent var | 2.62E-0 |
| Adjusted R-squared | -0.011609 | S.D. dependent var | 0.00478 |
| S.E. of regression | 0.004815 | Akaike info criterion | -7.80961 |
| Sum squared resid | 0.001808 | Schwarz criterion | -7.75006 |
| Log likelihood | 314.3845 | Hannan-Quinn criter. | -7.78573 |
| F-statistic | 0.093388 | Durbin-Watson stat | 3.32200 |
| Prob(F-statistic) | 0.760728 | | |

### 7.3.6 IR

**China - DF**

Null Hypothesis: IR_CHINA_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -8.838545 | 0.0000 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR_CHINA_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 01:32
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_CHINA_SARG_2(-1) | -1.012858 | 0.114596 | -8.838545 | 0.0000 |
| C | -0.051176 | 0.019948 | -2.565444 | 0.0123 |
| @TREND("1995Q2") | 0.000883 | 0.000419 | 2.108554 | 0.0383 |

| | | | |
|---|---|---|---|
| R-squared | 0.506882 | Mean dependent var | 0.000157 |
| Adjusted R-squared | 0.493906 | S.D. dependent var | 0.116029 |
| S.E. of regression | 0.082544 | Akaike info criterion | -2.113747 |
| Sum squared resid | 0.517821 | Schwarz criterion | -2.023768 |
| Log likelihood | 86.49300 | Hannan-Quinn criter. | -2.077698 |
| F-statistic | 39.06071 | Durbin-Watson stat | 1.998054 |
| Prob(F-statistic) | 0.000000 | | |

**China - PP**

Null Hypothesis: IR_CHINA_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -8.849468 | 0.0000 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.006555 |
| HAC corrected variance (Bartlett kernel) | 0.007176 |

Phillips-Perron Test Equation
Dependent Variable: D(IR_CHINA_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 01:33
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_CHINA_SARG_2(-1) | -1.012858 | 0.114596 | -8.838545 | 0.0000 |
| C | -0.051176 | 0.019948 | -2.565444 | 0.0123 |
| @TREND("1995Q2") | 0.000883 | 0.000419 | 2.108554 | 0.0383 |

| | | | |
|---|---|---|---|
| R-squared | 0.506882 | Mean dependent var | 0.000157 |
| Adjusted R-squared | 0.493906 | S.D. dependent var | 0.116029 |
| S.E. of regression | 0.082544 | Akaike info criterion | -2.113747 |
| Sum squared resid | 0.517821 | Schwarz criterion | -2.023768 |
| Log likelihood | 86.49300 | Hannan-Quinn criter. | -2.077698 |
| F-statistic | 39.06071 | Durbin-Watson stat | 1.998054 |
| Prob(F-statistic) | 0.000000 | | |

**China - KPSS**

Null Hypothesis: IR_CHINA_SARG_2 is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.085861 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.006490 |
| HAC corrected variance (Bartlett kernel) | 0.007015 |

KPSS Test Equation
Dependent Variable: IR_CHINA_SARG_2
Method: Least Squares
Date: 12/25/16 Time: 01:34
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.048686 | 0.018416 | -2.643689 | 0.0099 |
| @TREND("1995Q2") | 0.000838 | 0.000395 | 2.121673 | 0.0370 |

| | | | |
|---|---|---|---|
| R-squared | 0.054563 | Mean dependent var | -0.014743 |
| Adjusted R-squared | 0.042442 | S.D. dependent var | 0.083376 |
| S.E. of regression | 0.081587 | Akaike info criterion | -2.149608 |
| Sum squared resid | 0.519204 | Schwarz criterion | -2.090057 |
| Log likelihood | 87.98431 | Hannan-Quinn criter. | -2.125732 |
| F-statistic | 4.501496 | Durbin-Watson stat | 2.022582 |
| Prob(F-statistic) | 0.037040 | | |

## EA - DF

Null Hypothesis: IR_EA_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.546849 | 0.0024 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR_EA_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 21:50
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_EA_SARG_2(-1) | -0.427097 | 0.093932 | -4.546849 | 0.0000 |
| C | -0.003824 | 0.014206 | -0.269201 | 0.7885 |
| @TREND("1995Q2") | -6.46E-05 | 0.000302 | -0.214222 | 0.8309 |

| | | | |
|---|---|---|---|
| R-squared | 0.214085 | Mean dependent var | 6.49E-05 |
| Adjusted R-squared | 0.193403 | S.D. dependent var | 0.068040 |
| S.E. of regression | 0.061108 | Akaike info criterion | -2.715124 |
| Sum squared resid | 0.283795 | Schwarz criterion | -2.625145 |
| Log likelihood | 110.2474 | Hannan-Quinn criter. | -2.679076 |
| F-statistic | 10.35129 | Durbin-Watson stat | 1.969705 |
| Prob(F-statistic) | 0.000106 | | |

## EA - PP

Null Hypothesis: IR_EA_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -4.565871 | 0.0023 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.003592 |
| HAC corrected variance (Bartlett kernel) | 0.003642 |

Phillips-Perron Test Equation
Dependent Variable: D(IR_EA_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 21:51
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_EA_SARG_2(-1) | -0.427097 | 0.093932 | -4.546849 | 0.0000 |
| C | -0.003824 | 0.014206 | -0.269201 | 0.7885 |
| @TREND("1995Q2") | -6.46E-05 | 0.000302 | -0.214222 | 0.8309 |

| | | | |
|---|---|---|---|
| R-squared | 0.214085 | Mean dependent var | 6.49E-05 |
| Adjusted R-squared | 0.193403 | S.D. dependent var | 0.068040 |
| S.E. of regression | 0.061108 | Akaike info criterion | -2.715124 |
| Sum squared resid | 0.283795 | Schwarz criterion | -2.625145 |
| Log likelihood | 110.2474 | Hannan-Quinn criter. | -2.679076 |
| F-statistic | 10.35129 | Durbin-Watson stat | 1.969705 |
| Prob(F-statistic) | 0.000106 | | |

## EA - KPSS

Null Hypothesis: IR_EA_SARG_2 is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.045192 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.005296 |
| HAC corrected variance (Bartlett kernel) | 0.011933 |

KPSS Test Equation
Dependent Variable: IR_EA_SARG_2
Method: Least Squares
Date: 12/25/16 Time: 21:49
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.013476 | 0.016636 | -0.810032 | 0.4204 |
| @TREND("1995Q2") | -5.26E-05 | 0.000357 | -0.147401 | 0.8832 |

| | | | |
|---|---|---|---|
| R-squared | 0.000278 | Mean dependent var | -0.015606 |
| Adjusted R-squared | -0.012538 | S.D. dependent var | 0.073245 |
| S.E. of regression | 0.073703 | Akaike info criterion | -2.352868 |
| Sum squared resid | 0.423705 | Schwarz criterion | -2.293317 |
| Log likelihood | 96.11471 | Hannan-Quinn criter. | -2.328992 |
| F-statistic | 0.021727 | Durbin-Watson stat | 0.852250 |
| Prob(F-statistic) | 0.883196 | | |

## JAPAN - DF

Null Hypothesis: IR_JP_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -9.219390 | 0.0000 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR_JP_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 21:52
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_JP_SARG_2(-1) | -0.804534 | 0.087265 | -9.219390 | 0.000 |
| C | -0.003740 | 0.006659 | -0.561588 | 0.576 |
| @TREND("1995Q2") | 5.91E-05 | 0.000141 | 0.420027 | 0.675 |

| | | | |
|---|---|---|---|
| R-squared | 0.533652 | Mean dependent var | 0.00268 |
| Adjusted R-squared | 0.521380 | S.D. dependent var | 0.04042 |
| S.E. of regression | 0.027969 | Akaike info criterion | -4.27820 |
| Sum squared resid | 0.059452 | Schwarz criterion | -4.18822 |
| Log likelihood | 171.9890 | Hannan-Quinn criter. | -4.24215 |
| F-statistic | 43.48430 | Durbin-Watson stat | 1.94881 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - PP

Null Hypothesis: IR_JP_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -9.030704 | 0.0000 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.000753 |
| HAC corrected variance (Bartlett kernel) | 0.000906 |

Phillips-Perron Test Equation
Dependent Variable: D(IR_JP_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 21:59
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_JP_SARG_2(-1) | -0.804534 | 0.087265 | -9.219390 | 0.0000 |
| C | -0.003740 | 0.006659 | -0.561588 | 0.5760 |
| @TREND("1995Q2") | 5.91E-05 | 0.000141 | 0.420027 | 0.6757 |

| | | | |
|---|---|---|---|
| R-squared | 0.533652 | Mean dependent var | 0.002689 |
| Adjusted R-squared | 0.521380 | S.D. dependent var | 0.040428 |
| S.E. of regression | 0.027969 | Akaike info criterion | -4.278202 |
| Sum squared resid | 0.059452 | Schwarz criterion | -4.188223 |
| Log likelihood | 171.9890 | Hannan-Quinn criter. | -4.242154 |
| F-statistic | 43.48430 | Durbin-Watson stat | 1.948811 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - KPSS

Null Hypothesis: IR_JP_SARG_2 is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.108371 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.001284 |
| HAC corrected variance (Bartlett kernel) | 0.001836 |

KPSS Test Equation
Dependent Variable: IR_JP_SARG_2
Method: Least Squares
Date: 12/25/16 Time: 22:00
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.017406 | 0.008193 | -2.124631 | 0.0368 |
| @TREND("1995Q2") | 0.000309 | 0.000176 | 1.758092 | 0.0827 |

| | | | |
|---|---|---|---|
| R-squared | 0.038116 | Mean dependent var | -0.004894 |
| Adjusted R-squared | 0.025784 | S.D. dependent var | 0.036773 |
| S.E. of regression | 0.036296 | Akaike info criterion | -3.769554 |
| Sum squared resid | 0.102755 | Schwarz criterion | -3.710004 |
| Log likelihood | 152.7822 | Hannan-Quinn criter. | -3.745679 |
| F-statistic | 3.090887 | Durbin-Watson stat | 1.245021 |
| Prob(F-statistic) | 0.082655 | | |

## UK - DF

Null Hypothesis: IR_UK_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.770545 | 0.0012 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR_UK_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:01
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_UK_SARG_2(-1) | -0.460771 | 0.096587 | -4.770545 | 0.0000 |
| C | -0.003910 | 0.014371 | -0.272053 | 0.7863 |
| @TREND("1995Q2") | -4.64E-05 | 0.000307 | -0.151228 | 0.8802 |

| | | | |
|---|---|---|---|
| R-squared | 0.230526 | Mean dependent var | -0.000190 |
| Adjusted R-squared | 0.210276 | S.D. dependent var | 0.069819 |
| S.E. of regression | 0.062045 | Akaike info criterion | -2.684664 |
| Sum squared resid | 0.292572 | Schwarz criterion | -2.594685 |
| Log likelihood | 109.0442 | Hannan-Quinn criter. | -2.648616 |
| F-statistic | 11.38436 | Durbin-Watson stat | 1.844908 |
| Prob(F-statistic) | 0.000047 | | |

## UK - KPSS

Null Hypothesis: IR_UK_SARG_2 is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.052157 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.005161 |
| HAC corrected variance (Bartlett kernel) | 0.010228 |

KPSS Test Equation
Dependent Variable: IR_UK_SARG_2
Method: Least Squares
Date: 12/25/16 Time: 22:03
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.005823 | 0.016422 | -0.354552 | 0.7239 |
| @TREND("1995Q2") | -0.000155 | 0.000352 | -0.439150 | 0.6618 |

| | | | |
|---|---|---|---|
| R-squared | 0.002466 | Mean dependent var | -0.012088 |
| Adjusted R-squared | -0.010323 | S.D. dependent var | 0.072383 |
| S.E. of regression | 0.072756 | Akaike info criterion | -2.378736 |
| Sum squared resid | 0.412885 | Schwarz criterion | -2.319185 |
| Log likelihood | 97.14943 | Hannan-Quinn criter. | -2.354860 |
| F-statistic | 0.192853 | Durbin-Watson stat | 0.920896 |
| Prob(F-statistic) | 0.661767 | | |

## UK - PP

Null Hypothesis: IR_UK_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -4.806864 | 0.0010 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.003703 |
| HAC corrected variance (Bartlett kernel) | 0.003803 |

Phillips-Perron Test Equation
Dependent Variable: D(IR_UK_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:02
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_UK_SARG_2(-1) | -0.460771 | 0.096587 | -4.770545 | 0.0000 |
| C | -0.003910 | 0.014371 | -0.272053 | 0.7863 |
| @TREND("1995Q2") | -4.64E-05 | 0.000307 | -0.151228 | 0.8802 |

| | | | |
|---|---|---|---|
| R-squared | 0.230526 | Mean dependent var | -0.000190 |
| Adjusted R-squared | 0.210276 | S.D. dependent var | 0.069819 |
| S.E. of regression | 0.062045 | Akaike info criterion | -2.684664 |
| Sum squared resid | 0.292572 | Schwarz criterion | -2.594685 |
| Log likelihood | 109.0442 | Hannan-Quinn criter. | -2.648616 |
| F-statistic | 11.38436 | Durbin-Watson stat | 1.844908 |
| Prob(F-statistic) | 0.000047 | | |

## US- DF

Null Hypothesis: IR_US_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.283537 | 0.0766 |
| Test critical values: | 1% level | -4.080021 | |
| | 5% level | -3.468459 | |
| | 10% level | -3.161067 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IR_US_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:04
Sample (adjusted): 1996Q1 2015Q2
Included observations: 78 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_US_SARG_2(-1) | -0.365238 | 0.111233 | -3.283537 | 0.0016 |
| D(IR_US_SARG_2(-1)) | -0.251875 | 0.112485 | -2.239189 | 0.0281 |
| C | -0.004824 | 0.017192 | -0.280588 | 0.7798 |
| @TREND("1995Q2") | 1.35E-05 | 0.000363 | 0.037085 | 0.9705 |

| | | | |
|---|---|---|---|
| R-squared | 0.292056 | Mean dependent var | 0.000153 |
| Adjusted R-squared | 0.263355 | S.D. dependent var | 0.084113 |
| S.E. of regression | 0.072192 | Akaike info criterion | -2.369044 |
| Sum squared resid | 0.385669 | Schwarz criterion | -2.248187 |
| Log likelihood | 96.39270 | Hannan-Quinn criter. | -2.320662 |
| F-statistic | 10.17599 | Durbin-Watson stat | 2.072355 |
| Prob(F-statistic) | 0.000011 | | |

## US - PP

Null Hypothesis: IR_US_SARG_2 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -5.210332 | 0.0003 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.005215 |
| HAC corrected variance (Bartlett kernel) | 0.006209 |

Phillips-Perron Test Equation
Dependent Variable: D(IR_US_SARG_2)
Method: Least Squares
Date: 12/25/16 Time: 22:05
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| IR_US_SARG_2(-1) | -0.488705 | 0.098587 | -4.957095 | 0.0000 |
| C | -0.005718 | 0.017085 | -0.334690 | 0.738 |
| @TREND("1995Q2") | 3.57E-08 | 0.000363 | 9.83E-05 | 0.999 |

| | | | |
|---|---|---|---|
| R-squared | 0.244329 | Mean dependent var | 0.00040 |
| Adjusted R-squared | 0.224442 | S.D. dependent var | 0.08360 |
| S.E. of regression | 0.073624 | Akaike info criterion | -2.34246 |
| Sum squared resid | 0.411954 | Schwarz criterion | -2.25248 |
| Log likelihood | 95.52741 | Hannan-Quinn criter. | -2.30641 |
| F-statistic | 12.28640 | Durbin-Watson stat | 2.25624 |
| Prob(F-statistic) | 0.000024 | | |

## US - KPSS

Null Hypothesis: IR_US_SARG_2 is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.047015 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.006975 |
| HAC corrected variance (Bartlett kernel) | 0.021472 |

KPSS Test Equation
Dependent Variable: IR_US_SARG_2
Method: Least Squares
Date: 12/25/16 Time: 22:05
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.012811 | 0.019091 | -0.671057 | 0.5042 |
| @TREND("1995Q2") | 1.25E-05 | 0.000409 | 0.030445 | 0.9758 |

| | | | |
|---|---|---|---|
| R-squared | 0.000012 | Mean dependent var | -0.012306 |
| Adjusted R-squared | -0.012808 | S.D. dependent var | 0.084041 |
| S.E. of regression | 0.084578 | Akaike info criterion | -2.077604 |
| Sum squared resid | 0.557968 | Schwarz criterion | -2.018053 |
| Log likelihood | 85.10416 | Hannan-Quinn criter. | -2.053729 |
| F-statistic | 0.000927 | Durbin-Watson stat | 0.977048 |
| Prob(F-statistic) | 0.975790 | | |

### 7.3.7 M2

**China - DF**

Null Hypothesis: M2_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.525423 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(M2_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:30
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_CHINA_SARG(-1) | -0.717487 | 0.109953 | -6.525423 | 0.0000 |
| C | 0.030757 | 0.005690 | 5.405318 | 0.0000 |
| @TREND("1995Q2") | -0.000131 | 7.13E-05 | -1.842037 | 0.0693 |

| | | | |
|---|---|---|---|
| R-squared | 0.356233 | Mean dependent var | -0.000358 |
| Adjusted R-squared | 0.339511 | S.D. dependent var | 0.017503 |
| S.E. of regression | 0.014225 | Akaike info criterion | -5.630830 |
| Sum squared resid | 0.015581 | Schwarz criterion | -5.541504 |
| Log likelihood | 228.2332 | Hannan-Quinn criter. | -5.595016 |
| F-statistic | 21.30420 | Durbin-Watson stat | 2.063744 |
| Prob(F-statistic) | 0.000000 | | |

**China - PP**

Null Hypothesis: M2_CHINA_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -6.625918 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.000195 |
| HAC corrected variance (Bartlett kernel) | 0.000213 |

Phillips-Perron Test Equation
Dependent Variable: D(M2_CHINA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:30
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_CHINA_SARG(-1) | -0.717487 | 0.109953 | -6.525423 | 0.0000 |
| C | 0.030757 | 0.005690 | 5.405318 | 0.0000 |
| @TREND("1995Q2") | -0.000131 | 7.13E-05 | -1.842037 | 0.0693 |

| | | | |
|---|---|---|---|
| R-squared | 0.356233 | Mean dependent var | -0.000358 |
| Adjusted R-squared | 0.339511 | S.D. dependent var | 0.017503 |
| S.E. of regression | 0.014225 | Akaike info criterion | -5.630830 |
| Sum squared resid | 0.015581 | Schwarz criterion | -5.541504 |
| Log likelihood | 228.2332 | Hannan-Quinn criter. | -5.595016 |
| F-statistic | 21.30420 | Durbin-Watson stat | 2.063744 |
| Prob(F-statistic) | 0.000000 | | |

**China - KPSS**

Null Hypothesis: M2_CHINA_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.052046 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.000209 |
| HAC corrected variance (Bartlett kernel) | 0.000349 |

KPSS Test Equation
Dependent Variable: M2_CHINA_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:31
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.042885 | 0.003222 | 13.30927 | 0.0000 |
| @TREND("1995Q2") | -0.000180 | 6.95E-05 | -2.582550 | 0.0117 |

| | | | |
|---|---|---|---|
| R-squared | 0.077852 | Mean dependent var | 0.035700 |
| Adjusted R-squared | 0.066179 | S.D. dependent var | 0.015144 |
| S.E. of regression | 0.014634 | Akaike info criterion | -5.586530 |
| Sum squared resid | 0.016919 | Schwarz criterion | -5.527408 |
| Log likelihood | 228.2545 | Hannan-Quinn criter. | -5.562809 |
| F-statistic | 6.669567 | Durbin-Watson stat | 1.430727 |
| Prob(F-statistic) | 0.011654 | | |

## EA - DF

Null Hypothesis: M2_EA_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.420175 | 0.0560 |
| Test critical values: | 1% level | -4.078420 | |
| | 5% level | -3.467703 | |
| | 10% level | -3.160627 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(M2_EA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:35
Sample (adjusted): 1995Q4 2015Q2
Included observations: 79 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_EA_SARG(-1) | -0.397746 | 0.116294 | -3.420175 | 0.0010 |
| D(M2_EA_SARG(-1)) | -0.263753 | 0.112790 | -2.338440 | 0.0220 |
| C | 0.004583 | 0.001971 | 2.324983 | 0.0228 |
| @TREND("1995Q2") | -1.61E-05 | 3.16E-05 | -0.510897 | 0.6109 |

| | | | |
|---|---|---|---|
| R-squared | 0.319934 | Mean dependent var | 7.56E-06 |
| Adjusted R-squared | 0.292732 | S.D. dependent var | 0.007506 |
| S.E. of regression | 0.006312 | Akaike info criterion | -7.243290 |
| Sum squared resid | 0.002988 | Schwarz criterion | -7.123318 |
| Log likelihood | 290.1100 | Hannan-Quinn criter. | -7.195226 |
| F-statistic | 11.76116 | Durbin-Watson stat | 2.060142 |
| Prob(F-statistic) | 0.000002 | | |

## EA - PP

Null Hypothesis: M2_EA_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -5.601642 | 0.0001 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 4.01E-05 |
| HAC corrected variance (Bartlett kernel) | 4.61E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(M2_EA_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:36
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_EA_SARG(-1) | -0.543913 | 0.100373 | -5.418914 | 0.0000 |
| C | 0.006318 | 0.001827 | 3.457411 | 0.0009 |
| @TREND("1995Q2") | -2.48E-05 | 3.14E-05 | -0.788224 | 0.4330 |

| | | | |
|---|---|---|---|
| R-squared | 0.276353 | Mean dependent var | 8.75E-05 |
| Adjusted R-squared | 0.257557 | S.D. dependent var | 0.007492 |
| S.E. of regression | 0.006456 | Akaike info criterion | -7.210883 |
| Sum squared resid | 0.003209 | Schwarz criterion | -7.121557 |
| Log likelihood | 291.4353 | Hannan-Quinn criter. | -7.175069 |
| F-statistic | 14.70274 | Durbin-Watson stat | 2.222665 |
| Prob(F-statistic) | 0.000004 | | |

## EA - KPSS

Null Hypothesis: M2_EA_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.133451 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 5.11E-05 |
| HAC corrected variance (Bartlett kernel) | 0.000160 |

KPSS Test Equation
Dependent Variable: M2_EA_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:37
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.010913 | 0.001594 | 6.847576 | 0.0000 |
| @TREND("1995Q2") | -3.26E-05 | 3.44E-05 | -0.946325 | 0.3469 |

| | | | |
|---|---|---|---|
| R-squared | 0.011209 | Mean dependent var | 0.009611 |
| Adjusted R-squared | -0.001308 | S.D. dependent var | 0.007234 |
| S.E. of regression | 0.007238 | Akaike info criterion | -6.994455 |
| Sum squared resid | 0.004139 | Schwarz criterion | -6.935333 |
| Log likelihood | 285.2754 | Hannan-Quinn criter. | -6.970734 |
| F-statistic | 0.895530 | Durbin-Watson stat | 1.071697 |
| Prob(F-statistic) | 0.346869 | | |

## JAPAN - DF

Null Hypothesis: M2_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.233959 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(M2_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:38
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_JP_SARG(-1) | -0.802560 | 0.110943 | -7.233959 | 0.0000 |
| C | 0.005709 | 0.001461 | 3.908364 | 0.0002 |
| @TREND("1995Q2") | -1.65E-05 | 2.59E-05 | -0.634500 | 0.5276 |

| | | | |
|---|---|---|---|
| R-squared | 0.404801 | Mean dependent var | -9.53E-05 |
| Adjusted R-squared | 0.389341 | S.D. dependent var | 0.006812 |
| S.E. of regression | 0.005323 | Akaike info criterion | -7.596621 |
| Sum squared resid | 0.002182 | Schwarz criterion | -7.507295 |
| Log likelihood | 306.8648 | Hannan-Quinn criter. | -7.560807 |
| F-statistic | 26.18422 | Durbin-Watson stat | 1.992380 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - PP

Null Hypothesis: M2_JP_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.234747 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 2.73E-05 |
| HAC corrected variance (Bartlett kernel) | 2.73E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(M2_JP_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:39
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_JP_SARG(-1) | -0.802560 | 0.110943 | -7.233959 | 0.0000 |
| C | 0.005709 | 0.001461 | 3.908364 | 0.0002 |
| @TREND("1995Q2") | -1.65E-05 | 2.59E-05 | -0.634500 | 0.5276 |

| | | | |
|---|---|---|---|
| R-squared | 0.404801 | Mean dependent var | -9.53E-05 |
| Adjusted R-squared | 0.389341 | S.D. dependent var | 0.006812 |
| S.E. of regression | 0.005323 | Akaike info criterion | -7.596621 |
| Sum squared resid | 0.002182 | Schwarz criterion | -7.507295 |
| Log likelihood | 306.8648 | Hannan-Quinn criter. | -7.560807 |
| F-statistic | 26.18422 | Durbin-Watson stat | 1.992380 |
| Prob(F-statistic) | 0.000000 | | |

## JAPAN - KPSS

Null Hypothesis: M2_JP_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.083266 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 2.84E-05 |
| HAC corrected variance (Bartlett kernel) | 3.73E-05 |

KPSS Test Equation
Dependent Variable: M2_JP_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:39
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.007462 | 0.001189 | 6.277705 | 0.0000 |
| @TREND("1995Q2") | -2.69E-05 | 2.57E-05 | -1.047409 | 0.2981 |

| | | | |
|---|---|---|---|
| R-squared | 0.013697 | Mean dependent var | 0.006387 |
| Adjusted R-squared | 0.001212 | S.D. dependent var | 0.005402 |
| S.E. of regression | 0.005399 | Akaike info criterion | -7.580993 |
| Sum squared resid | 0.002302 | Schwarz criterion | -7.521871 |
| Log likelihood | 309.0302 | Hannan-Quinn criter. | -7.557272 |
| F-statistic | 1.097066 | Durbin-Watson stat | 1.592482 |
| Prob(F-statistic) | 0.298105 | | |

## UK - DF

Null Hypothesis: M2_UK_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -9.032531 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(M2_UK_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:41
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_UK_SARG(-1) | -1.024515 | 0.113425 | -9.032531 | 0.000 |
| C | 0.022403 | 0.005222 | 4.290417 | 0.000 |
| @TREND("1995Q2") | -0.000249 | 0.000103 | -2.429061 | 0.017 |

| | | | |
|---|---|---|---|
| R-squared | 0.514566 | Mean dependent var | -5.13E-0 |
| Adjusted R-squared | 0.501957 | S.D. dependent var | 0.02910 |
| S.E. of regression | 0.020537 | Akaike info criterion | -4.89642 |
| Sum squared resid | 0.032475 | Schwarz criterion | -4.80710 |
| Log likelihood | 198.8572 | Hannan-Quinn criter. | -4.86061 |
| F-statistic | 40.81041 | Durbin-Watson stat | 1.99162 |
| Prob(F-statistic) | 0.000000 | | |

## UK - PP

Null Hypothesis: M2_UK_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -9.183555 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.000406 |
| HAC corrected variance (Bartlett kernel) | 0.000603 |

Phillips-Perron Test Equation
Dependent Variable: D(M2_UK_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:41
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_UK_SARG(-1) | -1.024515 | 0.113425 | -9.032531 | 0.000 |
| C | 0.022403 | 0.005222 | 4.290417 | 0.000 |
| @TREND("1995Q2") | -0.000249 | 0.000103 | -2.429061 | 0.017 |

| | | | |
|---|---|---|---|
| R-squared | 0.514566 | Mean dependent var | -5.13E-0 |
| Adjusted R-squared | 0.501957 | S.D. dependent var | 0.02910 |
| S.E. of regression | 0.020537 | Akaike info criterion | -4.89642 |
| Sum squared resid | 0.032475 | Schwarz criterion | -4.80710 |
| Log likelihood | 198.8572 | Hannan-Quinn criter. | -4.86061 |
| F-statistic | 40.81041 | Durbin-Watson stat | 1.99162 |
| Prob(F-statistic) | 0.000000 | | |

## UK - KPSS

Null Hypothesis: M2_UK_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.187212 |
| Asymptotic critical values*: | 1% level | 0.216000 |
| | 5% level | 0.146000 |
| | 10% level | 0.119000 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.000405 |
| HAC corrected variance (Bartlett kernel) | 0.000572 |

KPSS Test Equation
Dependent Variable: M2_UK_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:42
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.021030 | 0.004486 | 4.688129 | 0.000 |
| @TREND("1995Q2") | -0.000228 | 9.68E-05 | -2.354470 | 0.021 |

| | | | |
|---|---|---|---|
| R-squared | 0.065570 | Mean dependent var | 0.01191 |
| Adjusted R-squared | 0.053742 | S.D. dependent var | 0.02094 |
| S.E. of regression | 0.020373 | Akaike info criterion | -4.92482 |
| Sum squared resid | 0.032790 | Schwarz criterion | -4.86570 |
| Log likelihood | 201.4555 | Hannan-Quinn criter. | -4.90110 |
| F-statistic | 5.543528 | Durbin-Watson stat | 2.04032 |
| Prob(F-statistic) | 0.021033 | | |

## US- DF

Null Hypothesis: M2_US_SARG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.212830 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(M2_US_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:43
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_US_SARG(-1) | -0.806048 | 0.111752 | -7.212830 | 0.0000 |
| C | 0.006381 | 0.002494 | 2.558563 | 0.0125 |
| @TREND("1995Q2") | 3.71E-05 | 5.01E-05 | 0.740494 | 0.4613 |

| | | | |
|---|---|---|---|
| R-squared | 0.403217 | Mean dependent var | -8.62E-05 |
| Adjusted R-squared | 0.387716 | S.D. dependent var | 0.013169 |
| S.E. of regression | 0.010304 | Akaike info criterion | -6.275734 |
| Sum squared resid | 0.008176 | Schwarz criterion | -6.186408 |
| Log likelihood | 254.0294 | Hannan-Quinn criter. | -6.239921 |
| F-statistic | 26.01253 | Durbin-Watson stat | 1.946670 |
| Prob(F-statistic) | 0.000000 | | |

## US - PP

Null Hypothesis: M2_US_SARG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -7.094464 | 0.0000 |
| Test critical values: | 1% level | -4.076860 | |
| | 5% level | -3.466966 | |
| | 10% level | -3.160198 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.000102 |
| HAC corrected variance (Bartlett kernel) | 8.40E-05 |

Phillips-Perron Test Equation
Dependent Variable: D(M2_US_SARG)
Method: Least Squares
Date: 12/25/16 Time: 01:44
Sample (adjusted): 1995Q3 2015Q2
Included observations: 80 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| M2_US_SARG(-1) | -0.806048 | 0.111752 | -7.212830 | 0.000 |
| C | 0.006381 | 0.002494 | 2.558563 | 0.012 |
| @TREND("1995Q2") | 3.71E-05 | 5.01E-05 | 0.740494 | 0.461 |

| | | | |
|---|---|---|---|
| R-squared | 0.403217 | Mean dependent var | -8.62E-0 |
| Adjusted R-squared | 0.387716 | S.D. dependent var | 0.01316 |
| S.E. of regression | 0.010304 | Akaike info criterion | -6.2757 |
| Sum squared resid | 0.008176 | Schwarz criterion | -6.18640 |
| Log likelihood | 254.0294 | Hannan-Quinn criter. | -6.23992 |
| F-statistic | 26.01253 | Durbin-Watson stat | 1.94667 |
| Prob(F-statistic) | 0.000000 | | |

## US - KPSS

Null Hypothesis: M2_US_SARG is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

| | | LM-Stat. |
|---|---|---|
| Kwiatkowski-Phillips-Schmidt-Shin test statistic | | 0.06402 |
| Asymptotic critical values*: | 1% level | 0.21600 |
| | 5% level | 0.14600 |
| | 10% level | 0.11900 |

*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

| | |
|---|---|
| Residual variance (no correction) | 0.00010 |
| HAC corrected variance (Bartlett kernel) | 0.00012 |

KPSS Test Equation
Dependent Variable: M2_US_SARG
Method: Least Squares
Date: 12/25/16 Time: 01:45
Sample: 1995Q2 2015Q2
Included observations: 81

| Variable | Coefficient | Std. Error | t-Statistic | Prob |
|---|---|---|---|---|
| C | 0.008217 | 0.002287 | 3.592242 | 0.000 |
| @TREND("1995Q2") | 4.08E-05 | 4.94E-05 | 0.826751 | 0.410 |

| | | | |
|---|---|---|---|
| R-squared | 0.008578 | Mean dependent var | 0.0098 |
| Adjusted R-squared | -0.003972 | S.D. dependent var | 0.0103 |
| S.E. of regression | 0.010389 | Akaike info criterion | -6.2718 |
| Sum squared resid | 0.008526 | Schwarz criterion | -6.2126 |
| Log likelihood | 256.0087 | Hannan-Quinn criter. | -6.2481 |
| F-statistic | 0.683517 | Durbin-Watson stat | 1.6069 |
| Prob(F-statistic) | 0.410869 | | |

## 7.4 Correlograms (Seasonality)

### 7.4.1 Close 1

**China – 1st differences**

Date: 12/25/16 Time: 01:46
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.200 | 0.200 | 3.3551 | 0.067 |
| | | 2 | 0.080 | 0.042 | 3.8988 | 0.142 |
| | | 3 | 0.220 | 0.205 | 8.0754 | 0.044 |
| | | 4 | -0.276 | -0.390 | 14.738 | 0.005 |
| | | 5 | -0.239 | -0.143 | 19.787 | 0.001 |
| | | 6 | 0.065 | 0.159 | 20.161 | 0.003 |
| | | 7 | -0.140 | -0.008 | 21.941 | 0.003 |
| | | 8 | -0.199 | -0.255 | 25.596 | 0.001 |
| | | 9 | 0.131 | 0.073 | 27.205 | 0.001 |
| | | 10 | -0.110 | -0.054 | 28.342 | 0.002 |
| | | 11 | -0.060 | 0.062 | 28.693 | 0.003 |
| | | 12 | 0.231 | 0.061 | 33.892 | 0.001 |
| | | 13 | -0.070 | -0.133 | 34.371 | 0.001 |
| | | 14 | -0.040 | -0.016 | 34.528 | 0.002 |
| | | 15 | 0.211 | 0.164 | 39.072 | 0.001 |
| | | 16 | -0.198 | -0.229 | 43.144 | 0.000 |
| | | 17 | -0.165 | -0.120 | 46.012 | 0.000 |
| | | 18 | -0.008 | -0.120 | 46.019 | 0.000 |
| | | 19 | -0.251 | 0.004 | 52.874 | 0.000 |
| | | 20 | -0.179 | -0.096 | 56.408 | 0.000 |
| | | 21 | 0.038 | -0.141 | 56.568 | 0.000 |
| | | 22 | -0.014 | 0.076 | 56.590 | 0.000 |
| | | 23 | -0.061 | -0.069 | 57.028 | 0.000 |
| | | 24 | 0.078 | -0.215 | 57.751 | 0.000 |
| | | 25 | -0.026 | -0.025 | 57.831 | 0.000 |
| | | 26 | -0.176 | -0.245 | 61.635 | 0.000 |
| | | 27 | 0.113 | 0.111 | 63.212 | 0.000 |
| | | 28 | 0.023 | 0.004 | 63.279 | 0.000 |
| | | 29 | -0.016 | -0.123 | 63.314 | 0.000 |
| | | 30 | 0.175 | -0.039 | 67.336 | 0.000 |
| | | 31 | 0.009 | -0.002 | 67.348 | 0.000 |
| | | 32 | 0.000 | 0.050 | 67.348 | 0.000 |
| | | 33 | 0.122 | 0.012 | 69.432 | 0.000 |
| | | 34 | 0.086 | -0.069 | 70.494 | 0.000 |
| | | 35 | -0.083 | -0.114 | 71.495 | 0.000 |
| | | 36 | 0.131 | 0.120 | 74.057 | 0.000 |

**China – 2nd differences**

Date: 12/25/16 Time: 01:46
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.414 | -0.414 | 14.205 | 0.000 |
| | | 2 | -0.190 | -0.436 | 17.245 | 0.000 |
| | | 3 | 0.413 | 0.179 | 31.807 | 0.000 |
| | | 4 | -0.312 | -0.135 | 40.222 | 0.000 |
| | | 5 | -0.173 | -0.324 | 42.842 | 0.000 |
| | | 6 | 0.324 | -0.105 | 52.130 | 0.000 |
| | | 7 | -0.093 | 0.078 | 52.910 | 0.000 |
| | | 8 | -0.258 | -0.241 | 58.987 | 0.000 |
| | | 9 | 0.362 | -0.036 | 71.081 | 0.000 |
| | | 10 | -0.174 | -0.155 | 73.934 | 0.000 |
| | | 11 | -0.160 | -0.117 | 76.361 | 0.000 |
| | | 12 | 0.373 | 0.068 | 89.783 | 0.000 |
| | | 13 | -0.209 | -0.069 | 94.079 | 0.000 |
| | | 14 | -0.136 | -0.161 | 95.913 | 0.000 |
| | | 15 | 0.420 | 0.220 | 113.74 | 0.000 |
| | | 16 | -0.263 | 0.044 | 120.82 | 0.000 |
| | | 17 | -0.103 | 0.026 | 121.92 | 0.000 |
| | | 18 | 0.250 | -0.103 | 128.55 | 0.000 |
| | | 19 | -0.186 | 0.001 | 132.27 | 0.000 |
| | | 20 | -0.091 | 0.046 | 133.17 | 0.000 |
| | | 21 | 0.166 | -0.164 | 136.23 | 0.000 |
| | | 22 | -0.009 | -0.013 | 136.24 | 0.000 |
| | | 23 | -0.116 | 0.094 | 137.80 | 0.000 |
| | | 24 | 0.140 | -0.093 | 140.12 | 0.000 |
| | | 25 | 0.019 | 0.088 | 140.16 | 0.000 |
| | | 26 | -0.251 | -0.258 | 147.80 | 0.000 |
| | | 27 | 0.238 | -0.062 | 154.83 | 0.000 |
| | | 28 | -0.025 | 0.071 | 154.91 | 0.000 |
| | | 29 | -0.144 | -0.052 | 157.58 | 0.000 |
| | | 30 | 0.209 | -0.056 | 163.29 | 0.000 |
| | | 31 | -0.108 | -0.104 | 164.86 | 0.000 |
| | | 32 | -0.082 | -0.034 | 165.79 | 0.000 |
| | | 33 | 0.101 | 0.055 | 167.21 | 0.000 |
| | | 34 | 0.076 | 0.039 | 168.03 | 0.000 |
| | | 35 | -0.219 | -0.147 | 175.02 | 0.000 |
| | | 36 | 0.173 | 0.079 | 179.47 | 0.000 |

