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ISSN 1750-4171

DEPARTMENT OF ECONOMICS

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WP 2010 - 08

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Terms of Trade Shocks and Economic Performance Under Different Exchange Rate Regimes

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Abstract

The impact of terms of trade shocks on a country's output and price level are, according to economic theory, expected to vary according to the *de facto* exchange rate regime. This paper tests this hypothesis how terms of trade shocks impact on 22 African countries, which operate different *de facto* exchange rate regimes, using a structural VAR with long-run restrictions, over the period from 1980 to 2007. The empirical findings support the view that the exchange rate regime matters as to how countries respond to exogenous external shocks like terms of trade shocks, in that output variation is greater for countries with fixed regimes, while for flexible regime countries real exchange rate variation reduces the need for output variability.

*JEL Classification***:** F13, F31, F41

Keywords: Terms of Trade, Exchange Rate Regimes, Structural VARs

March 2010

1. Introduction

There is an extensive literature that argues that the exchange rate regime adopted is likely to be an important determinant of a country's macroeconomic performance. Friedman (1953) pointed out the potentially insulating properties of floating exchange rates, whereas Mundell (1963), Fleming (1962) and Poole (1970), the latter, in a stochastic framework, all argued that fixed exchange rates were preferable for a country dealing with nominal shocks whereas floating rates were preferable if a country faced a real shock. In the context of developing countries, which are frequently confronted with exogenous terms of trade shocks, then this analysis seems to suggest flexible nominal exchange rates may serve as a shock absorber and the decline in output from an adverse shock, may be partially offset as the fall in the exchange rate stimulates competitiveness and partially offsets the terms of trade effect. This literature also points to the fact that exchange rate regime choices may not be permanent, once-and-for-all choices, but rather are dependent of the types of shocks, real or nominal, for example, that a country may expect to face and hence if the nature of exogenous shocks changes then so may the optimal exchange rate regime. This also suggests that neither fixed nor floating exchange rates are ideal and that managed exchange rates are more likely to be optimal from the point of view of economic management with the nominal exchange rate more heavily managed in the face of nominal shock and much less managed in the face of real shocks. Indeed the apparent ambiguity between *de jure* and *de facto* exchange rates regimes by Reinhart (2000), Calvo and Rienhart (2001) and Frankel *et al* (2001) may, at least in part, reflect a practical response of monetary authorities to the degree of exchange rate management in the face of different shocks.

In terms of the African economies studied in this paper, there is evidence of increasing exchange rate flexibility since the mid-1990s, although this increased flexibility is not captured by recent empirical papers whose samples typically end in the mid-1990s. For example, Cashin et al (2004) estimate that the half-life of a terms of trade shock in 42 sub-Saharan African counties over the period 1960 to 1996 is about six years. Broda (2004) explicitly tests the insulation hypothesis and finds that exchange rate flexibility of 75 developing countries does influence the extent of

output fluctuations using a post-Bretton Woods sample up to 1996. Hoffmaister et al (1998), using data for the period 1971-1993 analyses macroeconomic fluctuations in sub-Saharan Africa and finds that external shocks, particularly terms of trade shocks were more important in pegged countries of CFA zones than in non-CFA countries with more flexible exchange rate regimes. Bleaney and Greenaway (2001) estimated a panel 14 sub-Saharan African countries over the period 1980-1995 to discover that terms of trade shocks and real exchange rates are important factors that affect growth and investment in these countries.

This paper extends these papers in three ways. First, following the work of Calvo and Reinhart (2000), Frankel et al (2001) and Reinhart and Rogoff (2004), we first attempt to distinguish empirically between *de facto* fixed and floating exchange rate countries using the method of Levy-Yeyati et al (2005). It is important that we correctly assign the appropriate de facto regimes if the tests of the effects of terms of trade shocks are to be valid. Secondly, we generalise the empirical structural VAR framework of Blanchard and Quah (1989) to include four autonomous shocks: terms of trade shocks, domestic shocks, nominal shocks and supply-side shocks and investigate the effect of each of these shocks on output, the price level and the real exchange rate of the respective countries. Thirdly, this analysis is conducted over the period 1980-2008, to encompass the perceived switch to more flexible exchange rate regimes of this set of African countries in the mid-1990s.

The rest of this paper is organised as follows. The next section sets out the econometric methodology employed used, where the long-run structural identifications based on Blanchard and Quah are explained and justified. Section 3 identifies and classifies the exchange rate regimes of the countries covered by this study. Section 4 reviews the data set and the results from the impulse response functions and Section 5 analyses the relative importance of the terms of trade and other exogenous shocks for the respective countries, using variance decomposition analysis. Section 6 concludes.

2. Econometric methodology

The paper uses a structural VAR model, applying the long-run restrictions suggested by Blanchard and Quah (1989). One of the advantages of this approach is that the restrictions are only applied to the long-run parameters, while the short-run

dynamics are allowed to be determined freely. The paper considers a vector of four variables:

$$\Delta x_t = \left[\Delta t_t, \Delta y_t, \Delta q_t, \Delta p_t\right]' \tag{1}$$

where x_t is a 4×1 vector of variables, where y_t denotes the real GDP; q_t represents real exchange rates; p_t is the consumer price index; and t_t stands for the terms of trade, which is the ratio of export to import prices. The following denotes structural disturbances of the model:

$$\varepsilon_t = \left[\varepsilon_{tt}, \varepsilon_s, \varepsilon_d, \varepsilon_\eta\right]' \tag{2}$$

where $\varepsilon_{tt}, \varepsilon_s, \varepsilon_d$ and ε_η represent terms of trade shocks, the supply shocks, demand and nominal shocks, respectively. The first step, after determining level of integration of the variables included, is to estimate a reduced form of VAR

$$\Delta x_t = A(L)u_t \tag{3}$$

where Δx_t is a vector of first differences of the variables, *A(L)* is a lag polynomial and u_t is a vector of disturbances with estimated variances of Σ. In order to disentangle the impact of various structural shocks, the coefficients of the structural model need to be estimated:

$$\Delta x_t = C(L)\varepsilon_t \tag{4}$$

where ε_t is an n×1 vector of an unobserved mutually interrelated shocks that are interpreted as above. The long-run representation of the structural VAR can be represented as:

$$\begin{bmatrix} \Delta t_t \\ \Delta y_t \\ \Delta q_t \\ \Delta p_t \end{bmatrix} = \begin{bmatrix} C_{11}(1) & C_{12}(1) & C_{13}(1) & C_{14}(1) \\ C_{21}(1) & C_{22}(1) & C_{23}(1) & C_{24}(1) \\ C_{31}(1) & C_{32}(1) & C_{33}(1) & C_{34}(1) \\ C_{41}(1) & C_{42}(1) & C_{43}(1) & C_{44}(1) \end{bmatrix} \begin{bmatrix} \varepsilon_t \\ \varepsilon_s \\ \varepsilon_d \\ \varepsilon_\eta \end{bmatrix} \tag{5}$$

where $C(1) = C_0 + C_1 + C_2 + \ldots$ are the long-run multipliers of the structural VAR. Equations (3) and (4) suggest linear relationship in

$$u_t = C_0\varepsilon_t \tag{6}$$

where C_0 is the 4×4 matrix that defines the contemporaneous structure amongst the variables, which is required to be identified to determine the vector structural shocks, ε_t from the estimated disturbance vector u_t.

The model specified in equation (6) is not identified and additional restrictions are required in order to recover estimates of C_0 and u_t. Blanchard and Quah (1989) suggested the use of economic theory to determine the required additional restrictions. The first restriction stems from the exogeneity of terms of trade. This means that domestic shocks have no impact on the terms of trade hence, $C_{12} = C_{13} = C_{14} = 0$. The second and third restrictions come from the assumption that the long-run level of domestic output is not affected by the demand and nominal shocks, so that in the long-run domestic output is determined by supply factors and $C_{23} = C_{24} = 0$. The fourth restriction is that the long-run level of the real exchange rate is not affected by the aggregate nominal shocks and therefore that the long-run real exchange rate is determined by supply and relative demand, so $C_{34} = 0$. These restrictions imply that all four elements above the main diagonal of the sub-matrix are zero. This technique provides us with two tools to shed light on the behaviour of these variables in the face of a shock: the impulse response functions and forecast error variance decomposition. The impulse response functions allow the possibility of investigating the dynamic response of the variables to different shocks within the system. The forecast error variance decomposition gives the percentage of the variance accounted for by each of the shocks at different horizons, and shows the relative contribution of the structural shocks to the forecast error variance of the variables.

Underlying this methodological approach is the assumption of the exogeneity of terms of trade shocks. Theoretical support for the exogenous terms of trade assumption comes from the small open economy models, or dependent-economy models, of Salter (1959) and Swan (1960), which assume that a single, small country will have little influence on the determination of prices and quantities in the world markets for its goods. In these models internal and external adjustment comes about through a change in the internal relative prices of traded goods in terms of non-traded goods. In a flexible exchange rate system, if the prices of non-traded goods are fixed or sticky, adjustment will occur through a change in the nominal exchange rate. Recent empirical work, for example, Hoffmaister et al (1998) and Bleaney and

Greenaway (2001), shows the importance of terms of trade shocks in these African countries, despite the fact that these countries produced over 80% of African output in 2005, both their imports and exports account for only about 4% of the total volume of world trade for the period of 1980-2005. This therefore, puts the countries in a position from which it would be difficult to exert a considerable influence on either their import or export prices. Table 1 presents the share of these countries' trade in the world from 1980-2005. The five-year average of 1980-1985 was the highest where collectively the countries accounted for 6.7% of the world trade. The lowest was that of 1996-2000, where the countries' total trade volume constituted only 2.8% of world trade.

3. Exchange rate regimes classifications

Exchange rate regime classification is carried out and reported by IMF in its annual report, `Exchange Rate Arrangement and Exchange Restrictions'. Initially, the classifications were based on the reported regime by the member-countries (de jure), although, there have been increasing doubts on the accuracies of these reports. Following the seminal work of Calvo and Reinhart (2002), a number of studies find that de jure regimes (the regimes reported by the countries) are not the same as the de facto regimes (the actual regimes operated by the countries). Calvo and Reinhart[1] discovered that many countries that reported floating regime were not actually floating while Reinhart and Rogoff (2004) discovered that a number of countries reported fixed exchange rate regimes should be more accurately classified as a managed float or free floating.[2] Other empirical findings that contradicted the de jure regimes include Frankel, et al (2001) and Levy-Yeyati and Sturznegger (2005) . To accurately classify the exchange rate regimes followed by the countries investigated in this study, this paper follows the technique specified in Levy-Yeyati and Sturznegger (2005).

Typically a fixed exchange rate regime is typified by less volatility in exchange rate and greater reserve fluctuations as a result of intervention in the exchange rate markets. Flexible exchange rate regimes, on the other hand are characterised by little

[1] They dubbed this phenomenon as `fear of floating', which was prevalent in both developed and developing countries.
[2] Reinhart and Rogoff (2004) assert that about half of the countries that are `officially' classified as peg should be more accurately classified as `limited flexibility, managed or free floating'. An indication that `fear of pegging' also exists.

monetary authority intervention in the foreign exchange markets and, consequently, a relatively high volatility of nominal exchange rates. A crawling peg can be described as a situation where nominal exchange rate volatility takes place with low volatility and accompanied by high changes in reserves due to active interventions. A dirty float is when relatively high volatility occurs in exchange rate changes and reserves. Frankel et al (2001) had identified nine exchange rate regimes as published in the IMF Exchange Rate Arrangements and Restrictions,[3] however, as in Levy-Yeyati and Sturznegger (2005), these regimes can be easily grouped into the four categories identified above. The classification variables are chosen based on the volatility of the nominal exchange rate, the volatility of the exchange rate changes and the volatility of reserves. These features are summarised in Table 2. This methodology incorporates policy variables (intervention) and the outcome (exchange rate fluctuations). Exchange rate volatility was computed as the average of the absolute monthly percentage changes in the nominal exchange rate in a year. The volatility of exchange rate changes was calculated as the standard deviation of the monthly percentage changes in the exchange rate. Calculating the volatility of reserves is a problematic issue, because changes in reserves may not necessarily mean intervention activities. For example, Ghosh et al (2002) argue that non-intervention activities such as payment of bulk purchases (like oil or aircraft) and foreign debt servicing in developing countries can result into significant movements in reserves. In order to reflect intervention activities by the monetary authorities, we follow Levy-Yeyati and Sturznegger (2005) by subtracting central government deposits at the central bank from the central bank's net foreign assets. Therefore, reserves, R_t are defined as:

$$R_t = \frac{Net \quad Foreign \quad Assets - Central \quad Gov \quad Deposit}{e_t} \tag{7}$$

where e_t is the price of foreign currency (US Dollar) in terms of domestic currency, since central bank items are denominated in local currency. The monthly intervention in the exchange markets is given as:

$$I = \frac{R_t - R_{t-1}}{\frac{Monetary \quad Base}{e_{t-1}}} \tag{8}$$

[3] These are currency union, currency board, truly fixed, adjustable peg, crawling peg, basket peg, basket peg, target zones, managed and free float.

The measure of reserve volatility is the average of the monthly changes in *I*, which is the average of the monthly changes in net dollar foreign reserves relative to the monetary base in the preceding month. Figure 1 summarises this classification of the variables for all the countries investigated. As observed by Levy-Yeyati and Sturznegger (2005), there are instances as in Calvo and Reinhart (2002) where the interest rate has been used to tackle exchange rate pressure instead of an outright intervention. However, the capacity of exchange rate policy to alter the level of the exchange rate is limited in extent and efficacy, if there is no accompanying of reserve movements.[4]

Cluster analysis is used to identify and group the exchange rate regimes, based on the classification variables explained above. Cluster analysis determines the natural groups of observations by detecting similarities or dissimilarities in them. The partition methods of clustering divide the observations into a discrete number of non-overlapping groups, such as the kmeans. Under the kmeans, the researcher specifies the number of clusters, *k*, to create using an iterative process. Each observation is allotted to a group to whose mean it is the closest. The kmeans, therefore, creates the best k-group classification of the observations with little input from the researcher.[5] Using the criteria explained above, the kmeans clustering is used to identify distinctive exchange rate regimes of the countries from the data. Table 1 reports de facto regimes for the countries, based on the four regimes identified. In order to obtain a two-regime classification, crawling peg and dirty float were combined with fixed and flexible exchange rate regimes, respectively.

4. Data and estimation results

The data set is sourced from the IMF International Financial Statistics database and the series are quarterly real GDP, real exchange rates, consumer price index, CPI and terms of trade, which is the ratio of export to import prices. The real exchange rate is constructed from the nominal exchange rate, e_t, which is defined as domestic currency per foreign currency, using $q_t = e_t + p_t^* - p_t$ (all in logs). The paper covers 22 African countries, among which 11 are on peg and 11 are on flexible exchange rate

[4] See Levy-Yeyati and Sturznegger (2005) for the full argument.

[5] The researcher only needs to specify k ex ante.

regimes.[6] To identify level of integration of the variables, the series were subjected to various unit root tests that include Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS). The results indicate that they are I(1) in levels and I(0) in first differences[7]. Therefore, it is appropriate to estimate the VAR in first difference. Johansen (1988) tests were used to test for the presence of co-integration, but this was rejected for all the countries in favour of its non-existence.[8] Consequently, a structural VAR was estimated for each of the countries. Since the VAR is sensitive to lag length (see for example Chari et al., 2008), information criteria were used in determining the optimal lag length, which, testing down from the highest possible lags, showed that four lags were optimal.