**Euro Area – 1st differences**

Date: 12/25/16 Time: 01:50
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.184 | 0.184 | 2.8474 | 0.092 |
| | | 2 | 0.133 | 0.103 | 4.3580 | 0.113 |
| | | 3 | 0.187 | 0.152 | 7.3624 | 0.061 |
| | | 4 | -0.086 | -0.163 | 8.0070 | 0.091 |
| | | 5 | 0.007 | 0.013 | 8.0115 | 0.156 |
| | | 6 | 0.137 | 0.143 | 9.6922 | 0.138 |
| | | 7 | 0.092 | 0.100 | 10.460 | 0.164 |
| | | 8 | -0.123 | -0.229 | 11.850 | 0.158 |
| | | 9 | 0.023 | 0.011 | 11.900 | 0.219 |
| | | 10 | 0.009 | 0.067 | 11.908 | 0.291 |
| | | 11 | -0.081 | -0.006 | 12.540 | 0.324 |
| | | 12 | -0.105 | -0.215 | 13.605 | 0.327 |
| | | 13 | 0.001 | 0.037 | 13.605 | 0.402 |
| | | 14 | -0.130 | -0.025 | 15.290 | 0.359 |
| | | 15 | -0.004 | 0.107 | 15.292 | 0.431 |
| | | 16 | 0.043 | -0.074 | 15.481 | 0.490 |
| | | 17 | -0.143 | -0.136 | 17.618 | 0.413 |
| | | 18 | -0.068 | -0.009 | 18.118 | 0.448 |
| | | 19 | -0.198 | -0.134 | 22.378 | 0.266 |
| | | 20 | -0.154 | -0.087 | 24.984 | 0.202 |
| | | 21 | -0.051 | 0.023 | 25.275 | 0.235 |
| | | 22 | -0.076 | -0.039 | 25.932 | 0.255 |
| | | 23 | 0.090 | 0.166 | 26.862 | 0.262 |
| | | 24 | 0.103 | 0.101 | 28.116 | 0.255 |
| | | 25 | 0.096 | 0.073 | 29.224 | 0.255 |
| | | 26 | 0.064 | -0.030 | 29.724 | 0.279 |
| | | 27 | 0.033 | 0.002 | 29.861 | 0.320 |
| | | 28 | -0.086 | -0.146 | 30.804 | 0.326 |
| | | 29 | 0.119 | 0.196 | 32.647 | 0.292 |
| | | 30 | 0.030 | -0.102 | 32.769 | 0.333 |
| | | 31 | 0.125 | 0.107 | 34.883 | 0.288 |
| | | 32 | 0.079 | -0.072 | 35.747 | 0.297 |
| | | 33 | -0.108 | -0.098 | 37.387 | 0.275 |
| | | 34 | 0.008 | -0.007 | 37.397 | 0.316 |
| | | 35 | -0.082 | 0.023 | 38.385 | 0.319 |
| | | 36 | 0.038 | -0.020 | 38.596 | 0.353 |

**Euro Area – 2nd differences**

Date: 12/25/16 Time: 01:51
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.465 | -0.465 | 17.946 | 0.000 |
| | | 2 | -0.068 | -0.363 | 18.341 | 0.000 |
| | | 3 | 0.201 | -0.016 | 21.784 | 0.000 |
| | | 4 | -0.222 | -0.186 | 26.039 | 0.000 |
| | | 5 | -0.028 | -0.269 | 26.105 | 0.000 |
| | | 6 | 0.112 | -0.184 | 27.222 | 0.000 |
| | | 7 | 0.103 | 0.138 | 28.171 | 0.000 |
| | | 8 | -0.224 | -0.119 | 32.755 | 0.000 |
| | | 9 | 0.095 | -0.165 | 33.582 | 0.000 |
| | | 10 | 0.058 | -0.063 | 33.902 | 0.000 |
| | | 11 | -0.051 | 0.125 | 34.151 | 0.000 |
| | | 12 | -0.079 | -0.143 | 34.756 | 0.001 |
| | | 13 | 0.156 | -0.062 | 37.125 | 0.000 |
| | | 14 | -0.166 | -0.173 | 39.866 | 0.000 |
| | | 15 | 0.040 | -0.008 | 40.024 | 0.000 |
| | | 16 | 0.152 | 0.041 | 42.388 | 0.000 |
| | | 17 | -0.159 | -0.084 | 45.007 | 0.000 |
| | | 18 | 0.121 | 0.052 | 46.547 | 0.000 |
| | | 19 | -0.103 | -0.026 | 47.677 | 0.000 |
| | | 20 | -0.039 | -0.144 | 47.840 | 0.000 |
| | | 21 | 0.080 | -0.054 | 48.553 | 0.001 |
| | | 22 | -0.108 | -0.213 | 49.883 | 0.001 |
| | | 23 | 0.096 | -0.134 | 50.952 | 0.001 |
| | | 24 | 0.009 | -0.102 | 50.962 | 0.001 |
| | | 25 | 0.009 | -0.002 | 50.972 | 0.002 |
| | | 26 | -0.008 | -0.043 | 50.979 | 0.002 |
| | | 27 | 0.057 | 0.090 | 51.374 | 0.003 |
| | | 28 | -0.193 | -0.246 | 56.055 | 0.001 |
| | | 29 | 0.180 | 0.056 | 60.239 | 0.001 |
| | | 30 | -0.113 | -0.143 | 61.925 | 0.001 |
| | | 31 | 0.088 | 0.032 | 62.960 | 0.001 |
| | | 32 | 0.081 | 0.063 | 63.858 | 0.001 |
| | | 33 | -0.183 | -0.038 | 68.547 | 0.000 |
| | | 34 | 0.127 | -0.067 | 70.852 | 0.000 |
| | | 35 | -0.128 | -0.026 | 73.233 | 0.000 |
| | | 36 | 0.087 | -0.069 | 74.372 | 0.000 |

### United States – 1st differences

Date: 12/25/16 Time: 02:18
Sample: 1995Q2 2015Q2
Included observations: 81

| Lag | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.230 | 0.230 | 4.4295 | 0.035 |
| 2 | 0.070 | 0.018 | 4.8459 | 0.089 |
| 3 | 0.124 | 0.110 | 6.1738 | 0.103 |
| 4 | -0.152 | -0.218 | 8.1799 | 0.085 |
| 5 | 0.190 | 0.301 | 11.389 | 0.044 |
| 6 | 0.091 | -0.056 | 12.132 | 0.059 |
| 7 | -0.049 | -0.015 | 12.351 | 0.090 |
| 8 | -0.101 | -0.232 | 13.294 | 0.102 |
| 9 | -0.080 | 0.140 | 13.890 | 0.126 |
| 10 | 0.123 | 0.104 | 15.320 | 0.121 |
| 11 | -0.014 | -0.094 | 15.340 | 0.167 |
| 12 | -0.085 | -0.158 | 16.043 | 0.189 |
| 13 | -0.000 | 0.134 | 16.043 | 0.247 |
| 14 | -0.122 | -0.049 | 17.532 | 0.229 |
| 15 | 0.007 | -0.017 | 17.538 | 0.288 |
| 16 | 0.044 | -0.075 | 17.740 | 0.339 |
| 17 | -0.158 | -0.052 | 20.359 | 0.256 |
| 18 | -0.077 | -0.010 | 20.995 | 0.280 |
| 19 | -0.137 | -0.130 | 23.026 | 0.236 |
| 20 | -0.193 | -0.177 | 27.110 | 0.132 |
| 21 | -0.099 | -0.045 | 28.203 | 0.134 |
| 22 | -0.131 | 0.007 | 30.156 | 0.115 |
| 23 | -0.003 | 0.068 | 30.157 | 0.145 |
| 24 | 0.151 | 0.179 | 32.842 | 0.107 |
| 25 | 0.134 | 0.091 | 35.012 | 0.088 |
| 26 | 0.133 | 0.064 | 37.189 | 0.072 |
| 27 | 0.003 | -0.064 | 37.190 | 0.092 |
| 28 | -0.069 | -0.106 | 37.790 | 0.102 |
| 29 | 0.094 | 0.087 | 38.926 | 0.103 |
| 30 | 0.049 | -0.002 | 39.246 | 0.120 |
| 31 | 0.127 | 0.099 | 41.419 | 0.100 |
| 32 | 0.137 | 0.086 | 43.998 | 0.077 |
| 33 | -0.112 | -0.111 | 45.762 | 0.069 |
| 34 | -0.062 | -0.176 | 46.310 | 0.078 |
| 35 | -0.002 | 0.025 | 46.310 | 0.096 |
| 36 | -0.084 | -0.128 | 47.361 | 0.097 |

### United States – 2nd differences

Date: 12/25/16 Time: 02:20
Sample: 1995Q2 2015Q2
Included observations: 80

| Lag | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.401 | -0.401 | 13.320 | 0.000 |
| 2 | -0.135 | -0.352 | 14.851 | 0.001 |
| 3 | 0.215 | 0.001 | 18.785 | 0.000 |
| 4 | -0.400 | -0.449 | 32.597 | 0.000 |
| 5 | 0.283 | -0.062 | 39.608 | 0.000 |
| 6 | 0.028 | -0.088 | 39.679 | 0.000 |
| 7 | -0.055 | 0.113 | 39.955 | 0.000 |
| 8 | -0.056 | -0.261 | 40.237 | 0.000 |
| 9 | -0.117 | -0.207 | 41.498 | 0.000 |
| 10 | 0.229 | 0.020 | 46.401 | 0.000 |
| 11 | -0.051 | 0.062 | 46.652 | 0.000 |
| 12 | -0.094 | -0.220 | 47.506 | 0.000 |
| 13 | 0.138 | -0.032 | 49.359 | 0.000 |
| 14 | -0.174 | -0.048 | 52.372 | 0.000 |
| 15 | 0.064 | -0.009 | 52.791 | 0.000 |
| 16 | 0.157 | -0.030 | 55.302 | 0.000 |
| 17 | -0.182 | -0.070 | 58.755 | 0.000 |
| 18 | 0.089 | 0.049 | 59.589 | 0.000 |
| 19 | 0.000 | 0.083 | 59.589 | 0.000 |
| 20 | -0.095 | -0.062 | 60.572 | 0.000 |
| 21 | 0.076 | -0.109 | 61.209 | 0.000 |
| 22 | -0.090 | -0.135 | 62.129 | 0.000 |
| 23 | -0.018 | -0.221 | 62.168 | 0.000 |
| 24 | 0.102 | -0.114 | 63.381 | 0.000 |
| 25 | -0.006 | -0.078 | 63.385 | 0.000 |
| 26 | 0.078 | 0.046 | 64.129 | 0.000 |
| 27 | -0.038 | 0.079 | 64.309 | 0.000 |
| 28 | -0.142 | -0.112 | 66.837 | 0.000 |
| 29 | 0.132 | -0.016 | 69.076 | 0.000 |
| 30 | -0.086 | -0.105 | 70.037 | 0.000 |
| 31 | 0.045 | -0.086 | 70.313 | 0.000 |
| 32 | 0.159 | 0.100 | 73.788 | 0.000 |
| 33 | -0.191 | 0.152 | 78.882 | 0.000 |
| 34 | -0.004 | -0.065 | 78.885 | 0.000 |
| 35 | 0.092 | 0.082 | 80.128 | 0.000 |
| 36 | -0.122 | -0.063 | 82.332 | 0.000 |

### United Kingdom – 1st differences

Date: 12/25/16 Time: 02:21
Sample: 1995Q2 2015Q2
Included observations: 81

| Lag | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.085 | 0.085 | 0.6096 | 0.435 |
| 2 | 0.108 | 0.101 | 1.6012 | 0.449 |
| 3 | 0.087 | 0.072 | 2.2608 | 0.520 |
| 4 | -0.084 | -0.108 | 2.8698 | 0.580 |
| 5 | 0.082 | 0.083 | 3.4634 | 0.629 |
| 6 | 0.014 | 0.015 | 3.4813 | 0.746 |
| 7 | 0.073 | 0.073 | 3.9684 | 0.783 |
| 8 | -0.251 | -0.302 | 9.7512 | 0.283 |
| 9 | 0.087 | 0.159 | 10.454 | 0.315 |
| 10 | 0.048 | 0.067 | 10.673 | 0.384 |
| 11 | -0.118 | -0.107 | 12.002 | 0.364 |
| 12 | -0.065 | -0.185 | 12.416 | 0.413 |
| 13 | -0.116 | 0.011 | 13.743 | 0.392 |
| 14 | -0.123 | -0.070 | 15.262 | 0.361 |
| 15 | -0.013 | 0.045 | 15.280 | 0.431 |
| 16 | 0.048 | -0.051 | 15.520 | 0.487 |
| 17 | -0.188 | -0.135 | 19.228 | 0.316 |
| 18 | -0.092 | -0.040 | 20.122 | 0.326 |
| 19 | -0.119 | -0.117 | 21.671 | 0.301 |
| 20 | -0.140 | -0.129 | 23.818 | 0.250 |
| 21 | -0.070 | -0.063 | 24.372 | 0.275 |
| 22 | -0.041 | -0.016 | 24.568 | 0.318 |
| 23 | 0.064 | 0.126 | 25.046 | 0.348 |
| 24 | 0.104 | 0.144 | 26.319 | 0.337 |
| 25 | 0.194 | 0.051 | 30.821 | 0.195 |
| 26 | 0.083 | 0.028 | 31.661 | 0.205 |
| 27 | 0.030 | 0.003 | 31.770 | 0.241 |
| 28 | -0.080 | -0.191 | 32.572 | 0.252 |
| 29 | 0.049 | 0.056 | 32.880 | 0.283 |
| 30 | 0.046 | -0.002 | 33.160 | 0.316 |
| 31 | 0.085 | 0.071 | 34.125 | 0.320 |
| 32 | 0.106 | 0.041 | 35.665 | 0.300 |
| 33 | -0.101 | -0.144 | 37.105 | 0.285 |
| 34 | 0.040 | -0.035 | 37.330 | 0.319 |
| 35 | -0.036 | -0.001 | 37.520 | 0.354 |
| 36 | 0.050 | 0.003 | 37.887 | 0.383 |

### United Kingdom – 2nd differences

Date: 12/25/16 Time: 02:21
Sample: 1995Q2 2015Q2
Included observations: 80

| Lag | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.514 | -0.514 | 21.926 | 0.000 |
| 2 | 0.027 | -0.322 | 21.988 | 0.000 |
| 3 | 0.085 | -0.093 | 22.609 | 0.000 |
| 4 | -0.187 | -0.251 | 25.632 | 0.000 |
| 5 | 0.121 | -0.158 | 26.911 | 0.000 |
| 6 | -0.060 | -0.177 | 27.226 | 0.000 |
| 7 | 0.206 | 0.189 | 31.046 | 0.000 |
| 8 | -0.371 | -0.293 | 43.567 | 0.000 |
| 9 | 0.203 | -0.191 | 47.381 | 0.000 |
| 10 | 0.091 | 0.037 | 48.160 | 0.000 |
| 11 | -0.143 | 0.076 | 50.100 | 0.000 |
| 12 | 0.070 | -0.137 | 50.579 | 0.000 |
| 13 | -0.012 | -0.036 | 50.593 | 0.000 |
| 14 | -0.081 | -0.115 | 51.251 | 0.000 |
| 15 | 0.021 | -0.053 | 51.296 | 0.000 |
| 16 | 0.173 | 0.027 | 54.370 | 0.000 |
| 17 | -0.182 | -0.075 | 57.804 | 0.000 |
| 18 | 0.064 | 0.028 | 58.238 | 0.000 |
| 19 | 0.008 | 0.011 | 58.245 | 0.000 |
| 20 | -0.058 | -0.073 | 58.617 | 0.000 |
| 21 | 0.020 | -0.099 | 58.660 | 0.000 |
| 22 | -0.027 | -0.187 | 58.743 | 0.000 |
| 23 | 0.038 | -0.167 | 58.912 | 0.000 |
| 24 | -0.038 | -0.038 | 59.081 | 0.000 |
| 25 | 0.114 | -0.005 | 60.620 | 0.000 |
| 26 | -0.038 | 0.004 | 60.798 | 0.000 |
| 27 | 0.024 | 0.173 | 60.868 | 0.000 |
| 28 | -0.112 | -0.088 | 62.451 | 0.000 |
| 29 | 0.074 | -0.008 | 63.158 | 0.000 |
| 30 | -0.035 | -0.048 | 63.318 | 0.000 |
| 31 | 0.014 | -0.003 | 63.344 | 0.001 |
| 32 | 0.111 | 0.151 | 65.028 | 0.000 |
| 33 | -0.186 | 0.016 | 69.840 | 0.000 |
| 34 | 0.120 | -0.028 | 71.895 | 0.000 |
| 35 | -0.086 | -0.022 | 72.983 | 0.000 |
| 36 | 0.078 | -0.033 | 73.900 | 0.000 |

**Japan – 1st differences**

Date: 12/25/16 Time: 02:15
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.219 | 0.219 | 4.0461 | 0.044 |
| | | 2 | 0.012 | -0.038 | 4.0585 | 0.131 |
| | | 3 | 0.113 | 0.125 | 5.1588 | 0.161 |
| | | 4 | -0.102 | -0.166 | 6.0726 | 0.194 |
| | | 5 | -0.067 | 0.002 | 6.4734 | 0.263 |
| | | 6 | 0.044 | 0.040 | 6.6458 | 0.355 |
| | | 7 | 0.001 | 0.012 | 6.6459 | 0.467 |
| | | 8 | -0.143 | -0.164 | 8.5284 | 0.384 |
| | | 9 | 0.004 | 0.062 | 8.5297 | 0.482 |
| | | 10 | 0.049 | 0.037 | 8.7582 | 0.555 |
| | | 11 | -0.116 | -0.103 | 10.060 | 0.525 |
| | | 12 | -0.179 | -0.198 | 13.198 | 0.355 |
| | | 13 | -0.038 | 0.037 | 13.341 | 0.422 |
| | | 14 | 0.073 | 0.150 | 13.874 | 0.459 |
| | | 15 | 0.212 | 0.223 | 18.472 | 0.239 |
| | | 16 | 0.024 | -0.208 | 18.533 | 0.294 |
| | | 17 | -0.080 | -0.105 | 19.203 | 0.317 |
| | | 18 | -0.141 | -0.111 | 21.319 | 0.264 |
| | | 19 | -0.218 | -0.094 | 26.456 | 0.118 |
| | | 20 | -0.127 | -0.139 | 28.231 | 0.104 |
| | | 21 | -0.109 | -0.086 | 29.553 | 0.101 |
| | | 22 | -0.096 | 0.001 | 30.606 | 0.104 |
| | | 23 | -0.045 | 0.025 | 30.844 | 0.127 |
| | | 24 | 0.105 | 0.035 | 32.136 | 0.124 |
| | | 25 | 0.095 | 0.018 | 33.212 | 0.126 |
| | | 26 | -0.015 | 0.008 | 33.237 | 0.155 |
| | | 27 | -0.106 | -0.111 | 34.646 | 0.148 |
| | | 28 | -0.033 | -0.050 | 34.784 | 0.176 |
| | | 29 | 0.069 | 0.017 | 35.407 | 0.191 |
| | | 30 | 0.113 | 0.015 | 37.077 | 0.175 |
| | | 31 | 0.174 | 0.105 | 41.166 | 0.105 |
| | | 32 | 0.053 | -0.002 | 41.558 | 0.120 |
| | | 33 | -0.075 | -0.054 | 42.344 | 0.128 |
| | | 34 | -0.011 | 0.033 | 42.362 | 0.154 |
| | | 35 | -0.013 | -0.019 | 42.388 | 0.182 |
| | | 36 | -0.141 | -0.127 | 45.372 | 0.136 |

**Japan – 2nd differences**

Date: 12/25/16 Time: 02:16
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.327 | -0.327 | 8.8769 | 0.003 |
| | | 2 | -0.214 | -0.359 | 12.715 | 0.002 |
| | | 3 | 0.188 | -0.031 | 15.722 | 0.001 |
| | | 4 | -0.160 | -0.212 | 17.945 | 0.001 |
| | | 5 | -0.045 | -0.176 | 18.119 | 0.003 |
| | | 6 | 0.084 | -0.133 | 18.744 | 0.005 |
| | | 7 | 0.058 | 0.019 | 19.046 | 0.008 |
| | | 8 | -0.167 | -0.194 | 21.579 | 0.006 |
| | | 9 | 0.044 | -0.133 | 21.760 | 0.010 |
| | | 10 | 0.135 | -0.004 | 23.464 | 0.009 |
| | | 11 | -0.047 | 0.055 | 23.677 | 0.014 |
| | | 12 | -0.138 | -0.176 | 25.518 | 0.013 |
| | | 13 | 0.006 | -0.229 | 25.522 | 0.020 |
| | | 14 | 0.006 | -0.227 | 25.526 | 0.030 |
| | | 15 | 0.219 | 0.206 | 30.374 | 0.011 |
| | | 16 | -0.058 | 0.050 | 30.718 | 0.015 |
| | | 17 | -0.027 | 0.059 | 30.792 | 0.021 |
| | | 18 | 0.006 | 0.010 | 30.796 | 0.030 |
| | | 19 | -0.116 | 0.043 | 32.237 | 0.029 |
| | | 20 | 0.037 | -0.034 | 32.387 | 0.039 |
| | | 21 | 0.007 | -0.098 | 32.393 | 0.053 |
| | | 22 | -0.035 | -0.116 | 32.531 | 0.069 |
| | | 23 | -0.063 | -0.107 | 32.984 | 0.081 |
| | | 24 | 0.108 | -0.067 | 34.345 | 0.079 |
| | | 25 | 0.054 | -0.070 | 34.694 | 0.094 |
| | | 26 | 0.026 | 0.082 | 34.776 | 0.117 |
| | | 27 | -0.115 | -0.007 | 36.423 | 0.106 |
| | | 28 | -0.036 | -0.059 | 36.583 | 0.128 |
| | | 29 | 0.044 | -0.075 | 36.831 | 0.151 |
| | | 30 | -0.017 | -0.148 | 36.871 | 0.181 |
| | | 31 | 0.119 | -0.010 | 38.780 | 0.159 |
| | | 32 | 0.025 | 0.057 | 38.868 | 0.188 |
| | | 33 | -0.123 | -0.030 | 40.990 | 0.160 |
| | | 34 | 0.027 | 0.040 | 41.096 | 0.188 |
| | | 35 | 0.090 | 0.150 | 42.282 | 0.185 |
| | | 36 | -0.216 | -0.109 | 49.230 | 0.070 |

### 7.4.2 Close 2

**China – 1st differences**

Date: 12/25/16 Time: 02:27
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.546 | 0.546 | 25.025 | 0.000 |
| | | 2 | 0.240 | -0.082 | 29.946 | 0.000 |
| | | 3 | 0.038 | -0.086 | 30.067 | 0.000 |
| | | 4 | -0.255 | -0.322 | 35.767 | 0.000 |
| | | 5 | -0.281 | 0.022 | 42.767 | 0.000 |
| | | 6 | -0.091 | 0.195 | 43.506 | 0.000 |
| | | 7 | -0.123 | -0.199 | 44.892 | 0.000 |
| | | 8 | -0.155 | -0.205 | 47.115 | 0.000 |
| | | 9 | 0.017 | 0.192 | 47.144 | 0.000 |
| | | 10 | -0.087 | -0.141 | 47.857 | 0.000 |
| | | 11 | -0.025 | 0.090 | 47.918 | 0.000 |
| | | 12 | 0.118 | 0.002 | 49.268 | 0.000 |
| | | 13 | 0.035 | -0.087 | 49.393 | 0.000 |
| | | 14 | 0.022 | 0.053 | 49.441 | 0.000 |
| | | 15 | 0.067 | -0.020 | 49.902 | 0.000 |
| | | 16 | -0.072 | -0.107 | 50.441 | 0.000 |
| | | 17 | -0.206 | -0.173 | 54.908 | 0.000 |
| | | 18 | -0.114 | 0.032 | 56.295 | 0.000 |
| | | 19 | -0.271 | -0.213 | 64.233 | 0.000 |
| | | 20 | -0.230 | -0.002 | 70.057 | 0.000 |
| | | 21 | -0.044 | -0.013 | 70.277 | 0.000 |
| | | 22 | -0.045 | -0.068 | 70.503 | 0.000 |
| | | 23 | 0.011 | -0.037 | 70.517 | 0.000 |
| | | 24 | 0.067 | -0.163 | 71.052 | 0.000 |
| | | 25 | -0.071 | -0.174 | 71.664 | 0.000 |
| | | 26 | -0.101 | 0.053 | 72.905 | 0.000 |
| | | 27 | 0.044 | -0.024 | 73.147 | 0.000 |
| | | 28 | -0.018 | -0.118 | 73.187 | 0.000 |
| | | 29 | 0.031 | -0.051 | 73.312 | 0.000 |
| | | 30 | 0.163 | 0.057 | 76.826 | 0.000 |
| | | 31 | 0.081 | 0.043 | 77.712 | 0.000 |
| | | 32 | 0.048 | -0.098 | 78.033 | 0.000 |
| | | 33 | 0.144 | 0.039 | 80.937 | 0.000 |
| | | 34 | 0.022 | -0.105 | 81.009 | 0.000 |
| | | 35 | -0.005 | 0.066 | 81.012 | 0.000 |
| | | 36 | 0.112 | -0.004 | 82.871 | 0.000 |

**China – 2nd differences**

Date: 12/25/16 Time: 02:28
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.133 | -0.133 | 1.4790 | 0.224 |
| | | 2 | -0.117 | -0.137 | 2.6205 | 0.270 |
| | | 3 | 0.114 | 0.080 | 3.7182 | 0.294 |
| | | 4 | -0.275 | -0.274 | 10.236 | 0.037 |
| | | 5 | -0.223 | -0.305 | 14.603 | 0.012 |
| | | 6 | 0.238 | 0.096 | 19.637 | 0.003 |
| | | 7 | -0.000 | 0.033 | 19.637 | 0.006 |
| | | 8 | -0.230 | -0.298 | 24.469 | 0.002 |
| | | 9 | 0.285 | 0.073 | 31.966 | 0.000 |
| | | 10 | -0.168 | -0.159 | 34.599 | 0.000 |
| | | 11 | -0.084 | -0.011 | 35.267 | 0.000 |
| | | 12 | 0.249 | 0.063 | 41.265 | 0.000 |
| | | 13 | -0.070 | -0.073 | 41.738 | 0.000 |
| | | 14 | -0.057 | 0.028 | 42.065 | 0.000 |
| | | 15 | 0.211 | 0.113 | 46.578 | 0.000 |
| | | 16 | -0.014 | 0.092 | 46.599 | 0.000 |
| | | 17 | -0.243 | -0.104 | 52.742 | 0.000 |
| | | 18 | 0.225 | 0.078 | 58.094 | 0.000 |
| | | 19 | -0.182 | -0.076 | 61.652 | 0.000 |
| | | 20 | -0.155 | -0.045 | 64.286 | 0.000 |
| | | 21 | 0.210 | 0.005 | 69.196 | 0.000 |
| | | 22 | -0.102 | -0.109 | 70.369 | 0.000 |
| | | 23 | -0.046 | 0.010 | 70.608 | 0.000 |
| | | 24 | 0.224 | 0.073 | 76.485 | 0.000 |
| | | 25 | -0.095 | -0.134 | 77.557 | 0.000 |
| | | 26 | -0.139 | -0.032 | 79.892 | 0.000 |
| | | 27 | 0.266 | 0.076 | 88.632 | 0.000 |
| | | 28 | -0.115 | -0.021 | 90.307 | 0.000 |
| | | 29 | -0.113 | -0.034 | 91.936 | 0.000 |
| | | 30 | 0.138 | -0.134 | 94.428 | 0.000 |
| | | 31 | -0.075 | 0.057 | 95.184 | 0.000 |
| | | 32 | -0.184 | -0.093 | 99.816 | 0.000 |
| | | 33 | 0.245 | 0.075 | 108.22 | 0.000 |
| | | 34 | -0.081 | -0.108 | 109.15 | 0.000 |
| | | 35 | -0.131 | -0.031 | 111.65 | 0.000 |
| | | 36 | 0.181 | -0.037 | 116.53 | 0.000 |

## Euro Area – 1st differences

Date: 12/25/16 Time: 02:30
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.232 | 0.232 | 4.5405 | 0.033 |
| 2 | 0.207 | 0.161 | 8.1705 | 0.017 |
| 3 | 0.205 | 0.139 | 11.805 | 0.008 |
| 4 | 0.001 | -0.105 | 11.805 | 0.019 |
| 5 | 0.024 | -0.016 | 11.858 | 0.037 |
| 6 | 0.104 | 0.103 | 12.837 | 0.046 |
| 7 | 0.093 | 0.087 | 13.629 | 0.058 |
| 8 | -0.126 | -0.218 | 15.083 | 0.058 |
| 9 | 0.015 | 0.013 | 15.104 | 0.088 |
| 10 | -0.007 | 0.040 | 15.109 | 0.128 |
| 11 | -0.079 | -0.016 | 15.706 | 0.152 |
| 12 | -0.099 | -0.151 | 16.654 | 0.163 |
| 13 | -0.052 | -0.018 | 16.923 | 0.203 |
| 14 | -0.033 | 0.086 | 17.030 | 0.255 |
| 15 | -0.026 | 0.050 | 17.099 | 0.313 |
| 16 | -0.136 | -0.248 | 19.011 | 0.268 |
| 17 | -0.117 | -0.083 | 20.457 | 0.252 |
| 18 | -0.155 | 0.004 | 23.014 | 0.190 |
| 19 | -0.188 | -0.048 | 26.842 | 0.108 |
| 20 | -0.069 | -0.068 | 27.361 | 0.125 |
| 21 | -0.060 | -0.011 | 27.763 | 0.147 |
| 22 | -0.121 | -0.021 | 29.420 | 0.133 |
| 23 | 0.035 | 0.150 | 29.559 | 0.162 |
| 24 | 0.149 | 0.136 | 32.177 | 0.123 |
| 25 | -0.012 | -0.098 | 32.194 | 0.152 |
| 26 | 0.103 | 0.039 | 33.481 | 0.149 |
| 27 | -0.029 | -0.105 | 33.584 | 0.178 |
| 28 | 0.050 | 0.121 | 33.899 | 0.204 |
| 29 | 0.076 | 0.023 | 34.653 | 0.216 |
| 30 | 0.084 | -0.055 | 35.581 | 0.222 |
| 31 | 0.118 | 0.055 | 37.461 | 0.197 |
| 32 | -0.015 | -0.002 | 37.492 | 0.232 |
| 33 | -0.040 | -0.139 | 37.712 | 0.262 |
| 34 | -0.023 | -0.033 | 37.785 | 0.300 |
| 35 | 0.007 | 0.001 | 37.792 | 0.343 |
| 36 | -0.012 | 0.064 | 37.815 | 0.386 |

## Euro Area – 2nd differences

Date: 12/25/16 Time: 02:30
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.485 | -0.485 | 19.496 | 0.000 |
| 2 | -0.014 | -0.325 | 19.513 | 0.000 |
| 3 | 0.133 | -0.049 | 21.013 | 0.000 |
| 4 | -0.159 | -0.147 | 23.190 | 0.000 |
| 5 | -0.020 | -0.216 | 23.224 | 0.000 |
| 6 | 0.049 | -0.176 | 23.434 | 0.001 |
| 7 | 0.137 | 0.127 | 25.129 | 0.001 |
| 8 | -0.233 | -0.121 | 30.069 | 0.000 |
| 9 | 0.106 | -0.127 | 31.104 | 0.000 |
| 10 | 0.031 | -0.064 | 31.191 | 0.001 |
| 11 | -0.035 | 0.062 | 31.306 | 0.001 |
| 12 | -0.036 | -0.078 | 31.434 | 0.002 |
| 13 | 0.012 | -0.160 | 31.449 | 0.003 |
| 14 | 0.011 | -0.109 | 31.462 | 0.005 |
| 15 | 0.080 | 0.186 | 32.106 | 0.006 |
| 16 | -0.088 | -0.007 | 32.891 | 0.008 |
| 17 | 0.035 | -0.090 | 33.015 | 0.011 |
| 18 | -0.004 | -0.041 | 33.017 | 0.017 |
| 19 | -0.098 | -0.021 | 34.051 | 0.018 |
| 20 | 0.074 | -0.076 | 34.655 | 0.022 |
| 21 | 0.044 | -0.057 | 34.866 | 0.029 |
| 22 | -0.144 | -0.223 | 37.204 | 0.022 |
| 23 | 0.025 | -0.194 | 37.275 | 0.030 |
| 24 | 0.181 | 0.052 | 41.127 | 0.016 |
| 25 | -0.173 | -0.066 | 44.699 | 0.009 |
| 26 | 0.164 | 0.082 | 47.969 | 0.005 |
| 27 | -0.141 | -0.147 | 50.426 | 0.004 |
| 28 | 0.032 | -0.040 | 50.555 | 0.006 |
| 29 | 0.015 | 0.042 | 50.584 | 0.008 |
| 30 | -0.022 | -0.062 | 50.647 | 0.011 |
| 31 | 0.110 | -0.018 | 52.271 | 0.010 |
| 32 | -0.074 | 0.114 | 53.010 | 0.011 |
| 33 | -0.026 | 0.005 | 53.106 | 0.015 |
| 34 | -0.010 | -0.024 | 53.120 | 0.019 |
| 35 | 0.034 | -0.090 | 53.285 | 0.025 |
| 36 | -0.073 | -0.093 | 54.074 | 0.027 |

## United States – 1st differences

Date: 12/25/16 Time: 02:31
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.485 | 0.485 | 19.784 | 0.000 |
| 2 | 0.177 | -0.077 | 22.444 | 0.000 |
| 3 | 0.094 | 0.051 | 23.206 | 0.000 |
| 4 | 0.013 | -0.057 | 23.220 | 0.000 |
| 5 | 0.111 | 0.169 | 24.302 | 0.000 |
| 6 | 0.136 | 0.017 | 25.957 | 0.000 |
| 7 | -0.019 | -0.140 | 25.989 | 0.001 |
| 8 | -0.149 | -0.131 | 28.021 | 0.000 |
| 9 | -0.029 | 0.163 | 28.102 | 0.001 |
| 10 | 0.022 | -0.006 | 28.148 | 0.002 |
| 11 | 0.070 | 0.041 | 28.614 | 0.003 |
| 12 | -0.008 | -0.136 | 28.620 | 0.004 |
| 13 | -0.099 | 0.009 | 29.596 | 0.005 |
| 14 | -0.009 | 0.115 | 29.605 | 0.009 |
| 15 | -0.007 | -0.088 | 29.610 | 0.013 |
| 16 | -0.081 | -0.161 | 30.293 | 0.017 |
| 17 | -0.122 | -0.032 | 31.847 | 0.016 |
| 18 | -0.156 | 0.003 | 34.432 | 0.011 |
| 19 | -0.208 | -0.114 | 39.114 | 0.004 |
| 20 | -0.186 | -0.155 | 42.944 | 0.002 |
| 21 | -0.155 | -0.030 | 45.623 | 0.001 |
| 22 | -0.177 | 0.011 | 49.193 | 0.001 |
| 23 | -0.011 | 0.182 | 49.207 | 0.001 |
| 24 | 0.109 | 0.044 | 50.611 | 0.001 |
| 25 | 0.179 | 0.112 | 54.448 | 0.001 |
| 26 | 0.166 | 0.041 | 57.797 | 0.000 |
| 27 | -0.010 | -0.122 | 57.809 | 0.001 |
| 28 | -0.024 | -0.003 | 57.883 | 0.001 |
| 29 | 0.051 | 0.026 | 58.220 | 0.001 |
| 30 | 0.076 | 0.010 | 58.973 | 0.001 |
| 31 | 0.139 | 0.145 | 61.589 | 0.001 |
| 32 | 0.107 | -0.007 | 63.152 | 0.001 |
| 33 | -0.087 | -0.158 | 64.219 | 0.001 |
| 34 | -0.069 | 0.003 | 64.894 | 0.001 |
| 35 | -0.042 | -0.131 | 65.153 | 0.001 |
| 36 | -0.046 | -0.016 | 65.474 | 0.002 |

## United States – 2nd differences

Date: 12/25/16 Time: 02:31
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.207 | -0.207 | 3.5648 | 0.059 |
| 2 | -0.212 | -0.267 | 7.3541 | 0.025 |
| 3 | 0.005 | -0.120 | 7.3560 | 0.061 |
| 4 | -0.176 | -0.300 | 10.043 | 0.040 |
| 5 | 0.071 | -0.115 | 10.487 | 0.063 |
| 6 | 0.163 | 0.029 | 12.855 | 0.045 |
| 7 | -0.015 | 0.019 | 12.874 | 0.075 |
| 8 | -0.244 | -0.269 | 18.300 | 0.019 |
| 9 | 0.042 | -0.108 | 18.464 | 0.030 |
| 10 | 0.030 | -0.104 | 18.551 | 0.046 |
| 11 | 0.120 | 0.062 | 19.923 | 0.046 |
| 12 | 0.005 | -0.089 | 19.926 | 0.069 |
| 13 | -0.160 | -0.178 | 22.434 | 0.049 |
| 14 | 0.075 | 0.024 | 22.999 | 0.060 |
| 15 | 0.063 | 0.093 | 23.394 | 0.076 |
| 16 | -0.021 | -0.047 | 23.438 | 0.103 |
| 17 | -0.003 | -0.092 | 23.439 | 0.135 |
| 18 | 0.020 | 0.048 | 23.483 | 0.173 |
| 19 | -0.069 | 0.072 | 24.001 | 0.196 |
| 20 | -0.010 | -0.053 | 24.012 | 0.242 |
| 21 | 0.045 | -0.112 | 24.235 | 0.282 |
| 22 | -0.159 | -0.218 | 27.108 | 0.207 |
| 23 | 0.054 | -0.037 | 27.444 | 0.238 |
| 24 | 0.038 | -0.102 | 27.614 | 0.277 |
| 25 | 0.074 | -0.048 | 28.267 | 0.296 |
| 26 | 0.148 | 0.122 | 30.928 | 0.231 |
| 27 | -0.153 | 0.011 | 33.837 | 0.171 |
| 28 | -0.074 | -0.032 | 34.536 | 0.184 |
| 29 | 0.062 | -0.009 | 35.029 | 0.204 |
| 30 | -0.064 | -0.139 | 35.567 | 0.223 |
| 31 | 0.108 | 0.061 | 37.136 | 0.207 |
| 32 | 0.126 | 0.156 | 39.305 | 0.175 |
| 33 | -0.210 | -0.036 | 45.460 | 0.073 |
| 34 | 0.002 | 0.069 | 45.460 | 0.091 |
| 35 | 0.030 | -0.003 | 45.591 | 0.108 |
| 36 | -0.052 | -0.017 | 45.989 | 0.123 |