The dynamic responses of the estimated structural VAR for the countries are reported in Figure 1. The results for the floating rate countries show that the real exchange rate responded to the terms of trade shocks while the real output response remained insignificant up to the tenth quarter after the shock. Based on the discussion in the preceding section, there are 10 countries with flexible exchange rate regime and twelve countries that are on fixed exchange rate regime.[9] Although, in all these countries, as expected, it is the real exchange rate that responds to the terms of trade shock, the magnitude and duration of the response vary from country to country. The real exchange rates of Algeria, Malawi, Mauritius and Nigeria responded with an immediate depreciation in the period immediately after the shock, but gradually appreciated back to their long-run level. Among this group Nigeria recorded the highest depreciation during the period immediately after the shock and recorded a further depreciation in the second quarter, before sharply appreciating in the third quarter. For Kenya and South Africa, on the other hand, the real exchange rates did not respond to the shock during the period contemporaneous to the shock, but gradually depreciated up to the second and third quarter before appreciating. Ghana's real exchange rate also did not respond by immediate depreciation, but only after two quarter lags reaching its peak in the fourth quarter. Tanzania's real exchange rate responded to the shock by appreciation during the second quarter after the shock,

[6] Please refer to Table 1.

[7] All cointegration and unit root test results are available in the working paper version of this paper as Tables 3 and 4.

[8] The unit root and co-integration results are not reported here, but available on request.

[9] Those on flexible regimes are countries are Algeria, Ghana, Kenya, Malawi, Mauritius, Nigeria, South Africa, Tanzania, Uganda and Zambia. The countries with fixed exchange rate regime, on the other hand, include Benin, Botswana, Cameroon, Central Africa, Egypt, Ethiopia, Gabon, Libya, Mauritania, Morocco, Senegal and Tunisia.

followed by a 50% depreciation in the fourth quarter, where it stayed for two quarters before appreciating back towards its long-run trend. The remaining two floating rate countries, Uganda and Zambia, exchange rates appreciated mildly after the shock, but then depreciated in the second quarter. The depreciation is sharper in Uganda, where it recorded a 3% depreciation in the third quarter.

The results for fixed exchange rate regimes reveal that terms of trade shocks gave rise to adjustment from real output as predicted by the theory. However, like in the flexible regimes, the pattern of the responses vary from one country to another. The real output of Benin, Botswana, Gabon, Morocco and Senegal responded positively immediately after the shock. However, by the second quarter, output had returned to its long-run trend. The results for Cameroon, Central Africa, Libya and Mauritania indicate that the real output of these countries contracted only after a delay of three quarters after the shock, where it remained for a quarter before subsequently rising up to the long-run level. The real output of Egypt and Ethiopia responded positively, during the third quarter of the shock. Tunisia's real output responded by a positive rise after a delay of five quarters following the shock. Bleaney and Fielding (2002), while analysing effects of exchange rate regimes on developing countries output, find a similar pattern whereby pegged regimes have higher output fluctuations and lower inflation than the flexible exchange rate regimes.

Terms of trade shocks have produced an insignificant response in the price level of the countries investigated, except in Senegal, where the price level responded by a positive rise during the period after the shock, but this only lasted for a month. Similarly, real exchange rate shocks do not seem to have a significant impact on the output of these countries. Two notable exceptions, however, are Tanzania and Zambia. In the former, output responded to the real exchange rate depreciation by a rise in the third quarter, but which lasted for only three quarters before the output level returned to its long-run level. In Zambia, a real exchange rate depreciation resulted in the country's real output contracting for about a month before returning to its long-run trend. Broda (2004) has found that countries with flexible exchange rate regimes have smoother adjustment in their real output while countries that have peg regimes recorded smoother adjustment in their real exchange rates as predicted by the theory.

5. How important are terms of trade shocks?

Impulse response analysis is useful in considering the signs and magnitude of responses to specific shocks, but the relative importance of shocks for a change in a given variable is best assessed through forecast error variance decompositions. The results[10] show the contributions of demand, terms of trade, supply and nominal shocks to variations of real exchange rates, real output and the price level. It is evident that contributions of terms of trade to output fluctuations vary across the countries. Terms of trade shocks accounted for between 1% and 36% of the countries covered, with Gabon having the highest of 36%.[11] Terms of trade shocks have significantly contributed to output fluctuations in all of the countries covered. They contributed to more than 30% of output variations in Ethiopia, Gabon, Mauritius and Tunisia; to more than 20% of output changes in Benin, Botswana, Malawi and Morocco; and between 10% and 20% of output fluctuations in Algeria, Central Africa, Egypt, Kenya, Libya, Mauritania, Morocco, Nigeria, Senegal, South Africa, Tanzania and Zambia. The countries of Ethiopia, Gabon and Tunisia, which recorded the largest impact of terms of trade shock on their output are on fixed exchange rate regimes. This result is consistent with findings of Hoffmaister et al (1998), who find that external shocks are more important on the output of CFA (monetary union) countries than on output of non-CFA (flexible exchange rate regime) countries. Similarly, Broda (2004) discovered that about 30% to 33% of output fluctuations in pegged countries are attributable to terms of trade shocks. South Africa, Uganda, Ghana and Nigeria are on flexible exchange rate regimes. Terms of trade shocks have not significantly influenced inflation in these countries. However, terms of trade shocks contribute 21% inflation in Mauritania, 18% in Senegal, 17% in Ethiopia and 16% in Kenya. It is noteworthy that the countries with the least influence of terms of trade shocks on their inflation are those on fixed regime. For example Botswana, Cameroon and Gabon, which operated fixed exchange rate regime, the effects of terms of trade shocks on their inflation rates are between 5% and 6%. Similar results were reported by Bleaney and Fielding (2002) for pegged regimes. Influence of terms of trade shocks to real exchange rate variations in Ghana, Kenya and Uganda is between 15% and 30%. These countries are on flexible exchange rate regimes, which emphasise the role of the exchange rate in the adjustment process.

[10] The detailed tables for each country are given in Ahmad and Pentecost (2010).
[11] The countries covered are Algeria, Benin, Botswana, Central Africa, Egypt, Ethiopia, Gabon, Kenya, Malawi, Libya, Mauritania, Mauritius, Morocco, Senegal, South Africa, Tanzania, Tunisia and Zambia.

The demand shock is the most dominant source of real exchange rate variations for all the countries covered, except Central Africa. About 47% of South African real exchange rate fluctuations are attributable to supply shocks, while demand shocks contributed about 33%. The demand shock has also significantly contributed to the output fluctuations in Tanzania, Nigeria and Morocco. Between 15%-30% of output fluctuations in these countries are due to demand shocks.

The most important source of output volatility in these countries are supply shocks, which contributed between 47% and 86% of output variations in Tunisia and Cameroon, respectively. Countries where supply shocks have additionally significantly influenced real exchange rate variations include Central Africa, Ethiopia, Gabon, South Africa, Tunisia and Uganda. Supply shocks are responsible for about 18%-22% of real exchange rate fluctuations in these countries. Similarly, supply shocks have led to between 10% and 15% real exchange rate variations in Malawi, Mauritius, Morocco, Nigeria and Zambia. Supply shocks have also significantly contributed to the inflation rate in the pegged countries of Benin, Central Africa, Gabon and Senegal, where between 23% and 34% of inflation volatility is due to supply shocks.

Nominal shock contributed less than 15% of output fluctuations in most of the countries. However, its contributions to output variations in South Africa is about 23%. This is not surprising given the fact that South Africa has the most developed financial system on the continent. The nominal shock has dominated the South African inflation rate, but its significance is less pronounced in fixed exchange rate regime countries than in the flexible exchange rate regimes. For example, nominal shocks are responsible for 22% and 43% of price level fluctuations in Benin and Senegal, but it is as high as 65%, 75% and 80% in South Africa, Tanzania and Uganda, respectively. Nominal shock contributions to real exchange fluctuations are generally marginal, less than 15%. Contributions of terms of trade shocks to real exchange rate fluctuations vary from 1% in Algeria to about 30% in Ghana. Countries with the highest contribution of nominal shocks to their real exchange rate fluctuations are Mauritania, South Africa, Gabon, Egypt and Mauritius, where its contribution ranges between 14% and 10%. Although the contribution of the terms of trade to real exchange rate variation of Tunisia is the highest among the peggers, its contribution to the fluctuation of the real output is higher at about 31%. This is consistent with the theoretical predictions. Terms of trade shocks accounted for less

than 1% of real exchange rate fluctuations in Algeria but up to 29% in Ghana, among the floating countries. The results for countries like Algeria, Malawi, Mauritius, Nigeria, South Africa, Tanzania and Zambia recorded a significant contribution of terms of trade to the real exchange rate volatility of the countries.

The percentages of output variations that are attributable to terms of trade shocks are generally higher in pegging countries than in floating regimes. Only two countries among the peggers that recorded lower contributions of term of trade shocks to their output variations than real exchange rates - Cameroon and Mauritania. Countries with flexible exchange rate regimes recorded lower volatility of output due to the terms of trade influence.

6. Conclusions

Using a structural VAR model, this paper investigates how 22 African countries cope with terms of trade shocks under different exchange rate regimes. Principally, two regimes were identified by using econometric and statistical procedures of testing for structural breaks. The findings support the view that the exchange rate regime matters as to how countries respond to exogenous external shocks, like terms of trade shocks. In countries identified with flexible exchange rates adjustment to the terms of trade shock was undertaken largely through variations in the real exchange rate. Thus there is higher volatility of real exchange rates in these countries than in countries with de facto fixed exchange rates. This finding concurs with other studies of Hoffmaister et al (1998) and Broda (2004), who find that the pattern of real exchange rate behaviour and output differ according to the exchange rate regimes operated by these countries. The effects of terms of trade shocks on output fluctuation are significant in these countries. Terms of trade shocks are responsible for about 10%-36% of output fluctuations in twenty out of the twenty-two countries this study covers. Its influence on output is more pronounced in the fixed exchange rate regime than in flexible exchange rate regime. Gabon, Ethiopia, and Tunisia, for example, which are identified as fixed exchange rate regime, recorded the highest impact of terms of trade shocks on their output. In general, the findings support the theoretical argument that exchange rate regime matters in face of external shocks like those that emanate from the terms of trade.

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Table 1

African country trade shares

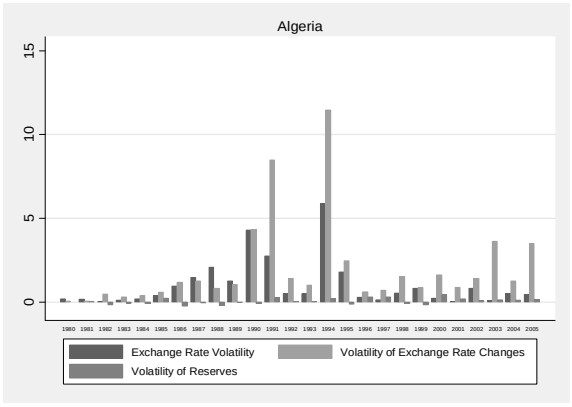
	1980-85	1986-90	1991-95	1996-2000	2001-2005
World	100	100	100	100	100
Algeria	0.95	0.49	0.37	0.33	0.43
Benin	0.01	0.02	0.02	0.01	0.01
Botswana	0.05	0.07	0.07	0.06	0.05
Cameroon	0.09	0.07	0.06	0.04	0.04
C/African	0.01	0.01	0.00	0.00	0.00
Egypt	0.40	0.44	0.20	0.20	0.19
Gabon	0.13	0.07	0.07	0.05	0.05
Ghana	0.07	0.05	0.05	0.05	0.05
Kenya	0.90	0.41	0.31	0.21	0.24
Libya	0.90	0.41	0.31	0.21	0.24
Malawi	0.02	0.02	0.02	0.01	0.01
Mauritania	0.03	0.02	0.02	0.01	0.01
Mauritius	0.03	0.05	0.05	0.05	0.04
Morocco	0.22	0.21	0.21	0.21	0.21
Nigeria	1.13	0.38	0.38	0.34	0.44
South Africa	1.43	1.07	0.88	0.76	0.74
Tanzania	0.05	0.03	0.03	0.02	0.03
Tunisia	0.19	0.16	0.18	0.17	0.18
Uganda	0.03	0.02	0.01	0.02	0.02
Zambia	0.07	0.05	0.03	0.03	0.03
Total	6.71	4.04	3.27	2.80	3.01

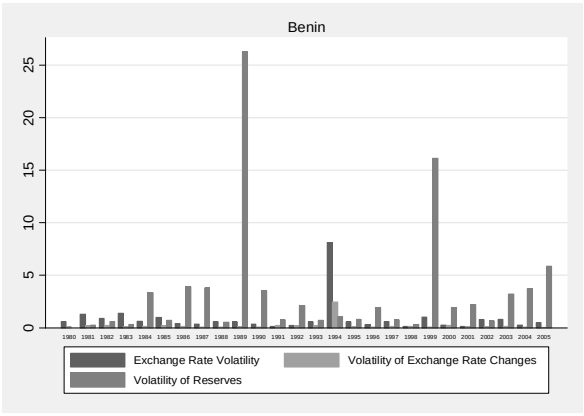
Table 2

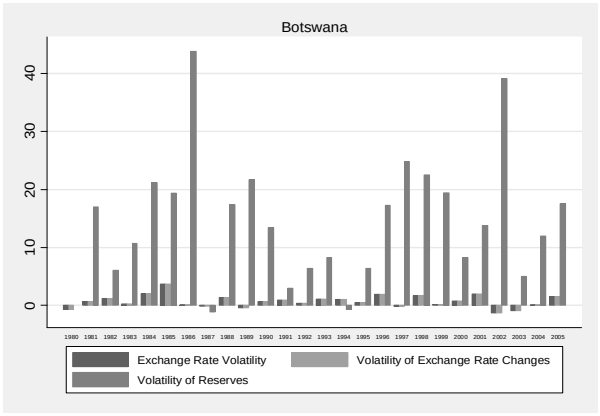
Exchange rate identification scheme

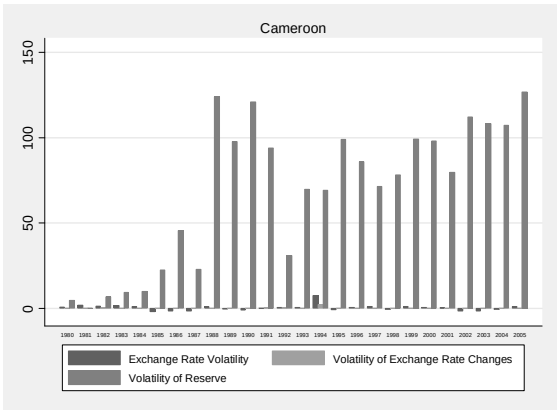
	Fixed	**Crawling**	**Dirty Float**	**Flexible**
Exchange Rate Volatility	Low	High	High	High
Volatility of Exchange Rate Changes	Low	Low	High	High
Volatility of Reserves	High	High	High	Low

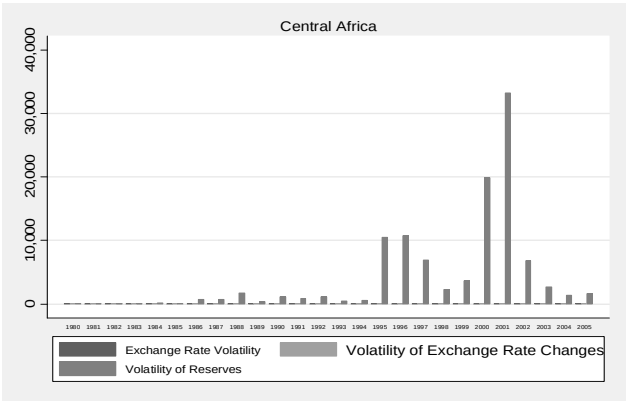
Figure 1
Exchange Rate Volatility, Volatility of Exchange Rate Changes and Volatility of Reserves