## United Kingdom – 1st differences

Date: 12/25/16 Time: 02:33
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.426 | 0.426 | 15.241 | 0.000 |
| 2 | 0.174 | -0.009 | 17.807 | 0.000 |
| 3 | 0.026 | -0.055 | 17.864 | 0.000 |
| 4 | -0.014 | -0.005 | 17.882 | 0.001 |
| 5 | 0.103 | 0.148 | 18.828 | 0.002 |
| 6 | 0.080 | -0.017 | 19.402 | 0.004 |
| 7 | -0.028 | -0.105 | 19.473 | 0.007 |
| 8 | -0.195 | -0.183 | 22.959 | 0.003 |
| 9 | 0.014 | 0.250 | 22.978 | 0.006 |
| 10 | -0.010 | -0.100 | 22.988 | 0.011 |
| 11 | 0.005 | -0.032 | 22.991 | 0.018 |
| 12 | -0.088 | -0.127 | 23.747 | 0.022 |
| 13 | -0.217 | -0.071 | 28.390 | 0.008 |
| 14 | -0.071 | 0.107 | 28.895 | 0.011 |
| 15 | -0.055 | -0.092 | 29.204 | 0.015 |
| 16 | -0.110 | -0.193 | 30.445 | 0.016 |
| 17 | -0.132 | 0.057 | 32.279 | 0.014 |
| 18 | -0.195 | -0.122 | 36.341 | 0.006 |
| 19 | -0.202 | -0.082 | 40.763 | 0.003 |
| 20 | -0.154 | -0.141 | 43.364 | 0.002 |
| 21 | -0.100 | -0.024 | 44.486 | 0.002 |
| 22 | -0.069 | 0.105 | 45.029 | 0.003 |
| 23 | 0.086 | 0.118 | 45.886 | 0.003 |
| 24 | 0.181 | 0.063 | 49.761 | 0.002 |
| 25 | 0.202 | 0.108 | 54.652 | 0.001 |
| 26 | 0.119 | -0.094 | 56.394 | 0.001 |
| 27 | -0.030 | -0.062 | 56.508 | 0.001 |
| 28 | -0.032 | -0.047 | 56.635 | 0.001 |
| 29 | 0.013 | -0.023 | 56.656 | 0.002 |
| 30 | 0.083 | 0.069 | 57.561 | 0.002 |
| 31 | 0.097 | 0.031 | 58.829 | 0.002 |
| 32 | 0.063 | -0.009 | 59.374 | 0.002 |
| 33 | -0.081 | -0.161 | 60.288 | 0.003 |
| 34 | 0.029 | 0.086 | 60.405 | 0.004 |
| 35 | 0.039 | -0.052 | 60.626 | 0.005 |
| 36 | 0.025 | -0.001 | 60.718 | 0.006 |

## United Kingdom – 2nd differences

Date: 12/25/16 Time: 02:34
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.286 | -0.286 | 6.7706 | 0.009 |
| 2 | -0.084 | -0.180 | 7.3616 | 0.025 |
| 3 | -0.087 | -0.187 | 7.9995 | 0.046 |
| 4 | -0.141 | -0.288 | 9.7246 | 0.045 |
| 5 | 0.119 | -0.095 | 10.972 | 0.052 |
| 6 | 0.069 | -0.011 | 11.390 | 0.077 |
| 7 | 0.057 | 0.055 | 11.678 | 0.112 |
| 8 | -0.336 | -0.367 | 21.972 | 0.005 |
| 9 | 0.193 | -0.014 | 25.422 | 0.003 |
| 10 | -0.016 | -0.050 | 25.447 | 0.005 |
| 11 | 0.083 | 0.021 | 26.101 | 0.006 |
| 12 | 0.040 | -0.044 | 26.254 | 0.010 |
| 13 | -0.226 | -0.190 | 31.243 | 0.003 |
| 14 | 0.112 | 0.025 | 32.498 | 0.003 |
| 15 | 0.043 | 0.089 | 32.683 | 0.005 |
| 16 | -0.023 | -0.163 | 32.736 | 0.008 |
| 17 | 0.043 | 0.020 | 32.926 | 0.012 |
| 18 | -0.056 | -0.014 | 33.256 | 0.016 |
| 19 | -0.033 | 0.027 | 33.375 | 0.022 |
| 20 | -0.004 | -0.085 | 33.377 | 0.031 |
| 21 | -0.001 | -0.218 | 33.377 | 0.042 |
| 22 | -0.091 | -0.167 | 34.323 | 0.046 |
| 23 | 0.060 | -0.077 | 34.735 | 0.055 |
| 24 | 0.067 | -0.110 | 35.268 | 0.065 |
| 25 | 0.092 | 0.092 | 36.284 | 0.067 |
| 26 | 0.057 | 0.077 | 36.674 | 0.080 |
| 27 | -0.137 | 0.037 | 38.996 | 0.063 |
| 28 | -0.036 | 0.008 | 39.156 | 0.078 |
| 29 | 0.002 | -0.055 | 39.156 | 0.099 |
| 30 | 0.025 | -0.012 | 39.237 | 0.120 |
| 31 | 0.054 | 0.052 | 39.631 | 0.138 |
| 32 | 0.059 | 0.151 | 40.114 | 0.154 |
| 33 | -0.224 | -0.099 | 47.142 | 0.053 |
| 34 | 0.096 | 0.032 | 48.456 | 0.051 |
| 35 | 0.027 | -0.006 | 48.562 | 0.063 |
| 36 | -0.047 | -0.072 | 48.893 | 0.074 |

## Japan – 1st differences

Date: 12/25/16 Time: 02:35
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.353 | 0.353 | 10.473 | 0.001 |
| 2 | 0.074 | -0.058 | 10.936 | 0.004 |
| 3 | 0.034 | 0.031 | 11.034 | 0.012 |
| 4 | -0.090 | -0.124 | 11.734 | 0.019 |
| 5 | 0.000 | 0.087 | 11.734 | 0.039 |
| 6 | -0.001 | -0.036 | 11.734 | 0.068 |
| 7 | -0.027 | -0.009 | 11.800 | 0.107 |
| 8 | -0.130 | -0.154 | 13.347 | 0.100 |
| 9 | 0.020 | 0.157 | 13.384 | 0.146 |
| 10 | 0.034 | -0.040 | 13.493 | 0.197 |
| 11 | -0.127 | -0.142 | 15.036 | 0.181 |
| 12 | -0.178 | -0.152 | 18.136 | 0.112 |
| 13 | -0.060 | 0.119 | 18.494 | 0.140 |
| 14 | 0.121 | 0.155 | 19.957 | 0.132 |
| 15 | 0.221 | 0.130 | 24.929 | 0.051 |
| 16 | 0.023 | -0.234 | 24.983 | 0.070 |
| 17 | -0.125 | -0.070 | 26.626 | 0.064 |
| 18 | -0.247 | -0.199 | 33.158 | 0.016 |
| 19 | -0.194 | -0.008 | 37.258 | 0.007 |
| 20 | -0.093 | -0.100 | 38.203 | 0.008 |
| 21 | -0.205 | -0.144 | 42.916 | 0.003 |
| 22 | -0.055 | 0.099 | 43.259 | 0.004 |
| 23 | -0.005 | 0.015 | 43.262 | 0.006 |
| 24 | 0.088 | 0.030 | 44.166 | 0.007 |
| 25 | 0.129 | 0.022 | 46.167 | 0.006 |
| 26 | -0.066 | -0.109 | 46.694 | 0.008 |
| 27 | -0.083 | 0.026 | 47.553 | 0.009 |
| 28 | -0.004 | -0.003 | 47.555 | 0.012 |
| 29 | 0.145 | 0.018 | 50.288 | 0.008 |
| 30 | 0.156 | -0.008 | 53.502 | 0.005 |
| 31 | 0.152 | 0.155 | 56.627 | 0.003 |
| 32 | 0.029 | -0.041 | 56.744 | 0.005 |
| 33 | -0.100 | -0.058 | 58.140 | 0.004 |
| 34 | -0.024 | -0.043 | 58.224 | 0.006 |
| 35 | -0.045 | 0.013 | 58.526 | 0.008 |
| 36 | -0.041 | 0.055 | 58.777 | 0.010 |

## Japan – 2nd differences

Date: 12/25/16 Time: 02:35
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.252 | -0.252 | 5.2700 | 0.022 |
| 2 | -0.183 | -0.263 | 8.0946 | 0.017 |
| 3 | 0.053 | -0.082 | 8.3333 | 0.040 |
| 4 | -0.162 | -0.251 | 10.593 | 0.032 |
| 5 | 0.059 | -0.091 | 10.901 | 0.053 |
| 6 | 0.024 | -0.098 | 10.951 | 0.090 |
| 7 | 0.025 | -0.010 | 11.009 | 0.138 |
| 8 | -0.187 | -0.278 | 14.211 | 0.076 |
| 9 | 0.101 | -0.059 | 15.155 | 0.087 |
| 10 | 0.144 | 0.045 | 17.090 | 0.072 |
| 11 | -0.074 | 0.005 | 17.610 | 0.091 |
| 12 | -0.143 | -0.243 | 19.574 | 0.076 |
| 13 | -0.041 | -0.212 | 19.741 | 0.102 |
| 14 | 0.070 | -0.120 | 20.223 | 0.123 |
| 15 | 0.239 | 0.216 | 25.965 | 0.038 |
| 16 | -0.012 | 0.054 | 25.979 | 0.054 |
| 17 | -0.036 | 0.123 | 26.115 | 0.072 |
| 18 | -0.150 | -0.076 | 28.499 | 0.055 |
| 19 | -0.027 | 0.012 | 28.577 | 0.073 |
| 20 | 0.138 | 0.030 | 30.667 | 0.060 |
| 21 | -0.204 | -0.206 | 35.289 | 0.026 |
| 22 | 0.077 | -0.055 | 35.963 | 0.031 |
| 23 | -0.059 | -0.103 | 36.360 | 0.038 |
| 24 | 0.057 | -0.050 | 36.741 | 0.046 |
| 25 | 0.197 | 0.048 | 41.355 | 0.021 |
| 26 | -0.104 | -0.030 | 42.659 | 0.021 |
| 27 | -0.098 | -0.031 | 43.852 | 0.021 |
| 28 | -0.056 | -0.040 | 44.247 | 0.026 |
| 29 | 0.109 | -0.018 | 45.768 | 0.025 |
| 30 | -0.004 | -0.161 | 45.770 | 0.033 |
| 31 | 0.100 | 0.019 | 47.099 | 0.032 |
| 32 | 0.006 | 0.060 | 47.103 | 0.042 |
| 33 | -0.119 | 0.077 | 49.069 | 0.036 |
| 34 | 0.038 | 0.008 | 49.279 | 0.044 |
| 35 | -0.014 | -0.038 | 49.308 | 0.055 |
| 36 | -0.039 | 0.068 | 49.536 | 0.066 |

### 7.4.3 CPI

**China – 1st differences**

Date: 12/25/16 Time: 02:37
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.672 | 0.672 | 37.939 | 0.000 |
| | | 2 | 0.518 | 0.122 | 60.799 | 0.000 |
| | | 3 | 0.332 | -0.103 | 70.301 | 0.000 |
| | | 4 | 0.134 | -0.171 | 71.865 | 0.000 |
| | | 5 | -0.001 | -0.069 | 71.865 | 0.000 |
| | | 6 | -0.110 | -0.055 | 72.945 | 0.000 |
| | | 7 | -0.149 | 0.015 | 74.958 | 0.000 |
| | | 8 | -0.172 | -0.023 | 77.679 | 0.000 |
| | | 9 | -0.148 | 0.016 | 79.717 | 0.000 |
| | | 10 | -0.101 | 0.025 | 80.689 | 0.000 |
| | | 11 | -0.051 | 0.019 | 80.937 | 0.000 |
| | | 12 | 0.052 | 0.113 | 81.200 | 0.000 |
| | | 13 | 0.135 | 0.080 | 82.992 | 0.000 |
| | | 14 | 0.081 | -0.187 | 83.646 | 0.000 |
| | | 15 | 0.121 | 0.064 | 85.127 | 0.000 |
| | | 16 | -0.010 | -0.205 | 85.138 | 0.000 |
| | | 17 | -0.002 | 0.130 | 85.138 | 0.000 |
| | | 18 | -0.108 | -0.149 | 86.392 | 0.000 |
| | | 19 | -0.174 | -0.036 | 89.658 | 0.000 |
| | | 20 | -0.215 | -0.077 | 94.750 | 0.000 |
| | | 21 | -0.193 | 0.114 | 98.942 | 0.000 |
| | | 22 | -0.157 | -0.016 | 101.75 | 0.000 |
| | | 23 | -0.195 | -0.148 | 106.17 | 0.000 |
| | | 24 | -0.197 | -0.139 | 110.74 | 0.000 |
| | | 25 | -0.136 | 0.068 | 112.98 | 0.000 |
| | | 26 | -0.123 | -0.045 | 114.84 | 0.000 |
| | | 27 | -0.066 | 0.066 | 115.38 | 0.000 |
| | | 28 | -0.007 | -0.019 | 115.39 | 0.000 |
| | | 29 | -0.046 | -0.101 | 115.66 | 0.000 |
| | | 30 | -0.001 | -0.030 | 115.66 | 0.000 |
| | | 31 | -0.036 | 0.057 | 115.83 | 0.000 |
| | | 32 | -0.063 | -0.118 | 116.37 | 0.000 |
| | | 33 | -0.071 | 0.079 | 117.09 | 0.000 |
| | | 34 | -0.028 | -0.037 | 117.20 | 0.000 |
| | | 35 | -0.133 | -0.250 | 119.80 | 0.000 |
| | | 36 | -0.140 | 0.035 | 122.75 | 0.000 |

**China – 2nd differences**

Date: 12/25/16 Time: 02:38
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.273 | -0.273 | 6.1950 | 0.013 |
| | | 2 | 0.084 | 0.011 | 6.7947 | 0.033 |
| | | 3 | -0.003 | 0.024 | 6.7956 | 0.079 |
| | | 4 | -0.141 | -0.148 | 8.5101 | 0.075 |
| | | 5 | 0.052 | -0.028 | 8.7430 | 0.120 |
| | | 6 | -0.101 | -0.087 | 9.6390 | 0.141 |
| | | 7 | 0.003 | -0.053 | 9.6396 | 0.210 |
| | | 8 | -0.093 | -0.133 | 10.436 | 0.236 |
| | | 9 | -0.018 | -0.086 | 10.467 | 0.314 |
| | | 10 | 0.040 | -0.008 | 10.615 | 0.388 |
| | | 11 | -0.097 | -0.113 | 11.503 | 0.402 |
| | | 12 | 0.038 | -0.075 | 11.641 | 0.475 |
| | | 13 | 0.248 | 0.259 | 17.646 | 0.171 |
| | | 14 | -0.181 | -0.080 | 20.887 | 0.105 |
| | | 15 | 0.331 | 0.247 | 31.937 | 0.007 |
| | | 16 | -0.226 | -0.098 | 37.188 | 0.002 |
| | | 17 | 0.108 | 0.097 | 38.393 | 0.002 |
| | | 18 | -0.040 | -0.027 | 38.564 | 0.003 |
| | | 19 | -0.063 | 0.028 | 38.996 | 0.004 |
| | | 20 | -0.034 | -0.120 | 39.126 | 0.006 |
| | | 21 | -0.119 | -0.032 | 40.710 | 0.006 |
| | | 22 | 0.126 | 0.052 | 42.497 | 0.005 |
| | | 23 | -0.023 | 0.098 | 42.558 | 0.008 |
| | | 24 | -0.119 | -0.172 | 44.213 | 0.007 |
| | | 25 | 0.111 | 0.051 | 45.678 | 0.007 |
| | | 26 | -0.077 | -0.101 | 46.401 | 0.008 |
| | | 27 | 0.012 | -0.007 | 46.420 | 0.011 |
| | | 28 | 0.155 | -0.040 | 49.466 | 0.007 |
| | | 29 | -0.163 | -0.000 | 52.892 | 0.004 |
| | | 30 | 0.137 | -0.094 | 55.365 | 0.003 |
| | | 31 | -0.043 | 0.133 | 55.609 | 0.004 |
| | | 32 | 0.009 | -0.119 | 55.619 | 0.006 |
| | | 33 | -0.107 | -0.009 | 57.231 | 0.006 |
| | | 34 | 0.124 | 0.122 | 59.436 | 0.004 |
| | | 35 | -0.069 | -0.046 | 60.125 | 0.005 |
| | | 36 | -0.065 | -0.095 | 60.761 | 0.006 |

**Euro Area – 1st differences**

Date: 12/25/16 Time: 02:38
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.430 | 0.430 | 15.517 | 0.000 |
| | | 2 | 0.263 | 0.096 | 21.408 | 0.000 |
| | | 3 | 0.254 | 0.137 | 26.979 | 0.000 |
| | | 4 | -0.054 | -0.277 | 27.232 | 0.000 |
| | | 5 | -0.103 | -0.053 | 28.166 | 0.000 |
| | | 6 | -0.034 | 0.053 | 28.271 | 0.000 |
| | | 7 | -0.049 | 0.067 | 28.485 | 0.000 |
| | | 8 | -0.184 | -0.229 | 31.589 | 0.000 |
| | | 9 | -0.098 | -0.001 | 32.492 | 0.000 |
| | | 10 | -0.096 | -0.027 | 33.371 | 0.000 |
| | | 11 | -0.125 | 0.042 | 34.862 | 0.000 |
| | | 12 | -0.099 | -0.118 | 35.826 | 0.000 |
| | | 13 | -0.121 | -0.098 | 37.284 | 0.000 |
| | | 14 | 0.007 | 0.155 | 37.288 | 0.001 |
| | | 15 | -0.004 | 0.016 | 37.290 | 0.001 |
| | | 16 | -0.002 | -0.065 | 37.290 | 0.002 |
| | | 17 | 0.154 | 0.105 | 39.789 | 0.001 |
| | | 18 | 0.096 | 0.019 | 40.777 | 0.002 |
| | | 19 | 0.062 | 0.016 | 41.194 | 0.002 |
| | | 20 | 0.120 | -0.010 | 42.794 | 0.002 |
| | | 21 | 0.100 | 0.030 | 43.915 | 0.002 |
| | | 22 | 0.099 | 0.137 | 45.036 | 0.003 |
| | | 23 | 0.109 | 0.004 | 46.415 | 0.003 |
| | | 24 | 0.043 | -0.118 | 46.638 | 0.004 |
| | | 25 | -0.046 | -0.049 | 46.888 | 0.005 |
| | | 26 | -0.098 | -0.024 | 48.060 | 0.005 |
| | | 27 | -0.152 | -0.032 | 50.953 | 0.004 |
| | | 28 | -0.107 | 0.019 | 52.403 | 0.003 |
| | | 29 | -0.018 | 0.087 | 52.446 | 0.005 |
| | | 30 | -0.079 | -0.039 | 53.263 | 0.006 |
| | | 31 | -0.028 | -0.036 | 53.372 | 0.008 |
| | | 32 | -0.009 | -0.040 | 53.384 | 0.010 |
| | | 33 | -0.054 | 0.050 | 53.797 | 0.013 |
| | | 34 | -0.106 | -0.157 | 55.409 | 0.012 |
| | | 35 | -0.082 | -0.057 | 56.384 | 0.012 |
| | | 36 | -0.110 | -0.061 | 58.183 | 0.011 |

**Euro Area – 2nd differences**

Date: 12/25/16 Time: 02:39
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.340 | -0.340 | 9.6109 | 0.002 |
| | | 2 | -0.141 | -0.291 | 11.291 | 0.004 |
| | | 3 | 0.256 | 0.117 | 16.869 | 0.001 |
| | | 4 | -0.225 | -0.144 | 21.220 | 0.000 |
| | | 5 | -0.100 | -0.202 | 22.092 | 0.001 |
| | | 6 | 0.071 | -0.174 | 22.533 | 0.001 |
| | | 7 | 0.101 | 0.102 | 23.447 | 0.001 |
| | | 8 | -0.184 | -0.138 | 26.534 | 0.001 |
| | | 9 | 0.066 | -0.092 | 26.935 | 0.001 |
| | | 10 | 0.022 | -0.145 | 26.979 | 0.003 |
| | | 11 | -0.040 | 0.016 | 27.130 | 0.004 |
| | | 12 | 0.036 | -0.024 | 27.255 | 0.007 |
| | | 13 | -0.133 | -0.243 | 28.974 | 0.007 |
| | | 14 | 0.122 | -0.078 | 30.456 | 0.007 |
| | | 15 | -0.004 | 0.002 | 30.458 | 0.010 |
| | | 16 | -0.147 | -0.172 | 32.670 | 0.008 |
| | | 17 | 0.186 | -0.064 | 36.281 | 0.004 |
| | | 18 | -0.017 | -0.061 | 36.309 | 0.006 |
| | | 19 | -0.080 | -0.023 | 37.003 | 0.008 |
| | | 20 | 0.072 | -0.059 | 37.575 | 0.010 |
| | | 21 | -0.023 | -0.160 | 37.633 | 0.014 |
| | | 22 | -0.007 | -0.026 | 37.639 | 0.020 |
| | | 23 | 0.075 | 0.106 | 38.286 | 0.024 |
| | | 24 | 0.013 | 0.019 | 38.305 | 0.032 |
| | | 25 | -0.017 | 0.009 | 38.339 | 0.043 |
| | | 26 | 0.003 | 0.006 | 38.340 | 0.056 |
| | | 27 | -0.112 | -0.068 | 39.903 | 0.052 |
| | | 28 | -0.036 | -0.125 | 40.069 | 0.065 |
| | | 29 | 0.131 | 0.004 | 42.268 | 0.053 |
| | | 30 | -0.102 | -0.007 | 43.644 | 0.051 |
| | | 31 | 0.034 | 0.006 | 43.799 | 0.063 |
| | | 32 | 0.065 | -0.082 | 44.378 | 0.072 |
| | | 33 | 0.002 | 0.121 | 44.379 | 0.089 |
| | | 34 | -0.062 | 0.009 | 44.927 | 0.100 |
| | | 35 | 0.041 | 0.001 | 45.174 | 0.116 |
| | | 36 | -0.003 | -0.052 | 45.175 | 0.140 |

## United States – 1st differences

Date: 12/25/16 Time: 02:40
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.268 | 0.268 | 6.0211 | 0.014 |
| | | 2 | -0.043 | -0.123 | 6.1754 | 0.046 |
| | | 3 | -0.097 | -0.056 | 6.9867 | 0.072 |
| | | 4 | -0.200 | -0.177 | 10.480 | 0.033 |
| | | 5 | 0.093 | 0.209 | 11.243 | 0.047 |
| | | 6 | 0.138 | 0.023 | 12.957 | 0.044 |
| | | 7 | -0.050 | -0.116 | 13.181 | 0.068 |
| | | 8 | -0.068 | -0.040 | 13.610 | 0.093 |
| | | 9 | -0.101 | -0.016 | 14.569 | 0.103 |
| | | 10 | -0.081 | -0.043 | 15.192 | 0.125 |
| | | 11 | 0.070 | 0.036 | 15.664 | 0.154 |
| | | 12 | 0.040 | -0.014 | 15.824 | 0.199 |
| | | 13 | -0.067 | -0.078 | 16.268 | 0.235 |
| | | 14 | 0.080 | 0.148 | 16.915 | 0.261 |
| | | 15 | -0.040 | -0.090 | 17.078 | 0.314 |
| | | 16 | -0.120 | -0.112 | 18.561 | 0.292 |
| | | 17 | 0.095 | 0.134 | 19.501 | 0.301 |
| | | 18 | 0.040 | 0.033 | 19.673 | 0.352 |
| | | 19 | 0.016 | -0.051 | 19.701 | 0.413 |
| | | 20 | 0.036 | -0.014 | 19.843 | 0.468 |
| | | 21 | -0.055 | 0.050 | 20.178 | 0.510 |
| | | 22 | 0.111 | 0.154 | 21.577 | 0.485 |
| | | 23 | 0.108 | -0.027 | 22.923 | 0.465 |
| | | 24 | 0.088 | 0.099 | 23.826 | 0.472 |
| | | 25 | 0.071 | 0.019 | 24.430 | 0.495 |
| | | 26 | -0.133 | -0.122 | 26.600 | 0.431 |
| | | 27 | -0.076 | 0.071 | 27.316 | 0.447 |
| | | 28 | 0.050 | 0.027 | 27.632 | 0.484 |
| | | 29 | 0.037 | -0.028 | 27.808 | 0.528 |
| | | 30 | -0.047 | -0.077 | 28.105 | 0.565 |
| | | 31 | -0.078 | -0.010 | 28.920 | 0.573 |
| | | 32 | -0.046 | 0.045 | 29.210 | 0.608 |
| | | 33 | -0.006 | -0.009 | 29.216 | 0.656 |
| | | 34 | -0.002 | -0.084 | 29.217 | 0.701 |
| | | 35 | -0.027 | -0.004 | 29.320 | 0.738 |
| | | 36 | -0.107 | -0.136 | 31.036 | 0.704 |

## United States – 2nd differences

Date: 12/25/16 Time: 02:40
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.281 | -0.281 | 6.5441 | 0.011 |
| | | 2 | -0.178 | -0.278 | 9.1985 | 0.010 |
| | | 3 | 0.029 | -0.132 | 9.2723 | 0.026 |
| | | 4 | -0.272 | -0.426 | 15.678 | 0.003 |
| | | 5 | 0.171 | -0.164 | 18.226 | 0.003 |
| | | 6 | 0.160 | -0.023 | 20.488 | 0.002 |
| | | 7 | -0.116 | -0.105 | 21.691 | 0.003 |
| | | 8 | 0.014 | -0.109 | 21.710 | 0.005 |
| | | 9 | -0.040 | -0.074 | 21.855 | 0.009 |
| | | 10 | -0.091 | -0.141 | 22.629 | 0.012 |
| | | 11 | 0.126 | -0.073 | 24.146 | 0.012 |
| | | 12 | 0.053 | -0.006 | 24.420 | 0.018 |
| | | 13 | -0.177 | -0.222 | 27.475 | 0.011 |
| | | 14 | 0.184 | 0.031 | 30.824 | 0.006 |
| | | 15 | -0.028 | 0.040 | 30.901 | 0.009 |
| | | 16 | -0.205 | -0.205 | 35.225 | 0.004 |
| | | 17 | 0.184 | -0.084 | 38.739 | 0.002 |
| | | 18 | -0.020 | 0.001 | 38.783 | 0.003 |
| | | 19 | -0.028 | -0.041 | 38.865 | 0.005 |
| | | 20 | 0.079 | -0.097 | 39.553 | 0.006 |
| | | 21 | -0.179 | -0.182 | 43.102 | 0.003 |
| | | 22 | 0.113 | 0.002 | 44.539 | 0.003 |
| | | 23 | 0.011 | -0.125 | 44.554 | 0.005 |
| | | 24 | 0.002 | -0.024 | 44.554 | 0.007 |
| | | 25 | 0.134 | 0.112 | 46.692 | 0.005 |
| | | 26 | -0.170 | -0.073 | 50.220 | 0.003 |
| | | 27 | -0.064 | -0.036 | 50.733 | 0.004 |
| | | 28 | 0.093 | 0.030 | 51.835 | 0.004 |
| | | 29 | 0.050 | 0.065 | 52.155 | 0.005 |
| | | 30 | -0.039 | -0.015 | 52.359 | 0.007 |
| | | 31 | -0.039 | -0.071 | 52.561 | 0.009 |
| | | 32 | -0.002 | -0.010 | 52.561 | 0.012 |
| | | 33 | 0.020 | 0.054 | 52.617 | 0.016 |
| | | 34 | 0.025 | -0.023 | 52.709 | 0.021 |
| | | 35 | 0.033 | 0.097 | 52.865 | 0.027 |
| | | 36 | -0.024 | 0.046 | 52.948 | 0.034 |

## United Kingdom – 1st differences

Date: 12/25/16 Time: 02:41
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.482 | 0.482 | 19.513 | 0.000 |
| | | 2 | 0.216 | -0.021 | 23.490 | 0.000 |
| | | 3 | 0.213 | 0.152 | 27.398 | 0.000 |
| | | 4 | 0.139 | -0.025 | 29.088 | 0.000 |
| | | 5 | 0.204 | 0.176 | 32.768 | 0.000 |
| | | 6 | 0.407 | 0.307 | 47.623 | 0.000 |
| | | 7 | 0.312 | -0.009 | 56.493 | 0.000 |
| | | 8 | 0.028 | -0.240 | 56.567 | 0.000 |
| | | 9 | 0.039 | 0.036 | 56.707 | 0.000 |
| | | 10 | 0.102 | 0.083 | 57.699 | 0.000 |
| | | 11 | 0.187 | 0.156 | 61.055 | 0.000 |
| | | 12 | 0.200 | -0.106 | 64.944 | 0.000 |
| | | 13 | 0.131 | -0.088 | 66.640 | 0.000 |
| | | 14 | -0.055 | -0.096 | 66.948 | 0.000 |
| | | 15 | -0.180 | -0.103 | 70.234 | 0.000 |
| | | 16 | -0.203 | -0.217 | 74.509 | 0.000 |
| | | 17 | -0.030 | 0.078 | 74.601 | 0.000 |
| | | 18 | 0.049 | 0.046 | 74.860 | 0.000 |
| | | 19 | 0.014 | 0.076 | 74.881 | 0.000 |
| | | 20 | -0.072 | -0.076 | 75.457 | 0.000 |
| | | 21 | -0.096 | 0.093 | 76.491 | 0.000 |
| | | 22 | -0.071 | 0.104 | 77.066 | 0.000 |
| | | 23 | -0.041 | -0.037 | 77.263 | 0.000 |
| | | 24 | -0.019 | -0.177 | 77.306 | 0.000 |
| | | 25 | -0.109 | -0.094 | 78.734 | 0.000 |
| | | 26 | -0.227 | -0.053 | 85.054 | 0.000 |
| | | 27 | -0.324 | -0.151 | 98.089 | 0.000 |
| | | 28 | -0.156 | 0.058 | 101.16 | 0.000 |
| | | 29 | -0.094 | -0.028 | 102.29 | 0.000 |
| | | 30 | -0.122 | -0.062 | 104.25 | 0.000 |
| | | 31 | -0.154 | -0.131 | 107.44 | 0.000 |
| | | 32 | -0.148 | 0.069 | 110.43 | 0.000 |
| | | 33 | -0.240 | -0.010 | 118.50 | 0.000 |
| | | 34 | -0.237 | -0.095 | 126.52 | 0.000 |
| | | 35 | -0.112 | -0.047 | 128.37 | 0.000 |
| | | 36 | -0.127 | 0.111 | 130.79 | 0.000 |

## United Kingdom – 2nd differences

Date: 12/25/16 Time: 02:41
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.251 | -0.251 | 5.2326 | 0.022 |
| | | 2 | -0.251 | -0.335 | 10.540 | 0.005 |
| | | 3 | 0.061 | -0.130 | 10.853 | 0.013 |
| | | 4 | -0.118 | -0.273 | 12.062 | 0.017 |
| | | 5 | -0.132 | -0.369 | 13.593 | 0.018 |
| | | 6 | 0.290 | -0.030 | 21.066 | 0.002 |
| | | 7 | 0.194 | 0.218 | 24.440 | 0.001 |
| | | 8 | -0.290 | -0.062 | 32.121 | 0.000 |
| | | 9 | -0.061 | -0.108 | 32.460 | 0.000 |
| | | 10 | 0.003 | -0.143 | 32.461 | 0.000 |
| | | 11 | 0.061 | 0.097 | 32.814 | 0.001 |
| | | 12 | 0.070 | 0.077 | 33.292 | 0.001 |
| | | 13 | 0.124 | 0.074 | 34.798 | 0.001 |
| | | 14 | -0.056 | 0.093 | 35.114 | 0.001 |
| | | 15 | -0.100 | 0.199 | 36.116 | 0.002 |
| | | 16 | -0.183 | -0.112 | 39.554 | 0.001 |
| | | 17 | 0.116 | -0.059 | 40.953 | 0.001 |
| | | 18 | 0.089 | -0.092 | 41.789 | 0.001 |
| | | 19 | 0.048 | 0.050 | 42.036 | 0.002 |
| | | 20 | -0.064 | -0.131 | 42.479 | 0.002 |
| | | 21 | -0.040 | -0.123 | 42.654 | 0.003 |
| | | 22 | -0.020 | 0.009 | 42.702 | 0.005 |
| | | 23 | 0.033 | 0.169 | 42.823 | 0.007 |
| | | 24 | 0.065 | -0.015 | 43.319 | 0.009 |
| | | 25 | 0.033 | -0.023 | 43.452 | 0.012 |
| | | 26 | -0.001 | 0.097 | 43.452 | 0.017 |
| | | 27 | -0.244 | -0.093 | 50.849 | 0.004 |
| | | 28 | 0.103 | -0.040 | 52.194 | 0.004 |
| | | 29 | 0.076 | -0.013 | 52.942 | 0.004 |
| | | 30 | 0.009 | 0.097 | 52.953 | 0.006 |
| | | 31 | -0.064 | -0.098 | 53.499 | 0.007 |
| | | 32 | 0.114 | -0.053 | 55.273 | 0.006 |
| | | 33 | -0.098 | 0.027 | 56.620 | 0.006 |
| | | 34 | -0.117 | -0.022 | 58.567 | 0.006 |
| | | 35 | 0.143 | -0.136 | 61.532 | 0.004 |
| | | 36 | 0.019 | -0.170 | 61.585 | 0.005 |

**Japan – 1st differences**

Date: 12/25/16 Time: 02:42
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.210 | 0.210 | 3.6914 | 0.055 |
| | | 2 | 0.127 | 0.087 | 5.0670 | 0.079 |
| | | 3 | 0.167 | 0.131 | 7.4587 | 0.059 |
| | | 4 | 0.002 | -0.068 | 7.4590 | 0.114 |
| | | 5 | -0.048 | -0.068 | 7.6636 | 0.176 |
| | | 6 | 0.090 | 0.103 | 8.3850 | 0.211 |
| | | 7 | -0.082 | -0.104 | 8.9885 | 0.253 |
| | | 8 | -0.088 | -0.059 | 9.7089 | 0.286 |
| | | 9 | 0.076 | 0.099 | 10.250 | 0.331 |
| | | 10 | -0.058 | -0.057 | 10.572 | 0.392 |
| | | 11 | -0.038 | -0.006 | 10.713 | 0.468 |
| | | 12 | -0.101 | -0.146 | 11.705 | 0.470 |
| | | 13 | -0.076 | 0.002 | 12.270 | 0.506 |
| | | 14 | 0.060 | 0.139 | 12.628 | 0.556 |
| | | 15 | 0.027 | -0.017 | 12.701 | 0.625 |
| | | 16 | -0.172 | -0.201 | 15.762 | 0.470 |
| | | 17 | -0.079 | -0.053 | 16.418 | 0.494 |
| | | 18 | -0.167 | -0.119 | 19.378 | 0.369 |
| | | 19 | -0.193 | -0.080 | 23.424 | 0.219 |
| | | 20 | -0.071 | -0.035 | 23.976 | 0.243 |
| | | 21 | -0.074 | 0.004 | 24.593 | 0.265 |
| | | 22 | -0.064 | 0.044 | 25.056 | 0.294 |
| | | 23 | 0.096 | 0.064 | 26.123 | 0.295 |
| | | 24 | 0.180 | 0.136 | 29.930 | 0.187 |
| | | 25 | -0.009 | -0.075 | 29.940 | 0.227 |
| | | 26 | -0.031 | -0.120 | 30.060 | 0.265 |
| | | 27 | 0.032 | 0.044 | 30.185 | 0.306 |
| | | 28 | 0.007 | -0.003 | 30.191 | 0.354 |
| | | 29 | 0.025 | -0.012 | 30.273 | 0.400 |
| | | 30 | 0.068 | 0.028 | 30.891 | 0.421 |
| | | 31 | 0.030 | 0.039 | 31.009 | 0.466 |
| | | 32 | -0.008 | -0.014 | 31.018 | 0.516 |
| | | 33 | -0.017 | -0.091 | 31.056 | 0.564 |
| | | 34 | 0.019 | 0.010 | 31.107 | 0.610 |
| | | 35 | 0.022 | 0.056 | 31.175 | 0.653 |
| | | 36 | 0.025 | 0.020 | 31.270 | 0.693 |

**Japan – 2nd differences**

Date: 12/25/16 Time: 02:43
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.438 | -0.438 | 15.904 | 0.000 |
| | | 2 | -0.083 | -0.339 | 16.479 | 0.000 |
| | | 3 | 0.130 | -0.093 | 17.926 | 0.000 |
| | | 4 | -0.097 | -0.126 | 18.735 | 0.001 |
| | | 5 | -0.095 | -0.239 | 19.518 | 0.002 |
| | | 6 | 0.192 | -0.013 | 22.800 | 0.001 |
| | | 7 | -0.105 | -0.061 | 23.795 | 0.001 |
| | | 8 | -0.076 | -0.154 | 24.316 | 0.002 |
| | | 9 | 0.167 | -0.001 | 26.879 | 0.001 |
| | | 10 | -0.102 | -0.051 | 27.851 | 0.002 |
| | | 11 | 0.057 | 0.069 | 28.163 | 0.003 |
| | | 12 | -0.063 | -0.091 | 28.545 | 0.005 |
| | | 13 | -0.081 | -0.200 | 29.191 | 0.006 |
| | | 14 | 0.137 | -0.008 | 31.069 | 0.005 |
| | | 15 | 0.074 | 0.133 | 31.628 | 0.007 |
| | | 16 | -0.178 | -0.041 | 34.862 | 0.004 |
| | | 17 | 0.119 | 0.009 | 36.344 | 0.004 |
| | | 18 | -0.045 | -0.024 | 36.562 | 0.006 |
| | | 19 | -0.088 | -0.056 | 37.396 | 0.007 |
| | | 20 | 0.076 | -0.104 | 38.034 | 0.009 |
| | | 21 | -0.010 | -0.113 | 38.045 | 0.013 |
| | | 22 | -0.092 | -0.127 | 38.997 | 0.014 |
| | | 23 | 0.052 | -0.180 | 39.307 | 0.018 |
| | | 24 | 0.165 | 0.053 | 42.484 | 0.011 |
| | | 25 | -0.093 | 0.086 | 43.521 | 0.012 |
| | | 26 | -0.063 | -0.065 | 43.999 | 0.015 |
| | | 27 | 0.039 | -0.028 | 44.185 | 0.020 |
| | | 28 | -0.015 | -0.016 | 44.214 | 0.026 |
| | | 29 | -0.017 | -0.055 | 44.250 | 0.035 |
| | | 30 | 0.050 | -0.054 | 44.581 | 0.042 |
| | | 31 | 0.003 | -0.006 | 44.583 | 0.054 |
| | | 32 | -0.016 | 0.049 | 44.616 | 0.068 |
| | | 33 | -0.030 | -0.044 | 44.739 | 0.083 |
| | | 34 | 0.022 | -0.068 | 44.806 | 0.102 |
| | | 35 | -0.001 | -0.031 | 44.806 | 0.124 |
| | | 36 | 0.029 | 0.106 | 44.935 | 0.146 |

### 7.4.4 GDP

**China – 1st differences**

Date: 12/25/16 Time: 02:45
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.368 | 0.368 | 11.364 | 0.001 |
| | | 2 | 0.163 | 0.032 | 13.629 | 0.001 |
| | | 3 | 0.130 | 0.070 | 15.091 | 0.002 |
| | | 4 | 0.274 | 0.233 | 21.629 | 0.000 |
| | | 5 | 0.261 | 0.104 | 27.654 | 0.000 |
| | | 6 | 0.161 | 0.011 | 29.975 | 0.000 |
| | | 7 | 0.023 | -0.089 | 30.022 | 0.000 |
| | | 8 | 0.050 | -0.001 | 30.254 | 0.000 |
| | | 9 | 0.080 | -0.007 | 30.858 | 0.000 |
| | | 10 | 0.142 | 0.077 | 32.773 | 0.000 |
| | | 11 | 0.001 | -0.088 | 32.773 | 0.001 |
| | | 12 | 0.056 | 0.095 | 33.083 | 0.001 |
| | | 13 | 0.187 | 0.182 | 36.532 | 0.000 |
| | | 14 | 0.033 | -0.165 | 36.642 | 0.001 |
| | | 15 | -0.020 | -0.032 | 36.683 | 0.001 |
| | | 16 | -0.093 | -0.117 | 37.576 | 0.002 |
| | | 17 | 0.078 | 0.111 | 38.212 | 0.002 |
| | | 18 | -0.086 | -0.238 | 38.998 | 0.003 |
| | | 19 | -0.071 | 0.037 | 39.545 | 0.004 |
| | | 20 | -0.041 | 0.095 | 39.732 | 0.005 |
| | | 21 | -0.069 | -0.077 | 40.266 | 0.007 |
| | | 22 | -0.108 | -0.068 | 41.604 | 0.007 |
| | | 23 | -0.036 | 0.026 | 41.752 | 0.010 |
| | | 24 | -0.087 | 0.024 | 42.646 | 0.011 |
| | | 25 | -0.060 | -0.085 | 43.075 | 0.014 |
| | | 26 | -0.140 | -0.122 | 45.460 | 0.010 |
| | | 27 | -0.100 | 0.018 | 46.714 | 0.011 |
| | | 28 | -0.143 | -0.003 | 49.295 | 0.008 |
| | | 29 | -0.089 | -0.010 | 50.308 | 0.008 |
| | | 30 | -0.073 | -0.069 | 51.015 | 0.010 |
| | | 31 | -0.273 | -0.140 | 61.024 | 0.001 |
| | | 32 | -0.262 | -0.083 | 70.411 | 0.000 |
| | | 33 | -0.099 | 0.061 | 71.779 | 0.000 |
| | | 34 | -0.128 | -0.150 | 74.133 | 0.000 |
| | | 35 | -0.174 | 0.038 | 78.574 | 0.000 |
| | | 36 | -0.164 | 0.049 | 82.613 | 0.000 |

**China – 2nd differences**

Date: 12/25/16 Time: 02:45
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.325 | -0.325 | 8.7518 | 0.003 |
| | | 2 | -0.060 | -0.185 | 9.0537 | 0.011 |
| | | 3 | -0.187 | -0.312 | 12.018 | 0.007 |
| | | 4 | 0.119 | -0.107 | 13.238 | 0.010 |
| | | 5 | 0.064 | 0.003 | 13.601 | 0.018 |
| | | 6 | 0.039 | 0.048 | 13.736 | 0.033 |
| | | 7 | -0.119 | -0.049 | 15.007 | 0.036 |
| | | 8 | -0.032 | -0.069 | 15.098 | 0.057 |
| | | 9 | -0.013 | -0.093 | 15.113 | 0.088 |
| | | 10 | 0.169 | 0.083 | 17.796 | 0.058 |
| | | 11 | -0.142 | -0.092 | 19.708 | 0.050 |
| | | 12 | -0.070 | -0.153 | 20.180 | 0.064 |
| | | 13 | 0.189 | 0.178 | 23.660 | 0.034 |
| | | 14 | -0.091 | -0.040 | 24.477 | 0.040 |
| | | 15 | 0.106 | 0.089 | 25.602 | 0.042 |
| | | 16 | -0.238 | -0.153 | 31.400 | 0.012 |
| | | 17 | 0.288 | 0.235 | 40.034 | 0.001 |
| | | 18 | -0.212 | -0.121 | 44.811 | 0.000 |
| | | 19 | 0.049 | -0.112 | 45.067 | 0.001 |
| | | 20 | -0.006 | 0.023 | 45.071 | 0.001 |
| | | 21 | 0.057 | 0.049 | 45.434 | 0.002 |
| | | 22 | -0.088 | -0.061 | 46.307 | 0.002 |
| | | 23 | 0.086 | -0.040 | 47.151 | 0.002 |
| | | 24 | -0.027 | 0.145 | 47.233 | 0.003 |
| | | 25 | 0.046 | 0.049 | 47.487 | 0.004 |
| | | 26 | -0.113 | -0.097 | 49.049 | 0.004 |
| | | 27 | 0.081 | -0.055 | 49.856 | 0.005 |
| | | 28 | -0.084 | -0.027 | 50.743 | 0.005 |
| | | 29 | 0.024 | -0.011 | 50.816 | 0.007 |
| | | 30 | 0.199 | 0.086 | 55.998 | 0.003 |
| | | 31 | -0.201 | -0.009 | 61.431 | 0.001 |
| | | 32 | -0.065 | -0.128 | 62.012 | 0.001 |
| | | 33 | 0.087 | 0.150 | 63.079 | 0.001 |
| | | 34 | 0.081 | -0.088 | 64.018 | 0.001 |
| | | 35 | -0.109 | -0.098 | 65.754 | 0.001 |
| | | 36 | -0.056 | -0.112 | 66.225 | 0.002 |

## Euro Area – 1st differences

Date: 12/25/16 Time: 02:46
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.653 | 0.653 | 35.792 | 0.000 |
| | | 2 | 0.448 | 0.038 | 52.840 | 0.000 |
| | | 3 | 0.276 | -0.052 | 59.409 | 0.000 |
| | | 4 | 0.186 | 0.026 | 62.444 | 0.000 |
| | | 5 | 0.036 | -0.152 | 62.560 | 0.000 |
| | | 6 | -0.006 | 0.037 | 62.564 | 0.000 |
| | | 7 | -0.042 | -0.015 | 62.727 | 0.000 |
| | | 8 | -0.107 | -0.112 | 63.784 | 0.000 |
| | | 9 | -0.013 | 0.217 | 63.800 | 0.000 |
| | | 10 | 0.030 | -0.011 | 63.883 | 0.000 |
| | | 11 | 0.024 | -0.062 | 63.939 | 0.000 |
| | | 12 | 0.052 | 0.103 | 64.202 | 0.000 |
| | | 13 | 0.116 | 0.032 | 65.537 | 0.000 |
| | | 14 | 0.147 | 0.064 | 67.697 | 0.000 |
| | | 15 | 0.163 | 0.058 | 70.399 | 0.000 |
| | | 16 | 0.134 | -0.093 | 72.262 | 0.000 |
| | | 17 | 0.101 | 0.054 | 73.340 | 0.000 |
| | | 18 | 0.099 | 0.060 | 74.379 | 0.000 |
| | | 19 | 0.053 | -0.115 | 74.679 | 0.000 |
| | | 20 | -0.001 | 0.016 | 74.679 | 0.000 |
| | | 21 | 0.049 | 0.167 | 74.949 | 0.000 |
| | | 22 | 0.011 | -0.152 | 74.963 | 0.000 |
| | | 23 | 0.062 | 0.185 | 75.403 | 0.000 |
| | | 24 | 0.043 | -0.093 | 75.625 | 0.000 |
| | | 25 | 0.029 | -0.110 | 75.724 | 0.000 |
| | | 26 | -0.051 | 0.052 | 76.037 | 0.000 |
| | | 27 | -0.018 | -0.040 | 76.079 | 0.000 |
| | | 28 | 0.006 | 0.019 | 76.084 | 0.000 |
| | | 29 | -0.034 | 0.026 | 76.231 | 0.000 |
| | | 30 | -0.040 | -0.122 | 76.438 | 0.000 |
| | | 31 | -0.076 | -0.031 | 77.210 | 0.000 |
| | | 32 | -0.106 | -0.022 | 78.760 | 0.000 |
| | | 33 | -0.103 | -0.053 | 80.233 | 0.000 |
| | | 34 | -0.100 | -0.012 | 81.668 | 0.000 |
| | | 35 | -0.150 | -0.071 | 84.936 | 0.000 |
| | | 36 | -0.158 | -0.073 | 88.684 | 0.000 |

## China – 2nd differences

Date: 12/25/16 Time: 02:46
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.213 | -0.213 | 3.7594 | 0.05 |
| | | 2 | -0.037 | -0.086 | 3.8720 | 0.14 |
| | | 3 | -0.114 | -0.148 | 4.9750 | 0.17 |
| | | 4 | 0.075 | 0.012 | 5.4586 | 0.24 |
| | | 5 | -0.151 | -0.161 | 7.4595 | 0.18 |
| | | 6 | 0.014 | -0.073 | 7.4764 | 0.27 |
| | | 7 | 0.048 | 0.019 | 7.6851 | 0.36 |
| | | 8 | -0.264 | -0.326 | 14.027 | 0.08 |
| | | 9 | 0.085 | -0.052 | 14.700 | 0.10 |
| | | 10 | 0.048 | -0.024 | 14.913 | 0.13 |
| | | 11 | -0.020 | -0.137 | 14.950 | 0.18 |
| | | 12 | -0.072 | -0.093 | 15.445 | 0.21 |
| | | 13 | 0.053 | -0.119 | 15.719 | 0.26 |
| | | 14 | 0.016 | -0.073 | 15.744 | 0.32 |
| | | 15 | 0.068 | 0.051 | 16.209 | 0.36 |
| | | 16 | 0.010 | -0.098 | 16.220 | 0.43 |
| | | 17 | -0.053 | -0.097 | 16.514 | 0.48 |
| | | 18 | 0.058 | 0.055 | 16.872 | 0.53 |
| | | 19 | 0.010 | -0.041 | 16.882 | 0.59 |
| | | 20 | -0.143 | -0.213 | 19.102 | 0.51 |
| | | 21 | 0.130 | 0.094 | 20.987 | 0.46 |
| | | 22 | -0.129 | -0.200 | 22.880 | 0.40 |
| | | 23 | 0.083 | 0.033 | 23.680 | 0.42 |
| | | 24 | 0.018 | 0.069 | 23.718 | 0.47 |
| | | 25 | 0.088 | -0.072 | 24.634 | 0.48 |
| | | 26 | -0.163 | -0.030 | 27.863 | 0.36 |
| | | 27 | 0.009 | -0.058 | 27.872 | 0.41 |
| | | 28 | 0.100 | -0.048 | 29.122 | 0.40 |
| | | 29 | -0.054 | 0.049 | 29.504 | 0.43 |
| | | 30 | 0.057 | 0.000 | 29.935 | 0.46 |
| | | 31 | -0.002 | 0.007 | 29.936 | 0.52 |
| | | 32 | -0.055 | -0.020 | 30.349 | 0.55 |
| | | 33 | -0.017 | -0.002 | 30.388 | 0.59 |
| | | 34 | 0.087 | 0.013 | 31.477 | 0.59 |
| | | 35 | -0.064 | 0.003 | 32.078 | 0.61 |
| | | 36 | -0.040 | -0.028 | 32.318 | 0.64 |

## United States – 1st differences

Date: 12/25/16 Time: 02:47
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.470 | 0.470 | 18.597 | 0.000 |
| | | 2 | 0.406 | 0.237 | 32.632 | 0.000 |
| | | 3 | 0.285 | 0.038 | 39.653 | 0.000 |
| | | 4 | 0.258 | 0.067 | 45.464 | 0.000 |
| | | 5 | 0.118 | -0.095 | 46.689 | 0.000 |
| | | 6 | 0.112 | 0.014 | 47.806 | 0.000 |
| | | 7 | 0.052 | -0.020 | 48.055 | 0.000 |
| | | 8 | -0.019 | -0.086 | 48.090 | 0.000 |
| | | 9 | 0.098 | 0.177 | 48.979 | 0.000 |
| | | 10 | -0.020 | -0.112 | 49.018 | 0.000 |
| | | 11 | -0.127 | -0.188 | 50.562 | 0.000 |
| | | 12 | -0.101 | 0.030 | 51.564 | 0.000 |
| | | 13 | -0.111 | -0.047 | 52.791 | 0.000 |
| | | 14 | -0.040 | 0.136 | 52.952 | 0.000 |
| | | 15 | -0.049 | 0.008 | 53.197 | 0.000 |
| | | 16 | 0.006 | 0.012 | 53.200 | 0.000 |
| | | 17 | -0.122 | -0.131 | 54.761 | 0.000 |
| | | 18 | -0.105 | -0.132 | 55.934 | 0.000 |
| | | 19 | -0.012 | 0.165 | 55.950 | 0.000 |
| | | 20 | -0.104 | -0.071 | 57.143 | 0.000 |
| | | 21 | -0.050 | 0.049 | 57.429 | 0.000 |
| | | 22 | -0.124 | -0.111 | 59.168 | 0.000 |
| | | 23 | 0.035 | 0.099 | 59.313 | 0.000 |
| | | 24 | 0.129 | 0.262 | 61.280 | 0.000 |
| | | 25 | 0.188 | 0.020 | 65.517 | 0.000 |
| | | 26 | 0.079 | -0.065 | 66.270 | 0.000 |
| | | 27 | 0.063 | -0.062 | 66.757 | 0.000 |
| | | 28 | 0.162 | 0.043 | 70.073 | 0.000 |
| | | 29 | 0.152 | 0.132 | 73.079 | 0.000 |
| | | 30 | 0.119 | -0.067 | 74.944 | 0.000 |
| | | 31 | 0.070 | -0.008 | 75.604 | 0.000 |
| | | 32 | 0.051 | -0.069 | 75.957 | 0.000 |
| | | 33 | 0.029 | -0.124 | 76.076 | 0.000 |
| | | 34 | -0.056 | -0.069 | 76.526 | 0.000 |
| | | 35 | -0.070 | 0.004 | 77.241 | 0.000 |
| | | 36 | -0.204 | -0.017 | 83.473 | 0.000 |

## United States – 2nd differences

Date: 12/25/16 Time: 02:48
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.425 | -0.425 | 14.966 | 0.000 |
| | | 2 | 0.049 | -0.160 | 15.169 | 0.001 |
| | | 3 | -0.098 | -0.178 | 15.992 | 0.001 |
| | | 4 | 0.112 | -0.004 | 17.067 | 0.002 |
| | | 5 | -0.118 | -0.100 | 18.287 | 0.003 |
| | | 6 | 0.041 | -0.067 | 18.433 | 0.005 |
| | | 7 | 0.012 | -0.004 | 18.447 | 0.010 |
| | | 8 | -0.169 | -0.237 | 21.049 | 0.007 |
| | | 9 | 0.218 | 0.063 | 25.458 | 0.003 |
| | | 10 | -0.009 | 0.111 | 25.466 | 0.005 |
| | | 11 | -0.128 | -0.123 | 27.012 | 0.005 |
| | | 12 | 0.031 | -0.030 | 27.106 | 0.007 |
| | | 13 | -0.077 | -0.194 | 27.679 | 0.010 |
| | | 14 | 0.078 | -0.056 | 28.278 | 0.013 |
| | | 15 | -0.060 | -0.052 | 28.645 | 0.018 |
| | | 16 | 0.165 | 0.076 | 31.448 | 0.012 |
| | | 17 | -0.119 | 0.076 | 32.931 | 0.012 |
| | | 18 | -0.079 | -0.210 | 33.591 | 0.014 |
| | | 19 | 0.168 | 0.028 | 36.612 | 0.009 |
| | | 20 | -0.131 | -0.084 | 38.495 | 0.008 |
| | | 21 | 0.115 | 0.059 | 39.964 | 0.008 |
| | | 22 | -0.223 | -0.146 | 45.597 | 0.002 |
| | | 23 | 0.067 | -0.263 | 46.106 | 0.003 |
| | | 24 | 0.046 | 0.009 | 46.355 | 0.004 |
| | | 25 | 0.160 | 0.098 | 49.409 | 0.003 |
| | | 26 | -0.076 | 0.083 | 50.103 | 0.003 |
| | | 27 | -0.127 | -0.044 | 52.104 | 0.003 |
| | | 28 | 0.093 | -0.129 | 53.185 | 0.003 |
| | | 29 | 0.035 | 0.081 | 53.341 | 0.004 |
| | | 30 | 0.003 | 0.006 | 53.342 | 0.005 |
| | | 31 | -0.027 | 0.068 | 53.437 | 0.007 |
| | | 32 | -0.000 | 0.106 | 53.437 | 0.010 |
| | | 33 | 0.069 | 0.030 | 54.104 | 0.012 |
| | | 34 | -0.071 | -0.038 | 54.831 | 0.013 |
| | | 35 | 0.117 | -0.000 | 56.817 | 0.011 |
| | | 36 | -0.173 | 0.026 | 61.296 | 0.005 |

## United Kingdom – 1st differences

Date: 12/25/16 Time: 02:49
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.241 | 0.241 | 4.8652 | 0.027 |
| | | 2 | 0.192 | 0.143 | 8.0124 | 0.018 |
| | | 3 | 0.096 | 0.024 | 8.8059 | 0.032 |
| | | 4 | 0.080 | 0.031 | 9.3656 | 0.053 |
| | | 5 | -0.153 | -0.210 | 11.448 | 0.043 |
| | | 6 | -0.015 | 0.044 | 11.467 | 0.075 |
| | | 7 | 0.020 | 0.075 | 11.504 | 0.118 |
| | | 8 | -0.004 | -0.007 | 11.505 | 0.175 |
| | | 9 | -0.015 | -0.005 | 11.527 | 0.241 |
| | | 10 | 0.177 | 0.159 | 14.497 | 0.152 |
| | | 11 | 0.008 | -0.073 | 14.504 | 0.206 |
| | | 12 | 0.045 | 0.025 | 14.698 | 0.258 |
| | | 13 | 0.031 | 0.008 | 14.793 | 0.320 |
| | | 14 | -0.038 | -0.100 | 14.938 | 0.382 |
| | | 15 | -0.016 | 0.083 | 14.964 | 0.454 |
| | | 16 | 0.088 | 0.101 | 15.765 | 0.469 |
| | | 17 | 0.032 | -0.025 | 15.875 | 0.533 |
| | | 18 | -0.069 | -0.098 | 16.383 | 0.566 |
| | | 19 | -0.089 | -0.108 | 17.244 | 0.573 |
| | | 20 | -0.023 | -0.002 | 17.302 | 0.633 |
| | | 21 | -0.083 | 0.024 | 18.078 | 0.644 |
| | | 22 | -0.089 | -0.060 | 18.986 | 0.646 |
| | | 23 | 0.068 | 0.101 | 19.523 | 0.670 |
| | | 24 | -0.055 | -0.083 | 19.885 | 0.703 |
| | | 25 | 0.011 | 0.020 | 19.899 | 0.752 |
| | | 26 | -0.030 | -0.057 | 20.006 | 0.791 |
| | | 27 | 0.058 | 0.036 | 20.421 | 0.813 |
| | | 28 | -0.001 | 0.051 | 20.421 | 0.849 |
| | | 29 | 0.109 | 0.133 | 21.951 | 0.822 |
| | | 30 | -0.012 | -0.071 | 21.970 | 0.855 |
| | | 31 | 0.074 | 0.066 | 22.697 | 0.860 |
| | | 32 | -0.006 | -0.038 | 22.702 | 0.887 |
| | | 33 | 0.068 | -0.007 | 23.349 | 0.893 |
| | | 34 | -0.141 | -0.092 | 26.209 | 0.828 |
| | | 35 | -0.060 | -0.042 | 26.728 | 0.841 |
| | | 36 | -0.043 | 0.057 | 27.007 | 0.861 |

## United Kingdom – 2nd differences

Date: 12/25/16 Time: 02:49
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.470 | -0.470 | 18.373 | 0.000 |
| | | 2 | 0.032 | -0.243 | 18.458 | 0.000 |
| | | 3 | -0.053 | -0.203 | 18.695 | 0.000 |
| | | 4 | 0.144 | 0.038 | 20.483 | 0.000 |
| | | 5 | -0.244 | -0.211 | 25.677 | 0.000 |
| | | 6 | 0.068 | -0.204 | 26.092 | 0.000 |
| | | 7 | 0.038 | -0.103 | 26.219 | 0.000 |
| | | 8 | -0.007 | -0.095 | 26.223 | 0.001 |
| | | 9 | -0.136 | -0.238 | 27.923 | 0.001 |
| | | 10 | 0.240 | 0.006 | 33.299 | 0.000 |
| | | 11 | -0.136 | -0.090 | 35.055 | 0.000 |
| | | 12 | 0.030 | -0.073 | 35.144 | 0.000 |
| | | 13 | 0.040 | 0.040 | 35.301 | 0.001 |
| | | 14 | -0.064 | -0.145 | 35.702 | 0.001 |
| | | 15 | -0.051 | -0.152 | 35.968 | 0.002 |
| | | 16 | 0.104 | -0.019 | 37.086 | 0.002 |
| | | 17 | 0.033 | 0.054 | 37.202 | 0.003 |
| | | 18 | -0.057 | 0.057 | 37.543 | 0.004 |
| | | 19 | -0.061 | -0.061 | 37.940 | 0.006 |
| | | 20 | 0.088 | -0.080 | 38.785 | 0.007 |
| | | 21 | -0.034 | 0.008 | 38.915 | 0.010 |
| | | 22 | -0.107 | -0.143 | 40.220 | 0.010 |
| | | 23 | 0.184 | 0.040 | 44.100 | 0.005 |
| | | 24 | -0.129 | -0.072 | 46.049 | 0.004 |
| | | 25 | 0.071 | 0.002 | 46.649 | 0.005 |
| | | 26 | -0.086 | -0.092 | 47.542 | 0.006 |
| | | 27 | 0.096 | -0.107 | 48.682 | 0.006 |
| | | 28 | -0.110 | -0.183 | 50.205 | 0.006 |
| | | 29 | 0.155 | 0.028 | 53.289 | 0.004 |
| | | 30 | -0.136 | -0.107 | 55.703 | 0.003 |
| | | 31 | 0.108 | -0.004 | 57.273 | 0.003 |
| | | 32 | -0.101 | -0.040 | 58.665 | 0.003 |
| | | 33 | 0.188 | 0.043 | 63.605 | 0.001 |
| | | 34 | -0.194 | -0.004 | 68.954 | 0.000 |
| | | 35 | 0.043 | -0.096 | 69.230 | 0.000 |
| | | 36 | 0.027 | 0.012 | 69.342 | 0.001 |

## Japan – 1st differences

Date: 12/25/16 Time: 02:50
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.185 | 0.185 | 2.8889 | 0.089 |
| | | 2 | 0.057 | 0.023 | 3.1617 | 0.206 |
| | | 3 | -0.062 | -0.079 | 3.4947 | 0.321 |
| | | 4 | -0.087 | -0.065 | 4.1523 | 0.386 |
| | | 5 | -0.069 | -0.037 | 4.5768 | 0.470 |
| | | 6 | 0.038 | 0.063 | 4.7092 | 0.582 |
| | | 7 | -0.088 | -0.116 | 5.4195 | 0.609 |
| | | 8 | 0.010 | 0.031 | 5.4296 | 0.711 |
| | | 9 | 0.034 | 0.039 | 5.5403 | 0.785 |
| | | 10 | -0.033 | -0.058 | 5.6409 | 0.844 |
| | | 11 | -0.086 | -0.086 | 6.3519 | 0.849 |
| | | 12 | -0.120 | -0.098 | 7.7459 | 0.805 |
| | | 13 | 0.120 | 0.199 | 9.1780 | 0.759 |
| | | 14 | 0.192 | 0.137 | 12.866 | 0.537 |
| | | 15 | -0.045 | -0.180 | 13.071 | 0.597 |
| | | 16 | -0.054 | -0.045 | 13.377 | 0.645 |
| | | 17 | -0.116 | -0.051 | 14.798 | 0.610 |
| | | 18 | -0.061 | 0.018 | 15.199 | 0.648 |
| | | 19 | 0.049 | 0.032 | 15.458 | 0.693 |
| | | 20 | -0.137 | -0.203 | 17.527 | 0.619 |
| | | 21 | -0.072 | 0.017 | 18.101 | 0.643 |
| | | 22 | -0.070 | -0.096 | 18.666 | 0.666 |
| | | 23 | -0.116 | -0.150 | 20.217 | 0.629 |
| | | 24 | -0.046 | 0.004 | 20.466 | 0.670 |
| | | 25 | -0.053 | -0.020 | 20.804 | 0.703 |
| | | 26 | -0.034 | 0.013 | 20.942 | 0.745 |
| | | 27 | 0.049 | -0.122 | 21.235 | 0.775 |
| | | 28 | 0.088 | 0.027 | 22.206 | 0.772 |
| | | 29 | 0.050 | 0.107 | 22.526 | 0.798 |
| | | 30 | 0.013 | -0.032 | 22.548 | 0.833 |
| | | 31 | -0.001 | 0.014 | 22.549 | 0.865 |
| | | 32 | 0.040 | -0.034 | 22.771 | 0.885 |
| | | 33 | 0.038 | 0.054 | 22.974 | 0.904 |
| | | 34 | -0.079 | -0.075 | 23.857 | 0.903 |
| | | 35 | -0.064 | -0.133 | 24.455 | 0.909 |
| | | 36 | -0.093 | 0.017 | 25.749 | 0.897 |

## Japan – 2nd differences

Date: 12/25/16 Time: 02:50
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.418 | -0.418 | 14.507 | 0.000 |
| | | 2 | -0.001 | -0.213 | 14.507 | 0.001 |
| | | 3 | -0.063 | -0.194 | 14.844 | 0.002 |
| | | 4 | -0.033 | -0.196 | 14.937 | 0.005 |
| | | 5 | -0.044 | -0.232 | 15.108 | 0.010 |
| | | 6 | 0.132 | -0.047 | 16.653 | 0.011 |
| | | 7 | -0.135 | -0.182 | 18.285 | 0.011 |
| | | 8 | 0.051 | -0.155 | 18.521 | 0.018 |
| | | 9 | 0.059 | -0.039 | 18.839 | 0.027 |
| | | 10 | -0.009 | -0.015 | 18.847 | 0.042 |
| | | 11 | 0.007 | 0.014 | 18.852 | 0.064 |
| | | 12 | -0.183 | -0.257 | 22.089 | 0.037 |
| | | 13 | 0.101 | -0.153 | 23.086 | 0.041 |
| | | 14 | 0.184 | 0.159 | 26.452 | 0.023 |
| | | 15 | -0.119 | 0.035 | 27.876 | 0.022 |
| | | 16 | 0.015 | 0.018 | 27.898 | 0.033 |
| | | 17 | -0.067 | -0.049 | 28.372 | 0.041 |
| | | 18 | -0.041 | -0.058 | 28.554 | 0.054 |
| | | 19 | 0.175 | 0.145 | 31.832 | 0.033 |
| | | 20 | -0.141 | -0.066 | 33.998 | 0.026 |
| | | 21 | 0.043 | 0.039 | 34.200 | 0.034 |
| | | 22 | 0.020 | 0.069 | 34.246 | 0.046 |
| | | 23 | -0.076 | -0.101 | 34.905 | 0.053 |
| | | 24 | 0.067 | -0.059 | 35.428 | 0.062 |
| | | 25 | -0.019 | -0.066 | 35.472 | 0.080 |
| | | 26 | -0.046 | 0.047 | 35.732 | 0.097 |
| | | 27 | 0.022 | -0.095 | 35.794 | 0.120 |
| | | 28 | 0.048 | -0.142 | 36.089 | 0.140 |
| | | 29 | -0.002 | -0.011 | 36.089 | 0.171 |
| | | 30 | -0.012 | -0.050 | 36.107 | 0.205 |
| | | 31 | -0.024 | 0.024 | 36.184 | 0.239 |
| | | 32 | 0.004 | -0.061 | 36.186 | 0.279 |
| | | 33 | 0.084 | 0.075 | 37.182 | 0.282 |
| | | 34 | -0.082 | 0.086 | 38.150 | 0.286 |
| | | 35 | 0.020 | -0.056 | 38.210 | 0.326 |
| | | 36 | -0.113 | -0.130 | 40.123 | 0.292 |

### 7.4.5 GOV

**China – 1st differences**

Date: 12/25/16 Time: 02:53
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.122 | 0.122 | 1.2454 | 0.264 |
| | | 2 | 0.226 | 0.215 | 5.6050 | 0.061 |
| | | 3 | 0.317 | 0.286 | 14.261 | 0.003 |
| | | 4 | 0.278 | 0.220 | 21.018 | 0.000 |
| | | 5 | 0.249 | 0.147 | 26.491 | 0.000 |
| | | 6 | 0.277 | 0.140 | 33.361 | 0.000 |
| | | 7 | 0.225 | 0.063 | 37.971 | 0.000 |
| | | 8 | 0.104 | -0.112 | 38.975 | 0.000 |
| | | 9 | 0.177 | -0.056 | 41.903 | 0.000 |
| | | 10 | 0.124 | -0.080 | 43.350 | 0.000 |
| | | 11 | -0.014 | -0.206 | 43.369 | 0.000 |
| | | 12 | 0.046 | -0.131 | 43.571 | 0.000 |
| | | 13 | 0.035 | -0.066 | 43.695 | 0.000 |
| | | 14 | -0.009 | -0.015 | 43.704 | 0.000 |
| | | 15 | -0.072 | -0.050 | 44.233 | 0.000 |
| | | 16 | -0.024 | 0.029 | 44.291 | 0.000 |
| | | 17 | -0.045 | 0.081 | 44.502 | 0.000 |
| | | 18 | -0.171 | -0.068 | 47.625 | 0.000 |
| | | 19 | 0.014 | 0.113 | 47.647 | 0.000 |
| | | 20 | -0.180 | -0.079 | 51.219 | 0.000 |
| | | 21 | -0.007 | 0.131 | 51.224 | 0.000 |
| | | 22 | -0.093 | 0.010 | 52.216 | 0.000 |
| | | 23 | -0.058 | 0.045 | 52.603 | 0.000 |
| | | 24 | -0.225 | -0.200 | 58.585 | 0.000 |
| | | 25 | -0.009 | 0.023 | 58.596 | 0.000 |
| | | 26 | -0.017 | 0.023 | 58.633 | 0.000 |
| | | 27 | -0.117 | -0.021 | 60.336 | 0.000 |
| | | 28 | -0.055 | -0.027 | 60.713 | 0.000 |
| | | 29 | 0.017 | 0.092 | 60.751 | 0.000 |
| | | 30 | -0.007 | 0.114 | 60.758 | 0.001 |
| | | 31 | -0.048 | -0.008 | 61.070 | 0.001 |
| | | 32 | -0.063 | -0.105 | 61.617 | 0.001 |
| | | 33 | 0.058 | 0.058 | 62.089 | 0.002 |
| | | 34 | 0.040 | 0.080 | 62.315 | 0.002 |
| | | 35 | 0.060 | 0.010 | 62.848 | 0.003 |
| | | 36 | 0.035 | -0.020 | 63.028 | 0.004 |

**China – 2nd differences**

Date: 12/25/16 Time: 02:53
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.557 | -0.557 | 25.725 | 0.000 |
| | | 2 | 0.014 | -0.429 | 25.741 | 0.000 |
| | | 3 | 0.071 | -0.278 | 26.170 | 0.000 |
| | | 4 | -0.012 | -0.179 | 26.182 | 0.000 |
| | | 5 | -0.023 | -0.147 | 26.229 | 0.000 |
| | | 6 | 0.042 | -0.058 | 26.389 | 0.000 |
| | | 7 | 0.043 | 0.113 | 26.554 | 0.000 |
| | | 8 | -0.111 | 0.042 | 27.678 | 0.001 |
| | | 9 | 0.063 | 0.037 | 28.046 | 0.001 |
| | | 10 | 0.059 | 0.146 | 28.372 | 0.002 |
| | | 11 | -0.115 | 0.045 | 29.627 | 0.002 |
| | | 12 | 0.047 | -0.011 | 29.837 | 0.003 |
| | | 13 | 0.015 | -0.043 | 29.858 | 0.005 |
| | | 14 | 0.001 | -0.017 | 29.858 | 0.008 |
| | | 15 | -0.054 | -0.092 | 30.153 | 0.011 |
| | | 16 | 0.042 | -0.117 | 30.338 | 0.016 |
| | | 17 | 0.062 | 0.046 | 30.738 | 0.021 |
| | | 18 | -0.178 | -0.119 | 34.103 | 0.012 |
| | | 19 | 0.210 | 0.065 | 38.833 | 0.005 |
| | | 20 | -0.210 | -0.155 | 43.668 | 0.002 |
| | | 21 | 0.150 | -0.031 | 46.166 | 0.001 |
| | | 22 | -0.065 | -0.066 | 46.647 | 0.002 |
| | | 23 | 0.109 | 0.155 | 48.024 | 0.002 |
| | | 24 | -0.215 | -0.092 | 53.442 | 0.001 |
| | | 25 | 0.128 | -0.067 | 55.395 | 0.000 |
| | | 26 | 0.046 | -0.015 | 55.650 | 0.001 |
| | | 27 | -0.087 | -0.000 | 56.581 | 0.001 |
| | | 28 | -0.016 | -0.125 | 56.615 | 0.001 |
| | | 29 | 0.071 | -0.098 | 57.272 | 0.001 |
| | | 30 | -0.006 | 0.031 | 57.277 | 0.002 |
| | | 31 | -0.011 | 0.101 | 57.292 | 0.003 |
| | | 32 | -0.069 | -0.063 | 57.939 | 0.003 |
| | | 33 | 0.068 | -0.079 | 58.576 | 0.004 |
| | | 34 | -0.026 | -0.021 | 58.676 | 0.005 |
| | | 35 | 0.037 | 0.010 | 58.875 | 0.007 |
| | | 36 | -0.016 | -0.042 | 58.913 | 0.009 |

**Euro Area – 1st differences**

Date: 12/25/16 Time: 02:54
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.200 | 0.200 | 3.3562 | 0.067 |
| | | 2 | 0.251 | 0.220 | 8.7209 | 0.013 |
| | | 3 | 0.314 | 0.253 | 17.225 | 0.001 |
| | | 4 | 0.146 | 0.022 | 19.096 | 0.001 |
| | | 5 | 0.043 | -0.110 | 19.256 | 0.002 |
| | | 6 | -0.023 | -0.152 | 19.305 | 0.004 |
| | | 7 | 0.116 | 0.118 | 20.520 | 0.005 |
| | | 8 | -0.123 | -0.113 | 21.921 | 0.005 |
| | | 9 | -0.090 | -0.061 | 22.685 | 0.007 |
| | | 10 | 0.076 | 0.118 | 23.230 | 0.010 |
| | | 11 | -0.001 | 0.079 | 23.231 | 0.016 |
| | | 12 | -0.016 | 0.005 | 23.254 | 0.026 |
| | | 13 | 0.051 | 0.010 | 23.515 | 0.036 |
| | | 14 | 0.013 | -0.083 | 23.534 | 0.052 |
| | | 15 | -0.036 | -0.044 | 23.664 | 0.071 |
| | | 16 | -0.034 | -0.028 | 23.783 | 0.094 |
| | | 17 | 0.004 | -0.006 | 23.784 | 0.125 |
| | | 18 | -0.092 | -0.051 | 24.691 | 0.134 |
| | | 19 | 0.015 | 0.118 | 24.714 | 0.170 |
| | | 20 | -0.162 | -0.188 | 27.603 | 0.119 |
| | | 21 | -0.009 | 0.066 | 27.612 | 0.151 |
| | | 22 | 0.029 | 0.099 | 27.708 | 0.186 |
| | | 23 | -0.041 | -0.004 | 27.901 | 0.220 |
| | | 24 | 0.101 | 0.086 | 29.108 | 0.216 |
| | | 25 | -0.006 | -0.050 | 29.112 | 0.259 |
| | | 26 | -0.018 | -0.153 | 29.152 | 0.304 |
| | | 27 | 0.049 | 0.108 | 29.453 | 0.339 |
| | | 28 | 0.082 | 0.099 | 30.316 | 0.348 |
| | | 29 | 0.119 | 0.094 | 32.151 | 0.313 |
| | | 30 | -0.110 | -0.169 | 33.754 | 0.291 |
| | | 31 | 0.089 | 0.029 | 34.822 | 0.291 |
| | | 32 | -0.013 | -0.078 | 34.845 | 0.334 |
| | | 33 | -0.082 | 0.034 | 35.784 | 0.339 |
| | | 34 | -0.109 | -0.211 | 37.476 | 0.313 |
| | | 35 | -0.030 | 0.025 | 37.603 | 0.351 |
| | | 36 | -0.041 | 0.075 | 37.850 | 0.385 |

**Euro Area – 2nd differences**

Date: 12/25/16 Time: 02:55
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.535 | -0.535 | 23.753 | 0.000 |
| | | 2 | -0.009 | -0.413 | 23.759 | 0.000 |
| | | 3 | 0.159 | -0.115 | 25.916 | 0.000 |
| | | 4 | -0.050 | 0.020 | 26.135 | 0.000 |
| | | 5 | -0.024 | 0.040 | 26.184 | 0.000 |
| | | 6 | -0.119 | -0.220 | 27.450 | 0.000 |
| | | 7 | 0.242 | 0.037 | 32.699 | 0.000 |
| | | 8 | -0.181 | -0.027 | 35.668 | 0.000 |
| | | 9 | -0.072 | -0.179 | 36.141 | 0.000 |
| | | 10 | 0.138 | -0.150 | 37.921 | 0.000 |
| | | 11 | -0.041 | -0.071 | 38.079 | 0.000 |
| | | 12 | -0.056 | -0.079 | 38.387 | 0.000 |
| | | 13 | 0.065 | 0.008 | 38.802 | 0.000 |
| | | 14 | 0.001 | -0.047 | 38.802 | 0.000 |
| | | 15 | -0.031 | -0.049 | 38.897 | 0.001 |
| | | 16 | -0.016 | -0.064 | 38.924 | 0.001 |
| | | 17 | 0.078 | -0.014 | 39.557 | 0.001 |
| | | 18 | -0.121 | -0.176 | 41.101 | 0.001 |
| | | 19 | 0.174 | 0.115 | 44.372 | 0.001 |
| | | 20 | -0.205 | -0.155 | 48.982 | 0.000 |
| | | 21 | 0.076 | -0.164 | 49.630 | 0.000 |
| | | 22 | 0.064 | -0.072 | 50.088 | 0.001 |
| | | 23 | -0.127 | -0.129 | 51.954 | 0.001 |
| | | 24 | 0.161 | 0.027 | 55.008 | 0.000 |
| | | 25 | -0.057 | 0.137 | 55.400 | 0.000 |
| | | 26 | -0.061 | -0.145 | 55.844 | 0.001 |
| | | 27 | 0.021 | -0.151 | 55.900 | 0.001 |
| | | 28 | 0.006 | -0.157 | 55.905 | 0.001 |
| | | 29 | 0.152 | 0.133 | 58.871 | 0.001 |
| | | 30 | -0.258 | -0.069 | 67.576 | 0.000 |
| | | 31 | 0.194 | 0.037 | 72.632 | 0.000 |
| | | 32 | -0.030 | -0.091 | 72.757 | 0.000 |
| | | 33 | -0.040 | 0.151 | 72.979 | 0.000 |
| | | 34 | -0.035 | -0.071 | 73.155 | 0.000 |
| | | 35 | 0.040 | -0.118 | 73.385 | 0.000 |
| | | 36 | 0.061 | -0.100 | 73.935 | 0.000 |