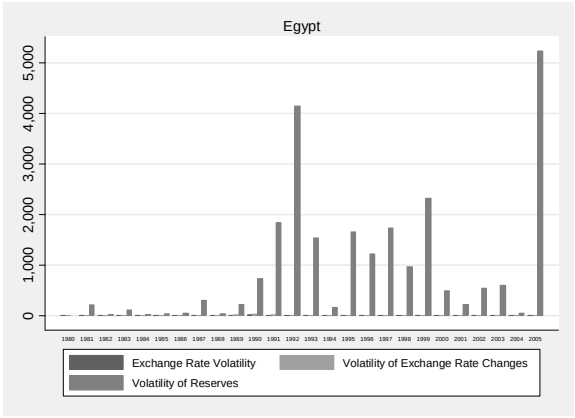


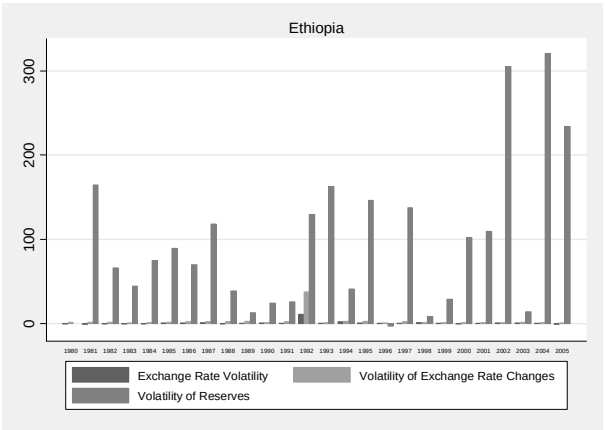












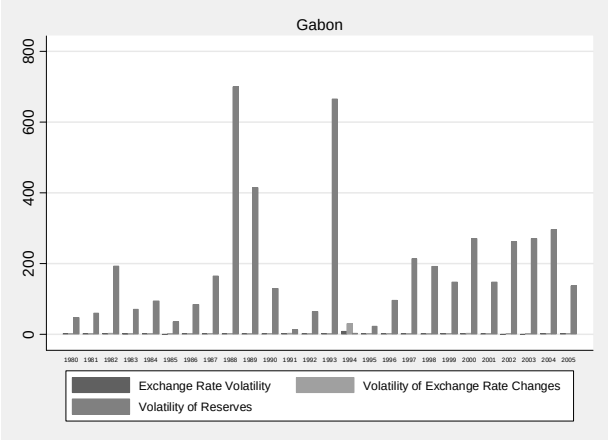


Figure 1

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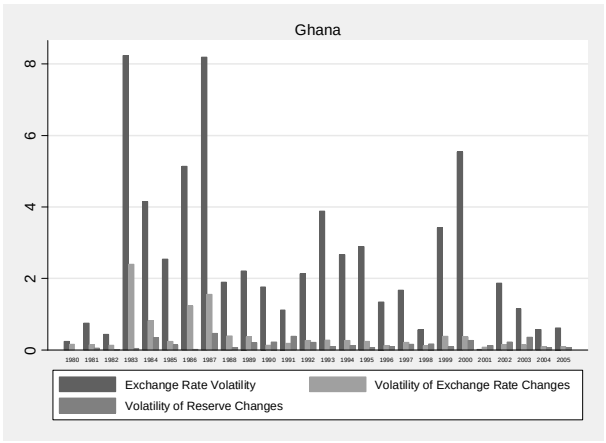
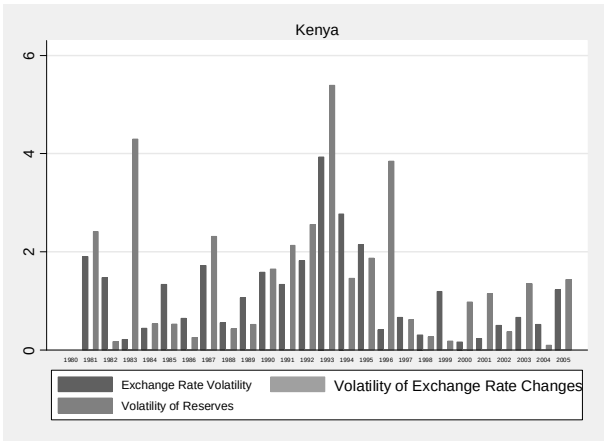

Ghana
0
2
4
6
8
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatility of Reserve Changes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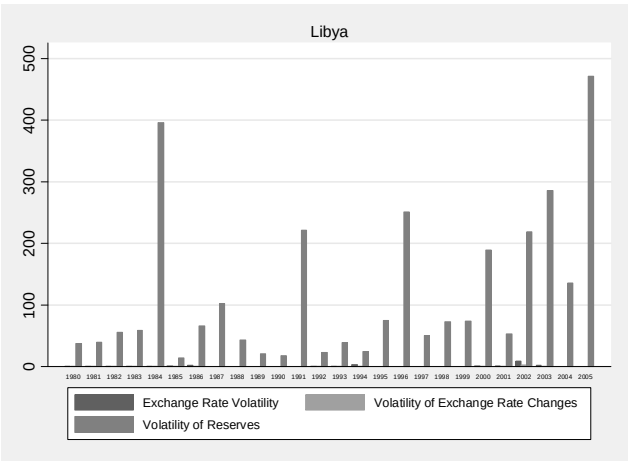
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatility of Reserves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200
300
400
500
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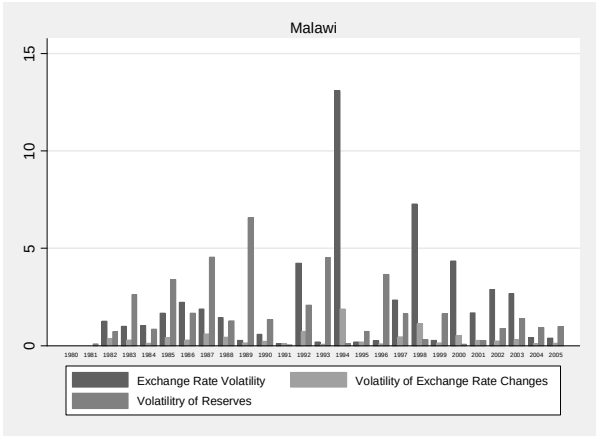
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatility of Reserves


Malawi
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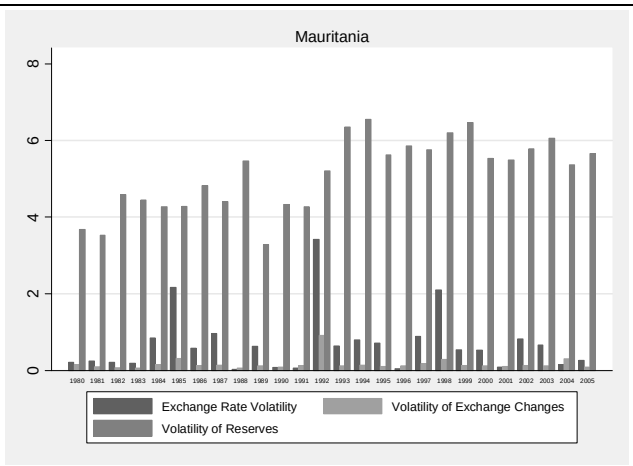
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatilitry of Reserves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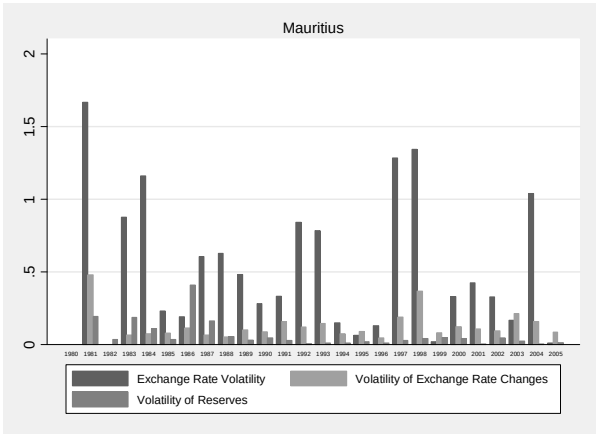
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatility of Reserves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.5
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1.5
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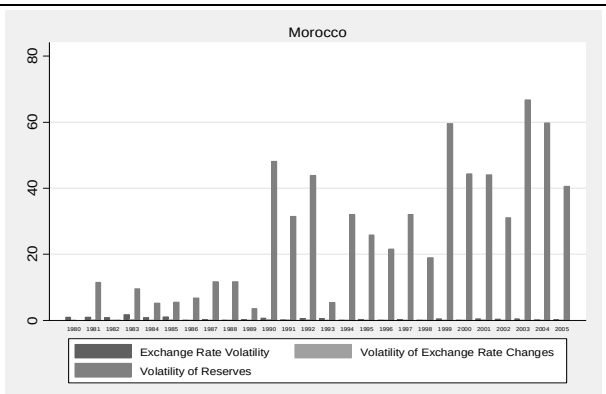
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatility of Reserves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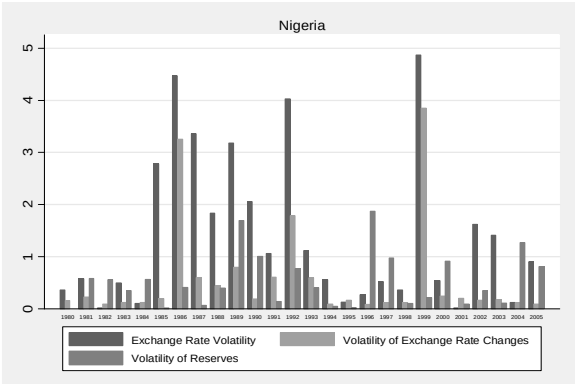
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatility of Reserves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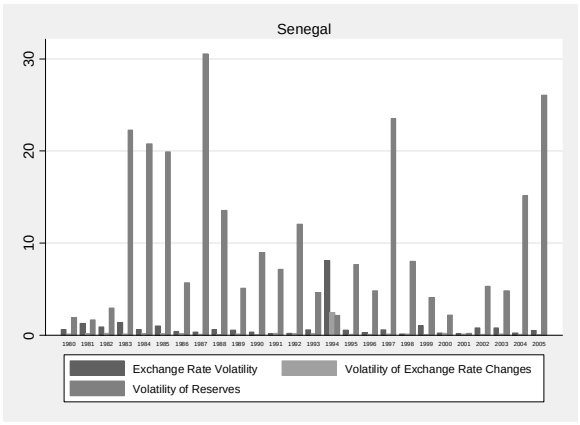
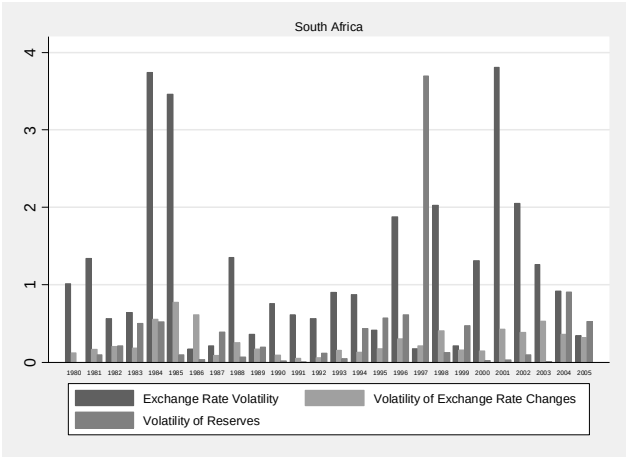
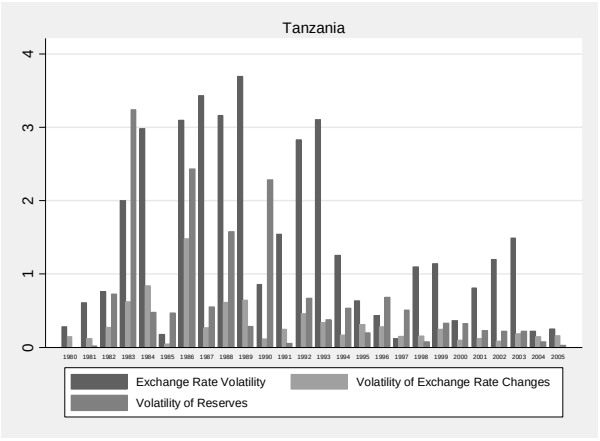
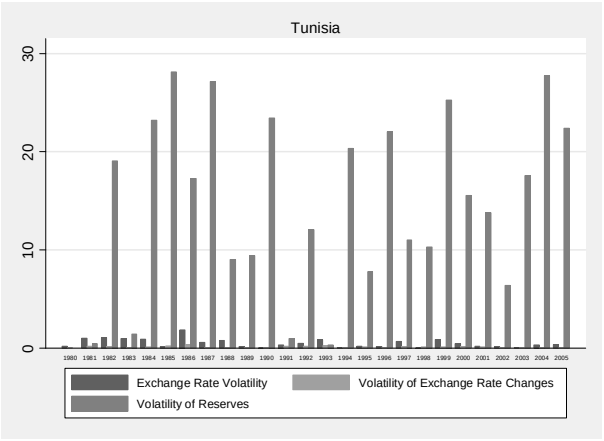
Exchange Rate Volatility
Volatility of Exchange Rate Changes
Volatility of Reserves

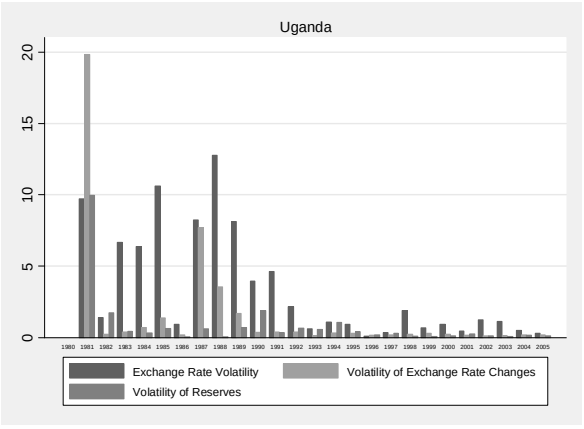
Figure 1
Continued

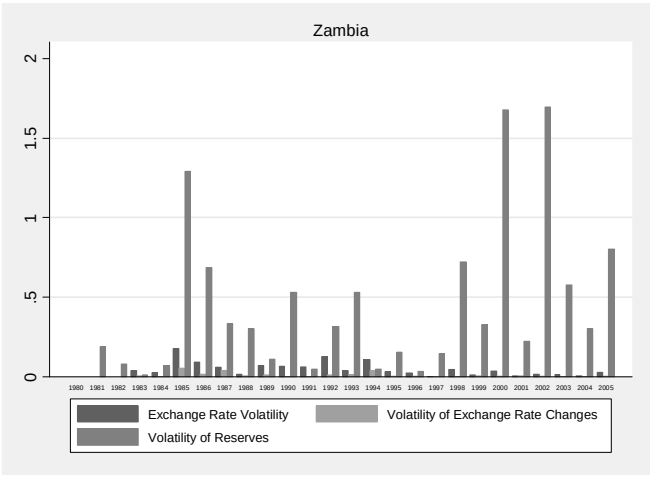








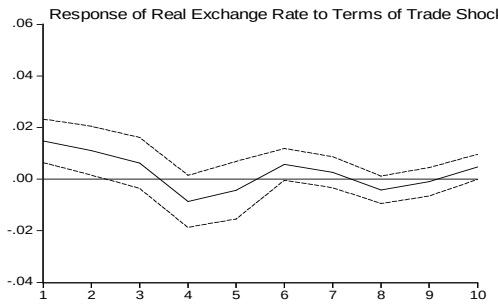


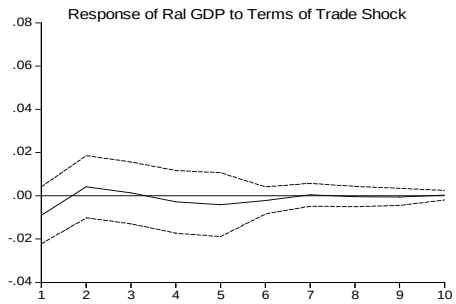


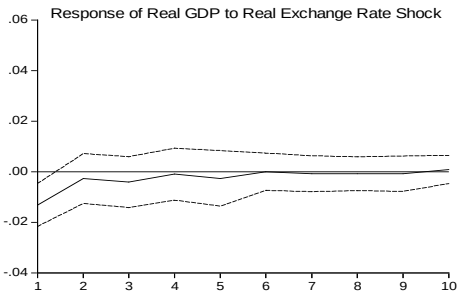
Appendices not to be published in journal version of the paper, include Figures 2 and Tables 2, 3 and 4

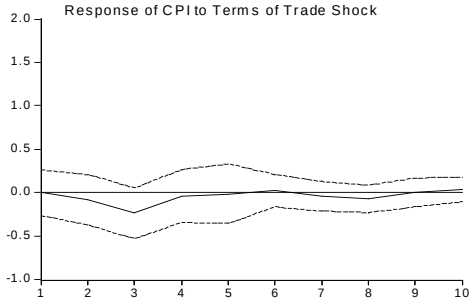
Figure 2 Impulse responses

Algeria

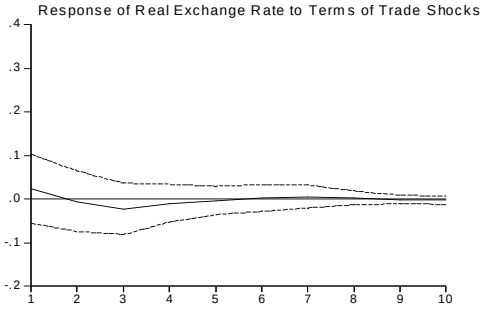


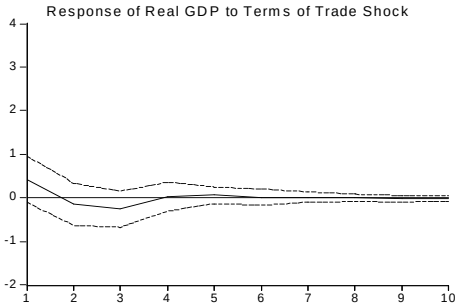


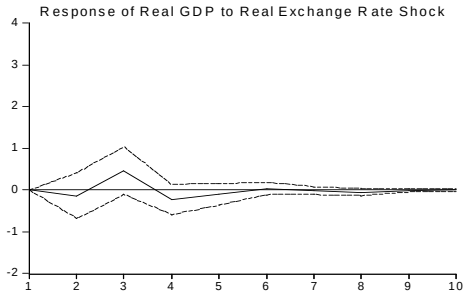




Benin Republic







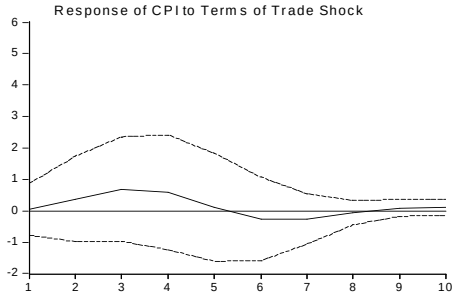
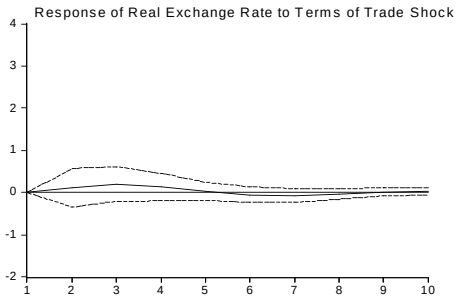
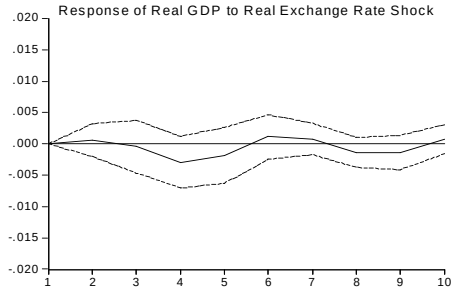
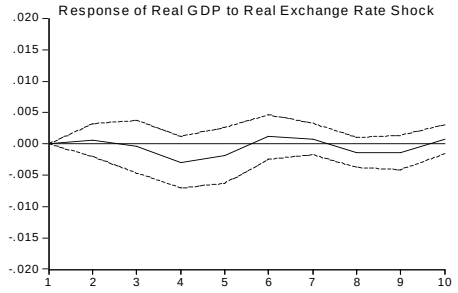


Figure 2: Impulse Response

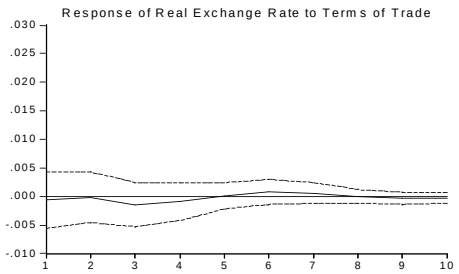
Botswana

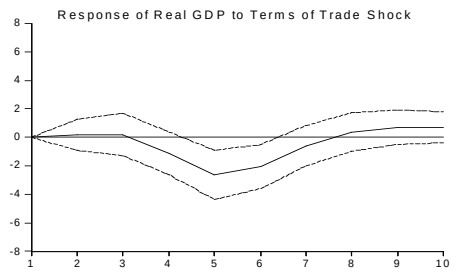


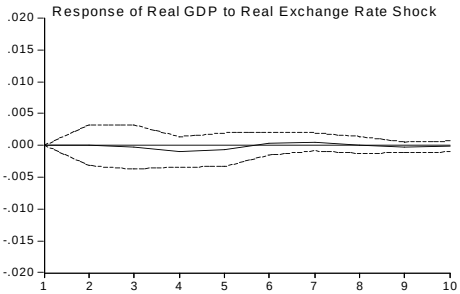


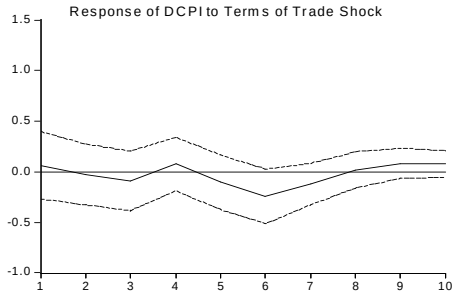


Cameroon

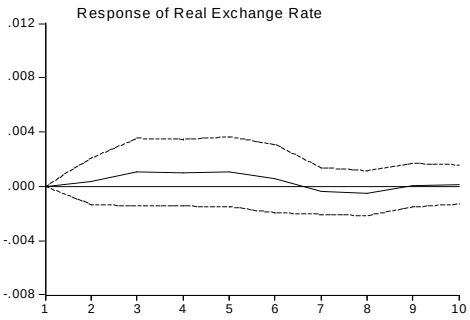


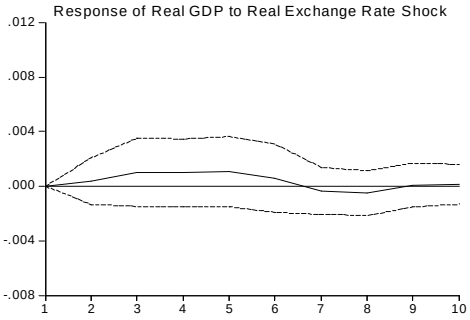


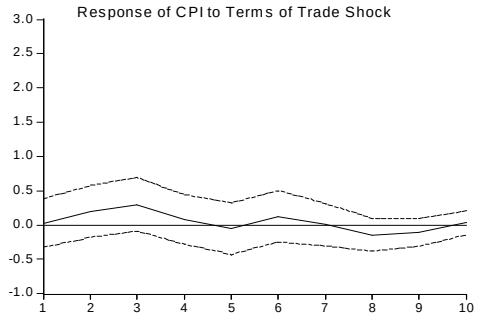




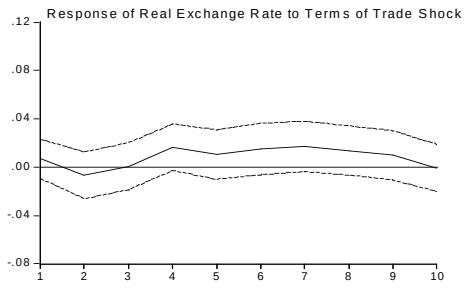
Impulse Response
Central Africa Republic

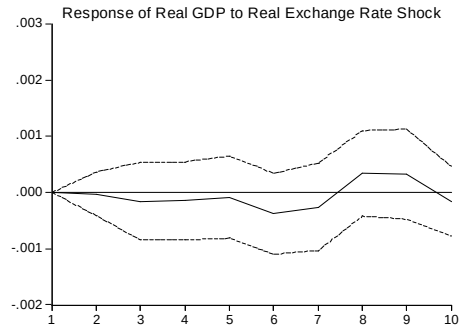


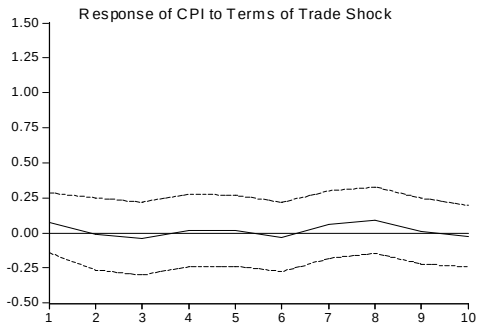




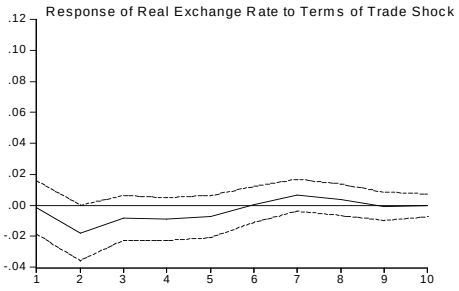
Egypt

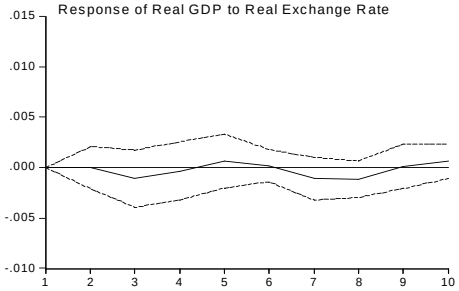


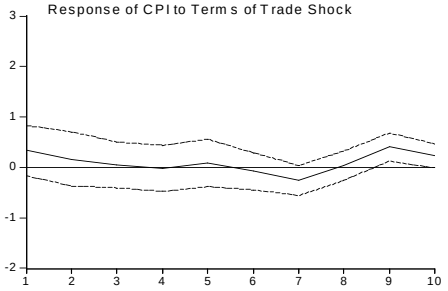




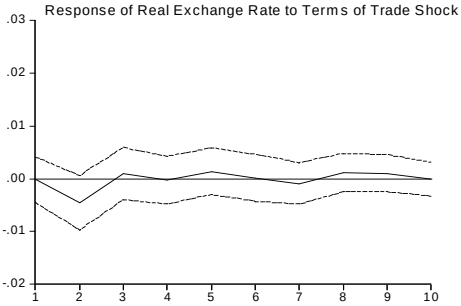
Impulse Response
Ethiopia

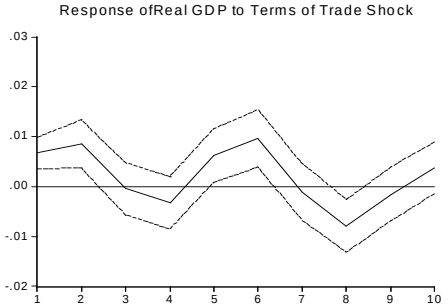


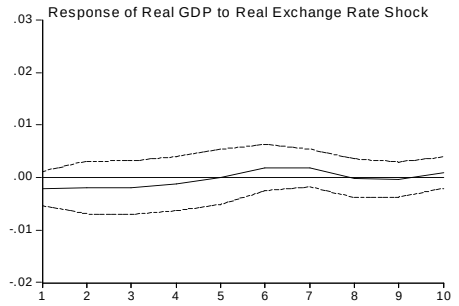


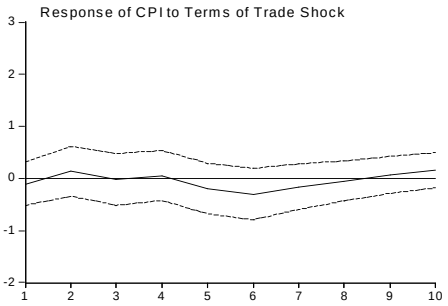


Gabon

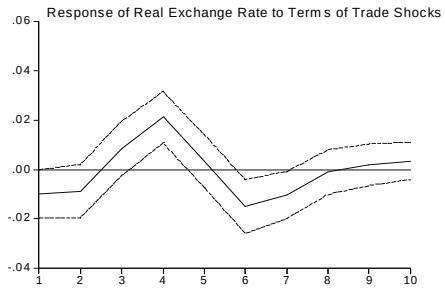


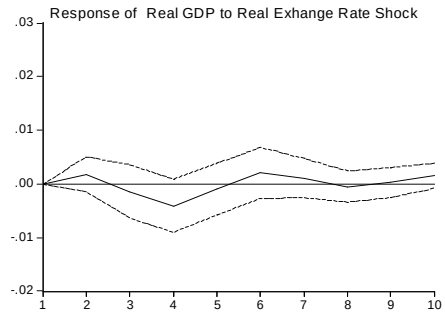


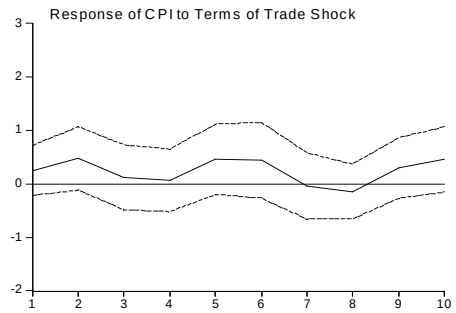




Impulse Response
Ghana







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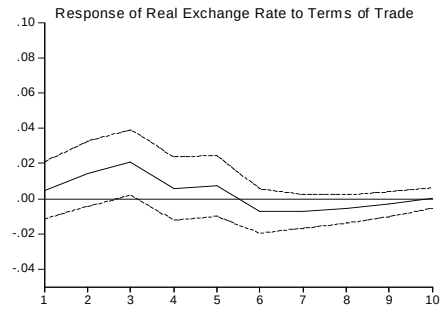
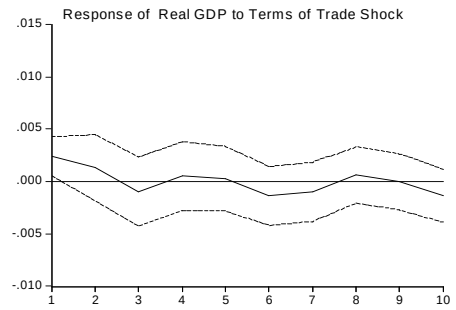
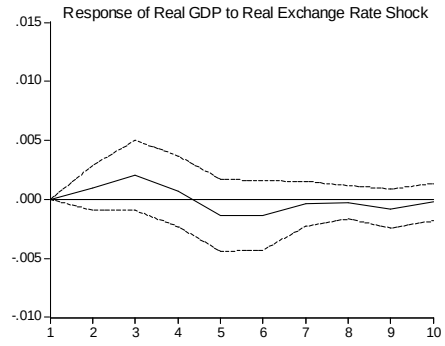
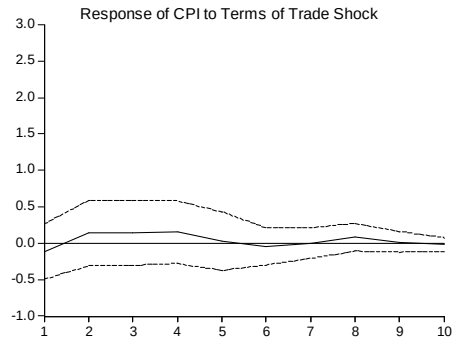
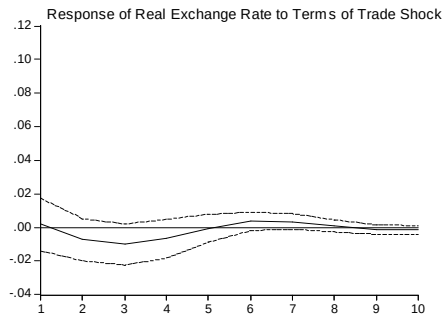