## United States – 1st differences

Date: 12/25/16 Time: 22:18
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.666 | -0.666 | 36.799 | 0.000 |
| | | 2 | 0.184 | -0.465 | 39.652 | 0.000 |
| | | 3 | 0.150 | 0.046 | 41.565 | 0.000 |
| | | 4 | -0.328 | -0.177 | 50.831 | 0.000 |
| | | 5 | 0.333 | 0.005 | 60.520 | 0.000 |
| | | 6 | -0.258 | -0.124 | 66.413 | 0.000 |
| | | 7 | 0.142 | -0.004 | 68.213 | 0.000 |
| | | 8 | -0.012 | -0.012 | 68.228 | 0.000 |
| | | 9 | -0.063 | 0.046 | 68.590 | 0.000 |
| | | 10 | 0.075 | -0.037 | 69.110 | 0.000 |
| | | 11 | -0.017 | 0.102 | 69.139 | 0.000 |
| | | 12 | 0.003 | 0.103 | 69.140 | 0.000 |
| | | 13 | -0.106 | -0.170 | 70.250 | 0.000 |
| | | 14 | 0.157 | -0.075 | 72.686 | 0.000 |
| | | 15 | -0.066 | 0.123 | 73.126 | 0.000 |
| | | 16 | -0.074 | -0.048 | 73.689 | 0.000 |
| | | 17 | 0.102 | -0.167 | 74.772 | 0.000 |
| | | 18 | -0.100 | -0.144 | 75.839 | 0.000 |
| | | 19 | 0.085 | -0.030 | 76.613 | 0.000 |
| | | 20 | -0.021 | 0.047 | 76.661 | 0.000 |
| | | 21 | -0.016 | 0.052 | 76.689 | 0.000 |
| | | 22 | 0.023 | -0.056 | 76.749 | 0.000 |
| | | 23 | -0.025 | 0.008 | 76.823 | 0.000 |
| | | 24 | 0.119 | 0.342 | 78.489 | 0.000 |
| | | 25 | -0.209 | -0.028 | 83.700 | 0.000 |
| | | 26 | 0.226 | 0.027 | 89.917 | 0.000 |
| | | 27 | -0.180 | 0.048 | 93.949 | 0.000 |
| | | 28 | 0.021 | -0.064 | 94.003 | 0.000 |
| | | 29 | 0.173 | -0.025 | 97.867 | 0.000 |
| | | 30 | -0.256 | -0.014 | 106.46 | 0.000 |
| | | 31 | 0.242 | -0.004 | 114.32 | 0.000 |
| | | 32 | -0.176 | -0.060 | 118.55 | 0.000 |
| | | 33 | 0.086 | 0.038 | 119.59 | 0.000 |
| | | 34 | 0.030 | -0.052 | 119.72 | 0.000 |
| | | 35 | -0.126 | -0.024 | 122.03 | 0.000 |
| | | 36 | 0.092 | -0.022 | 123.29 | 0.000 |

## United States – 2nd differences

Date: 12/25/16 Time: 22:19
Sample: 1995Q2 2015Q2
Included observations: 79

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.748 | -0.748 | 45.900 | 0.00 |
| | | 2 | 0.253 | -0.695 | 51.228 | 0.00 |
| | | 3 | 0.145 | -0.239 | 52.988 | 0.00 |
| | | 4 | -0.348 | -0.309 | 63.297 | 0.00 |
| | | 5 | 0.376 | -0.089 | 75.543 | 0.00 |
| | | 6 | -0.294 | -0.157 | 83.104 | 0.00 |
| | | 7 | 0.160 | -0.072 | 85.394 | 0.00 |
| | | 8 | -0.025 | -0.068 | 85.448 | 0.00 |
| | | 9 | -0.063 | 0.037 | 85.811 | 0.00 |
| | | 10 | 0.074 | -0.076 | 86.314 | 0.00 |
| | | 11 | -0.037 | -0.026 | 86.444 | 0.00 |
| | | 12 | 0.039 | 0.166 | 86.588 | 0.00 |
| | | 13 | -0.109 | -0.038 | 87.736 | 0.00 |
| | | 14 | 0.145 | -0.166 | 89.805 | 0.00 |
| | | 15 | -0.064 | 0.058 | 90.209 | 0.00 |
| | | 16 | -0.058 | 0.108 | 90.548 | 0.00 |
| | | 17 | 0.115 | 0.011 | 91.909 | 0.00 |
| | | 18 | -0.114 | -0.083 | 93.266 | 0.00 |
| | | 19 | 0.076 | -0.113 | 93.888 | 0.00 |
| | | 20 | -0.020 | -0.072 | 93.931 | 0.00 |
| | | 21 | -0.015 | 0.051 | 93.957 | 0.00 |
| | | 22 | 0.023 | -0.000 | 94.019 | 0.00 |
| | | 23 | -0.057 | -0.236 | 94.390 | 0.00 |
| | | 24 | 0.146 | 0.166 | 96.874 | 0.00 |
| | | 25 | -0.237 | -0.015 | 103.53 | 0.00 |
| | | 26 | 0.259 | -0.025 | 111.64 | 0.00 |
| | | 27 | -0.179 | 0.071 | 115.59 | 0.00 |
| | | 28 | 0.009 | 0.012 | 115.60 | 0.00 |
| | | 29 | 0.176 | -0.009 | 119.56 | 0.00 |
| | | 30 | -0.278 | 0.009 | 129.65 | 0.00 |
| | | 31 | 0.271 | 0.044 | 139.44 | 0.00 |
| | | 32 | -0.193 | -0.034 | 144.49 | 0.00 |

## United Kingdom – 1st differences

Date: 12/25/16 Time: 22:17
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.579 | -0.579 | 27.831 | 0.000 |
| | | 2 | -0.010 | -0.518 | 27.839 | 0.000 |
| | | 3 | 0.288 | -0.042 | 34.909 | 0.000 |
| | | 4 | -0.415 | -0.381 | 49.764 | 0.000 |
| | | 5 | 0.308 | -0.182 | 58.061 | 0.000 |
| | | 6 | -0.005 | -0.019 | 58.063 | 0.000 |
| | | 7 | -0.093 | 0.227 | 58.839 | 0.000 |
| | | 8 | 0.046 | 0.073 | 59.028 | 0.000 |
| | | 9 | -0.059 | 0.034 | 59.349 | 0.000 |
| | | 10 | 0.019 | -0.032 | 59.383 | 0.000 |
| | | 11 | 0.050 | 0.021 | 59.616 | 0.000 |
| | | 12 | -0.032 | -0.063 | 59.715 | 0.000 |
| | | 13 | 0.049 | 0.070 | 59.951 | 0.000 |
| | | 14 | -0.132 | -0.126 | 61.675 | 0.000 |
| | | 15 | 0.090 | -0.049 | 62.502 | 0.000 |
| | | 16 | 0.016 | -0.050 | 62.526 | 0.000 |
| | | 17 | -0.062 | 0.003 | 62.923 | 0.000 |
| | | 18 | 0.147 | 0.120 | 65.212 | 0.000 |
| | | 19 | -0.213 | -0.022 | 70.084 | 0.000 |
| | | 20 | 0.117 | 0.026 | 71.571 | 0.000 |
| | | 21 | 0.043 | 0.083 | 71.773 | 0.000 |
| | | 22 | -0.171 | -0.097 | 75.092 | 0.000 |
| | | 23 | 0.223 | -0.064 | 80.793 | 0.000 |
| | | 24 | -0.138 | -0.062 | 83.038 | 0.000 |
| | | 25 | -0.075 | -0.172 | 83.708 | 0.000 |
| | | 26 | 0.244 | 0.037 | 90.917 | 0.000 |
| | | 27 | -0.241 | -0.010 | 98.121 | 0.000 |
| | | 28 | 0.067 | -0.098 | 98.690 | 0.000 |
| | | 29 | 0.142 | 0.031 | 101.28 | 0.000 |
| | | 30 | -0.233 | 0.034 | 108.39 | 0.000 |
| | | 31 | 0.174 | 0.047 | 112.43 | 0.000 |
| | | 32 | -0.055 | -0.023 | 112.84 | 0.000 |
| | | 33 | -0.053 | -0.031 | 113.23 | 0.000 |
| | | 34 | 0.103 | -0.021 | 114.74 | 0.000 |
| | | 35 | -0.097 | -0.062 | 116.11 | 0.000 |
| | | 36 | 0.069 | -0.047 | 116.82 | 0.000 |

## United Kingdom – 2nd differences

Date: 12/25/16 Time: 22:17
Sample: 1995Q2 2015Q2
Included observations: 79

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prol |
|---|---|---|---|---|---|---|
| | | 1 | -0.680 | -0.680 | 37.911 | 0.00 |
| | | 2 | 0.096 | -0.680 | 38.680 | 0.00 |
| | | 3 | 0.304 | -0.168 | 46.461 | 0.00 |
| | | 4 | -0.446 | -0.335 | 63.423 | 0.00 |
| | | 5 | 0.329 | -0.295 | 72.776 | 0.00 |
| | | 6 | -0.074 | -0.238 | 73.256 | 0.00 |
| | | 7 | -0.065 | 0.104 | 73.636 | 0.00 |
| | | 8 | 0.064 | 0.087 | 74.008 | 0.00 |
| | | 9 | -0.041 | 0.071 | 74.163 | 0.00 |
| | | 10 | 0.001 | -0.033 | 74.163 | 0.00 |
| | | 11 | 0.041 | 0.028 | 74.319 | 0.00 |
| | | 12 | -0.044 | -0.078 | 74.501 | 0.00 |
| | | 13 | 0.069 | 0.123 | 74.967 | 0.00 |
| | | 14 | -0.119 | -0.008 | 76.354 | 0.00 |
| | | 15 | 0.089 | -0.023 | 77.142 | 0.00 |
| | | 16 | 0.003 | -0.048 | 77.143 | 0.00 |
| | | 17 | -0.091 | -0.088 | 77.997 | 0.00 |
| | | 18 | 0.178 | 0.059 | 81.330 | 0.00 |
| | | 19 | -0.209 | -0.008 | 85.992 | 0.00 |
| | | 20 | 0.116 | -0.027 | 87.442 | 0.00 |
| | | 21 | 0.047 | 0.114 | 87.687 | 0.00 |
| | | 22 | -0.184 | -0.002 | 91.482 | 0.00 |
| | | 23 | 0.222 | -0.039 | 97.105 | 0.00 |
| | | 24 | -0.114 | 0.045 | 98.616 | 0.00 |
| | | 25 | -0.086 | -0.099 | 99.484 | 0.00 |
| | | 26 | 0.239 | 0.054 | 106.40 | 0.00 |
| | | 27 | -0.241 | 0.066 | 113.58 | 0.00 |
| | | 28 | 0.078 | -0.085 | 114.35 | 0.00 |
| | | 29 | 0.129 | -0.073 | 116.47 | 0.00 |
| | | 30 | -0.229 | -0.054 | 123.30 | 0.00 |
| | | 31 | 0.190 | -0.003 | 128.10 | 0.00 |
| | | 32 | -0.077 | -0.011 | 128.90 | 0.00 |

**Japan – 1st differences**

Date: 12/25/16 Time: 02:59
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.122 | 0.122 | 1.2526 | 0.2 |
| 2 | 0.010 | -0.005 | 1.2608 | 0.5 |
| 3 | 0.282 | 0.286 | 8.1084 | 0.0 |
| 4 | -0.090 | -0.177 | 8.8231 | 0.0 |
| 5 | -0.019 | 0.033 | 8.8555 | 0.1 |
| 6 | 0.230 | 0.159 | 13.602 | 0.0 |
| 7 | -0.070 | -0.068 | 14.049 | 0.0 |
| 8 | -0.163 | -0.173 | 16.508 | 0.0 |
| 9 | 0.112 | 0.071 | 17.680 | 0.0 |
| 10 | 0.031 | 0.108 | 17.773 | 0.0 |
| 11 | -0.104 | -0.078 | 18.819 | 0.0 |
| 12 | -0.083 | -0.226 | 19.489 | 0.0 |
| 13 | 0.023 | 0.127 | 19.543 | 0.1 |
| 14 | -0.126 | -0.016 | 21.125 | 0.0 |
| 15 | 0.007 | 0.004 | 21.129 | 0.1 |
| 16 | 0.042 | -0.099 | 21.312 | 0.1 |
| 17 | -0.138 | 0.009 | 23.314 | 0.1 |
| 18 | -0.026 | 0.052 | 23.388 | 0.1 |
| 19 | 0.065 | -0.016 | 23.851 | 0.2 |
| 20 | -0.061 | -0.066 | 24.266 | 0.2 |
| 21 | 0.068 | 0.147 | 24.785 | 0.2 |
| 22 | 0.136 | 0.116 | 26.893 | 0.2 |
| 23 | -0.020 | -0.036 | 26.938 | 0.2 |
| 24 | 0.016 | -0.117 | 26.970 | 0.3 |
| 25 | 0.107 | 0.130 | 28.335 | 0.2 |
| 26 | -0.156 | -0.166 | 31.319 | 0.2 |
| 27 | -0.078 | -0.089 | 32.085 | 0.2 |
| 28 | 0.033 | -0.066 | 32.226 | 0.2 |
| 29 | -0.102 | 0.106 | 33.577 | 0.2 |
| 30 | -0.054 | -0.054 | 33.962 | 0.2 |
| 31 | 0.109 | 0.030 | 35.560 | 0.2 |
| 32 | -0.082 | -0.057 | 36.474 | 0.2 |
| 33 | -0.101 | 0.052 | 37.908 | 0.2 |
| 34 | 0.189 | 0.136 | 43.043 | 0.1 |
| 35 | 0.063 | 0.101 | 43.616 | 0.1 |
| 36 | -0.006 | -0.028 | 43.621 | 0.1 |

**Japan – 2nd differences**

Date: 12/25/16 Time: 03:00
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.443 | -0.443 | 16.314 | 0.000 |
| 2 | -0.214 | -0.511 | 20.176 | 0.000 |
| 3 | 0.374 | 0.007 | 32.106 | 0.000 |
| 4 | -0.257 | -0.191 | 37.823 | 0.000 |
| 5 | -0.104 | -0.279 | 38.760 | 0.000 |
| 6 | 0.324 | -0.020 | 48.058 | 0.000 |
| 7 | -0.119 | 0.088 | 49.335 | 0.000 |
| 8 | -0.204 | -0.141 | 53.144 | 0.000 |
| 9 | 0.205 | -0.157 | 57.013 | 0.000 |
| 10 | 0.018 | 0.027 | 57.043 | 0.000 |
| 11 | -0.083 | 0.166 | 57.696 | 0.000 |
| 12 | -0.047 | -0.197 | 57.906 | 0.000 |
| 13 | 0.138 | -0.053 | 59.769 | 0.000 |
| 14 | -0.169 | -0.091 | 62.606 | 0.000 |
| 15 | 0.068 | 0.031 | 63.071 | 0.000 |
| 16 | 0.116 | -0.080 | 64.444 | 0.000 |
| 17 | -0.158 | -0.102 | 67.032 | 0.000 |
| 18 | 0.006 | -0.049 | 67.037 | 0.000 |
| 19 | 0.115 | 0.004 | 68.456 | 0.000 |
| 20 | -0.151 | -0.210 | 70.949 | 0.000 |
| 21 | 0.037 | -0.178 | 71.100 | 0.000 |
| 22 | 0.137 | -0.013 | 73.232 | 0.000 |
| 23 | -0.117 | 0.079 | 74.800 | 0.000 |
| 24 | -0.026 | -0.160 | 74.881 | 0.000 |
| 25 | 0.205 | 0.137 | 79.883 | 0.000 |
| 26 | -0.203 | 0.035 | 84.881 | 0.000 |
| 27 | -0.025 | -0.011 | 84.959 | 0.000 |
| 28 | 0.183 | -0.115 | 89.182 | 0.000 |
| 29 | -0.133 | 0.038 | 91.459 | 0.000 |
| 30 | -0.062 | -0.057 | 91.964 | 0.000 |
| 31 | 0.216 | 0.013 | 98.200 | 0.000 |
| 32 | -0.131 | -0.097 | 100.55 | 0.000 |
| 33 | -0.151 | -0.147 | 103.72 | 0.000 |
| 34 | 0.245 | -0.126 | 112.29 | 0.000 |
| 35 | -0.047 | 0.042 | 112.61 | 0.000 |
| 36 | -0.119 | -0.020 | 114.72 | 0.000 |

### 7.4.6 M2

**China – 1st differences**

Date: 12/25/16 Time: 03:02
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.327 | 0.327 | 8.9867 | 0.003 |
| 2 | 0.246 | 0.155 | 14.122 | 0.001 |
| 3 | 0.096 | -0.026 | 14.911 | 0.002 |
| 4 | -0.059 | -0.134 | 15.210 | 0.004 |
| 5 | -0.021 | 0.022 | 15.249 | 0.009 |
| 6 | -0.169 | -0.148 | 17.817 | 0.007 |
| 7 | -0.110 | -0.017 | 18.907 | 0.008 |
| 8 | -0.185 | -0.118 | 22.070 | 0.005 |
| 9 | -0.084 | 0.041 | 22.731 | 0.007 |
| 10 | 0.005 | 0.058 | 22.734 | 0.012 |
| 11 | 0.086 | 0.104 | 23.441 | 0.015 |
| 12 | 0.034 | -0.088 | 23.556 | 0.023 |
| 13 | 0.028 | -0.013 | 23.634 | 0.035 |
| 14 | 0.237 | 0.244 | 29.274 | 0.010 |
| 15 | 0.059 | -0.079 | 29.632 | 0.013 |
| 16 | -0.030 | -0.181 | 29.722 | 0.019 |
| 17 | 0.003 | 0.075 | 29.723 | 0.028 |
| 18 | -0.140 | -0.070 | 31.818 | 0.023 |
| 19 | -0.197 | -0.190 | 36.022 | 0.010 |
| 20 | -0.105 | 0.093 | 37.244 | 0.011 |
| 21 | -0.157 | -0.074 | 39.998 | 0.007 |
| 22 | -0.071 | 0.004 | 40.579 | 0.009 |
| 23 | -0.085 | -0.019 | 41.409 | 0.011 |
| 24 | 0.002 | 0.002 | 41.410 | 0.015 |
| 25 | 0.138 | 0.064 | 43.684 | 0.012 |
| 26 | 0.066 | 0.031 | 44.216 | 0.014 |
| 27 | 0.155 | 0.059 | 47.208 | 0.009 |
| 28 | 0.133 | -0.031 | 49.459 | 0.007 |
| 29 | 0.149 | 0.130 | 52.318 | 0.005 |
| 30 | 0.043 | 0.005 | 52.566 | 0.007 |
| 31 | 0.112 | 0.042 | 54.239 | 0.006 |
| 32 | -0.003 | -0.024 | 54.240 | 0.008 |
| 33 | -0.127 | -0.023 | 56.507 | 0.007 |
| 34 | -0.045 | -0.023 | 56.802 | 0.008 |
| 35 | -0.068 | 0.071 | 57.479 | 0.010 |
| 36 | -0.082 | -0.125 | 58.477 | 0.010 |

**China – 2nd differences**

Date: 12/25/16 Time: 03:03
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.441 | -0.441 | 16.168 | 0.000 |
| 2 | 0.040 | -0.192 | 16.301 | 0.000 |
| 3 | 0.023 | -0.053 | 16.345 | 0.001 |
| 4 | -0.148 | -0.195 | 18.236 | 0.001 |
| 5 | 0.133 | -0.030 | 19.773 | 0.001 |
| 6 | -0.147 | -0.154 | 21.690 | 0.001 |
| 7 | 0.079 | -0.068 | 22.246 | 0.002 |
| 8 | -0.105 | -0.189 | 23.243 | 0.003 |
| 9 | -0.006 | -0.185 | 23.246 | 0.006 |
| 10 | 0.017 | -0.196 | 23.274 | 0.010 |
| 11 | 0.087 | -0.015 | 23.993 | 0.013 |
| 12 | -0.020 | -0.059 | 24.030 | 0.020 |
| 13 | -0.130 | -0.253 | 25.686 | 0.019 |
| 14 | 0.245 | 0.027 | 31.639 | 0.005 |
| 15 | -0.074 | 0.072 | 32.190 | 0.006 |
| 16 | -0.098 | -0.158 | 33.166 | 0.007 |
| 17 | 0.157 | 0.025 | 35.739 | 0.005 |
| 18 | -0.065 | 0.117 | 36.186 | 0.007 |
| 19 | -0.118 | -0.160 | 37.688 | 0.007 |
| 20 | 0.118 | 0.018 | 39.219 | 0.006 |
| 21 | -0.104 | -0.039 | 40.421 | 0.007 |
| 22 | 0.081 | -0.011 | 41.158 | 0.008 |
| 23 | -0.056 | -0.020 | 41.521 | 0.010 |
| 24 | -0.010 | -0.013 | 41.533 | 0.015 |
| 25 | 0.112 | 0.004 | 43.041 | 0.014 |
| 26 | -0.116 | -0.033 | 44.684 | 0.013 |
| 27 | 0.073 | 0.033 | 45.335 | 0.015 |
| 28 | -0.045 | -0.122 | 45.586 | 0.019 |
| 29 | 0.080 | 0.011 | 46.400 | 0.021 |
| 30 | -0.108 | -0.002 | 47.916 | 0.020 |
| 31 | 0.114 | 0.027 | 49.662 | 0.018 |
| 32 | 0.018 | 0.050 | 49.708 | 0.024 |
| 33 | -0.152 | 0.031 | 52.930 | 0.015 |
| 34 | 0.086 | -0.072 | 53.985 | 0.016 |
| 35 | -0.004 | 0.068 | 53.987 | 0.021 |
| 36 | -0.047 | -0.028 | 54.316 | 0.026 |

## Euro Area – 1st differences

Date: 12/25/16 Time: 03:04
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.465 | 0.465 | 18.144 | 0.000 |
| | | 2 | 0.421 | 0.261 | 33.216 | 0.000 |
| | | 3 | 0.364 | 0.134 | 44.644 | 0.000 |
| | | 4 | 0.249 | -0.022 | 50.073 | 0.000 |
| | | 5 | 0.227 | 0.028 | 54.625 | 0.000 |
| | | 6 | 0.227 | 0.075 | 59.256 | 0.000 |
| | | 7 | 0.197 | 0.037 | 62.782 | 0.000 |
| | | 8 | 0.144 | -0.034 | 64.697 | 0.000 |
| | | 9 | 0.229 | 0.132 | 69.583 | 0.000 |
| | | 10 | -0.055 | -0.316 | 69.874 | 0.000 |
| | | 11 | -0.028 | -0.056 | 69.950 | 0.000 |
| | | 12 | -0.081 | -0.071 | 70.596 | 0.000 |
| | | 13 | -0.153 | -0.065 | 72.906 | 0.000 |
| | | 14 | -0.061 | 0.090 | 73.278 | 0.000 |
| | | 15 | -0.148 | -0.114 | 75.495 | 0.000 |
| | | 16 | -0.171 | -0.069 | 78.502 | 0.000 |
| | | 17 | -0.161 | 0.004 | 81.231 | 0.000 |
| | | 18 | -0.204 | -0.103 | 85.662 | 0.000 |
| | | 19 | -0.310 | -0.067 | 96.076 | 0.000 |
| | | 20 | -0.323 | -0.166 | 107.57 | 0.000 |
| | | 21 | -0.204 | 0.152 | 112.25 | 0.000 |
| | | 22 | -0.220 | 0.026 | 117.75 | 0.000 |
| | | 23 | -0.126 | 0.004 | 119.60 | 0.000 |
| | | 24 | -0.107 | 0.101 | 120.95 | 0.000 |
| | | 25 | -0.096 | -0.014 | 122.05 | 0.000 |
| | | 26 | -0.109 | -0.055 | 123.51 | 0.000 |
| | | 27 | -0.149 | -0.062 | 126.28 | 0.000 |
| | | 28 | -0.070 | 0.066 | 126.90 | 0.000 |
| | | 29 | -0.064 | 0.045 | 127.42 | 0.000 |
| | | 30 | 0.006 | -0.072 | 127.43 | 0.000 |
| | | 31 | 0.038 | 0.048 | 127.63 | 0.000 |
| | | 32 | -0.020 | -0.180 | 127.68 | 0.000 |
| | | 33 | -0.061 | -0.129 | 128.20 | 0.000 |
| | | 34 | -0.090 | -0.048 | 129.36 | 0.000 |
| | | 35 | -0.015 | 0.060 | 129.39 | 0.000 |
| | | 36 | -0.038 | 0.037 | 129.61 | 0.000 |

## China – 2nd differences

Date: 12/25/16 Time: 03:05
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.455 | -0.455 | 17.171 | 0.000 |
| | | 2 | 0.017 | -0.239 | 17.196 | 0.000 |
| | | 3 | 0.041 | -0.077 | 17.340 | 0.001 |
| | | 4 | -0.085 | -0.123 | 17.969 | 0.001 |
| | | 5 | -0.012 | -0.140 | 17.981 | 0.003 |
| | | 6 | 0.026 | -0.086 | 18.043 | 0.006 |
| | | 7 | 0.010 | -0.031 | 18.053 | 0.012 |
| | | 8 | -0.122 | -0.186 | 19.399 | 0.013 |
| | | 9 | 0.346 | 0.263 | 30.434 | 0.000 |
| | | 10 | -0.293 | -0.024 | 38.475 | 0.000 |
| | | 11 | 0.089 | 0.001 | 39.219 | 0.000 |
| | | 12 | 0.020 | 0.013 | 39.260 | 0.000 |
| | | 13 | -0.177 | -0.173 | 42.321 | 0.000 |
| | | 14 | 0.203 | 0.075 | 46.408 | 0.000 |
| | | 15 | -0.068 | 0.018 | 46.872 | 0.000 |
| | | 16 | -0.042 | -0.069 | 47.050 | 0.000 |
| | | 17 | 0.044 | 0.020 | 47.250 | 0.000 |
| | | 18 | 0.057 | -0.035 | 47.591 | 0.000 |
| | | 19 | -0.082 | 0.061 | 48.307 | 0.000 |
| | | 20 | -0.134 | -0.273 | 50.267 | 0.000 |
| | | 21 | 0.128 | -0.114 | 52.090 | 0.000 |
| | | 22 | -0.114 | -0.078 | 53.554 | 0.000 |
| | | 23 | 0.125 | -0.130 | 55.342 | 0.000 |
| | | 24 | -0.028 | -0.006 | 55.437 | 0.000 |
| | | 25 | 0.029 | 0.028 | 55.537 | 0.000 |
| | | 26 | 0.023 | 0.022 | 55.603 | 0.001 |
| | | 27 | -0.123 | -0.105 | 57.484 | 0.001 |
| | | 28 | 0.075 | -0.074 | 58.201 | 0.001 |
| | | 29 | -0.055 | 0.061 | 58.586 | 0.001 |
| | | 30 | 0.036 | -0.067 | 58.757 | 0.001 |
| | | 31 | 0.083 | 0.190 | 59.673 | 0.001 |
| | | 32 | -0.010 | 0.076 | 59.688 | 0.002 |
| | | 33 | -0.024 | -0.016 | 59.768 | 0.003 |
| | | 34 | -0.099 | -0.103 | 61.171 | 0.003 |
| | | 35 | 0.097 | -0.072 | 62.537 | 0.003 |
| | | 36 | -0.086 | -0.021 | 63.639 | 0.003 |

## United States – 1st differences

Date: 12/25/16 Time: 03:05
Sample: 1995Q2 2015Q2
Included observations: 81

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.193 | 0.193 | 3.1461 | 0.076 |
| | | 2 | -0.078 | -0.120 | 3.6609 | 0.160 |
| | | 3 | -0.078 | -0.040 | 4.1900 | 0.242 |
| | | 4 | -0.139 | -0.130 | 5.8669 | 0.209 |
| | | 5 | 0.067 | 0.118 | 6.2636 | 0.281 |
| | | 6 | -0.013 | -0.087 | 6.2789 | 0.393 |
| | | 7 | -0.095 | -0.074 | 7.0910 | 0.419 |
| | | 8 | -0.114 | -0.107 | 8.2825 | 0.406 |
| | | 9 | -0.009 | 0.048 | 8.2902 | 0.505 |
| | | 10 | 0.022 | -0.039 | 8.3363 | 0.596 |
| | | 11 | 0.173 | 0.172 | 11.215 | 0.425 |
| | | 12 | -0.129 | -0.258 | 12.845 | 0.380 |
| | | 13 | -0.071 | 0.096 | 13.340 | 0.422 |
| | | 14 | 0.163 | 0.120 | 16.001 | 0.313 |
| | | 15 | -0.086 | -0.150 | 16.756 | 0.334 |
| | | 16 | -0.031 | -0.057 | 16.853 | 0.395 |
| | | 17 | -0.080 | -0.023 | 17.525 | 0.419 |
| | | 18 | 0.036 | 0.131 | 17.660 | 0.478 |
| | | 19 | 0.077 | -0.038 | 18.305 | 0.502 |
| | | 20 | -0.176 | -0.278 | 21.731 | 0.355 |
| | | 21 | -0.082 | 0.064 | 22.478 | 0.372 |
| | | 22 | 0.065 | 0.123 | 22.960 | 0.404 |
| | | 23 | 0.009 | -0.059 | 22.969 | 0.463 |
| | | 24 | 0.096 | -0.011 | 24.051 | 0.459 |
| | | 25 | 0.033 | -0.076 | 24.182 | 0.509 |
| | | 26 | -0.166 | 0.039 | 27.565 | 0.380 |
| | | 27 | -0.182 | -0.252 | 31.667 | 0.245 |
| | | 28 | 0.017 | 0.029 | 31.704 | 0.287 |
| | | 29 | 0.086 | 0.048 | 32.655 | 0.292 |
| | | 30 | 0.026 | -0.011 | 32.746 | 0.334 |
| | | 31 | -0.010 | 0.074 | 32.759 | 0.381 |
| | | 32 | -0.038 | -0.190 | 32.953 | 0.420 |
| | | 33 | -0.006 | -0.045 | 32.958 | 0.469 |
| | | 34 | -0.130 | -0.049 | 35.370 | 0.403 |
| | | 35 | -0.005 | -0.054 | 35.373 | 0.451 |
| | | 36 | -0.029 | -0.112 | 35.503 | 0.492 |

## United States – 2nd differences

Date: 12/25/16 Time: 03:06
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.325 | -0.325 | 8.7632 | 0.003 |
| | | 2 | -0.170 | -0.308 | 11.187 | 0.004 |
| | | 3 | 0.035 | -0.169 | 11.293 | 0.010 |
| | | 4 | -0.165 | -0.340 | 13.641 | 0.009 |
| | | 5 | 0.179 | -0.083 | 16.438 | 0.006 |
| | | 6 | -0.001 | -0.098 | 16.438 | 0.012 |
| | | 7 | -0.037 | -0.063 | 16.563 | 0.020 |
| | | 8 | -0.079 | -0.200 | 17.135 | 0.029 |
| | | 9 | 0.043 | -0.088 | 17.303 | 0.044 |
| | | 10 | -0.071 | -0.261 | 17.771 | 0.059 |
| | | 11 | 0.281 | 0.173 | 25.257 | 0.008 |
| | | 12 | -0.225 | -0.202 | 30.146 | 0.003 |
| | | 13 | -0.109 | -0.180 | 31.317 | 0.003 |
| | | 14 | 0.295 | 0.080 | 39.952 | 0.000 |
| | | 15 | -0.173 | -0.006 | 42.974 | 0.000 |
| | | 16 | 0.055 | -0.062 | 43.288 | 0.000 |
| | | 17 | -0.102 | -0.180 | 44.372 | 0.000 |
| | | 18 | 0.042 | -0.010 | 44.560 | 0.000 |
| | | 19 | 0.187 | 0.218 | 48.313 | 0.000 |
| | | 20 | -0.213 | -0.155 | 53.276 | 0.000 |
| | | 21 | -0.038 | -0.183 | 53.434 | 0.000 |
| | | 22 | 0.123 | 0.004 | 55.138 | 0.000 |
| | | 23 | -0.096 | -0.044 | 56.192 | 0.000 |
| | | 24 | 0.101 | 0.007 | 57.389 | 0.000 |
| | | 25 | 0.088 | -0.100 | 58.309 | 0.000 |
| | | 26 | -0.098 | 0.192 | 59.486 | 0.000 |
| | | 27 | -0.150 | -0.121 | 62.280 | 0.000 |
| | | 28 | 0.081 | -0.105 | 63.102 | 0.000 |
| | | 29 | 0.084 | -0.050 | 64.010 | 0.000 |
| | | 30 | -0.025 | -0.121 | 64.094 | 0.000 |
| | | 31 | 0.007 | 0.135 | 64.099 | 0.000 |
| | | 32 | -0.048 | -0.031 | 64.410 | 0.001 |
| | | 33 | 0.104 | -0.026 | 65.932 | 0.001 |
| | | 34 | -0.147 | -0.006 | 68.995 | 0.000 |
| | | 35 | 0.086 | 0.042 | 70.068 | 0.000 |
| | | 36 | -0.014 | -0.074 | 70.099 | 0.001 |

## United Kingdom – 1st differences

Date: 12/25/16 Time: 03:08
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.044 | 0.044 | 0.1625 | 0.687 |
| 2 | 0.139 | 0.137 | 1.7961 | 0.407 |
| 3 | 0.328 | 0.323 | 11.065 | 0.011 |
| 4 | 0.006 | -0.026 | 11.069 | 0.026 |
| 5 | 0.332 | 0.282 | 20.838 | 0.001 |
| 6 | 0.207 | 0.125 | 24.679 | 0.000 |
| 7 | -0.029 | -0.091 | 24.754 | 0.001 |
| 8 | 0.132 | -0.090 | 26.356 | 0.001 |
| 9 | 0.040 | -0.045 | 26.507 | 0.002 |
| 10 | 0.086 | 0.033 | 27.208 | 0.002 |
| 11 | 0.143 | 0.041 | 29.158 | 0.002 |
| 12 | 0.004 | 0.017 | 29.160 | 0.004 |
| 13 | 0.095 | 0.082 | 30.058 | 0.005 |
| 14 | -0.002 | -0.062 | 30.058 | 0.007 |
| 15 | 0.006 | -0.045 | 30.061 | 0.012 |
| 16 | -0.082 | -0.236 | 30.755 | 0.014 |
| 17 | -0.036 | -0.058 | 30.894 | 0.021 |
| 18 | -0.061 | -0.096 | 31.297 | 0.027 |
| 19 | -0.035 | 0.067 | 31.428 | 0.036 |
| 20 | -0.119 | -0.067 | 32.994 | 0.034 |
| 21 | -0.121 | 0.001 | 34.623 | 0.031 |
| 22 | -0.102 | -0.046 | 35.815 | 0.032 |
| 23 | -0.081 | -0.002 | 36.568 | 0.036 |
| 24 | -0.064 | -0.034 | 37.046 | 0.043 |
| 25 | -0.107 | -0.026 | 38.428 | 0.042 |
| 26 | -0.107 | -0.011 | 39.834 | 0.041 |
| 27 | -0.133 | -0.029 | 42.030 | 0.033 |
| 28 | -0.091 | -0.015 | 43.083 | 0.034 |
| 29 | -0.038 | 0.080 | 43.267 | 0.043 |
| 30 | -0.130 | -0.054 | 45.510 | 0.035 |
| 31 | -0.079 | 0.031 | 46.353 | 0.038 |
| 32 | -0.063 | -0.030 | 46.900 | 0.043 |
| 33 | -0.054 | 0.091 | 47.310 | 0.051 |
| 34 | 0.008 | 0.010 | 47.319 | 0.064 |
| 35 | -0.043 | 0.044 | 47.592 | 0.076 |
| 36 | 0.034 | 0.069 | 47.768 | 0.091 |

## United Kingdom – 2nd differences

Date: 12/25/16 Time: 03:08
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.548 | -0.548 | 24.941 | 0.000 |
| 2 | -0.049 | -0.499 | 25.142 | 0.000 |
| 3 | 0.265 | -0.093 | 31.119 | 0.000 |
| 4 | -0.341 | -0.365 | 41.148 | 0.000 |
| 5 | 0.238 | -0.180 | 46.109 | 0.000 |
| 6 | 0.057 | 0.037 | 46.396 | 0.000 |
| 7 | -0.206 | 0.028 | 50.200 | 0.000 |
| 8 | 0.135 | -0.012 | 51.868 | 0.000 |
| 9 | -0.084 | -0.100 | 52.515 | 0.000 |
| 10 | 0.006 | -0.090 | 52.519 | 0.000 |
| 11 | 0.097 | -0.064 | 53.414 | 0.000 |
| 12 | -0.121 | -0.121 | 54.817 | 0.000 |
| 13 | 0.097 | 0.005 | 55.739 | 0.000 |
| 14 | -0.058 | -0.021 | 56.076 | 0.000 |
| 15 | 0.054 | 0.157 | 56.366 | 0.000 |
| 16 | -0.069 | -0.031 | 56.847 | 0.000 |
| 17 | 0.031 | -0.000 | 56.949 | 0.000 |
| 18 | -0.021 | -0.143 | 56.995 | 0.000 |
| 19 | 0.058 | 0.009 | 57.351 | 0.000 |
| 20 | -0.042 | -0.047 | 57.541 | 0.000 |
| 21 | 0.004 | 0.026 | 57.543 | 0.000 |
| 22 | -0.014 | -0.006 | 57.565 | 0.000 |
| 23 | 0.005 | 0.025 | 57.568 | 0.000 |
| 24 | 0.020 | -0.018 | 57.617 | 0.000 |
| 25 | -0.016 | -0.049 | 57.646 | 0.000 |
| 26 | 0.027 | -0.011 | 57.736 | 0.000 |
| 27 | -0.053 | -0.032 | 58.079 | 0.000 |
| 28 | -0.003 | -0.112 | 58.080 | 0.001 |
| 29 | 0.083 | 0.038 | 58.971 | 0.001 |
| 30 | -0.084 | -0.033 | 59.891 | 0.001 |
| 31 | 0.024 | 0.000 | 59.968 | 0.001 |
| 32 | 0.006 | -0.125 | 59.973 | 0.002 |
| 33 | -0.033 | -0.045 | 60.122 | 0.003 |
| 34 | 0.064 | -0.071 | 60.715 | 0.003 |
| 35 | -0.069 | -0.087 | 61.410 | 0.004 |
| 36 | 0.105 | 0.109 | 63.040 | 0.004 |