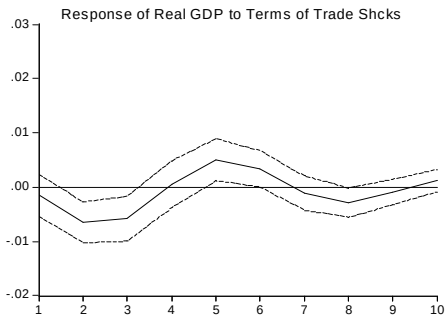


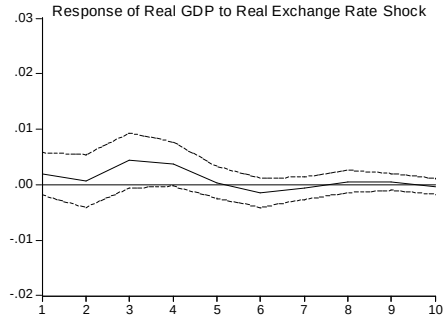


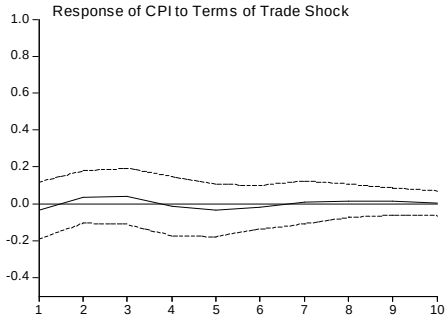


Impulse Response
Libya









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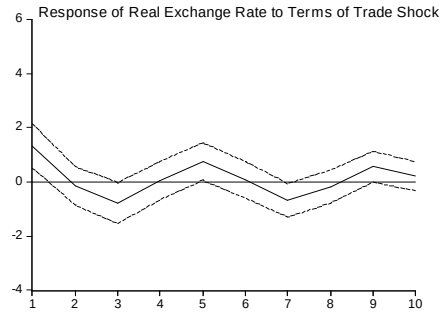
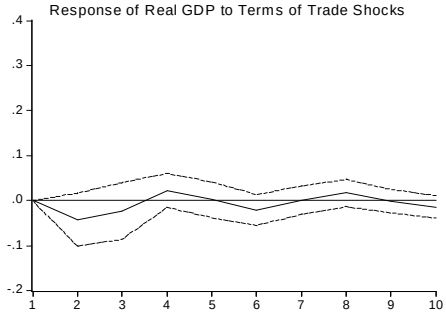
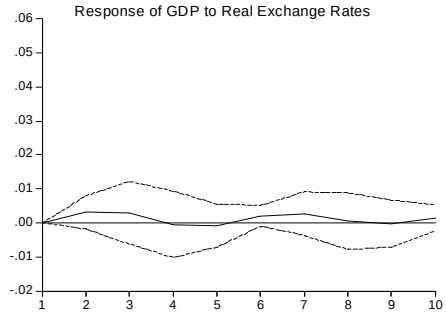
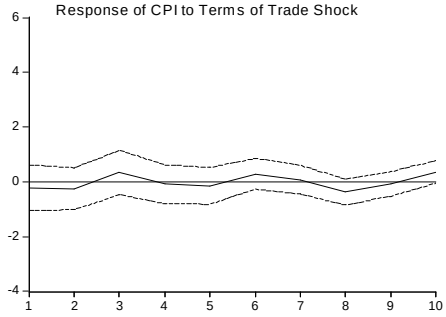
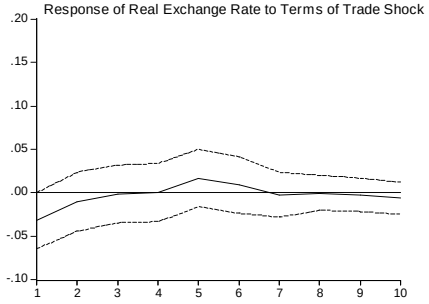


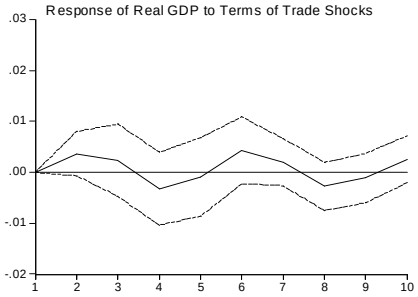


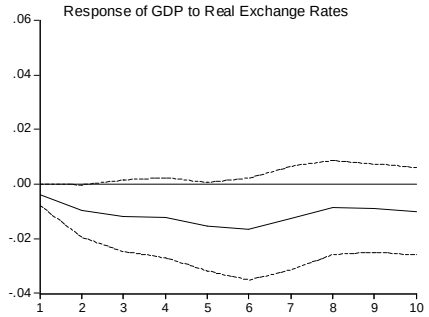


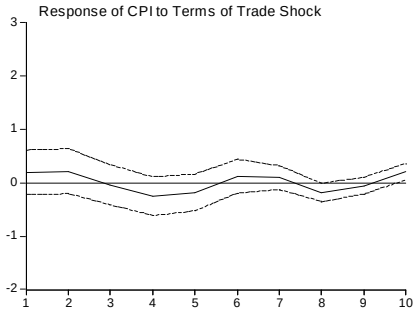


Impulse Response
Mauritania

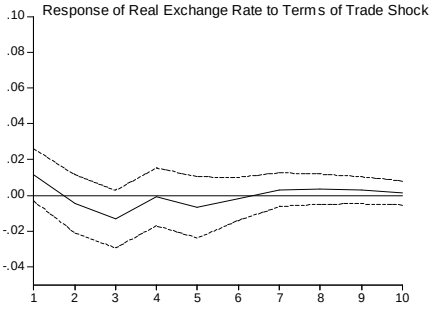


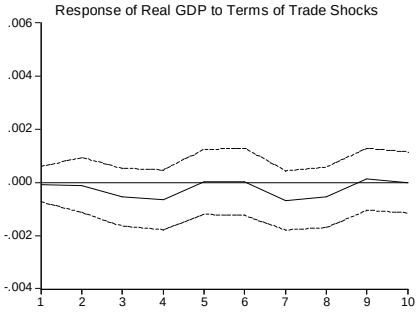


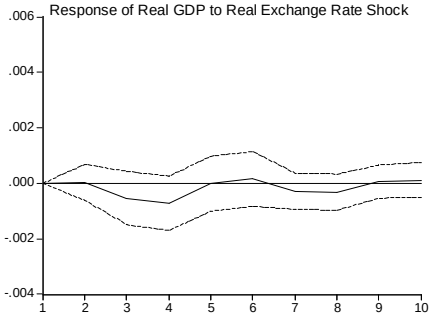


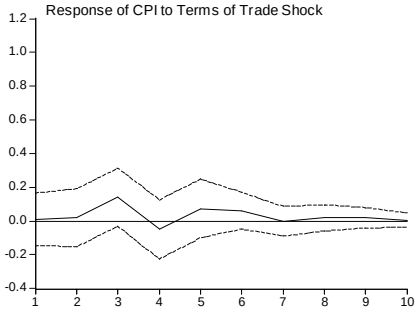


Mauritius

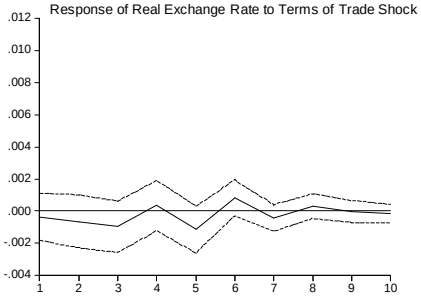


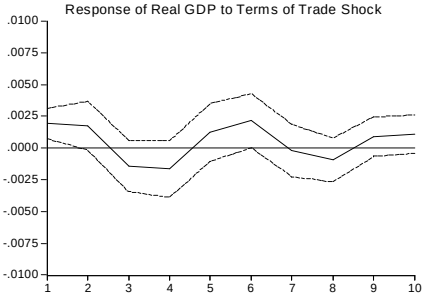


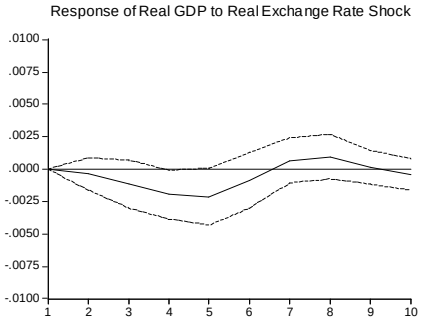


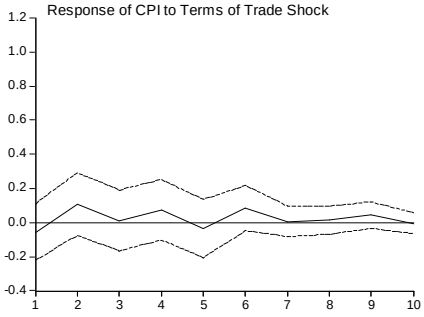


Impulse Response
Morocco

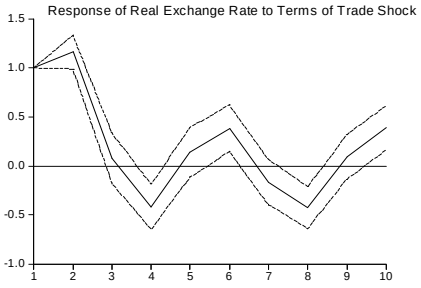


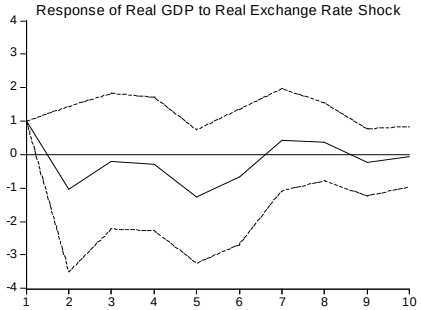


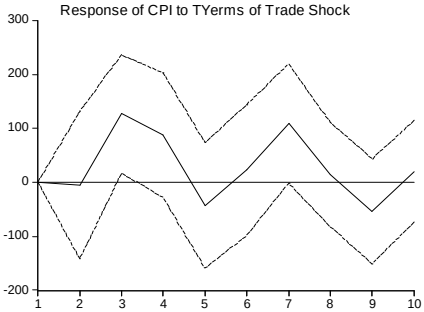




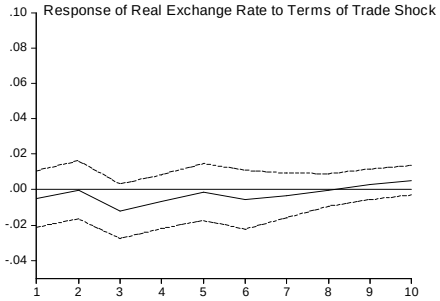
Nigeria

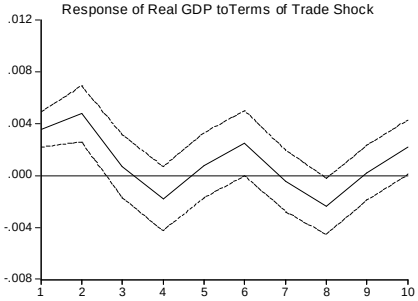


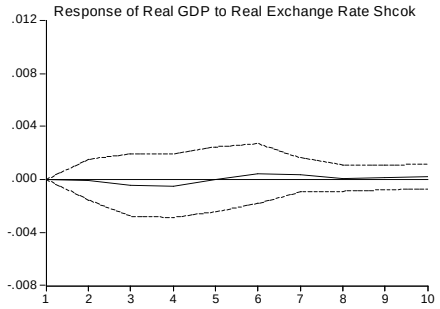


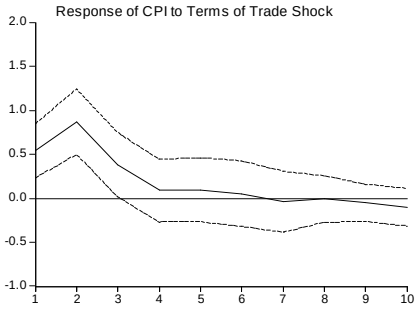


Impulse Response
Senegal









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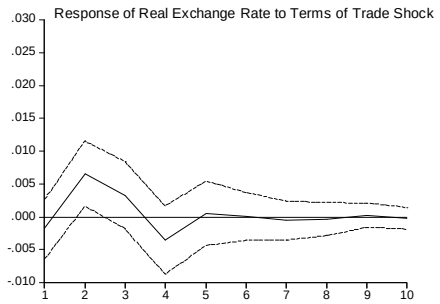
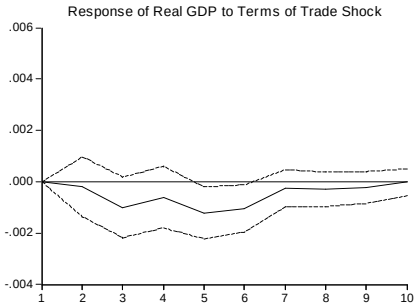
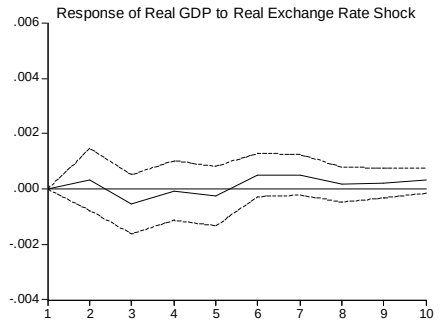
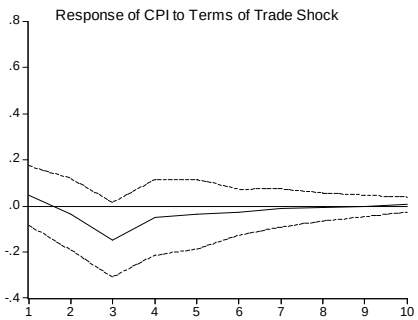
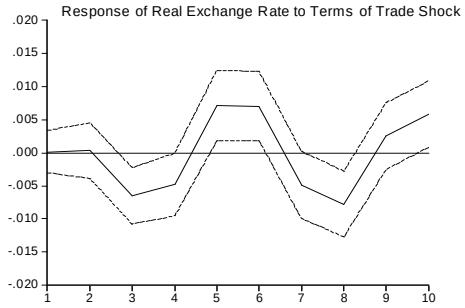