## Japan – 1st differences

Date: 12/25/16 Time: 03:09
Sample: 1995Q2 2015Q2
Included observations: 81

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.205 | 0.205 | 3.5436 | 0.060 |
| 2 | 0.086 | 0.046 | 4.1784 | 0.124 |
| 3 | 0.015 | -0.011 | 4.1990 | 0.241 |
| 4 | -0.038 | -0.045 | 4.3252 | 0.364 |
| 5 | -0.076 | -0.063 | 4.8410 | 0.436 |
| 6 | 0.027 | 0.062 | 4.9051 | 0.556 |
| 7 | -0.013 | -0.021 | 4.9210 | 0.670 |
| 8 | -0.058 | -0.062 | 5.2355 | 0.732 |
| 9 | 0.187 | 0.219 | 8.4951 | 0.485 |
| 10 | -0.045 | -0.132 | 8.6868 | 0.562 |
| 11 | 0.070 | 0.097 | 9.1642 | 0.607 |
| 12 | -0.141 | -0.200 | 11.110 | 0.520 |
| 13 | 0.047 | 0.147 | 11.331 | 0.583 |
| 14 | 0.148 | 0.175 | 13.523 | 0.486 |
| 15 | 0.048 | -0.087 | 13.753 | 0.544 |
| 16 | -0.127 | -0.153 | 15.429 | 0.493 |
| 17 | -0.096 | -0.048 | 16.402 | 0.496 |
| 18 | -0.132 | -0.111 | 18.267 | 0.438 |
| 19 | -0.255 | -0.145 | 25.317 | 0.150 |
| 20 | -0.118 | -0.149 | 26.859 | 0.139 |
| 21 | -0.197 | -0.053 | 31.194 | 0.070 |
| 22 | -0.014 | 0.032 | 31.217 | 0.092 |
| 23 | 0.028 | -0.027 | 31.306 | 0.115 |
| 24 | 0.148 | 0.099 | 33.875 | 0.087 |
| 25 | -0.084 | -0.135 | 34.713 | 0.094 |
| 26 | -0.139 | -0.102 | 37.080 | 0.074 |
| 27 | -0.059 | 0.031 | 37.519 | 0.086 |
| 28 | -0.021 | -0.023 | 37.575 | 0.107 |
| 29 | -0.040 | -0.019 | 37.782 | 0.127 |
| 30 | 0.010 | 0.102 | 37.795 | 0.155 |
| 31 | 0.146 | 0.123 | 40.673 | 0.115 |
| 32 | 0.003 | 0.016 | 40.674 | 0.140 |
| 33 | 0.026 | -0.082 | 40.766 | 0.166 |
| 34 | -0.062 | -0.006 | 41.310 | 0.182 |
| 35 | -0.035 | 0.012 | 41.490 | 0.209 |
| 36 | 0.010 | 0.025 | 41.505 | 0.243 |

## Japan – 2nd differences

Date: 12/25/16 Time: 03:10
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.415 | -0.415 | 14.269 | 0.000 |
| 2 | -0.040 | -0.256 | 14.404 | 0.001 |
| 3 | -0.002 | -0.166 | 14.404 | 0.002 |
| 4 | -0.029 | -0.150 | 14.478 | 0.006 |
| 5 | -0.077 | -0.227 | 14.996 | 0.010 |
| 6 | 0.096 | -0.102 | 15.808 | 0.015 |
| 7 | 0.011 | -0.042 | 15.820 | 0.027 |
| 8 | -0.178 | -0.271 | 18.719 | 0.016 |
| 9 | 0.287 | 0.083 | 26.352 | 0.002 |
| 10 | -0.223 | -0.152 | 31.013 | 0.001 |
| 11 | 0.197 | 0.131 | 34.693 | 0.000 |
| 12 | -0.245 | -0.223 | 40.499 | 0.000 |
| 13 | 0.044 | -0.207 | 40.687 | 0.000 |
| 14 | 0.150 | 0.071 | 42.919 | 0.000 |
| 15 | 0.023 | 0.091 | 42.973 | 0.000 |
| 16 | -0.118 | -0.040 | 44.396 | 0.000 |
| 17 | 0.045 | 0.025 | 44.605 | 0.000 |
| 18 | 0.054 | 0.051 | 44.912 | 0.000 |
| 19 | -0.156 | 0.047 | 47.543 | 0.000 |
| 20 | 0.125 | -0.086 | 49.253 | 0.000 |
| 21 | -0.155 | -0.142 | 51.940 | 0.000 |
| 22 | 0.081 | -0.063 | 52.685 | 0.000 |
| 23 | -0.044 | -0.175 | 52.905 | 0.000 |
| 24 | 0.208 | 0.075 | 57.976 | 0.000 |
| 25 | -0.097 | 0.018 | 59.109 | 0.000 |
| 26 | -0.096 | -0.092 | 60.237 | 0.000 |
| 27 | 0.017 | -0.058 | 60.271 | 0.000 |
| 28 | 0.050 | -0.047 | 60.582 | 0.000 |
| 29 | -0.038 | -0.130 | 60.767 | 0.000 |
| 30 | -0.057 | -0.141 | 61.186 | 0.001 |
| 31 | 0.184 | -0.012 | 65.733 | 0.000 |
| 32 | -0.101 | 0.075 | 67.134 | 0.000 |
| 33 | 0.057 | -0.010 | 67.591 | 0.000 |
| 34 | -0.065 | -0.012 | 68.190 | 0.000 |
| 35 | -0.014 | -0.019 | 68.218 | 0.001 |
| 36 | 0.019 | 0.146 | 68.270 | 0.001 |

## 7.4.7 IR

### China – 1st differences

Date: 12/25/16 Time: 03:11
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.044 | 0.044 | 0.1588 | 0.690 |
| | | 2 | 0.196 | 0.194 | 3.3836 | 0.184 |
| | | 3 | 0.028 | 0.013 | 3.4519 | 0.327 |
| | | 4 | -0.050 | -0.093 | 3.6703 | 0.452 |
| | | 5 | 0.154 | 0.158 | 5.7383 | 0.333 |
| | | 6 | 0.049 | 0.070 | 5.9499 | 0.429 |
| | | 7 | 0.047 | -0.021 | 6.1443 | 0.523 |
| | | 8 | -0.156 | -0.205 | 8.3675 | 0.398 |
| | | 9 | 0.010 | 0.046 | 8.3766 | 0.497 |
| | | 10 | 0.027 | 0.102 | 8.4475 | 0.585 |
| | | 11 | 0.099 | 0.081 | 9.3870 | 0.586 |
| | | 12 | 0.051 | -0.033 | 9.6373 | 0.648 |
| | | 13 | 0.105 | 0.132 | 10.716 | 0.635 |
| | | 14 | 0.075 | 0.107 | 11.275 | 0.664 |
| | | 15 | -0.016 | -0.083 | 11.302 | 0.731 |
| | | 16 | -0.050 | -0.193 | 11.553 | 0.774 |
| | | 17 | -0.001 | 0.041 | 11.554 | 0.826 |
| | | 18 | 0.007 | 0.089 | 11.559 | 0.869 |
| | | 19 | -0.031 | -0.075 | 11.660 | 0.900 |
| | | 20 | 0.005 | -0.067 | 11.663 | 0.927 |
| | | 21 | -0.019 | 0.112 | 11.705 | 0.947 |
| | | 22 | -0.140 | -0.086 | 13.935 | 0.904 |
| | | 23 | 0.028 | -0.064 | 14.026 | 0.926 |
| | | 24 | -0.075 | -0.117 | 14.682 | 0.930 |
| | | 25 | -0.088 | -0.059 | 15.610 | 0.926 |
| | | 26 | -0.015 | 0.027 | 15.637 | 0.945 |
| | | 27 | 0.023 | 0.097 | 15.701 | 0.958 |
| | | 28 | -0.013 | -0.029 | 15.723 | 0.970 |
| | | 29 | -0.006 | 0.021 | 15.728 | 0.978 |
| | | 30 | -0.010 | 0.019 | 15.741 | 0.985 |
| | | 31 | 0.000 | 0.029 | 15.741 | 0.990 |
| | | 32 | -0.001 | -0.082 | 15.741 | 0.993 |
| | | 33 | -0.007 | -0.046 | 15.748 | 0.995 |
| | | 34 | -0.082 | -0.072 | 16.706 | 0.994 |
| | | 35 | -0.182 | -0.106 | 21.542 | 0.964 |
| | | 36 | -0.003 | 0.085 | 21.543 | 0.973 |

### China – 2nd differences

Date: 12/25/16 Time: 03:11
Sample: 1995Q2 2015Q2
Included observations: 79

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.580 | -0.580 | 27.564 | 0.000 |
| | | 2 | 0.167 | -0.254 | 29.884 | 0.000 |
| | | 3 | -0.046 | -0.116 | 30.065 | 0.000 |
| | | 4 | -0.148 | -0.316 | 31.934 | 0.000 |
| | | 5 | 0.162 | -0.182 | 34.191 | 0.000 |
| | | 6 | -0.054 | -0.076 | 34.443 | 0.000 |
| | | 7 | 0.105 | 0.096 | 35.416 | 0.000 |
| | | 8 | -0.193 | -0.161 | 38.767 | 0.000 |
| | | 9 | 0.078 | -0.191 | 39.321 | 0.000 |
| | | 10 | -0.028 | -0.148 | 39.393 | 0.000 |
| | | 11 | 0.062 | -0.028 | 39.757 | 0.000 |
| | | 12 | -0.053 | -0.184 | 40.026 | 0.000 |
| | | 13 | 0.044 | -0.146 | 40.211 | 0.000 |
| | | 14 | 0.032 | 0.045 | 40.311 | 0.000 |
| | | 15 | -0.030 | 0.147 | 40.401 | 0.000 |
| | | 16 | -0.043 | -0.094 | 40.588 | 0.001 |
| | | 17 | 0.021 | -0.133 | 40.632 | 0.001 |
| | | 18 | 0.022 | 0.028 | 40.684 | 0.002 |
| | | 19 | -0.037 | 0.016 | 40.828 | 0.003 |
| | | 20 | 0.032 | -0.156 | 40.939 | 0.004 |
| | | 21 | 0.050 | 0.045 | 41.220 | 0.005 |
| | | 22 | -0.152 | 0.016 | 43.800 | 0.004 |
| | | 23 | 0.142 | 0.064 | 46.096 | 0.003 |
| | | 24 | -0.047 | 0.002 | 46.348 | 0.004 |
| | | 25 | -0.045 | -0.082 | 46.591 | 0.005 |
| | | 26 | 0.024 | -0.134 | 46.662 | 0.008 |
| | | 27 | 0.032 | -0.008 | 46.792 | 0.010 |
| | | 28 | -0.022 | -0.061 | 46.853 | 0.014 |
| | | 29 | 0.003 | -0.061 | 46.854 | 0.019 |
| | | 30 | -0.005 | -0.064 | 46.857 | 0.026 |
| | | 31 | 0.006 | 0.045 | 46.861 | 0.034 |
| | | 32 | 0.003 | 0.003 | 46.862 | 0.044 |

### Japan – 1st differences

Date: 12/25/16 Time: 22:25
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.202 | 0.202 | 3.4004 | 0.065 |
| | | 2 | 0.146 | 0.109 | 5.1908 | 0.075 |
| | | 3 | 0.007 | -0.044 | 5.1952 | 0.158 |
| | | 4 | -0.092 | -0.107 | 5.9221 | 0.205 |
| | | 5 | -0.011 | 0.032 | 5.9322 | 0.313 |
| | | 6 | -0.080 | -0.060 | 6.4996 | 0.370 |
| | | 7 | -0.076 | -0.060 | 7.0154 | 0.427 |
| | | 8 | -0.109 | -0.082 | 8.0909 | 0.425 |
| | | 9 | -0.021 | 0.034 | 8.1310 | 0.521 |
| | | 10 | -0.038 | -0.032 | 8.2685 | 0.603 |
| | | 11 | 0.018 | 0.017 | 8.3009 | 0.686 |
| | | 12 | 0.084 | 0.072 | 8.9852 | 0.704 |
| | | 13 | 0.077 | 0.047 | 9.5672 | 0.729 |
| | | 14 | 0.158 | 0.105 | 12.048 | 0.602 |
| | | 15 | 0.055 | -0.009 | 12.352 | 0.652 |
| | | 16 | 0.011 | -0.028 | 12.364 | 0.719 |
| | | 17 | -0.018 | -0.012 | 12.399 | 0.775 |
| | | 18 | -0.034 | 0.000 | 12.522 | 0.819 |
| | | 19 | -0.027 | -0.005 | 12.597 | 0.859 |
| | | 20 | -0.211 | -0.198 | 17.474 | 0.622 |
| | | 21 | -0.019 | 0.081 | 17.516 | 0.679 |
| | | 22 | 0.038 | 0.120 | 17.681 | 0.725 |
| | | 23 | 0.038 | -0.002 | 17.845 | 0.766 |
| | | 24 | 0.075 | 0.004 | 18.506 | 0.778 |
| | | 25 | 0.007 | -0.006 | 18.511 | 0.820 |
| | | 26 | 0.088 | 0.071 | 19.459 | 0.816 |
| | | 27 | -0.012 | -0.082 | 19.478 | 0.852 |
| | | 28 | 0.009 | -0.042 | 19.487 | 0.882 |
| | | 29 | -0.001 | 0.035 | 19.488 | 0.908 |
| | | 30 | -0.036 | -0.014 | 19.660 | 0.925 |
| | | 31 | 0.007 | 0.020 | 19.667 | 0.943 |
| | | 32 | -0.103 | -0.080 | 21.116 | 0.929 |
| | | 33 | -0.111 | -0.077 | 22.822 | 0.908 |
| | | 34 | -0.087 | 0.022 | 23.900 | 0.901 |
| | | 35 | -0.059 | -0.040 | 24.409 | 0.910 |
| | | 36 | 0.021 | -0.008 | 24.475 | 0.927 |

### Japan – 2nd differences

Date: 12/25/16 Time: 22:25
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.202 | 0.202 | 3.4004 | 0.065 |
| | | 2 | 0.146 | 0.109 | 5.1908 | 0.075 |
| | | 3 | 0.007 | -0.044 | 5.1952 | 0.158 |
| | | 4 | -0.092 | -0.107 | 5.9221 | 0.205 |
| | | 5 | -0.011 | 0.032 | 5.9322 | 0.313 |
| | | 6 | -0.080 | -0.060 | 6.4996 | 0.370 |
| | | 7 | -0.076 | -0.060 | 7.0154 | 0.427 |
| | | 8 | -0.109 | -0.082 | 8.0909 | 0.425 |
| | | 9 | -0.021 | 0.034 | 8.1310 | 0.521 |
| | | 10 | -0.038 | -0.032 | 8.2685 | 0.603 |
| | | 11 | 0.018 | 0.017 | 8.3009 | 0.686 |
| | | 12 | 0.084 | 0.072 | 8.9852 | 0.704 |
| | | 13 | 0.077 | 0.047 | 9.5672 | 0.729 |
| | | 14 | 0.158 | 0.105 | 12.048 | 0.602 |
| | | 15 | 0.055 | -0.009 | 12.352 | 0.652 |
| | | 16 | 0.011 | -0.028 | 12.364 | 0.719 |
| | | 17 | -0.018 | -0.012 | 12.399 | 0.775 |
| | | 18 | -0.034 | 0.000 | 12.522 | 0.819 |
| | | 19 | -0.027 | -0.005 | 12.597 | 0.859 |
| | | 20 | -0.211 | -0.198 | 17.474 | 0.622 |
| | | 21 | -0.019 | 0.081 | 17.516 | 0.679 |
| | | 22 | 0.038 | 0.120 | 17.681 | 0.725 |
| | | 23 | 0.038 | -0.002 | 17.845 | 0.766 |
| | | 24 | 0.075 | 0.004 | 18.506 | 0.778 |
| | | 25 | 0.007 | -0.006 | 18.511 | 0.820 |
| | | 26 | 0.088 | 0.071 | 19.459 | 0.816 |
| | | 27 | -0.012 | -0.082 | 19.478 | 0.852 |
| | | 28 | 0.009 | -0.042 | 19.487 | 0.882 |
| | | 29 | -0.001 | 0.035 | 19.488 | 0.908 |
| | | 30 | -0.036 | -0.014 | 19.660 | 0.925 |
| | | 31 | 0.007 | 0.020 | 19.667 | 0.943 |
| | | 32 | -0.103 | -0.080 | 21.116 | 0.929 |
| | | 33 | -0.111 | -0.077 | 22.822 | 0.908 |
| | | 34 | -0.087 | 0.022 | 23.900 | 0.901 |
| | | 35 | -0.059 | -0.040 | 24.409 | 0.910 |
| | | 36 | 0.021 | -0.008 | 24.475 | 0.927 |

## United states – 1st differences

Date: 12/25/16 Time: 22:33
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | 0.511 | 0.511 | 21.686 | 0.000 |
| 2 | 0.447 | 0.252 | 38.506 | 0.000 |
| 3 | 0.403 | 0.149 | 52.335 | 0.000 |
| 4 | 0.114 | -0.278 | 53.461 | 0.000 |
| 5 | 0.029 | -0.132 | 53.536 | 0.000 |
| 6 | -0.041 | -0.043 | 53.686 | 0.000 |
| 7 | -0.108 | 0.042 | 54.741 | 0.000 |
| 8 | -0.180 | -0.095 | 57.701 | 0.000 |
| 9 | -0.140 | 0.017 | 59.523 | 0.000 |
| 10 | -0.158 | -0.040 | 61.865 | 0.000 |
| 11 | -0.296 | -0.243 | 70.198 | 0.000 |
| 12 | -0.337 | -0.253 | 81.163 | 0.000 |
| 13 | -0.442 | -0.266 | 100.25 | 0.000 |
| 14 | -0.435 | -0.024 | 119.10 | 0.000 |
| 15 | -0.345 | 0.121 | 131.08 | 0.000 |
| 16 | -0.327 | -0.008 | 142.02 | 0.000 |
| 17 | -0.264 | -0.172 | 149.30 | 0.000 |
| 18 | -0.064 | 0.045 | 149.73 | 0.000 |
| 19 | -0.019 | -0.031 | 149.77 | 0.000 |
| 20 | 0.004 | -0.136 | 149.77 | 0.000 |
| 21 | 0.135 | -0.008 | 151.79 | 0.000 |
| 22 | 0.075 | -0.041 | 152.43 | 0.000 |
| 23 | 0.053 | -0.059 | 152.76 | 0.000 |
| 24 | 0.138 | -0.063 | 155.00 | 0.000 |
| 25 | 0.148 | -0.058 | 157.60 | 0.000 |
| 26 | 0.150 | -0.045 | 160.34 | 0.000 |
| 27 | 0.195 | -0.035 | 165.02 | 0.000 |
| 28 | 0.274 | 0.071 | 174.50 | 0.000 |
| 29 | 0.151 | -0.177 | 177.45 | 0.000 |
| 30 | 0.159 | -0.116 | 180.75 | 0.000 |
| 31 | 0.091 | -0.130 | 181.85 | 0.000 |
| 32 | -0.056 | -0.104 | 182.28 | 0.000 |
| 33 | -0.025 | -0.003 | 182.37 | 0.000 |
| 34 | -0.099 | -0.064 | 183.78 | 0.000 |
| 35 | -0.065 | 0.060 | 184.40 | 0.000 |
| 36 | -0.039 | -0.064 | 184.62 | 0.000 |

## United states – 2nd differences

Date: 12/25/16 Time: 22:34
Sample: 1995Q2 2015Q2
Included observations: 79

| | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|
| 1 | -0.434 | -0.434 | 15.484 | 0.000 |
| 2 | -0.021 | -0.259 | 15.521 | 0.000 |
| 3 | 0.251 | 0.168 | 20.824 | 0.000 |
| 4 | -0.208 | -0.017 | 24.529 | 0.000 |
| 5 | -0.014 | -0.108 | 24.545 | 0.000 |
| 6 | -0.004 | -0.174 | 24.546 | 0.000 |
| 7 | 0.005 | -0.028 | 24.549 | 0.001 |
| 8 | -0.114 | -0.136 | 25.728 | 0.001 |
| 9 | 0.059 | -0.067 | 26.051 | 0.002 |
| 10 | 0.122 | 0.117 | 27.427 | 0.002 |
| 11 | -0.099 | 0.075 | 28.342 | 0.003 |
| 12 | 0.064 | 0.020 | 28.730 | 0.004 |
| 13 | -0.115 | -0.235 | 30.018 | 0.005 |
| 14 | -0.084 | -0.304 | 30.706 | 0.006 |
| 15 | 0.074 | -0.133 | 31.255 | 0.008 |
| 16 | -0.043 | 0.034 | 31.440 | 0.012 |
| 17 | -0.142 | -0.183 | 33.512 | 0.010 |
| 18 | 0.159 | -0.090 | 36.151 | 0.007 |
| 19 | 0.023 | 0.005 | 36.209 | 0.010 |
| 20 | -0.113 | -0.126 | 37.592 | 0.010 |
| 21 | 0.195 | -0.081 | 41.775 | 0.004 |
| 22 | -0.042 | -0.062 | 41.975 | 0.006 |
| 23 | -0.110 | -0.059 | 43.355 | 0.006 |
| 24 | 0.077 | -0.066 | 44.050 | 0.008 |
| 25 | 0.005 | -0.081 | 44.053 | 0.011 |
| 26 | -0.025 | -0.059 | 44.130 | 0.015 |
| 27 | -0.046 | -0.155 | 44.387 | 0.019 |
| 28 | 0.210 | 0.088 | 49.903 | 0.007 |
| 29 | -0.132 | -0.009 | 52.143 | 0.005 |
| 30 | 0.075 | -0.001 | 52.872 | 0.006 |
| 31 | 0.080 | -0.039 | 53.720 | 0.007 |
| 32 | -0.185 | -0.133 | 58.395 | 0.003 |

## United Kingdom – 1st differences

Date: 12/25/16 Time: 22:32
Sample: 1995Q2 2015Q2
Included observations: 80

| | AC | PAC | Q-Stat |
|---|---|---|---|
| 1 | 0.540 | 0.540 | 24.206 |
| 2 | 0.190 | -0.144 | 27.226 |
| 3 | -0.025 | -0.093 | 27.279 |
| 4 | -0.128 | -0.068 | 28.702 |
| 5 | -0.144 | -0.034 | 30.515 |
| 6 | -0.108 | -0.013 | 31.554 |
| 7 | -0.162 | -0.157 | 33.902 |
| 8 | -0.201 | -0.095 | 37.572 |
| 9 | -0.080 | 0.108 | 38.163 |
| 10 | 0.056 | 0.065 | 38.458 |
| 11 | 0.058 | -0.091 | 38.782 |
| 12 | -0.020 | -0.113 | 38.821 |
| 13 | 0.029 | 0.138 | 38.903 |
| 14 | -0.026 | -0.101 | 38.971 |
| 15 | -0.070 | -0.094 | 39.460 |
| 16 | -0.081 | -0.051 | 40.130 |
| 17 | -0.050 | 0.069 | 40.389 |
| 18 | -0.143 | -0.171 | 42.540 |
| 19 | -0.153 | -0.106 | 45.069 |
| 20 | -0.150 | -0.093 | 47.529 |
| 21 | -0.061 | 0.116 | 47.938 |
| 22 | -0.048 | -0.146 | 48.199 |
| 23 | 0.031 | -0.024 | 48.309 |
| 24 | -0.077 | -0.248 | 49.012 |
| 25 | -0.118 | 0.051 | 50.672 |
| 26 | 0.045 | 0.130 | 50.913 |
| 27 | 0.163 | -0.018 | 54.195 |
| 28 | 0.190 | -0.032 | 58.767 |
| 29 | 0.109 | -0.010 | 60.297 |
| 30 | 0.076 | 0.069 | 61.050 |
| 31 | 0.025 | -0.027 | 61.132 |
| 32 | 0.020 | -0.109 | 61.189 |
| 33 | -0.015 | -0.017 | 61.222 |
| 34 | -0.074 | -0.021 | 61.999 |
| 35 | -0.203 | -0.144 | 67.993 |
| 36 | -0.083 | 0.028 | 69.029 |

## United Kingdom – 2nd differences

Date: 12/25/16 Time: 22:32
Sample: 1995Q2 2015Q2
Included observations: 79

| | AC | PAC | Q-Stat |
|---|---|---|---|
| 1 | -0.120 | -0.120 | 1.1735 |
| 2 | -0.143 | -0.160 | 2.8830 |
| 3 | -0.123 | -0.169 | 4.1601 |
| 4 | -0.094 | -0.173 | 4.9207 |
| 5 | -0.060 | -0.170 | 5.2308 |
| 6 | 0.097 | -0.021 | 6.0512 |
| 7 | -0.017 | -0.098 | 6.0769 |
| 8 | -0.174 | -0.267 | 8.8038 |
| 9 | -0.016 | -0.182 | 8.8268 |
| 10 | 0.145 | -0.018 | 10.789 |
| 11 | 0.091 | -0.002 | 11.574 |
| 12 | -0.138 | -0.240 | 13.397 |
| 13 | 0.117 | 0.014 | 14.728 |
| 14 | -0.012 | 0.000 | 14.743 |
| 15 | -0.037 | -0.050 | 14.876 |
| 16 | -0.048 | -0.158 | 15.108 |
| 17 | 0.132 | 0.080 | 16.920 |
| 18 | -0.100 | -0.013 | 17.960 |
| 19 | -0.008 | -0.024 | 17.966 |
| 20 | -0.091 | -0.217 | 18.856 |
| 21 | 0.085 | 0.051 | 19.648 |
| 22 | -0.073 | -0.080 | 20.244 |
| 23 | 0.207 | 0.133 | 25.132 |
| 24 | -0.075 | -0.178 | 25.782 |
| 25 | -0.215 | -0.217 | 31.274 |
| 26 | 0.054 | -0.045 | 31.623 |
| 27 | 0.089 | -0.041 | 32.598 |
| 28 | 0.112 | -0.057 | 34.175 |
| 29 | -0.056 | -0.127 | 34.572 |
| 30 | 0.027 | -0.013 | 34.670 |
| 31 | -0.052 | 0.060 | 35.037 |
| 32 | 0.035 | -0.041 | 35.203 |

## Euro Area – 1st differences

Date: 12/25/16 Time: 22:38
Sample: 1995Q2 2015Q2
Included observations: 80

| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | 0.572 | 0.572 | 27.202 | 0.000 |
| | | 2 | 0.309 | -0.027 | 35.238 | 0.000 |
| | | 3 | 0.052 | -0.170 | 35.465 | 0.000 |
| | | 4 | -0.183 | -0.212 | 38.352 | 0.000 |
| | | 5 | -0.135 | 0.155 | 39.942 | 0.000 |
| | | 6 | -0.186 | -0.139 | 43.015 | 0.000 |
| | | 7 | -0.255 | -0.212 | 48.848 | 0.000 |
| | | 8 | -0.269 | -0.111 | 55.439 | 0.000 |
| | | 9 | -0.219 | 0.078 | 59.852 | 0.000 |
| | | 10 | -0.098 | 0.021 | 60.745 | 0.000 |
| | | 11 | 0.025 | -0.025 | 60.804 | 0.000 |
| | | 12 | -0.010 | -0.200 | 60.813 | 0.000 |
| | | 13 | -0.052 | -0.065 | 61.079 | 0.000 |
| | | 14 | -0.076 | -0.009 | 61.659 | 0.000 |
| | | 15 | -0.059 | -0.006 | 62.011 | 0.000 |
| | | 16 | -0.049 | -0.179 | 62.260 | 0.000 |
| | | 17 | -0.066 | -0.112 | 62.719 | 0.000 |
| | | 18 | -0.065 | 0.017 | 63.162 | 0.000 |
| | | 19 | -0.091 | -0.062 | 64.050 | 0.000 |
| | | 20 | -0.080 | -0.167 | 64.758 | 0.000 |
| | | 21 | 0.019 | 0.008 | 64.798 | 0.000 |
| | | 22 | 0.115 | 0.104 | 66.295 | 0.000 |
| | | 23 | 0.142 | -0.042 | 68.602 | 0.000 |
| | | 24 | 0.173 | -0.043 | 72.122 | 0.000 |
| | | 25 | 0.140 | -0.021 | 74.458 | 0.000 |
| | | 26 | 0.086 | -0.022 | 75.349 | 0.000 |
| | | 27 | 0.068 | 0.000 | 75.915 | 0.000 |
| | | 28 | 0.127 | 0.186 | 77.951 | 0.000 |
| | | 29 | 0.118 | -0.001 | 79.746 | 0.000 |
| | | 30 | 0.090 | -0.019 | 80.806 | 0.000 |
| | | 31 | 0.017 | 0.001 | 80.843 | 0.000 |
| | | 32 | -0.084 | 0.001 | 81.813 | 0.000 |
| | | 33 | -0.085 | 0.000 | 82.824 | 0.000 |
| | | 34 | -0.150 | -0.117 | 86.023 | 0.000 |
| | | 35 | -0.178 | -0.072 | 90.667 | 0.000 |
| | | 36 | -0.202 | -0.043 | 96.748 | 0.000 |

## Euro Area – 2nd differences

Date: 12/25/16 Time: 22:38
Sample: 1995Q2 2015Q2
Included observations: 79

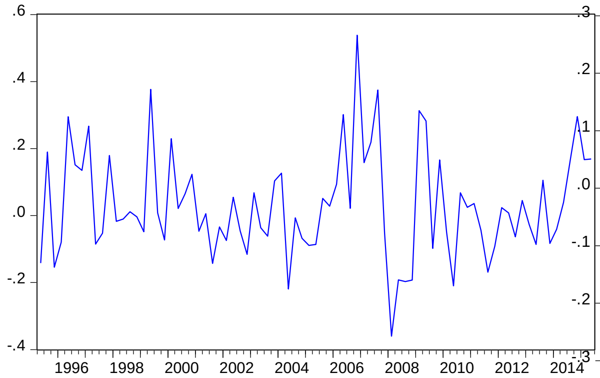
| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
|---|---|---|---|---|---|---|
| | | 1 | -0.192 | -0.192 | 3.0281 | 0.082 |
| | | 2 | -0.010 | -0.049 | 3.0365 | 0.219 |
| | | 3 | -0.021 | -0.034 | 3.0753 | 0.380 |
| | | 4 | -0.339 | -0.365 | 12.853 | 0.012 |
| | | 5 | 0.124 | -0.026 | 14.182 | 0.014 |
| | | 6 | 0.027 | 0.021 | 14.247 | 0.027 |
| | | 7 | -0.069 | -0.114 | 14.674 | 0.040 |
| | | 8 | -0.075 | -0.269 | 15.175 | 0.056 |
| | | 9 | -0.084 | -0.160 | 15.818 | 0.071 |
| | | 10 | -0.003 | -0.093 | 15.819 | 0.105 |
| | | 11 | 0.179 | 0.056 | 18.848 | 0.064 |
| | | 12 | 0.015 | -0.090 | 18.870 | 0.092 |
| | | 13 | -0.039 | -0.151 | 19.014 | 0.123 |
| | | 14 | -0.041 | -0.119 | 19.177 | 0.158 |
| | | 15 | 0.011 | 0.049 | 19.189 | 0.205 |
| | | 16 | 0.046 | -0.023 | 19.408 | 0.248 |
| | | 17 | -0.015 | -0.162 | 19.430 | 0.304 |
| | | 18 | 0.028 | -0.064 | 19.514 | 0.361 |
| | | 19 | -0.038 | 0.045 | 19.672 | 0.415 |
| | | 20 | -0.117 | -0.144 | 21.164 | 0.388 |
| | | 21 | 0.005 | -0.216 | 21.167 | 0.449 |
| | | 22 | 0.079 | -0.038 | 21.876 | 0.467 |
| | | 23 | -0.018 | -0.037 | 21.915 | 0.525 |
| | | 24 | 0.072 | -0.062 | 22.518 | 0.548 |
| | | 25 | 0.011 | -0.076 | 22.533 | 0.605 |
| | | 26 | -0.032 | -0.066 | 22.658 | 0.652 |
| | | 27 | -0.069 | -0.210 | 23.236 | 0.672 |
| | | 28 | 0.074 | -0.022 | 23.927 | 0.685 |
| | | 29 | 0.025 | -0.014 | 24.005 | 0.729 |
| | | 30 | 0.047 | -0.032 | 24.290 | 0.759 |
| | | 31 | 0.030 | -0.016 | 24.414 | 0.793 |
| | | 32 | -0.110 | -0.016 | 26.071 | 0.760 |