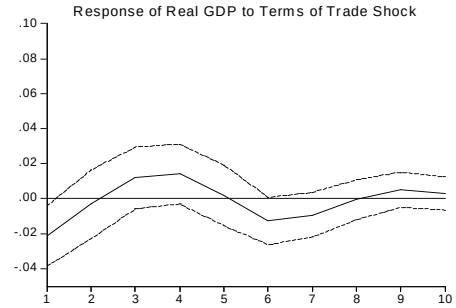


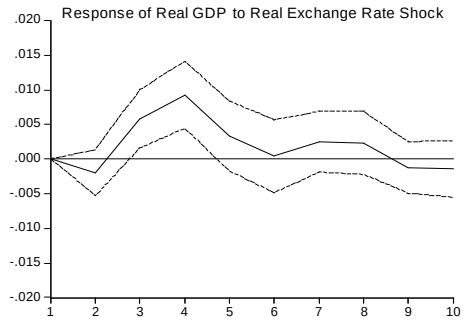


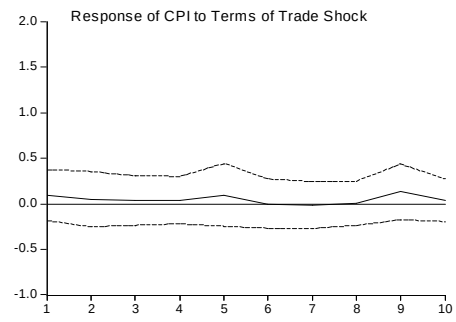


Impulse Response
Tanzania

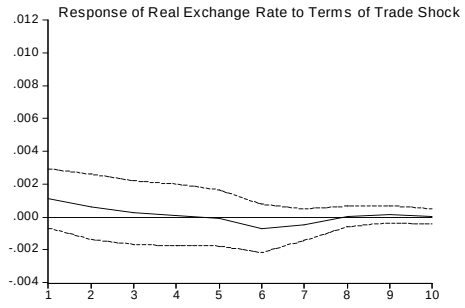


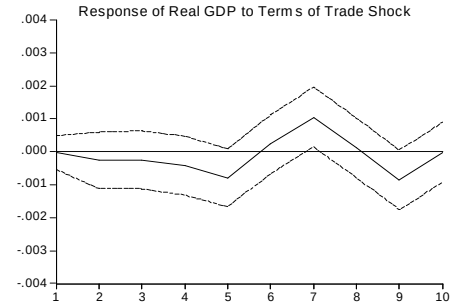


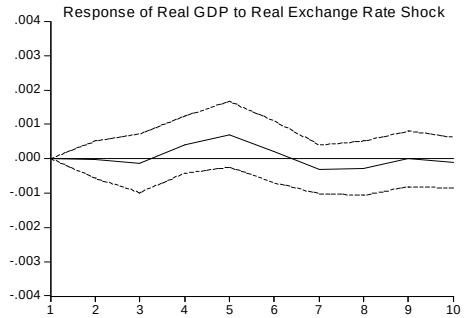


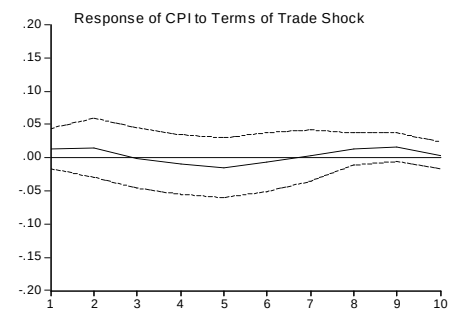


Tunisia

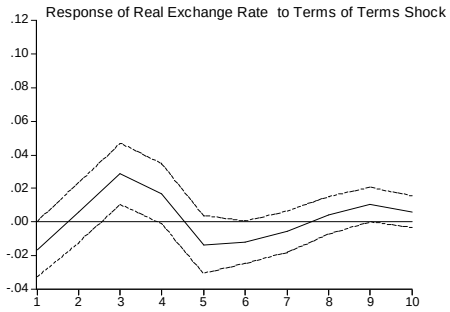


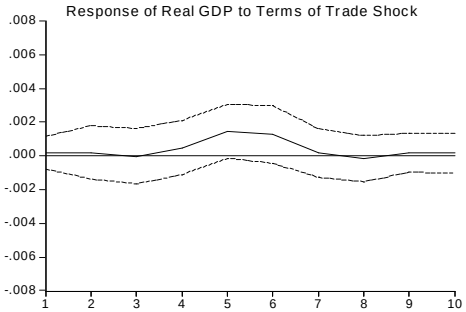


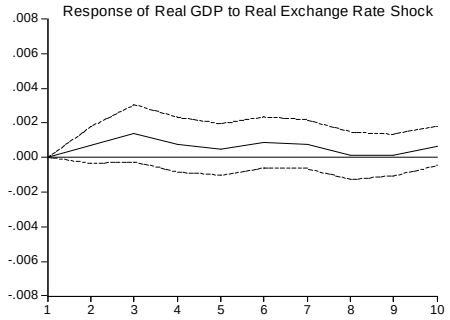


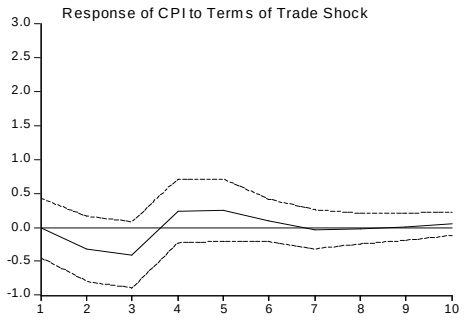


Impulse Response
Uganda

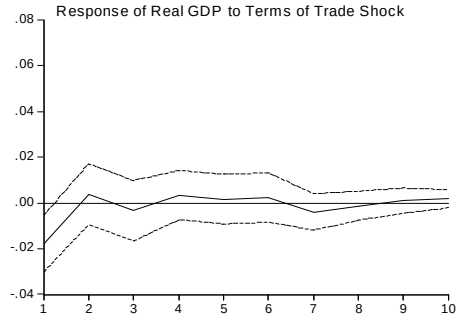


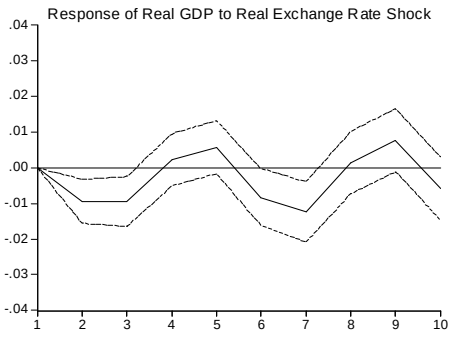






Zambia





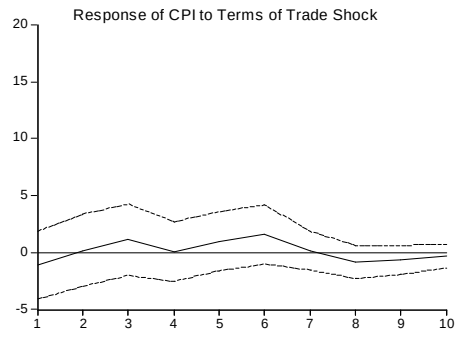


Table 3
Cointegration tests

Johansen Cointegration Tests					
Country	**Hypothesized No of CEs**	**Trace**	**0.05 Critical Values**	**Max-Eigen Statistic**	**0.05 Critical Values**
Algeria	r = 0	47.83621	47.85613	24.24565	27.58434
	r ≤ 1	23.59056	29.79707	15.19954	21.13162
	r ≤ 2	8.391023	15.49471	7.592088	14.26460
	r ≤ 3	0.798935	3.841466	0.798935	3.841466
Benin	r = 0	60.42727	63.87610	25.74059	32.11832
	r ≤ 1	34.68668	42.91525	14.30815	25.82321
	r ≤ 2	20.37853	25.87211	13.31941	19.38704
	r ≤ 3	7.059127	12.51798	7.059127	12.51798
Botswana	r = 0	62.64773	63.87610	26.21624	32.11832
	r ≤ 1	36.43149	42.91525	18.55901	25.82321
	r ≤ 2	17.87248	25.87211	11.40528	19.38704
	r ≤ 3	6.467198	12.51798	6.467198	12.51798
Cameroon	r = 0	57.48746	63.87610	29.10169	32.11832
	r ≤ 1	28.38577	42.91525	13.69122	25.82321
	r ≤ 2	14.69455	25.87211	8.750835	19.38704
	r ≤ 3	5.943712	12.51798	5.943712	12.51798
Central Africa	r = 0	39.23579	47.85613	21.92351	27.58434
	r ≤ 1	17.31228	29.79707	7.733623	21.13162
	r ≤ 2	9.578658	15.49471	6.158300	14.26460
	r ≤ 3	3.420358	3.841466	3.420358	3.841466
Egypt	r = 0	55.27641	63.87610	26.91737	32.11832
	r ≤ 1	28.35904	42.91525	13.23936	25.82321
	r ≤ 2	15.11967	25.87211	10.67175	19.38704
	r ≤ 3	4.447918	12.51798	4.447918	12.51798
Ethiopia	r = 0	52.82744	63.87610	23.05216	32.11832
	r ≤ 1	29.77528	42.91525	13.80814	25.82321
	r ≤ 2	15.96714	25.87211	10.77241	19.38704
	r ≤ 3	5.194724	12.51798	5.194724	12.51798
Gabon	r = 0	59.88178	63.87610	25.41623	32.11832
	r ≤ 1	34.46555	42.91525	18.01470	25.82321
	r ≤ 2	16.45085	25.87211	10.19786	19.38704
	r ≤ 3	6.252992	12.51798	6.252992	12.51798
Ghana	r = 0	63.10444	63.87610	28.08770	32.11832
	r ≤ 1	35.01674	42.91525	20.43134	25.82321
	r ≤ 2	14.58540	25.87211	9.189246	19.38704
	r ≤ 3	5.396158	12.51798	5.396158	12.51798
Kenya	r = 0	45.78365	47.85613	19.97520	27.58434
	r ≤ 1	25.80845	29.79707	16.15317	21.13162
	r ≤ 2	9.655284	15.49471	9.592345	14.26460
	r ≤ 3	0.062939	3.841466	0.062939	3.841466
Libya	r = 0	41.00324	47.85613	19.37072	27.58434
	r ≤ 1	21.63253	29.79707	12.27822	21.13162
	r ≤ 2	9.354309	15.49471	9.274687	14.26460
	r ≤ 3	0.079621	3.841466	0.079621	3.841466

Country	Hypothesized No of CEs	Trace	0.05 Critical Values	Max-Eigen Statistic	0.05 Critical Values
Malawi	r = 0	39.16359	47.85613	19.62248	27.58434
	r ≤ 1	19.54112	29.79707	14.10442	21.13162
	r ≤ 2	5.436693	15.49471	5.429817	14.26460
	r ≤ 3	0.006876	3.841466	0.006876	3.841466
Mauritania	r = 0	54.47907	63.87610	23.89045	32.11832
	r ≤ 1	30.58861	42.91525	16.30099	25.82321
	r ≤ 2	14.28762	25.87211	10.13066	19.38704
	r ≤ 3	4.156959	12.51798	4.156959	12.51798
Mauritius	r = 0	59.94143	63.87610	24.61153	32.11832
	r ≤ 1	35.32990	42.91525	16.36951	25.82321
	r ≤ 2	18.96039	25.87211	11.66484	19.38704
	r ≤ 3	7.295551	12.51798	7.295551	12.51798
Morocco	r = 0	63.23497	63.87610	24.34674	32.11832
	r ≤ 1	38.88823	42.91525	15.83011	25.82321
	r ≤ 2	23.05812	25.87211	12.70953	19.38704
	r ≤ 3	10.34859	12.51798	10.34859	12.51798
Nigeria	r = 0	45.87935	47.85613	27.12919	27.58434
	r ≤ 1	18.75016	29.79707	10.51732	21.13162
	r ≤ 2	8.232839	15.49471	8.182826	14.26460
	r ≤ 3	0.050014	3.841466	0.050014	3.841466
Senegal	r = 0	63.36231	63.87610	28.82939	32.11832
	r ≤ 1	34.53292	42.91525	23.67405	25.82321
	r ≤ 2	10.85888	25.87211	8.296276	19.38704
	r ≤ 3	2.562603	12.51798	2.562603	12.51798
South Africa	r = 0	45.52800	55.24578	24.80908	30.81507
	r ≤ 1	20.71892	35.01090	11.07423	24.25202
	r ≤ 2	9.644687	18.39771	8.488288	17.14769
	r ≤ 3	1.156399	3.841466	1.156399	3.841466
Tanzania	r = 0	58.41846	63.87610	23.61440	32.11832
	r ≤ 1	34.80406	42.91525	19.16495	25.82321
	r ≤ 2	15.63911	25.87211	10.40892	19.38704
	r ≤ 3	5.230196	12.51798	5.230196	12.51798
Tunisia	r = 0	45.09283	55.24578	26.51428	30.81507
	r ≤ 1	18.57855	35.01090	12.19311	24.25202
	r ≤ 2	6.385442	18.39771	6.347210	17.14769
	r ≤ 3	0.038232	3.841466	0.038232	3.841466
Uganda	r = 0	38.99698	40.17493	19.10966	24.15921
	r ≤ 1	19.88732	24.27596	12.39117	17.79730
	r ≤ 2	7.496145	12.32090	6.507612	11.22480
	r ≤ 3	0.988533	4.129906	0.988533	4.129906
Zambia	r = 0	45.09036	47.85613	19.17656	27.58434
	r ≤ 1	25.91380	29.79707	15.00751	21.13162
	r ≤ 2	10.90629	15.49471	7.331922	14.26460
	r ≤ 3	3.574372	3.841466	3.574372	3.841466

Table 4
Unit root tests

Country	Tests		LREER	LGDP	CPI	TOT
Algeria	ADF	Levels	-0.36*	-0.43*	-1.09*	-1.63*
		1st Difference	-8.35**	-2.52*	-1.83*	-10.03**
	PP	Levels	-0.56*	-0.03*	-1.84*	-1.70*
		1st Difference	-8.46**	-8.30**	-7.41**	-10.51**
	KPSS	Levels	1.00#	1.13#	1.08#	0.77#
		1st Difference	0.12##	0.12##	0.25##	0.17##
Benin	ADF	Levels	-4.79**	-0.77*	-3.22**	-2.168*
		1st Difference	-12.08**	-2.91**	-8.50**	-9.14**
	PP	Levels	-4.88**	-0.80*	-3.34**	-1.84*
		1st Difference	-15.53**	-7.40**	-10.27**	-5.47**
	KPSS	Levels	0.13##	1.12#	0.17##	0.83#
		1st Difference	0.12##	0.10##	0.08##	0.24##
Botswana	ADF	Levels	-1.41*	-1.62*	-1.59*	-2.63*
		1st Difference	-8.35**	-5.01**	-6.07**	-6.19**
	PP	Levels	-1.35*	-1.20*	-2.80*	-2.08*
		1st Difference	-8.42**	-8.35**	-10.68**	-5.92**
	KPSS	Levels	1.10#	1.13#	0.47#	0.44##
		1st Difference	0.11##	0.20##	0.47#	0.10##
Cameroon	ADF	Levels	-1.61*	-.0.64*	-0.37*	-2.03*
		1st Difference	-10.66**	-3.61**	-6.95**	-4.23**
	PP	Levels	-1.53*	-1.97*	-0.82*	-2.16*
		1st Difference	10.66**	-7.75**	-6.94**	-4.95**
	KPSS	Levels	0.68#	1.12#	1.12#	0.25#
		1st Difference	0.07##	0.20##	0.08##	0.03##
Central Africa	ADF	Levels	-1.83*	-1.78*	-1.06*	-2.24*
		1st Difference	-11.28**	-4.68**	-6.83**	-5.08*
	PP	Levels	-1.77*	-2.35*	-0.83*	-2.51*
		1st Difference	-11.50**	-6.55**	-6.82**	-4.90**
	KPSS	Levels	-0.93#	1.22#	1.12#	0.34##
		1st Difference	0.10##	0.27##	0.06##	0.15##
Egypt	ADF	Levels	-0.38*	-1.03*	1.31*	-1.02*
		1st Difference	-5.02**	-3.05**	-6.68**	-2.91**
	PP	Levels	-0.65*	-1.30*	1.35*	-0.63*

		1st Difference	-9.45**	-10.30**	-6.79**	-6.29**
	KPSS	Levels	1.02#	1.14##	1.14#	0.99#
		1st Difference	0.09##	0.17#	0.35##	0.10##
Ethiopia	ADF	Levels	-3.74*	0.75*	0.17*	-1.93*
		1st Difference	-6.74**	-2.33*	-4.53**	-6.09**
	PP	Levels	-3.23**	0.75*	0.48*	-1.98*
		1st Difference	-7.90**	-7.60**	-7.37**	-4.57**
	KPSS	Levels	0.31##	1.15#	1.23#	0.90#
		1st Difference	0.30##	0.16##	0.14#	0.40##
Gabon	ADF	Levels	-1.17*	-0.48*	-1.59*	-1.65*
		1st Difference	-10.72**	-4.34**	-6.69**	-6.32**
	PP	Levels	-1.13*	-0.61*	-1.65*	-2.13*
		1st Difference	10.75**	-6.70**	-6.73	-4.91**
	KPSS	Levels	1.06#	1.19#	1.12#	0.27##
		1st Difference	0.07##	0.05	0.10##	0.14##
Ghana	ADF	Levels	-1.44*	-0.65*	3.41*	-1.71*
		1st Difference	-4.85**	-4.32**	-0.09*	5.20**
	PP	Levels	-1.26*	-0.64*	7.96*	-1.84*
		1st Difference	-6.08**	-5.52**	-5.42**	-5.89**
	KPSS	Levels	0.91#	0.96#	1.02#	0.62#
		1st Difference	0.12##	0.15#	1.00#	0.11##
Kenya	ADF	Levels	-1.78*	-1.51*	2.20*	-3.63**
		1st Difference	-6.78**	-4.76**	-6.92**	-15.98**
	PP	Levels	-1.78*	-1.23*	2.61*	-6.14**
		1st Difference	-6.40**	-8.51**	-7.12**	-20.11**
	KPSS	Levels	1.11#	1.14#	1.11#	0.08##
		1st Difference	0.25##	0.22##	0.63#	0.04##
Libya	ADF	Levels	-2.30*	1.43*	-1.67 *	-1.19*
		1st Difference	-8.16**	-1.85*	-2.05 *	-5.50**
	PP	Levels	-2.36 *	3.18*	-1.75 *	-2.10*
		1st Difference	-8.16 **	-6.69**	-7.70 **	-4.89**
	KPSS	Levels	0.40#	0.95#	0.97#	0.38##
		1st Difference	0.06##	0.93#	0.39##	0.28##
Malawi	ADF	Levels	-2.12*	0.28*	2.12*	-2.22*
		1st Difference	-7.46**	-3.85**	-0.83*	-15.56**
	PP	Levels	-1.67*	0.58*	5.73*	-7.98**
		1st Difference	-7.11**	-8.43**	-8.78**	-24.58**

	KPSS	Levels	1.08#	1.13#	1.02#	0.30##
		1st Difference	0.04##	0.23##	0.88##	0.24##
Mauritania	ADF	Levels	-3.98* *	-0.35*	2.09*	-0.92*
		1st Difference	-6.86**	-4.10**	-8.69**	-3.15**
	PP	Levels	-2.95**	-0.01*	1.98*	-1.17*
		1st Difference	-6.75**	-8.24**	-8.79**	-4.64**
	KPSS	Levels	0.24##	1.15#	1.20#	0.40##
		1st Difference	0.14##	0.06##	0.43##	0.40##
Mauritius	ADF	Levels	-2.65*	-2.30*	3.78*	-1.68*
		1st Difference	-7.11**	-1.23*	-7.70**	-8.02**
	PP	Levels	-2.76*	-2.26*	3.18*	-1.60*
		1st Difference	-7.79**	-10.30**	-8.02**	-8.06**
	KPSS	Levels	0.98#	1.14#	1.13#	1.21#
		1st Difference	0.29##	0.44##	0.77#	0.11##
Morocco	ADF	Levels	-2.92*	-1.26*	-2.46*	-5.63**
		1st Difference	-8.54**	-4.77**	-9.60**	-9.57**
	PP	Levels	-2.88*	-0.89*	-2.65*	-6.11**
		1st Difference	-8.70**	-9.67**	-9.64**	-21.27**
	KPSS	Levels	0.24#	0.31#	1.13#	0.29##
		1st Difference	0.19#	0.04##	0.57#	0.02##
Nigeria	ADF	Levels	-1.52*	0.23*	5.11*	-2.95**
		1st Difference	-7.65**	-3.18**	-1.35*	-16.98**
	PP	Levels	-1.57*	1.03*	5.22*	-5.33**
		1st Difference	-7.75**	-6.33**	-7.35**	-17.35**
	KPSS	Levels	0.69#	1.08##	1.12#	0.49#
		1st Difference	0.11##	0.42#	0.95##	0.03##
Senegal	ADF	Levels	-3.24*	-0.35*	-1.25*	-2.06*
		1st Difference	-7.98**	-3.79**	-8.54**	-2.51*
	PP	Levels	-2.85*	-1.01*	-1.22*	-1.84*
		1st Difference	-7.85**	-7.40**	-8.63**	-6.35**
	KPSS	Levels	0.69#	1.24#	1.18#	0.23##
		1st Difference	0.18##	0.10##	0.09##	0.05##
South Africa	ADF	Levels	-1.54*	-0.14*	1.27*	-2.46*
		1st Difference	-4.71**	-10.78**	-5.18**	-14.55**
	PP	Levels	-1.72*	-0.14*	2.24*	-4.39**
		1st Difference	-8.65**	10.78**	-4.88**	-15.21**
	KPSS	Levels	0.86#	0.31#	1.13#	0.67#
		1st Difference	0.06##	0.11##	0.67#	0.07##

Tanzania	ADF	Levels	-2.38*	-1.71*	-0.61*	-1.83*
		1st Difference	-8.53**	-3.30**	-1.57*	-10.13**
	PP	Levels	-2.38*	-1.31*	0.93*	-1.54*
		1st Difference	-9.33**	-8.31**	-10.19**	-14.98**
	KPSS	Levels	0.26#	1.19#	1.08#	1.01#
		1st Difference	0.11##	0.23##	0.40##	0.21##
Tunisia	ADF	Levels	-1.40*	-1.68*	-0.65*	-4.54**
		1st Difference	-7.97**	-4.0**	-4.83**	-17.94**
	PP	Levels	-1.30*	-2.19*	-0.56*	-8.24**
		1st Difference	-8.12**	-10.79**	-5.12**	-62.80**
	KPSS	Levels	0.88#	0.26#	1.19#	1.12#
		1st Difference	0.13##	0.12##	0.12##	0.05##
Uganda	ADF	Levels	-4.16**	-0.86*	0.80*	-2.64*
		1st Difference	-8.16**	-3.86**	-8.28**	-5.41**
	PP	Levels	-2.84*	-0.39*	0.57*	-2.32*
		1st Difference	-11.04**	-7.85**	-8.35**	-7.00**
	KPSS	Levels	0.97#	1.10#	1.11#	0.85#
		1st Difference	0.25##	0.10##	0.28##	0.08##
Zambia	ADF	Levels	-2.60**	-1.66*	0.49*	-1.20*
		1st Difference	-10.16**	-1.53*	-9.08**	-6.28**
	PP	Levels	-2.81*	-0.56*	0.39*	-1.81*
		1st Difference	-10.18**	-8.75**	-9.09**	-4.64**
	KPSS	Levels	0.18##	1.12#	1.15#	0.56#
		1st Difference	0.11##	0.20##	0.23##	0.19##

*****Failed to reject the null that the series has a unit root
**Reject the null that the series has a unit root
#Reject the null that the series is stationary
##Failed to reject the null that the series is stationary

Table 5: Variance Decompositions

Table 3: Algeria				
Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	97.28664	0.797833	0.364700	1.550828
8	97.21321	0.807646	0.395669	1.583478
10	97.20533	0.809627	0.401415	1.583623
20	97.19284	0.812729	0.409728	1.584704
30	97.19110	0.813173	0.410918	1.584813
40	97.19084	0.813223	0.411112	1.584830
50	97.19080	0.813232	0.411134	1.584832
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	6.354269	8.997332	84.64840	0.000000
4	13.08971	16.40562	64.82594	5.678733
8	11.72574	16.76687	65.18777	6.319625
10	11.57774	16.92427	65.02474	6.473252
20	11.45323	17.52139	64.31222	6.713161
30	11.41652	17.61031	64.25333	6.719840
40	11.40955	17.61082	64.25873	6.720896
50	11.40927	17.61214	64.25714	6.721450
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.109478	1.444139	14.72868	83.71770
4	0.739339	4.769921	12.37382	82.11692
8	1.033187	5.079099	14.06296	79.82476
10	1.085090	5.180278	14.48721	79.24743
20	1.192317	5.357887	15.19489	78.25491
30	1.208876	5.391010	15.26900	78.13111
40	1.210656	5.395138	15.28099	78.11322
50	1.210932	5.395597	15.28283	78.11064

Benin Republic				
Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	96.32460	1.573922	1.046551	1.054927
8	91.94986	5.123949	1.656566	1.269630
10	89.86213	6.876125	1.846021	1.415728
20	86.55170	8.346109	3.482637	1.619555
30	85.81333	8.634348	3.846303	1.706015
40	85.59694	8.699154	3.999327	1.704576
50	85.54872	8.721444	4.017462	1.712371
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	1.739428	1.893339	96.36723	0.000000
4	2.555423	3.359770	87.77987	6.304936
8	7.864970	6.644537	76.60051	8.889980
10	9.331961	17.31598	65.77024	7.581817
20	13.64594	19.08926	59.64731	7.617489
30	14.14161	20.19811	58.22377	7.436508
40	14.26324	20.15043	58.21056	7.375772
50	14.30938	20.22137	58.10163	7.367612
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	38.92062	0.736003	3.516401	56.82697
4	28.90622	2.103407	27.85161	41.13876
8	34.66039	3.462995	31.51349	30.36313
10	40.49239	5.737382	27.27896	26.49127
20	39.47080	11.69276	25.57708	23.25936
30	38.75921	11.84639	26.85447	22.53992
40	38.71786	12.16188	26.80660	22.31365
50	38.69003	12.20891	26.83997	22.26109

Botswana

Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	95.52104	1.551797	0.259461	2.667699
8	92.02192	2.261279	0.820250	4.896550
10	91.35020	2.707356	0.991663	4.950776
20	89.95192	2.734142	1.151196	6.162747
30	89.82453	2.776126	1.165675	6.233672
40	89.80921	2.780827	1.170943	6.239017
50	89.80541	2.781792	1.173039	6.239754
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	1.094973	10.35588	88.54915	0.000000
4	2.251558	15.08906	79.89720	2.762175
8	2.598632	19.67258	72.62298	5.105813
10	3.852915	20.22559	71.17481	4.746689
20	4.400839	21.32352	70.16780	4.107842
30	4.232414	21.68988	70.17574	3.901963
40	4.178519	21.80898	70.19763	3.814872
50	4.154927	21.85365	70.21309	3.778335
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	7.062090	0.048595	0.004527	92.88479
4	17.05583	2.282312	3.542252	77.11961
8	21.56740	4.238121	3.244396	70.95008
10	22.96667	4.089735	3.596308	69.34729
20	25.12412	5.290018	3.685747	65.90011
30	25.21446	5.379490	3.702600	65.70345
40	25.23519	5.396861	3.706078	65.66187
50	25.23860	5.399142	3.707035	65.65523

Cameroon				
Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	88.60049	1.854466	5.501279	4.043766
8	82.33575	2.830692	7.309758	7.523805
10	82.04262	2.961335	7.467037	7.529004
20	80.90224	3.319193	7.942828	7.835742
30	80.84357	3.357301	7.940062	7.859066
40	80.83607	3.362827	7.940365	7.860742
50	80.83541	3.363381	7.940400	7.860804
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.217199	1.368207	98.41459	0.000000
4	0.721120	0.782890	96.12491	2.371084
8	2.467619	1.113213	90.49644	5.922728
10	2.332568	1.177058	89.60106	6.889316
20	2.739571	1.064919	86.06007	10.13544
30	2.719144	1.060885	85.75458	10.46539
40	2.718807	1.056184	85.70815	10.51686
50	2.718651	1.055173	85.69708	10.52910
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	22.39360	0.319551	0.521426	76.76542
4	38.77529	3.269676	3.199840	54.75520
8	36.37116	5.325704	5.963072	52.34006
10	35.45538	5.797272	6.735712	52.01163
20	35.16233	7.094075	6.758152	50.98544
30	35.16005	7.154613	6.760270	50.92507
40	35.15816	7.162159	6.764820	50.91486
50	35.15762	7.163231	6.765200	50.91395

Central Africa Republic				
Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	37.60639	3.338303	54.35773	4.697583
8	37.04613	5.498705	52.18142	5.273749
10	36.91059	5.445681	51.93942	5.704315
20	33.82655	10.53093	47.16672	8.475799
30	33.76593	10.46096	46.99345	8.779666
40	33.72373	10.50138	46.96667	8.808223
50	33.70634	10.51974	46.96310	8.810815
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.025284	5.574632	94.40008	0.000000
4	9.841315	3.833714	85.20719	1.117785
8	9.760222	3.820503	83.52094	2.898336
10	10.89682	4.775180	80.56592	3.762077
20	9.970034	10.72500	72.46815	6.836812
30	9.897389	11.61063	71.13474	7.357241
40	9.908438	11.67647	71.00683	7.408268
50	9.906239	11.71706	70.94919	7.427510
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.739149	0.224537	0.017662	99.01865
4	6.914281	3.068684	23.39004	66.62700
8	18.63221	5.366447	23.30532	52.69603
10	18.56911	5.321081	23.83743	52.27237
20	19.73585	10.24799	22.70205	47.31411
30	19.75451	10.60561	22.67570	46.96418
40	19.78532	10.65655	22.70169	46.85644
50	19.77871	10.68786	22.72167	46.81176

Egypt				
Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	91.27300	4.856797	1.261480	2.608726
8	78.61830	10.57368	4.017915	6.790107
10	76.90518	11.94354	4.302358	6.848924
20	74.40557	11.54256	4.792131	9.259739
30	73.67342	11.52980	4.811106	9.985674
40	73.49509	11.55135	4.806624	10.14694
50	73.46552	11.55458	4.812711	10.16719
Variance Decomposition of DLGDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.007947	6.378985	93.61307	0.000000
4	0.803075	7.777247	86.30399	5.115692
8	2.153178	6.946223	79.54414	11.35646
10	3.501470	6.790720	78.79523	10.91258
20	3.626888	10.11778	76.43722	9.818112
30	3.776083	13.27440	74.25603	8.693490
40	3.802787	15.12580	73.01378	8.057637
50	3.798498	16.19890	72.30178	7.700821
Variance Decomposition of DCPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	2.055392	0.000819	0.230961	97.71283
4	7.777668	0.750380	5.258102	86.21385
8	9.506233	1.709034	8.061604	80.72313
10	9.578199	1.974086	10.62322	77.82450
20	9.278822	2.883574	13.15837	74.67923
30	9.262275	3.103663	13.17762	74.45645
40	9.258573	3.118066	13.18369	74.43967
50	9.257984	3.120486	13.18568	74.43585

Ethiopia				
Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	90.72339	2.430332	6.476697	0.369582
8	73.56950	6.500853	14.24782	5.681831
10	66.86481	9.849907	16.37216	6.913114
20	63.42797	10.36130	19.08544	7.125297
30	61.86179	10.75576	19.79349	7.588963
40	61.74807	10.79444	19.78149	7.676006
50	61.64992	10.81233	19.83964	7.698106
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	1.584905	0.272827	98.14227	0.000000
4	3.882715	2.120082	88.64589	5.351318
8	5.426538	24.34764	61.41236	8.813461
10	4.911596	21.84574	62.83652	10.40614
20	6.908812	27.54318	54.99244	10.55557
30	7.737742	28.50507	53.49383	10.26336
40	7.747022	28.71930	53.38782	10.14586
50	7.766934	28.77887	53.36220	10.09200
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	1.839677	0.014351	1.191498	96.95447
4	8.012415	9.464223	2.818773	79.70459
8	11.47810	11.19487	5.660185	71.66684
10	11.23396	12.54172	5.792430	70.43189
20	11.15023	15.03479	10.70519	63.10979
30	11.32043	15.60751	12.09765	60.97441
40	11.11740	16.37287	13.22994	59.27979
50	11.09311	16.67914	13.85998	58.36778