## 7.5 Normal and histogram graph

### 7.5.1 Close 1

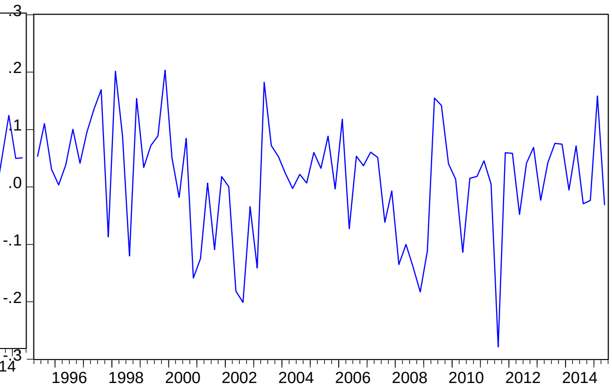
**China**

c1_chn_gnsa_saf



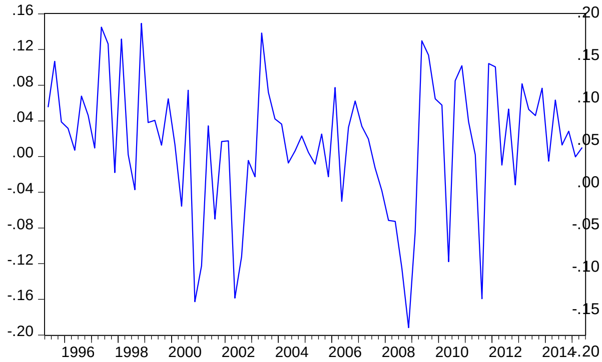

**Euro Area**

c1_euro_gnsa_saf



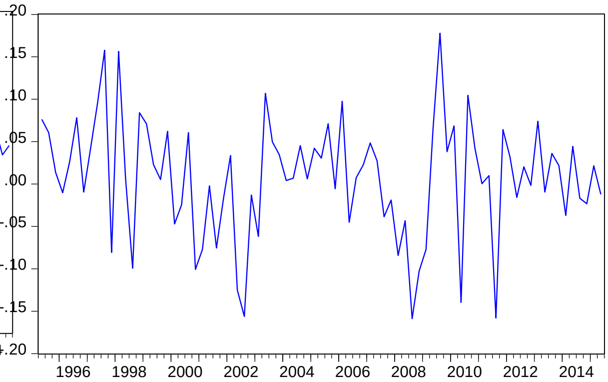

**United States**

c1_us_gnsa_saf



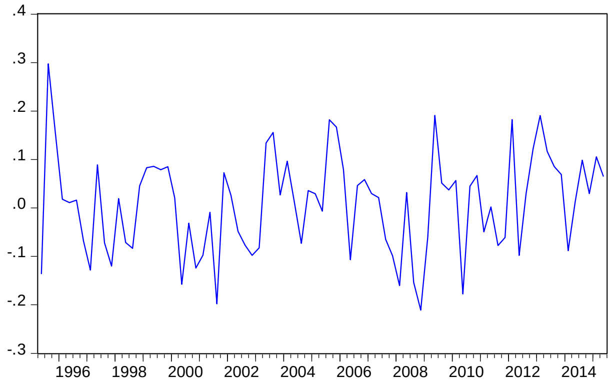

**United Kingdom**

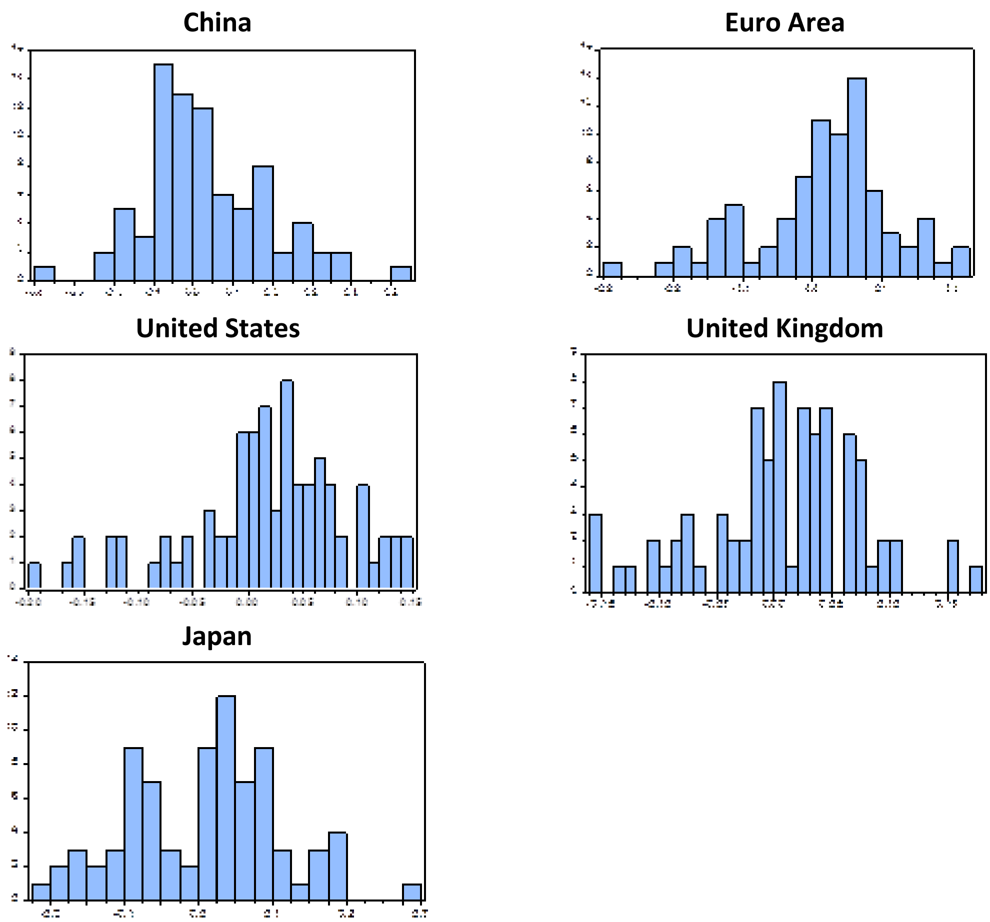
c1_uk_gnsa_saf




**Japan**

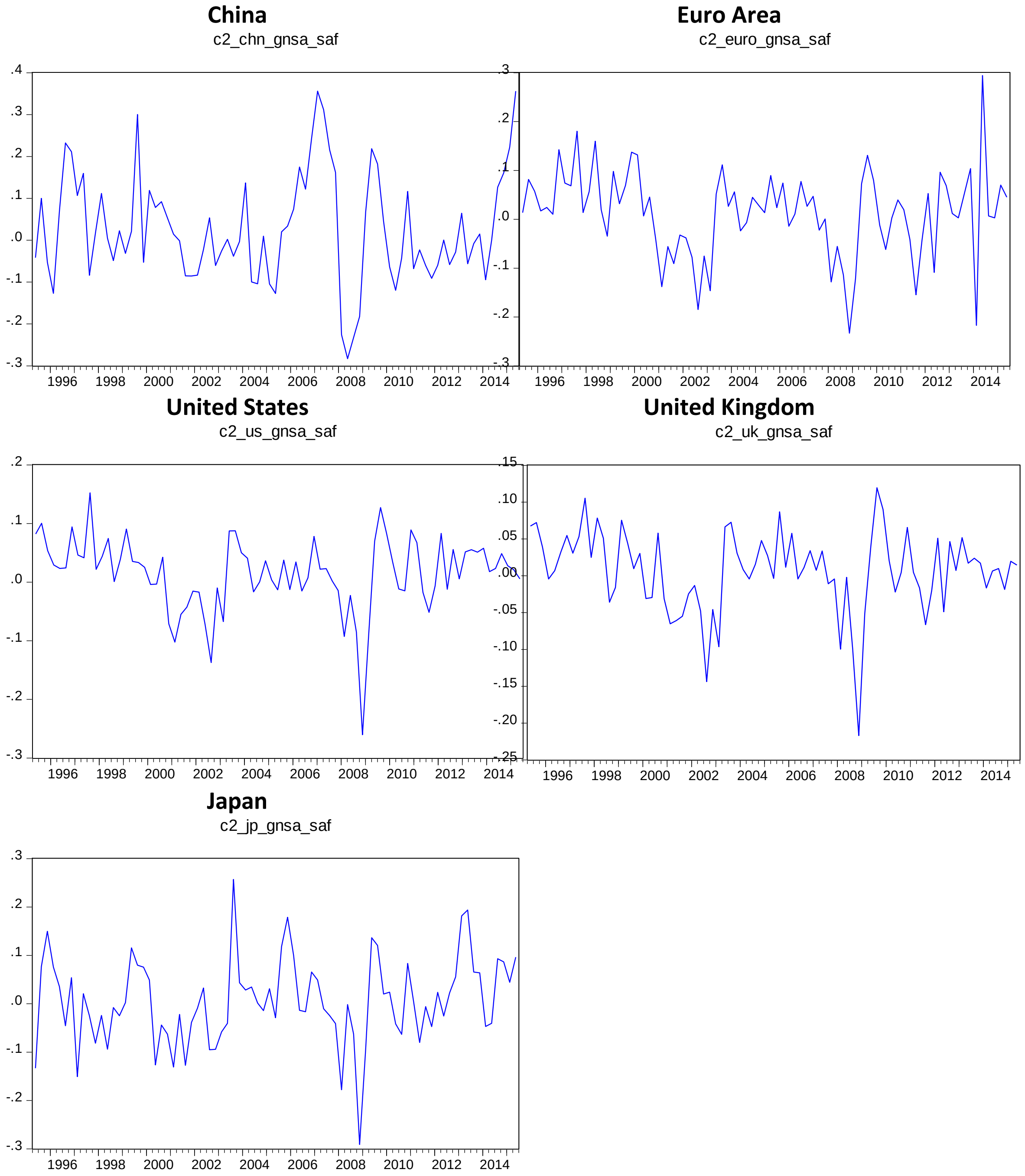
c1_jp_gnsa_saf

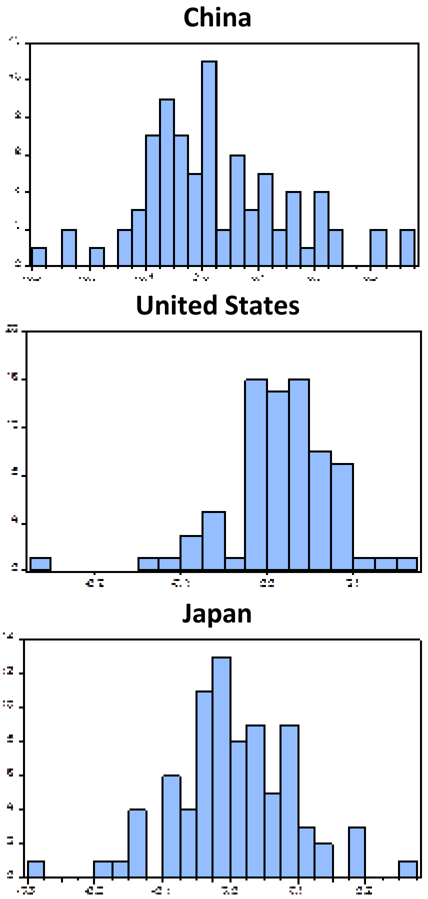





| | C1_CHN_GNSA_SAF | C1_EURO_GNSA_SAF | C1_JP_GNSA_SAF | C1_UK_GNSA_SAF | C1_US_GNSA_SAF |
|---|---|---|---|---|---|
| Mean | 0.030387 | 0.014565 | 0.008372 | 0.007225 | 0.015484 |
| Median | 0.007691 | 0.032386 | 0.021487 | 0.009926 | 0.023016 |
| Maximum | 0.538008 | 0.203318 | 0.297517 | 0.177875 | 0.149225 |
| Minimum | -0.359854 | -0.278680 | -0.211074 | -0.158686 | -0.191761 |
| Std. Dev. | 0.157871 | 0.097376 | 0.102734 | 0.069752 | 0.074544 |
| Skewness | 0.605372 | -0.563140 | 0.067238 | -0.311424 | -0.678053 |
| Kurtosis | 3.569296 | 3.239812 | 2.716799 | 3.271721 | 3.356809 |
| Jarque-Bera | 6.041248 | 4.475309 | 0.331718 | 1.558480 | 6.636393 |
| Probability | 0.048771 | 0.106708 | 0.847165 | 0.458755 | 0.036218 |
| Sum | 2.461366 | 1.179753 | 0.678133 | 0.585231 | 1.254199 |
| Sum Sq. Dev. | 1.993850 | 0.758571 | 0.844344 | 0.389226 | 0.444547 |
| Observations | 81 | 81 | 81 | 81 | 81 |

### 7.5.2 Close 2

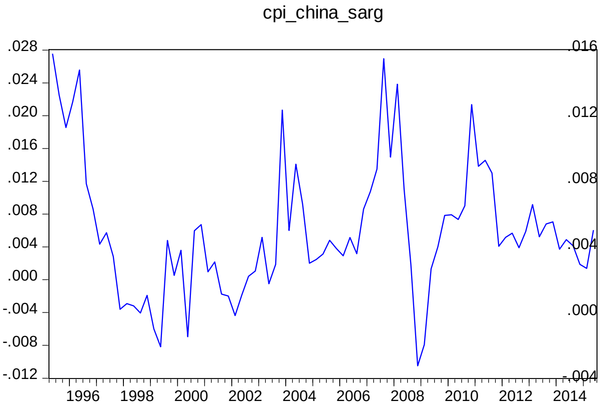

China
c2_chn_gnsa_saf
Euro Area
c2_euro_gnsa_saf
United States
c2_us_gnsa_saf
United Kingdom
c2_uk_gnsa_saf
Japan
c2_jp_gnsa_saf



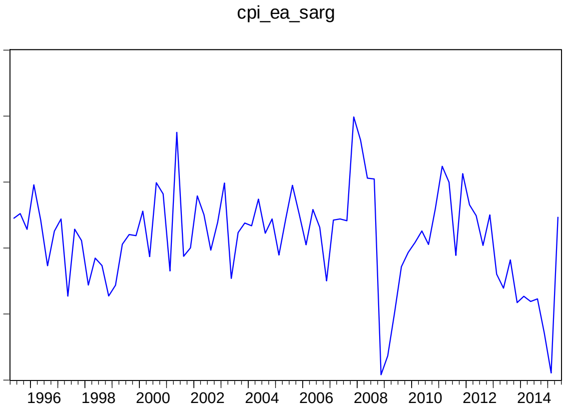

| | C2_CHN_GNSA_SAF | C2_EURO_GNSA_SAF | C2_JP_GNSA_SAF | C2_UK_GNSA_SAF | C2_US_GNSA_SAF |
|---|---|---|---|---|---|
| Mean | 0.027542 | 0.012432 | 0.005248 | 0.006809 | 0.014890 |
| Median | 0.004857 | 0.019519 | -0.001812 | 0.009785 | 0.023249 |
| Maximum | 0.356176 | 0.294251 | 0.257010 | 0.119662 | 0.152258 |
| Minimum | -0.283080 | -0.233043 | -0.290963 | -0.217017 | -0.260238 |
| Std. Dev. | 0.130498 | 0.089475 | 0.089613 | 0.055032 | 0.061976 |
| Skewness | 0.414983 | -0.277820 | -0.076163 | -1.055981 | -1.236823 |
| Kurtosis | 3.103059 | 4.018305 | 3.967271 | 5.589401 | 6.779088 |
| | | | | | |
| Jarque-Bera | 2.360698 | 4.541675 | 3.236004 | 37.68315 | 68.85145 |
| Probability | 0.307172 | 0.103226 | 0.198295 | 0.000000 | 0.000000 |
| | | | | | |
| Sum | 2.230863 | 1.007007 | 0.425078 | 0.551506 | 1.206105 |
| Sum Sq. Dev. | 1.362388 | 0.640458 | 0.642445 | 0.242281 | 0.307281 |
| | | | | | |
| Observations | 81 | 81 | 81 | 81 | 81 |

### 7.5.3 CPI

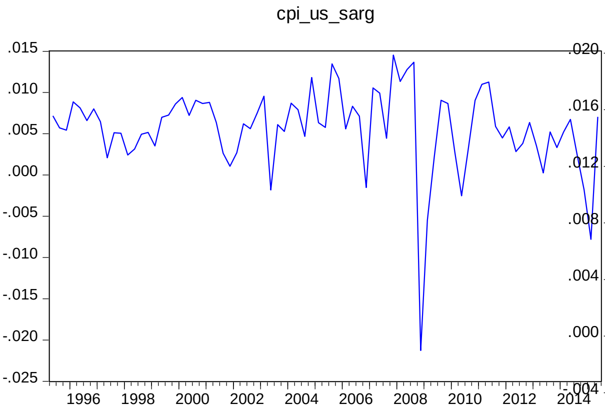
**China**



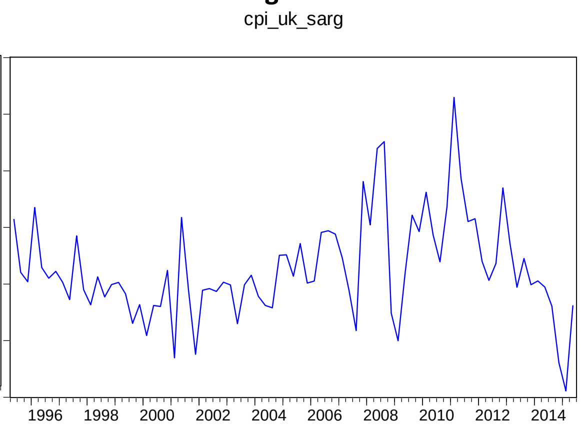

**Euro Area**



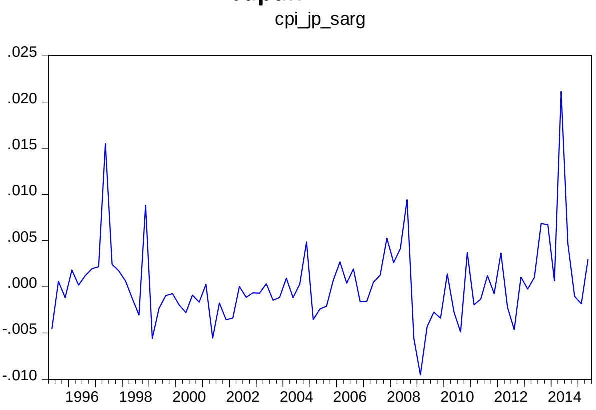

**United States**

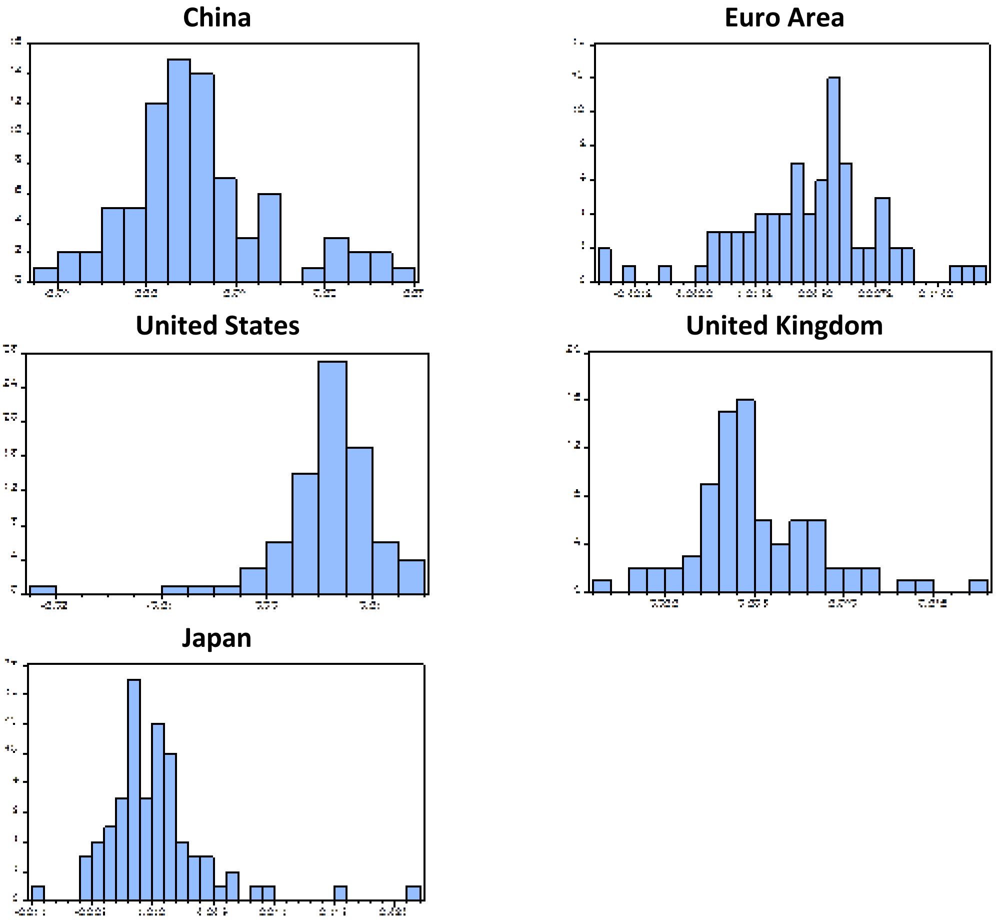



**United Kingdom**



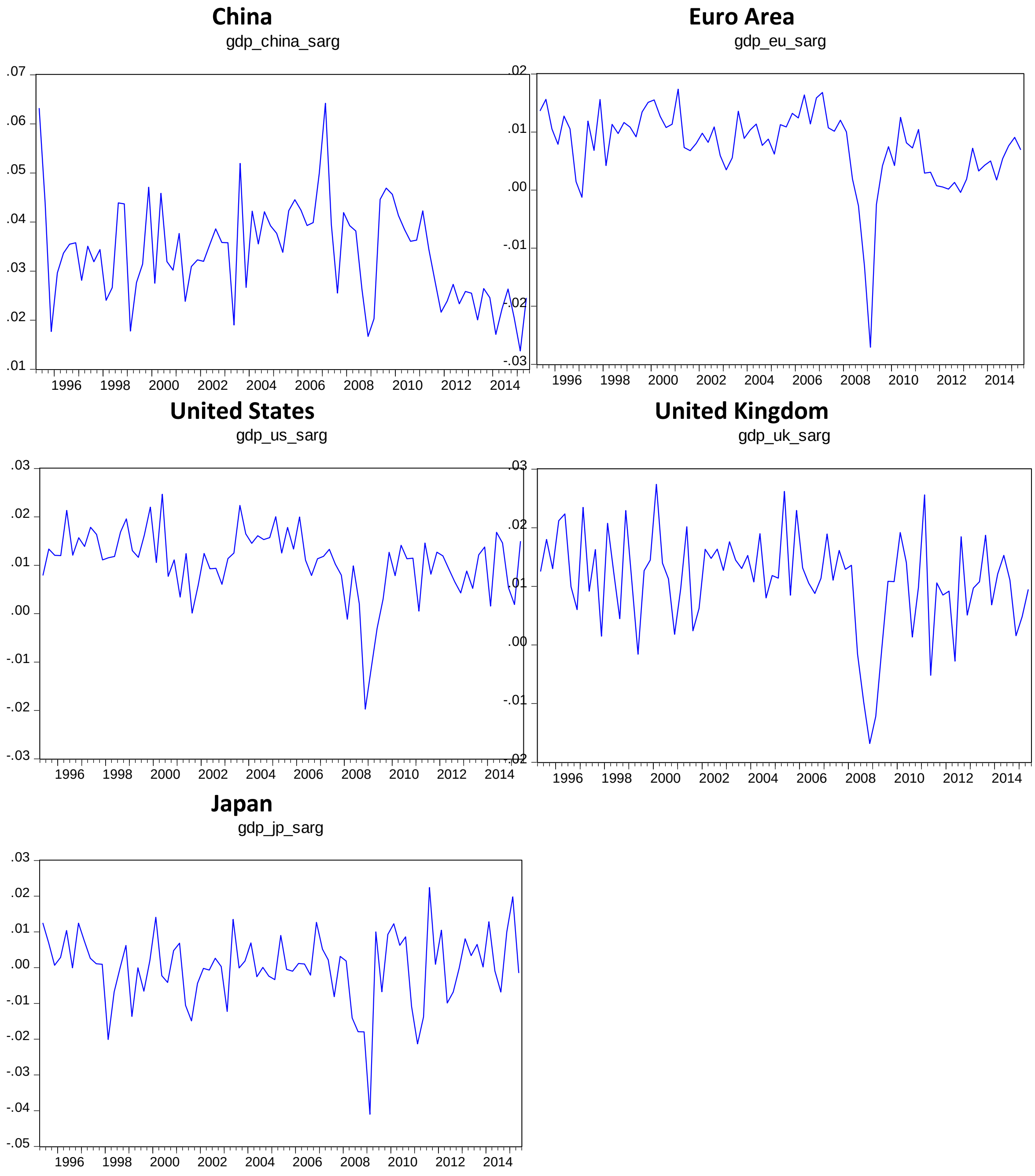

**Japan**

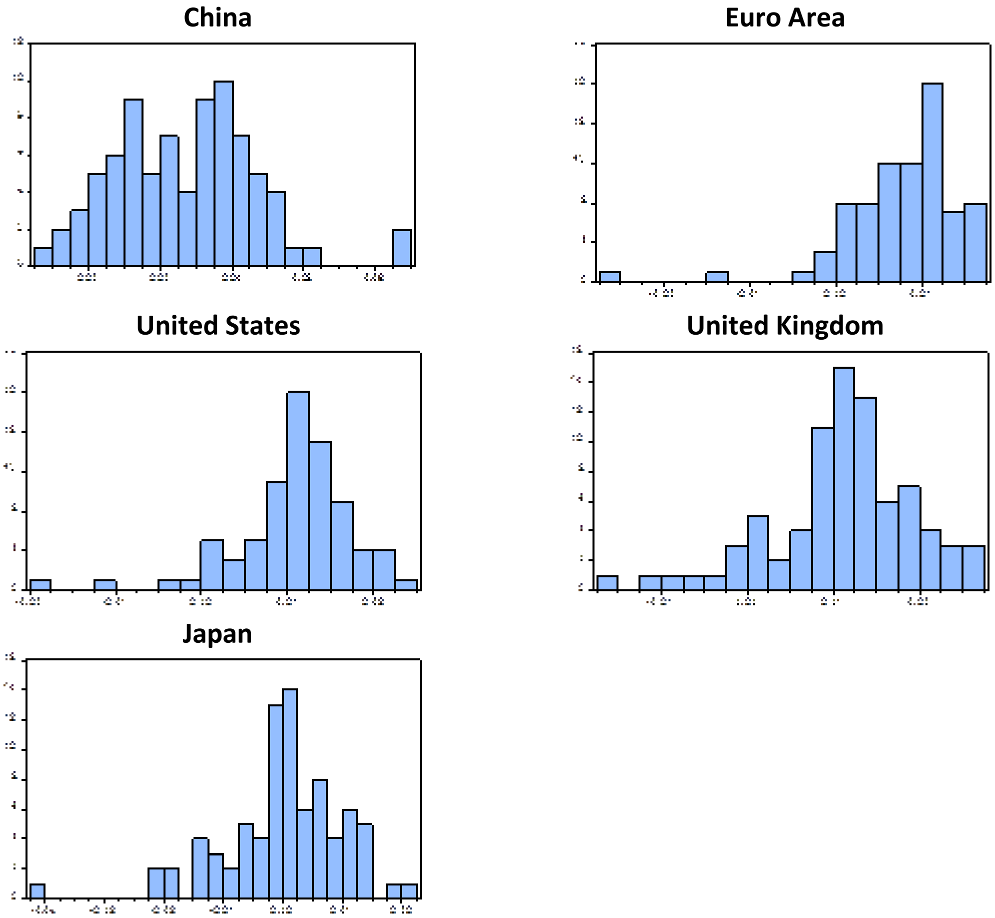





| | CPI_CHINA_SARG | CPI_EA_SARG | CPI_JP_SARG | CPI_UK_SARG | CPI_US_SARG |
|---|---|---|---|---|---|
| Mean | 0.005937 | 0.004605 | 0.000273 | 0.005055 | 0.005602 |
| Median | 0.004806 | 0.005028 | -0.000654 | 0.004224 | 0.006115 |
| Maximum | 0.027565 | 0.011949 | 0.021134 | 0.017184 | 0.014536 |
| Minimum | -0.010500 | -0.003680 | -0.009533 | -0.003558 | -0.021261 |
| Std. Dev. | 0.008147 | 0.002937 | 0.004363 | 0.003539 | 0.005069 |
| Skewness | 0.748857 | -0.410749 | 1.905133 | 0.699795 | -2.085775 |
| Kurtosis | 3.510234 | 3.804547 | 9.692217 | 4.304041 | 11.67190 |
| [redacted] | | | | | |
| Jarque-Bera | 8.449269 | 4.462268 | 200.1506 | 12.35038 | 312.5372 |
| Probability | 0.014631 | 0.107407 | 0.000000 | 0.002080 | 0.000000 |
| [redacted] | | | | | |
| Sum | 0.480917 | 0.373023 | 0.022109 | 0.409429 | 0.453770 |
| Sum Sq. Dev. | 0.005309 | 0.000690 | 0.001523 | 0.001002 | 0.002055 |
| [redacted] | | | | | |
| Observations | 81 | 81 | 81 | 81 | 81 |

### 7.5.4 GDP

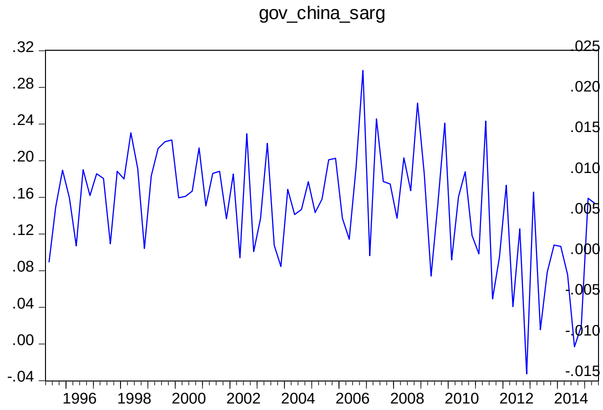

China
gdp_china_sarg
Euro Area
gdp_eu_sarg
United States
gdp_us_sarg
United Kingdom
gdp_uk_sarg
Japan
gdp_jp_sarg
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014



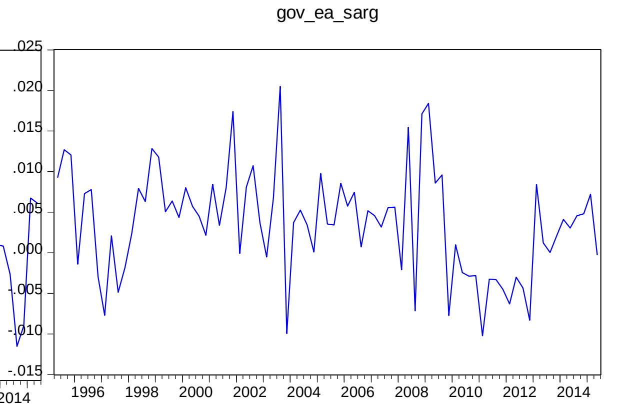

| | GDP_CHINA_SARG | GDP_EU_SARG | GDP_JP_SARG | GDP_UK_SARG | GDP_US_SARG |
|---|---|---|---|---|---|
| Mean | 0.033635 | 0.007588 | 0.000111 | 0.011040 | 0.010756 |
| Median | 0.034381 | 0.008795 | 0.000658 | 0.011382 | 0.011858 |
| Maximum | 0.064207 | 0.017367 | 0.022426 | 0.027392 | 0.024654 |
| Minimum | 0.013743 | -0.027049 | -0.040989 | -0.016802 | -0.019747 |
| Std. Dev. | 0.010085 | 0.006620 | 0.010025 | 0.008288 | 0.006966 |
| Skewness | 0.443687 | -2.139520 | -0.945898 | -0.800267 | -1.418495 |
| Kurtosis | 3.350697 | 11.36633 | 5.451122 | 4.281684 | 7.186780 |
| | | | | | |
| Jarque-Bera | 3.072667 | 298.0315 | 32.35576 | 14.18992 | 86.32455 |
| Probability | 0.215169 | 0.000000 | 0.000000 | 0.000829 | 0.000000 |
| | | | | | |
| Sum | 2.724441 | 0.614656 | 0.008974 | 0.894260 | 0.871205 |
| Sum Sq. Dev. | 0.008137 | 0.003506 | 0.008041 | 0.005496 | 0.003882 |
| | | | | | |
| Observations | 81 | 81 | 81 | 81 | 81 |

### 7.5.5 Government

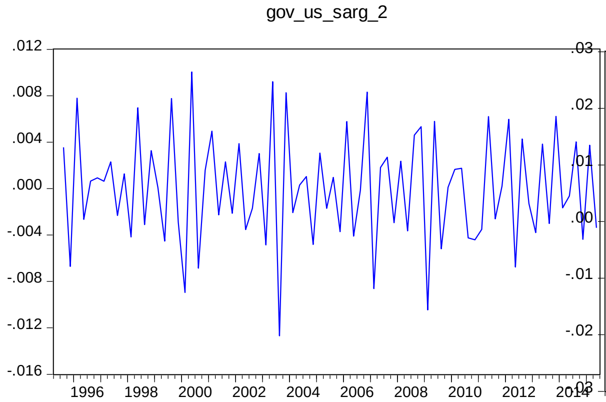
**China**



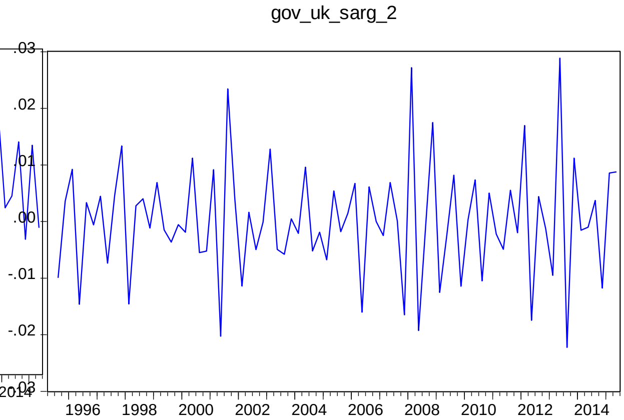

**Euro Area**



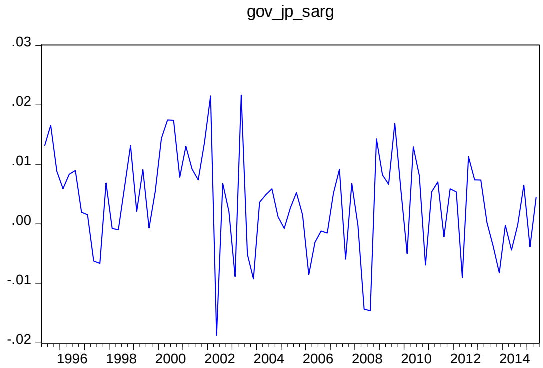

**United States**



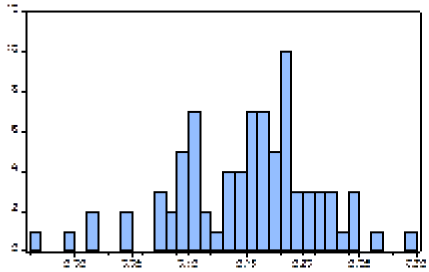

**United Kingdom**



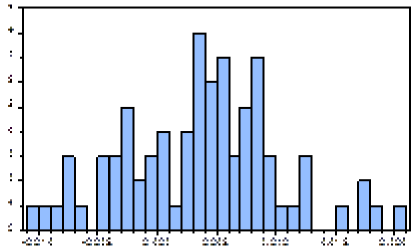

**Japan**



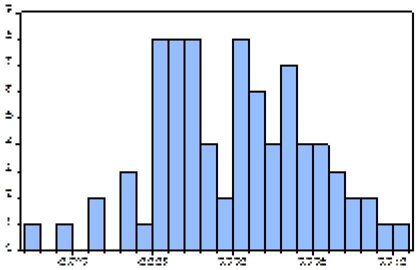
**China**



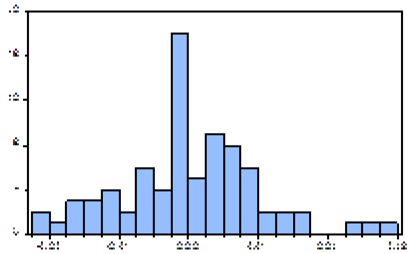
**Euro Area**



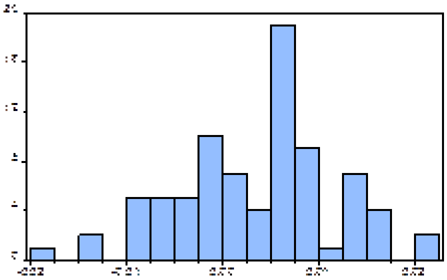
**United States**



**United Kingdom**



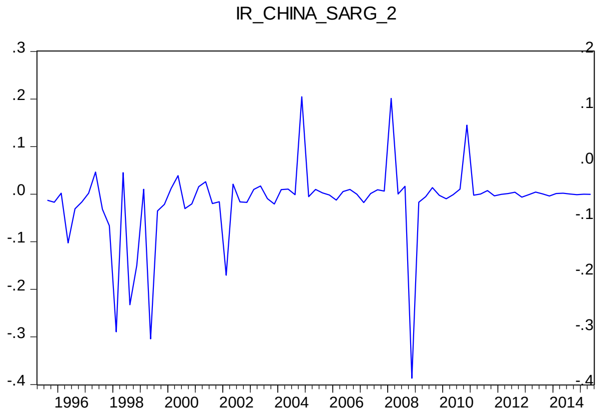
**Japan**



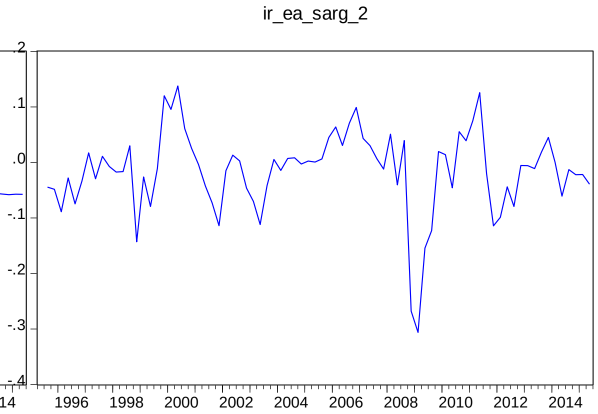
| | GOV_CHINA_SARG | GOV_EA_SARG | GOV_JP_SARG | GOV_UK_SARG_2 | GOV_US_SARG_2 |
|---|---|---|---|---|---|
| Mean | 0.151467 | 0.003625 | 0.003443 | 8.72E-05 | 2.62E-05 |
| Median | 0.159990 | 0.003927 | 0.005186 | -0.000576 | 0.000162 |
| Maximum | 0.298388 | 0.020493 | 0.021641 | 0.028856 | 0.010053 |
| Minimum | -0.032647 | -0.010234 | -0.018728 | -0.022256 | -0.012682 |
| Std. Dev. | 0.061144 | 0.006573 | 0.008219 | 0.010052 | 0.004787 |
| Skewness | -0.557898 | 0.129254 | -0.194085 | 0.266445 | -0.086965 |
| Kurtosis | 3.556584 | 2.947604 | 2.965266 | 3.571709 | 2.641639 |
| [redacted] | | | | | |
| Jarque-Bera | 5.182616 | 0.231907 | 0.506275 | 2.036079 | 0.528913 |
| Probability | 0.074922 | 0.890517 | 0.776361 | 0.361303 | 0.767623 |
| [redacted] | | | | | |
| Sum | 12.11737 | 0.289976 | 0.275407 | 0.006976 | 0.002099 |
| Sum Sq. Dev. | 0.295352 | 0.003413 | 0.005337 | 0.007982 | 0.001810 |
| [redacted] | | | | | |
| Observations | 80 | 80 | 80 | 80 | 80 |

### 7.5.6 IR

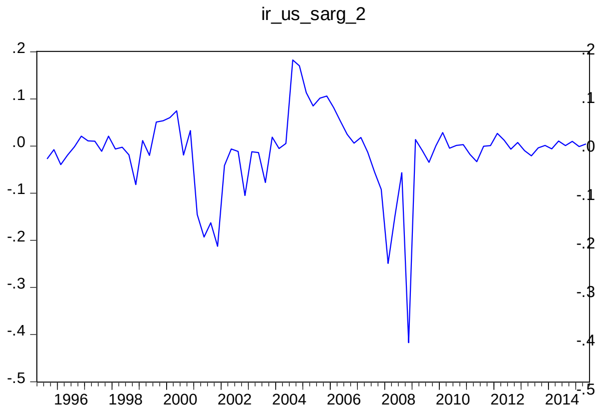
**China**



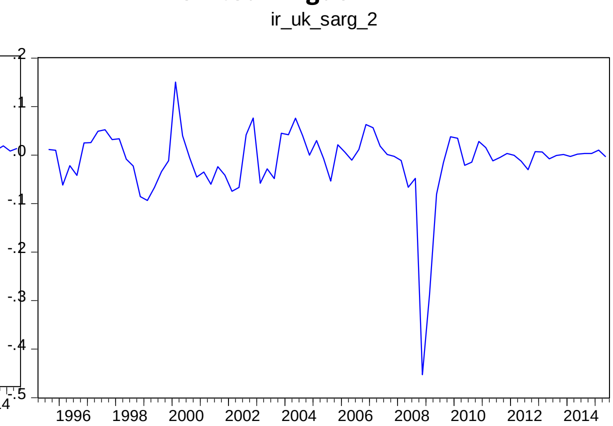

**Euro Area**



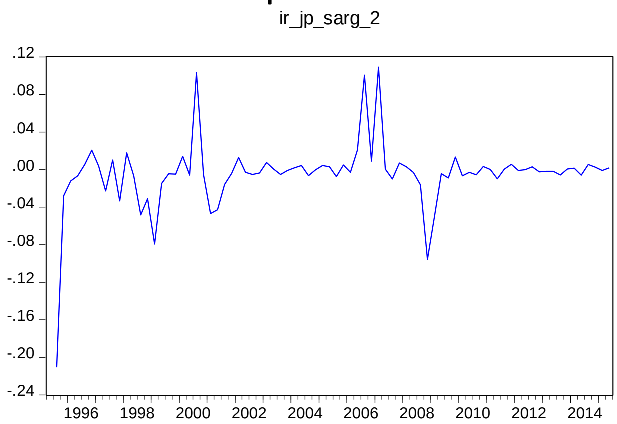

**United States**

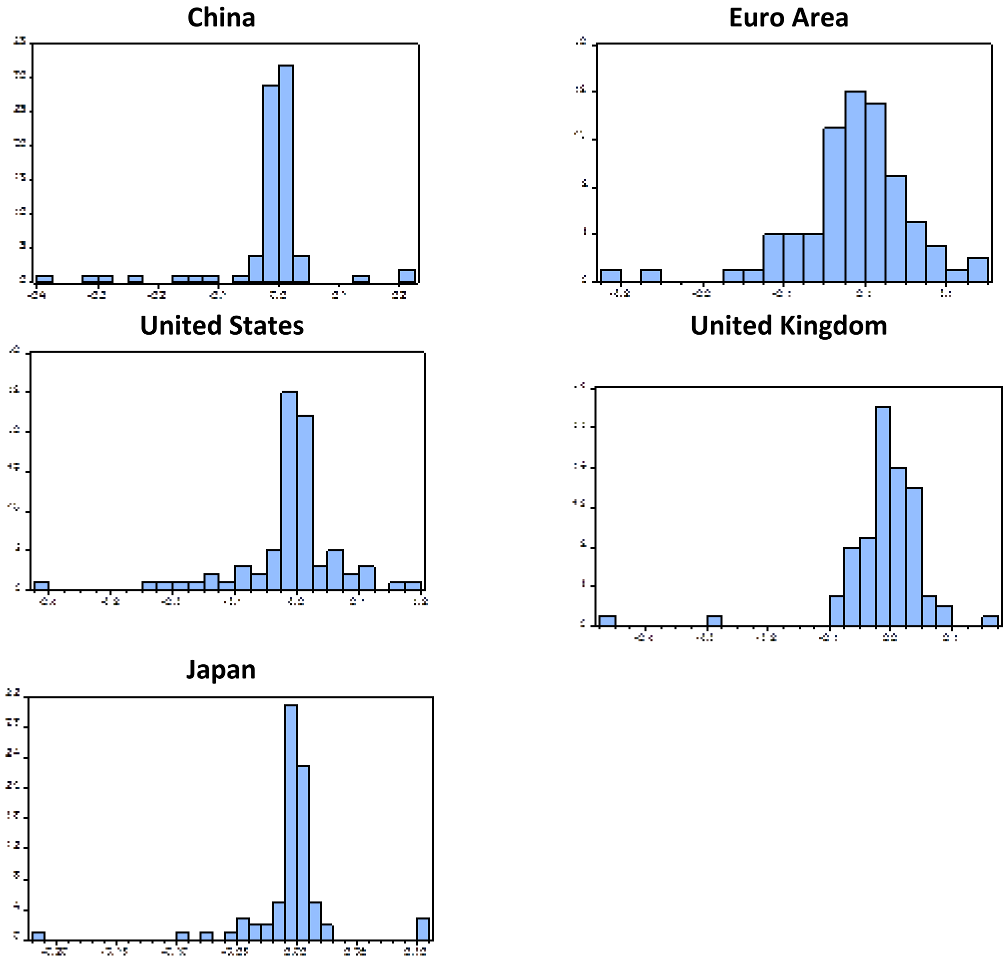



**United Kingdom**




**Japan**



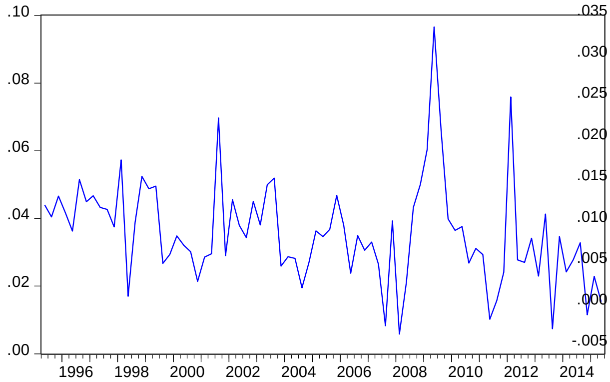



| | IR_CHINA_SARG_2 | IR_EA_SARG_2 | IR_JP_SARG_2 | IR_UK_SARG_2 | IR_US_SARG_2 |
|---|---|---|---|---|---|
| Mean | -0.014743 | -0.015606 | -0.004894 | -0.012088 | -0.012306 |
| Median | -0.000407 | -0.009075 | -0.002173 | -0.002666 | -0.002090 |
| Maximum | 0.204653 | 0.137913 | 0.109016 | 0.150690 | 0.182448 |
| Minimum | -0.386789 | -0.306229 | -0.210606 | -0.452707 | -0.417084 |
| Std. Dev. | 0.083376 | 0.073245 | 0.036773 | 0.072383 | 0.084041 |
| Skewness | -1.931414 | -1.142719 | -1.596528 | -3.382376 | -1.742307 |
| Kurtosis | 10.67328 | 6.372365 | 16.36398 | 20.86141 | 9.628801 |
| | | | | | |
| Jarque-Bera | 246.0023 | 55.32024 | 629.3055 | 1215.973 | 186.9451 |
| Probability | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | | | | | |
| Sum | -1.179451 | -1.248488 | -0.391515 | -0.967012 | -0.984494 |
| Sum Sq. Dev. | 0.549168 | 0.423823 | 0.106827 | 0.413906 | 0.557974 |
| | | | | | |
| Observations | 80 | 80 | 80 | 80 | 80 |

### 7.5.7 M2

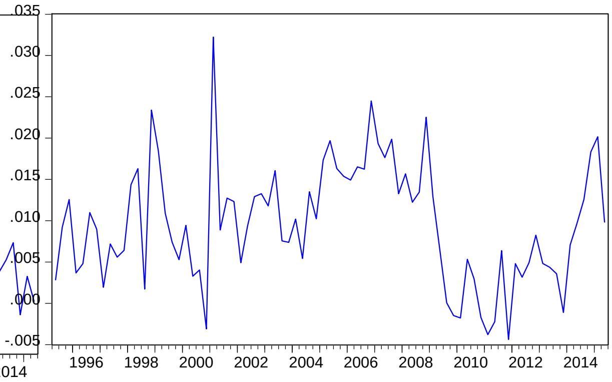
**China**

m2_china_sarg



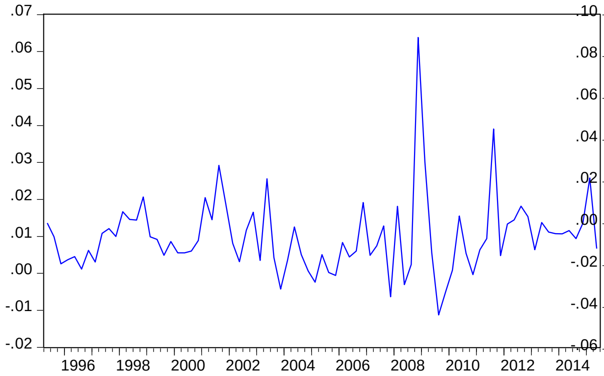

**Euro Area**

m2_ea_sarg



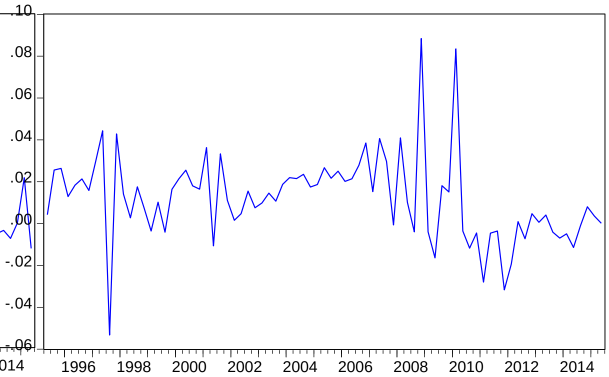

**United States**

m2_us_sarg



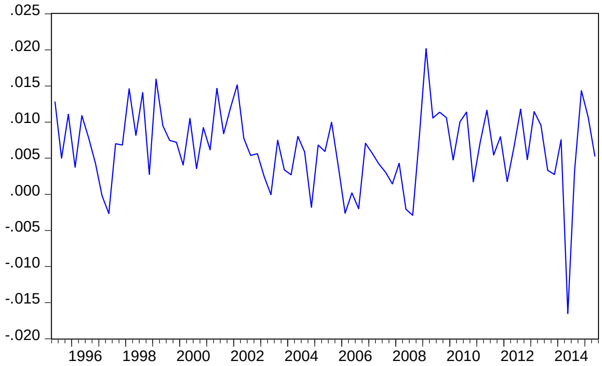

**United Kingdom**

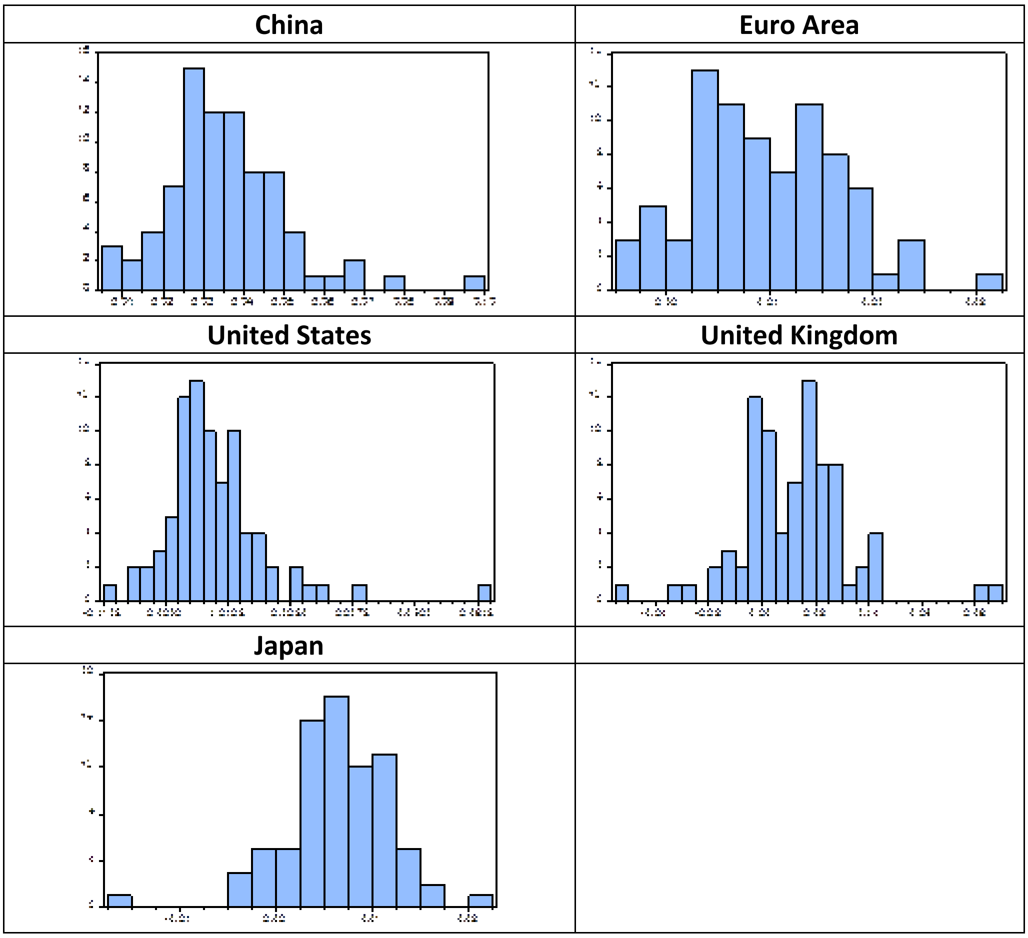
m2_uk_sarg




**Japan**

m2_jp_sarg






| | M2_CHINA_SARG | M2_EA_SARG | M2_JP_SARG | M2_UK_SARG | M2_US_SARG |
|---|---|---|---|---|---|
| Mean | 0.035700 | 0.009611 | 0.006387 | 0.011912 | 0.009849 |
| Median | 0.034633 | 0.009372 | 0.006820 | 0.012944 | 0.008591 |
| Maximum | 0.096570 | 0.032242 | 0.020162 | 0.088478 | 0.063813 |
| Minimum | 0.005844 | -0.004375 | -0.016516 | -0.053237 | -0.011241 |
| Std. Dev. | 0.015144 | 0.007234 | 0.005402 | 0.020944 | 0.010368 |
| Skewness | 0.957889 | 0.322348 | -0.757385 | 0.586250 | 2.026985 |
| Kurtosis | 5.556337 | 3.061176 | 5.864590 | 6.137752 | 11.15332 |
| [redacted] | | | | | |
| Jarque-Bera | 34.44208 | 1.415395 | 35.43885 | 37.86833 | 279.8256 |
| Probability | 0.000000 | 0.492778 | 0.000000 | 0.000000 | 0.000000 |
| [redacted] | | | | | |
| Sum | 2.891740 | 0.778511 | 0.517360 | 0.964841 | 0.797807 |
| Sum Sq. Dev. | 0.018347 | 0.004186 | 0.002334 | 0.035091 | 0.008600 |
| [redacted] | | | | | |
| Observations | 81 | 81 | 81 | 81 | 81 |

## 7.6 Routine

The routine to estimate the model, is represented as follows:

```
@e7=c(1)*@u7
@e8=c(2)*@u8
@e3=c(3)*@e7+c(4)*@e8+c(5)*@u3
@e2=c(6)*@e7+c(7)*@e8+c(8)*@e3+c(9)*@u2
@e4=c(10)*@e3+c(11)*@e2+c(12)*@u4
@e5=c(13)*@e3+c(14)*@e2+c(15)*@e4+c(16)*@u5
@e6=c(17)*@e7+c(18)*@e8+c(19)*@e4+c(20)*@e5+c(21)*@u6+c(22)*@e1
@e1=c(23)*@e7+c(24)*@e8+c(25)*@e3+c(26)*@e2+c(27)*@e4+c(28)*@e5+c(29)*@e6+c(3
0)*@u1
```

where
@e1 represents C_CHINA_SAG residuals
@e2 represents DT_CHINA_SAG residuals
@e3 represents GDP_CHINA_SAG residuals
@e4 represents GOV_CHINA_SAG residuals
@e5 represents M2_CHINA_SAG residuals
@e6 represents IR_CHINA_SAG residuals
@e7 represents GOV_EURO_SAG residuals
@e8 represents M2_EURO_SAG residuals

This routine represents the equation number3.

## 7.7 OPTIMAL LAG LENGTH

| model | | criteria | | | | | |
|---|---|---|---|---|---|---|---|
| | lag | LogL | LR | FPE | AIC | SC | HQ |
| 9 | 0 | 1483.572 | NA | 6.61e-28 | -39.88033 | -39.63124* | -39.78096 |
| | 1 | 1584.126 | 176.6483 | 2.49e-28 | -40.86827 | -38.62647 | -39.97399* |
| | 2 | 1652.318 | 105.0524 | 2.35e-28* | -40.98156 | -36.74706 | -39.29237 |
| | 3 | 1717.844 | 86.77814* | 2.63e-28 | -41.02281 | -34.79561 | -38.53871 |
| | 4 | 1789.025 | 78.87649 | 2.98e-28 | -41.21690 | -32.99699 | -37.93788 |
| | 5 | 1855.056 | 58.89207 | 5.05e-28 | -41.27178 | -31.05917 | -37.19784 |
| | 6 | 1954.423 | 67.14011 | 5.44e-28 | -42.22765* | -30.02234 | -37.35880 |
| 10 | 0 | 1371.904 | NA | 1.35e-26 | -36.86228 | -36.61319* | -36.76292* |
| | 1 | 1464.197 | 162.1356 | 6.36e-27 | -37.62695 | -35.38515 | -36.73267 |
| | 2 | 1533.999 | 107.5329 | 5.75e-27 | -37.78376 | -33.54926 | -36.09457 |
| | 3 | 1599.986 | 87.38864 | 6.36e-27 | -37.83747 | -31.61027 | -35.35336 |
| | 4 | 1680.026 | 88.69216 | 5.67e-27 | -38.27097 | -30.05106 | -34.99194 |
| | 5 | 1775.047 | 84.74906* | 4.39e-27 | -39.10939 | -28.89678 | -35.03545 |
| | 6 | 1881.956 | 72.23568 | 3.86e-27* | -40.26909* | -28.06377 | -35.40024 |
| 11 | 0 | 1488.249 | NA | 5.83e-28 | -40.00673 | -39.75764* | -39.90736* |
| | 1 | 1573.702 | 150.1204 | 3.30e-28 | -40.58654 | -38.34475 | -39.69226 |
| | 2 | 1633.969 | 92.84427 | 3.86e-28 | -40.48566 | -36.25116 | -38.79647 |
| | 3 | 1708.622 | 98.86491 | 3.38e-28 | -40.77358 | -34.54638 | -38.28947 |
| | 4 | 1795.555 | 96.33050* | 2.50e-28* | -41.39338 | -33.17347 | -38.11435 |
| | 5 | 1854.196 | 52.30194 | 5.17e-28 | -41.24855 | -31.03594 | -37.17462 |
| | 6 | 1940.059 | 58.01532 | 8.02e-28 | -41.83944* | -29.63412 | -36.97058 |
| | 0 | 1487.711 | NA | 5.91e-28 | -39.99218 | -39.74309* | -39.89282* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12 | 1 | 1567.027 | 139.3395 | 3.95e-28 | -40.40613 | -38.16434 | -39.51186 |
| | 2 | 1625.202 | 89.62084 | 4.89e-28 | -40.24870 | -36.01420 | -38.55951 |
| | 3 | 1692.416 | 89.01384 | 5.23e-28 | -40.33558 | -34.10838 | -37.85147 |
| | 4 | 1785.982 | 103.6813* | 3.23e-28* | -41.13466 | -32.91475 | -37.85564 |
| | 5 | 1862.776 | 68.49118 | 4.10e-28 | -41.48042 | -31.26781 | -37.40648 |
| | 6 | 1935.873 | 49.38992 | 8.98e-28 | -41.72629* | -29.52097 | -36.85744 |
| | | | | | | | |
| 21 | 0 | 1497.301 | NA | 4.56e-28 | -40.25137 | -40.00228* | -40.15201 |
| | 1 | 1613.667 | 204.4276 | 1.12e-28 | -41.66668 | -39.42489 | -40.77240* |
| | 2 | 1680.737 | 103.3243* | 1.09e-28* | -41.74966 | -37.51516 | -40.06046 |
| | 3 | 1735.556 | 72.59736 | 1.63e-28 | -41.50151 | -35.27430 | -39.01740 |
| | 4 | 1808.847 | 81.21420 | 1.74e-28 | -41.75261 | -33.53270 | -38.47359 |
| | 5 | 1882.760 | 65.92231 | 2.39e-28 | -42.02053 | -31.80791 | -37.94659 |
| | 6 | 1969.800 | 58.81127 | 3.59e-28 | -42.64325* | -30.43793 | -37.77440 |
| | | | | | | | |
| 22 | 0 | 1385.001 | NA | 9.49e-27 | -37.21625 | -36.96717* | -37.11689 |
| | 1 | 1496.952 | 196.6694 | 2.62e-27 | -38.51221 | -36.27041 | -37.61793* |
| | 2 | 1557.503 | 93.28190 | 3.05e-27 | -38.41900 | -34.18450 | -36.72981 |
| | 3 | 1622.189 | 85.66512 | 3.49e-27 | -38.43754 | -32.21034 | -35.95343 |
| | 4 | 1705.566 | 92.39065 | 2.84e-27 | -38.96124 | -30.74133 | -35.68222 |
| | 5 | 1799.855 | 84.09607* | 2.25e-27 | -39.77988 | -29.56726 | -35.70594 |
| | 6 | 1915.647 | 78.23757 | 1.55e-27* | -41.17965* | -28.97433 | -36.31080 |
| | | | | | | | |
| 23 | 0 | 1503.072 | NA | 3.90e-28 | -40.40736 | -40.15828* | -40.30800 |
| | 1 | 1605.669 | 180.2365 | 1.39e-28* | -41.45050 | -39.20871 | -40.55623* |
| | 2 | 1663.891 | 89.69461 | 1.72e-28 | -41.29436 | -37.05987 | -39.60517 |
| | 3 | 1729.877 | 87.38611 | 1.90e-28 | -41.34802 | -35.12082 | -38.86392 |
| | 4 | 1816.874 | 96.40251* | 1.40e-28 | -41.96958 | -33.74967 | -38.69055 |
| | 5 | 1887.599 | 63.07842 | 2.10e-28 | -42.15131 | -31.93870 | -38.07738 |
| | 6 | 1993.817 | 71.76935 | 1.88e-28 | -43.29236* | -31.08704 | -38.42351 |
| | | | | | | | |
| 24 | 0 | 1502.603 | NA | 3.95e-28 | -40.39467 | -40.14558* | -40.29530 |
| | 1 | 1599.699 | 170.5743 | 1.63e-28 | -41.28916 | -39.04737 | -40.39488* |
| | 2 | 1650.470 | 78.21470 | 2.47e-28 | -40.93162 | -36.69712 | -39.24242 |
| | 3 | 1718.941 | 90.67858 | 2.55e-28 | -41.05247 | -34.82527 | -38.56836 |
| | 4 | 1813.043 | 104.2745* | 1.56e-28 | -41.86602 | -33.64611 | -38.58700 |
| | 5 | 1901.246 | 78.66806 | 1.45e-28* | -42.52017 | -32.30756 | -38.44624 |
| | 6 | 1982.503 | 54.90282 | 2.55e-28 | -42.98656* | -30.78124 | -38.11771 |
| | | | | | | | |

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

## 7.8 MODEL VALIDATION TESTS

### 7.8.1 Stability

| 9 | 10 | 11 | 12 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|
| 0.851595 | 0.987681 | 0.984353 | 0.992314 | 0.964763 | 0.992372 | 0.998756 | 0.675329 |
| 0.851595 | 0.987681 | 0.984353 | 0.955479 | 0.964763 | 0.992372 | 0.998756 | 0.675329 |
| 0.842909 | 0.957786 | 0.896354 | 0.945987 | 0.959682 | 0.940794 | 0.890730 | 0.467129 |
| 0.842909 | 0.957786 | 0.896354 | 0.945987 | 0.959682 | 0.940794 | 0.890730 | 0.445705 |
| 0.776590 | 0.947494 | 0.893803 | 0.938977 | 0.950840 | 0.914057 | 0.888981 | 0.297628 |
| 0.776590 | 0.947494 | 0.893803 | 0.938977 | 0.950840 | 0.914057 | 0.888981 | 0.220335 |
| 0.772919 | 0.943112 | 0.867060 | 0.938628 | 0.938166 | 0.908341 | 0.835574 | 0.204399 |
| 0.772919 | 0.943112 | 0.867060 | 0.938628 | 0.938166 | 0.908341 | 0.835574 | 0.038257 |
| 0.745846 | 0.938932 | 0.866037 | 0.934864 | 0.938075 | 0.907640 | 0.827063 | |
| 0.745846 | 0.938932 | 0.866037 | 0.934864 | 0.938075 | 0.907640 | 0.827063 | |
| 0.736160 | 0.931944 | 0.843599 | 0.931995 | 0.930857 | 0.899902 | 0.825551 | |
| 0.736160 | 0.931944 | 0.843599 | 0.931995 | 0.930857 | 0.899902 | 0.825551 | |
| 0.731067 | 0.922899 | 0.812950 | 0.929938 | 0.927660 | 0.897641 | 0.806136 | |
| 0.731067 | 0.922899 | 0.812950 | 0.929938 | 0.927660 | 0.897641 | 0.806136 | |
| 0.677291 | 0.917679 | 0.786614 | 0.929823 | 0.912737 | 0.879022 | 0.797750 | |
| 0.677291 | 0.917679 | 0.786614 | 0.929823 | 0.912737 | 0.879022 | 0.797750 | |
| 0.657441 | 0.906463 | 0.766410 | 0.928780 | 0.909213 | 0.877266 | 0.780540 | |
| 0.657441 | 0.906463 | 0.766410 | 0.928780 | 0.909213 | 0.877266 | 0.780540 | |
| 0.635474 | 0.903243 | 0.760339 | 0.913545 | 0.903223 | 0.864048 | 0.766578 | |
| 0.635474 | 0.903243 | 0.760339 | 0.913545 | 0.903223 | 0.864048 | 0.766578 | |
| 0.532048 | 0.888755 | 0.736531 | 0.895822 | 0.897633 | 0.861556 | 0.763137 | |
| 0.392980 | 0.888755 | 0.736531 | 0.895822 | 0.897633 | 0.861556 | 0.763137 | |
| 0.392980 | 0.887080 | 0.709772 | 0.880142 | 0.893900 | 0.844130 | 0.716748 | |
| 0.131668 | 0.887080 | 0.709772 | 0.880142 | 0.893900 | 0.844130 | 0.716748 | |
| 0.851595 | 0.886716 | 0.682318 | 0.875105 | 0.881853 | 0.814181 | 0.631523 | |
| 0.851595 | 0.886716 | 0.682318 | 0.875105 | 0.881853 | 0.814181 | 0.631523 | |
| 0.842909 | 0.882129 | 0.656789 | 0.866621 | 0.880698 | 0.811470 | 0.585503 | |
| 0.842909 | 0.882129 | 0.601662 | 0.866621 | 0.880698 | 0.774725 | 0.538519 | |
| 0.776590 | 0.879900 | 0.601662 | 0.855672 | 0.872087 | 0.774725 | 0.338604 | |
| 0.776590 | 0.879900 | 0.225954 | 0.855672 | 0.872087 | 0.751283 | 0.308312 | |
| 0.772919 | 0.878679 | 0.139615 | 0.838431 | 0.870339 | 0.751283 | 0.308312 | |
| 0.772919 | 0.878679 | 0.139615 | 0.838431 | 0.870339 | 0.734228 | 0.113932 | |
| 0.745846 | 0.875994 | | 0.832554 | 0.850764 | 0.734228 | | |
| 0.745846 | 0.875994 | | 0.832554 | 0.850764 | 0.672515 | | |
| 0.736160 | 0.853664 | | 0.817612 | 0.841205 | 0.672515 | | |
| 0.736160 | 0.853664 | | 0.817612 | 0.835645 | 0.447072 | | |
| 0.731067 | 0.844244 | | 0.797761 | 0.835645 | 0.447072 | | |
| 0.731067 | 0.844244 | | 0.797761 | 0.831678 | 0.411871 | | |
| 0.677291 | 0.838573 | | 0.726777 | 0.831678 | 0.411871 | | |
| 0.677291 | 0.838573 | | 0.726777 | 0.774558 | 0.232479 | | |
| 0.657441 | 0.734494 | | 0.625279 | 0.774558 | | | |
| 0.657441 | 0.734494 | | 0.603994 | 0.722266 | | | |
| 0.635474 | 0.675051 | | 0.603994 | 0.722266 | | | |
| 0.635474 | 0.675051 | | 0.510030 | 0.610466 | | | |
| 0.532048 | 0.577486 | | 0.510030 | 0.598963 | | | |
| 0.392980 | 0.577486 | | 0.378619 | 0.491727 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.392980 | 0.565294 | | 0.125923 | 0.491727 | | | |
| 0.131668 | 0.066767 | | 0.052703 | 0.044830 | | | |

### 7.8.2 Autocorrelation

VAR Residual Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag order h

| Lags / model | 9 | 10 | 11 | 12 | 21 | 22 | 23 | 24 | |
|---|---|---|---|---|---|---|---|---|---|
| | LM- Stat (Prob) | | | | | | | | |
| 1 | 0.2279 | 0.0649 | 0.7081 | 0.1371 | 0.1616 | 0.2019 | 0.2666 | 0.0698 | |
| 2 | 0.7968 | 0.6041 | 0.7829 | 0.7542 | 0.7543 | 0.1191 | 0.1791 | 0.1315 | |
| 3 | 0.5616 | 0.1092 | 0.1289 | 0.6922 | 0.4914 | 0.0685 | 0.0104 | 0.0521 | |
| 4 | 0.1794 | 0.1528 | 0.0754 | 0.0813 | 0.5125 | 0.3857 | 0.0304 | 0.2430 | |
| 5 | 0.1208 | 0.3594 | 0.2318 | 0.0589 | 0.6466 | 0.7535 | 0.3617 | 0.0395 | |
| 6 | 0.6387 | 0.2352 | 0.3081 | 0.2445 | 0.9661 | 0.0627 | 0.0148 | 0.2018 | |
| 7 | 0.6186 | 0.1817 | 0.6034 | 0.8698 | 0.9269 | 0.4165 | 0.2853 | 0.9280 | |

### 7.8.3 Heteroscedasticity

Null Hypothesis: no heteroscedasticity at lag order h

| **Test type / statistics** | | **9** | **10** | **11** | **12** | **21** | **22** | **23** | **24** |
|---|---|---|---|---|---|---|---|---|---|
| **No cross terms** | **Chi-sq** | 1749.770 | - | 2304.552 | - | - | - | 2283.536 | 558.2242 |
| | **df** | 1728 | - | 2304 | - | - | - | 2304 | 576 |
| | **Prob.** | 0.3519 | - | 0.4928 | - | - | - | 0.6151 | 0.6948 |
| **Cross terms** | **Chi-sq** | - | - | - | - | - | - | - | 1635.544 |
| | **df** | - | - | - | - | - | - | - | 1584 |
| | **Prob.** | - | - | - | - | - | - | - | 0.1794 |

### 7.8.4 Normality

Null Hypothesis: residuals are multivariate normal

| **Orthogonalization method/ Model** | | **9** | **10** | **11** | **12** | **21** | **22** | **23** | **24** |
|---|---|---|---|---|---|---|---|---|---|
| Cholesky (Lutkepohl) | Jarques-Bera | 51.59001 | 53.03896 | 104.2567 | 34.77955 | 9.207452 | 54.19974 | 67.63529 | 207.3064 |
| | Df | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| | Joint p-value | 0.0000 | 0.0000 | 0.0000 | 0.0043 | 0.9046 | 0.0000 | 0.0000 | 0.0000 |
| Residual Correlation (Doornik-Hansen) | Jarques-Bera | 46.58028 | 25.41499 | 54.29702 | 22.62093 | 16.10632 | 37.74526 | 50.74235 | 69.02212 |
| | Df | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| | Joint p-value | 0.0001 | 0.0628 | 0.0000 | 0.1242 | 0.4456 | 0.0016 | 0.0000 | 0.0000 |
| Residual Covarian | Jarques-Bera | 1546.838 | 793.3633 | 732.5159 | 566.4190 | 579.5751 | 885.7341 | 611.9581 | 798.9680 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ce (Urzua) | Df | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 |
| | Joint p-value | 0.0000 | 0.0000 | 0.0000 | 0.0002 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Structural Factorization | Jarques-Bera | 52.60113 | 170.0208 | 75.63358 | 170.5966 | 173.5038 | 127.7367 | 83.43747 | 65.33975 |
| | Df | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| | Joint p-value | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

*=is considered have normal distribution in some joint p-values

## 8 Group Unit Root test for Residuals

$H_0: There\ is\ a\ unit\ root\ in\ the\ series$

| Model # | Method | Statistic | Prob.** | Cross-sections | Obs |
|---|---|---|---|---|---|
| 9 | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -24.3586 | 0.0000 | 8 | 606 |
| | Breitung t-stat | -12.1798 | 0.0000 | 8 | 598 |
| | | | | | |
| | Null: Unit root (assumes individual unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -22.2242 | 0.0000 | 8 | 606 |
| | ADF - Fisher Chi-square | 264.300 | 0.0000 | 8 | 606 |
| | PP - Fisher Chi-square | 258.692 | 0.0000 | 8 | 608 |
| | | | | | |
| 10 | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -25.8294 | 0.0000 | 8 | 584 |
| | Breitung t-stat | -16.5937 | 0.0000 | 8 | 576 |
| | | | | | |
| | Null: Unit root (assumes individual unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -22.5123 | 0.0000 | 8 | 584 |
| | ADF - Fisher Chi-square | 261.119 | 0.0000 | 8 | 584 |
| | PP - Fisher Chi-square | 248.611 | 0.0000 | 8 | 584 |
| | | | | | |
| 11 | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -26.2409 | 0.0000 | 8 | 600 |
| | Breitung t-stat | -13.4126 | 0.0000 | 8 | 592 |
| | | | | | |
| | Null: Unit root (assumes individual unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -24.1692 | 0.0000 | 8 | 600 |
| | ADF - Fisher Chi-square | 273.801 | 0.0000 | 8 | 600 |
| | PP - Fisher Chi-square | 260.692 | 0.0000 | 8 | 600 |
| | | | | | |
| | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -28.1686 | 0.0000 | 8 | 584 |
| | Breitung t-stat | -17.5611 | 0.0000 | 8 | 576 |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 12 | Null: Unit root (assumes individual unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -23.7869 | 0.0000 | 8 | 584 |
| | ADF - Fisher Chi-square | 272.902 | 0.0000 | 8 | 584 |
| | PP - Fisher Chi-square | 263.244 | 0.0000 | 8 | 584 |
| | | | | | |
| 21 | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -25.2559 | 0.0000 | 8 | 584 |
| | Breitung t-stat | -13.2914 | 0.0000 | 8 | 576 |
| | | | | | |
| | Null: Unit root (assumes common unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -22.1714 | 0.0000 | 8 | 584 |
| | ADF - Fisher Chi-square | 271.078 | 0.0000 | 8 | 584 |
| | PP - Fisher Chi-square | 265.237 | 0.0000 | 8 | 584 |
| | | | | | |
| 22 | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -26.8203 | 0.0000 | 8 | 588 |
| | Breitung t-stat | -12.8506 | 0.0000 | 8 | 580 |
| | | | | | |
| | Null: Unit root (assumes common unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -24.6343 | 0.0000 | 8 | 588 |
| | ADF - Fisher Chi-square | 260.615 | 0.0000 | 8 | 588 |
| | PP - Fisher Chi-square | 233.888 | 0.0000 | 8 | 592 |
| | | | | | |
| 23 | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -26.3617 | 0.0000 | 8 | 599 |
| | Breitung t-stat | -11.0535 | 0.0000 | 8 | 591 |
| | | | | | |
| | Null: Unit root (assumes common unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -23.5359 | 0.0000 | 8 | 599 |
| | ADF - Fisher Chi-square | 267.980 | 0.0000 | 8 | 599 |
| | PP - Fisher Chi-square | 264.331 | 0.0000 | 8 | 600 |
| | | | | | |
| 24 | Null: Unit root (assumes common unit root process) | | | | |
| | Levin, Lin & Chu t* | -30.4229 | 0.0000 | 8 | 624 |
| | Breitung t-stat | -15.4419 | 0.0000 | 8 | 616 |
| | | | | | |
| | Null: Unit root (assumes common unit root process) | | | | |
| | Im, Pesaran and Shin W-stat | -27.1058 | 0.0000 | 8 | 624 |
| | ADF - Fisher Chi-square | 245.714 | 0.0000 | 8 | 624 |
| | PP - Fisher Chi-square | 244.269 | 0.0000 | 8 | 624 |
| | | | | | |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

# 9 APPENDIX

## 9.1 LIST OF FIGURES



## 9.2 LIST OF TABLES

# 10 APPENDIX A : HISTORY OF QUANTITATIVE EASING PROGRAMS

**Recent history of the programs**

| Inst. | Program | Description |
|---|---|---|
| FED | Q1 -28 Nov 2008 | Fed purchase $100 billion in debt and $500 billion in mortgage backed securities |
| | Q1 expanded -18 Mar 2009 | purchase $300 billion in long term Treasuries and $750 billion in MBS |
| | Q2 -11 Mar 2010 | dwindle long-term interest rates, with a new round of Treasury securities purchases for $600 billion |
| | Operation TWIST - 21 Sep 2011 | purchase $400 billion in Treasuries |
| | Operation TWIST extended - 20 Feb 2012 | continue to purchase long term securities and sell short term securities; at the pace of about $45 billion per month |
| | QE3 - 13 Sep 2012 | purchase $40 billion of MBS per month |
| | QE3 expanded - 12 Dec 2012 | purchase $45 billion of long term Treasuries per month without sterilization |
| | Taper- Dec 2013 | indicated a taper, where the $85 billion spent per month would be reduced by $10 billion going forward |
| | End QE3 - October 2014 | End of the QE3 program |
| | 28 Mar and 15 Oct 2008 | Long term refinancing operations announced and expanded |

| | | |
|---|---|---|
| ECB | 7 May 2009 | purchase €60 billion in Euro-denominated covered bonds; 12 month LTRO announced |
| | 10 May 2010 | interventions in the Euro Area private and public debt securities markets, purchases sterilized |
| | 6 Oct 2011 | purchase €40 billion in Euro-denominated covered bonds |
| | 8 Dec 2011 | LTRO expanded, 36 month LTRO announced |
| | 6 Sep 2012 | Countries that apply to the ESM will potentially have their debt purchased in unlimited amounts on the secondary market by the ECB. |
| | QE1 - 22 Jan 2015 | Buy 60 billion euros in government treasury bonds |
| | 2 Sep 2015 | raised the purchase limit of a single country's debt stock from 25 to 33 per cent, €1.1trilion bond-buying program |
| | 22 Jan 2016 | extended its monthly asset purchases to 60 billion euros |
| | 10 Mar 2016 | extended its monthly asset purchases to 80 billion euros, including corporate bonds |
| OE | QE1 - 01/2009 | £75 billion of asset purchases; increased the program to £125bn, £175bn and then £200bn Maintenance from February 2010 onwards. |
| | QE1 - 19 Jan 2009 | purchase up to £50 billion of high quality private sector assets financed by Treasury issuance |
| | QE1 - 5 Mar 2009 | purchase £75 billion in assets financed by reserve issuance |
| | QE1 - 7 May 2009 | purchase up to £125 billion in assets |
| | QE1 - 6 Aug 2009 | purchase up to £175 billion in assets |
| | QE1 expanded | purchase £200 billion in assets |
| | QE2 6 Oct 2011 | purchase up to £275 billion in assets financed by reserve issuance |
| | QE2 - 9 Feb 2012 | purchase up to £325 billion in assets |

| | | |
|---|---|---|
| | QE2 - 5 July 2012 | purchase up to £375 billion in assets |
| | QE3 (02/2012 - ?) | £50 bn purchases was announced on 9th February 2012 |
| OJ | quantitative easing policy (QEP) - 03/2001-03/2006 | increased the commercial bank current account balance from ¥5 trillion to ¥35 trillion |
| | Beginning of "Abenomics" - 2008 and 2009 | outright purchases, from 1 to 2 trillion JPY each |
| | 1 Dec 2009 | offer 10 trillion JPY in 3 month loans |
| | 17 Mar and 21 May 2010 | expands the size of the fixed rate operations to 20 trillion JPY and offers 3 trillion JPY in 1-year loans to private institutions |
| | 30 Aug 2010 | adds 10 trillion JPY in 6 month loans to the fixed rate operations |
| | GSFF - 04/2010 | Growth- Supporting Funding Facility introduced, capped the quantity of loans at ¥3 trillion and fixed |
| | 5 Oct 2010 | will purchase 5 trillion JPY in assets |
| | 14 Mar 2011 | will purchase additional 5 trillion JPY in assets |
| | 14 Jun 2011 | 0.5 trillion JPY in loans available to private financial institutions |
| | 4 Aug 2011 | purchase additional 5 trillion JPY in assets, 6 month loans through the FROs expanded by 5 trillion JPY |
| | 27 Oct 2011 | purchase additional 5 trillion JPY in assets |
| | 14 Feb 2012 | purchase additional 10 trillion JPY in assets |

| | | |
|---|---|---|
| | 13 Mar 2012 | 2 trillion JPY in loans available to private financial institutions |
| | 27 Apr 2012 | purchase additional 10 trillion JPY in assets |
| | 12 Jul 2012 | purchase additional 5 trillion JPY in assets |
| | 19 Sep 2012 | purchase 5 trillion JPY in JGB and 5 trillion JPY in Treasury bills |
| | 30 Oct 2012 | purchase 5 trillion JPY in JGB and 5 trillion JPY in Treasury bills and other (preservation of this policy) |
| | 20 Dec 2012 | purchase 5 trillion JPY in JGB and 5 trillion JPY in Treasury bills (preservation of this policy) |
| | Extension of GSFF - 06/2011 | Extension of the GSFF to include an additional ¥500 billion credit line for investments in equity and asset-based lending. The loans had a 2-year maturity but could be rolled over only once. |
| | 10/2011-04/2013 | increase the commercial bank current account balance from ¥40 trillion (US$504 billion) to a total of ¥50 trillion (US$630 billion); expanded its asset purchase program by ¥5 trillion ($66bn) to a total of ¥55 trillion |
| | 04/2013 | expansion of the asset purchase program by 60 to 70 trillion |
| | 10/2014 | expansion of the bond buying program, to buy 80 trillion Yen of bonds a year. |

NOTES: MBS: mortgage-backed securities ; GSE: government-sponsored enterprise

Sources: (Ugai & others, 2007; Martin & Milas, 2012; Kapetanios, Mumtaz, Stevens, & Theodoridis, 2012; Fawley & Neely, 2013; Cavallo, 2015; ECB, 2015; Jones, 2015; Euronews, 2015; Team, 2015; Matthews, 2016)

# 11 APPENDIX B: TABLE OF ABBREVIATIONS

| Abbreviation | Meaning |
|---|---|
| US(A) | United States of (America) |
| EA | Euro Area |
| UK | United Kingdom |
| JP | Japan |
| (S)VAR | (Stuctural) Vector Autoregressive |
| QE | Quantitative Easing |
| Q1 | 1st quarter |
| BOJ | Bank of Japan |
| ECB | European Central Bank |
| FED | Federal Reserve System |
| RMB | Renminbi (official currency of Republic of China) |
| MBS | mortgage-backed securities |
| GSE | government-sponsored enterprise |