Gabon Variance Decomposition of Real Exchange Rate:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	64.47115	1.053643	23.25839	11.21681
8	62.63301	1.040262	22.98469	13.34204
10	62.43937	1.802184	22.57552	13.18293
20	61.72893	2.722630	22.40430	13.14414
30	61.67855	2.786471	22.39177	13.14320
40	61.67459	2.791329	22.39086	13.14322
50	61.67433	2.791651	22.39082	13.14320
Variance Decomposition of GDP:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.099806	11.62188	88.27831	0.000000
4	5.098314	15.29000	73.00369	6.607996
8	4.110778	33.41483	50.11268	12.36170
10	4.399077	34.35459	48.54580	12.70054
20	6.703004	35.61237	44.16460	13.52003
30	6.720433	35.87511	43.91082	13.49363
40	6.721048	35.90046	43.88732	13.49118
50	6.721173	35.90137	43.88624	13.49122
Variance Decomposition of CPI:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.046655	1.978621	0.563083	97.41164
4	18.04270	1.481911	24.22679	56.24860
8	19.83959	3.222647	25.85975	51.07801
10	19.57513	3.247171	26.74598	50.43172
20	19.08769	6.066989	25.79449	49.05083
30	19.05636	6.253820	25.74330	48.94652
40	19.05488	6.259466	25.74331	48.94235
50	19.05484	6.259900	25.74315	48.94212

Ghana Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
8	65.54059	28.57235	2.170674	3.716388
10	64.29638	29.51634	2.129985	4.057299
20	61.83796	29.60730	2.742860	5.811880
30	61.17260	29.40154	2.967587	6.458266
40	60.95195	29.32045	3.020260	6.707337
50	60.86799	29.29024	3.038328	6.803442
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.760164	0.000582	99.23925	0.000000
4	4.521115	0.370665	94.96454	0.143681
8	4.855466	0.947864	92.06569	2.130980
10	4.610828	1.109234	89.69734	4.582602
20	4.709924	1.467699	87.03314	6.789238
30	4.636198	1.527947	85.94842	7.887431
40	4.609947	1.547979	85.57411	8.267960
50	4.594478	1.561491	85.33802	8.506014
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.713019	0.515945	1.275798	97.49524
4	0.877992	5.017067	9.240761	84.86418
8	0.755542	6.231538	14.26523	78.74769
10	0.788604	6.485545	14.64615	78.07970
20	0.913710	6.230627	16.36872	76.48694
30	0.913727	6.201335	16.83188	76.05306
40	0.916102	6.172475	17.22565	75.68578
50	0.914469	6.157960	17.36998	75.55759

Kenya Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	77.03741	18.57834	1.865012	2.519244
8	72.29450	20.14823	5.083883	2.473396
10	70.57973	20.15602	5.394080	3.870178
20	66.01005	22.04058	6.722898	5.226471
30	65.06116	22.07803	6.756025	6.104788
40	64.75506	22.15275	6.848097	6.244095
50	64.65201	22.17654	6.851223	6.320232
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.397377	8.342729	91.25989	0.000000
4	3.086500	6.786779	89.74182	0.384904
8	7.852383	8.921366	72.33219	10.89406
10	9.792297	8.441073	70.72522	11.04141
20	11.74828	12.41589	64.86034	10.97550
30	11.63759	11.81075	63.24876	13.30290
40	11.46950	10.89175	62.04913	15.58962
50	11.52831	10.24432	60.50367	17.72370
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	3.154233	0.302610	0.173945	96.36921
4	8.258931	11.70759	0.270721	79.76276
8	11.19503	17.68099	0.793859	70.33012
10	10.69655	18.27429	1.701341	69.32782
20	11.06733	16.47223	6.972080	65.48836
30	11.81244	16.62049	9.424918	62.14216
40	12.01202	16.67606	10.77718	60.53474
50	11.96433	16.44470	11.91229	59.67868

Libya Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	96.18420	0.872295	1.855967	1.087535
8	95.31696	1.138076	2.232252	1.312712
10	95.23534	1.147112	2.271403	1.346149
20	95.13278	1.153208	2.323356	1.390654
30	95.13089	1.153305	2.324087	1.391720
40	95.13084	1.153306	2.324104	1.391746
50	95.13084	1.153306	2.324104	1.391747
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	3.842040	17.61224	78.54572	0.000000
4	8.503040	16.78508	74.08389	0.627992
8	8.603707	16.00222	73.30897	2.085105
10	8.562387	15.84092	73.28617	2.310526
20	8.527706	15.70102	73.05298	2.718290
30	8.527036	15.69895	73.04644	2.727573
40	8.527024	15.69892	73.04632	2.727737
50	8.527024	15.69891	73.04632	2.727741
Variance Decomposition of CPI Due to:				
Period	DRER	DLTOT	DLGDP	DCPI
1	2.949439	0.204103	10.87676	85.96970
4	2.514833	0.286852	11.79294	85.40538
8	2.416718	0.389089	12.83138	84.36281
10	2.406874	0.464766	12.93702	84.19134
20	2.404392	0.517404	13.08879	83.98941
30	2.404775	0.517675	13.09266	83.98489
40	2.404784	0.517687	13.09272	83.98480
50	2.404785	0.517687	13.09273	83.98480

Malawi Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	84.00941	5.040266	9.471414	1.478912
8	83.37425	5.198734	9.891312	1.535706
10	83.32429	5.215047	9.919009	1.541649
20	83.25899	5.236489	9.959228	1.545293
30	83.25363	5.238425	9.962543	1.545400
40	83.25321	5.238593	9.962784	1.545409
50	83.25318	5.238607	9.962802	1.545409
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.842883	0.197524	98.95959	0.000000
4	1.389330	14.65747	82.36902	1.584181
8	1.900912	19.62496	76.48361	1.990511
10	2.005868	20.58482	75.34460	2.064713
20	2.146723	21.84673	73.85025	2.156295
30	2.158510	21.95135	73.72649	2.163645
40	2.159489	21.95997	73.71623	2.164318
50	2.159566	21.96063	73.71543	2.164378
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.202790	0.349705	10.46775	88.97975
4	1.056115	0.984988	10.32874	87.63016
8	1.089171	1.808238	13.53110	83.57149
10	1.125320	2.232654	14.59075	82.05127
20	1.190932	3.034761	16.02426	79.75005
30	1.196785	3.109251	16.11654	79.57742
40	1.197286	3.115513	16.12315	79.56405
50	1.197329	3.116037	16.12364	79.56300

Mauritania Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	81.91289	14.10029	1.006529	2.980298
8	64.76249	22.48525	3.771047	8.981216
10	62.51433	24.63500	3.948274	8.902393
20	59.97415	22.71057	5.346065	11.96921
30	59.20315	22.14037	5.169904	13.48658
40	58.97391	21.78989	5.105691	14.13051
50	58.86573	21.79489	5.084628	14.25475
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	19.03708	0.226095	80.73682	0.000000
4	17.61894	1.028327	81.23739	0.115334
8	17.11979	0.964328	81.73374	0.182145
10	16.41204	4.508354	77.60499	1.474618
20	14.46458	7.646357	74.16521	3.723850
30	13.74104	9.459879	72.37092	4.428162
40	13.17381	10.75949	71.40958	4.657121
50	12.81428	11.44313	70.97925	4.763347
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	1.059418	6.319700	6.592618	86.02826
4	2.605670	6.458878	17.20612	73.72933
8	11.07167	13.46655	16.27526	59.18652
10	10.68879	17.85657	16.62100	54.83364
20	11.47820	20.34605	16.20201	51.97374
30	11.59585	20.94396	16.36940	51.09080
40	11.69206	20.94882	16.49336	50.86576
50	11.78571	20.89345	16.58451	50.73634

Mauritius Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	78.81207	5.718136	8.336412	7.133381
8	76.47762	6.140428	8.965594	8.416360
10	75.72225	6.455529	9.112285	8.709935
20	73.33156	7.217454	9.612272	9.838715
30	72.99162	7.342560	9.658424	10.00739
40	72.92601	7.379627	9.681673	10.01269
50	72.90943	7.385582	9.690604	10.01438
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	2.785576	0.006961	97.20746	0.000000
4	7.464378	0.741873	88.71519	3.078556
8	6.353465	4.911725	80.14474	8.590073
10	5.261468	10.58403	76.16990	7.984608
20	6.923867	21.89205	64.32227	6.861814
30	7.769577	26.31557	60.22033	5.694520
40	8.245875	28.25898	58.47179	5.023349
50	8.500015	29.35960	57.56358	4.576803
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.052137	0.006394	0.570024	99.37145
4	1.445916	2.657529	1.043133	94.85342
8	3.886083	5.109632	4.144416	86.85987
10	4.161167	7.023284	6.293967	82.52158
20	4.980518	7.279075	6.488866	81.25154
30	5.173619	7.356022	6.761092	80.70927
40	5.183743	7.358887	6.795574	80.66180
50	5.185357	7.369991	6.815870	80.62878

Morocco Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	89.88752	2.027040	5.840054	2.245382
8	73.65133	13.31636	7.795852	5.236457
10	73.13469	13.77614	7.896163	5.193010
20	70.55113	14.30939	9.615263	5.524216
30	70.01273	14.54128	9.870701	5.575284
40	69.82194	14.59646	10.00806	5.573538
50	69.71596	14.63148	10.07622	5.576335
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.013851	5.676266	94.30988	0.000000
4	7.467295	5.891908	73.41732	13.22347
8	12.69290	11.87517	59.20884	16.22309
10	16.36385	10.10566	59.03480	14.49569
20	16.26485	14.18470	54.21554	15.33491
30	16.21585	16.04920	53.19319	14.54176
40	16.18113	17.15453	52.65087	14.01348
50	16.19405	17.75861	52.40420	13.64315
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	12.27767	0.785379	2.356553	84.58039
4	12.48526	3.053229	3.554231	80.90728
8	19.68023	8.874427	4.050040	67.39530
10	18.80666	8.492588	5.536424	67.16432
20	18.25989	9.447708	6.778172	65.51423
30	18.08371	9.932847	7.166703	64.81674
40	18.05779	10.05899	7.319348	64.56388
50	18.03853	10.13157	7.436092	64.39381

Nigeria Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	96.24654	1.845517	0.179879	1.728064
8	94.75647	2.617144	0.255959	2.370429
10	94.38393	2.703214	0.449134	2.463722
20	92.21470	2.954849	2.200449	2.629998
30	89.67008	3.200962	4.354850	2.774112
40	86.74919	3.482889	6.828957	2.938968
50	83.44639	3.801670	9.626573	3.125368
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.375767	2.540020	93.42095	3.663260
4	2.056274	11.87896	74.95933	11.10545
8	7.511570	12.33241	69.58134	10.57467
10	10.13476	11.98382	67.98452	9.896900
20	16.02315	10.79570	65.10554	8.075614
30	17.92699	10.40845	64.17545	7.489114
40	18.83340	10.22419	63.73224	7.210165
50	19.35353	10.11846	63.47790	7.050107
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.682588	2.796705	0.000000	96.52071
4	1.381694	6.771833	5.284040	86.56243
8	1.806455	7.188499	6.363568	84.64148
10	2.046368	7.234131	7.063208	83.65629
20	2.914022	7.345897	9.678147	80.06193
30	3.899259	7.486668	12.64496	75.96911
40	4.980907	7.641234	15.90282	71.47504
50	6.144147	7.807441	19.40650	66.64191

Table 20: Senegal Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	89.74947	2.062486	1.347843	6.840205
8	83.03678	4.688715	4.139077	8.135429
10	80.96664	6.496799	4.244372	8.292191
20	79.97291	6.543341	4.321795	9.161950
30	79.54535	6.686275	4.457258	9.311115
40	79.43858	6.714896	4.478601	9.367922
50	79.40703	6.721364	4.488593	9.383017
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.360997	16.51283	83.12618	0.000000
4	0.423541	9.381501	77.94832	12.24663
8	1.950308	10.00752	74.64741	13.39477
10	2.792799	15.70256	67.52587	13.97877
20	4.767760	15.96985	61.28226	17.98013
30	4.967448	16.03442	60.26131	18.73682
40	5.046939	16.07593	59.88029	18.99685
50	5.073425	16.09928	59.73625	19.09104
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.810586	0.458113	2.892828	95.83847
4	1.010157	20.42870	20.38564	58.17550
8	1.471372	19.01556	26.48867	53.02440
10	3.388094	17.78588	32.53864	46.28738
20	4.787517	17.79472	33.61887	43.79889
30	5.030464	17.97049	33.80884	43.19021
40	5.098904	18.05084	33.81078	43.03948
50	5.117387	18.06828	33.82310	42.99123

South Africa Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	83.10928	3.108493	6.290509	7.491716
8	74.56394	2.626303	14.79896	8.010796
10	71.68799	2.801119	17.89870	7.612184
20	63.86107	7.540693	16.98433	11.61391
30	63.07579	8.160213	16.89417	11.86983
40	63.01314	8.186714	16.88820	11.91194
50	62.99086	8.190849	16.89287	11.92543
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	1.384214	0.581587	98.03420	0.000000
4	4.860997	10.52611	73.38167	11.23122
8	6.369397	14.88609	60.54288	18.20163
10	7.243760	19.04521	55.94458	17.76644
20	12.18674	16.19072	48.89775	22.72479
30	12.21821	16.23768	47.99616	23.54795
40	12.40086	16.13429	47.80214	23.66272
50	12.41062	16.12799	47.79587	23.66552
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	2.558224	4.188721	1.091506	92.16155
4	22.49738	6.918196	3.082328	67.50209
8	22.62847	9.792462	3.991608	63.58746
10	21.12740	9.721376	3.746030	65.40519
20	20.43464	10.92627	3.778420	64.86067
30	20.46643	10.93460	3.897124	64.70185
40	20.46369	10.92938	3.906844	64.70009
50	20.45777	10.93033	3.911469	64.70043

Tanzania Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	92.34459	4.429007	1.659845	1.566560
8	84.25355	9.178035	1.900782	4.667636
10	82.76620	10.50011	1.930049	4.803646
20	80.65997	10.81428	1.956110	6.569641
30	79.97176	10.76676	1.992326	7.269154
40	79.62690	10.77012	2.065242	7.537735
50	79.45400	10.76383	2.132251	7.649920
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.701687	0.073947	99.22437	0.000000
4	30.65154	0.854224	68.43355	0.060689
8	23.75254	15.45729	60.29272	0.497448
10	20.73486	15.78018	63.04696	0.437993
20	24.48068	16.43422	58.01284	1.072249
30	25.07930	16.51392	57.07967	1.327115
40	25.12114	16.58494	56.65720	1.636718
50	25.17253	16.62764	56.41038	1.789450
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.394087	1.758916	0.118093	97.72890
4	4.461276	2.088919	0.248057	93.20175
8	4.951937	2.290095	0.167166	92.59080
10	4.696908	2.390998	0.312844	92.59925
20	6.751651	2.701677	1.500996	89.04568
30	7.963126	3.211742	3.788989	85.03614
40	9.480882	3.601426	5.921576	80.99612
50	10.32727	4.041825	7.843725	77.78718

Tunisia Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	57.04921	21.71894	16.68901	4.542845
4	60.74540	17.56348	16.43452	5.256607
8	54.20035	23.36257	15.67402	6.763062
10	53.42952	23.03989	16.26038	7.270222
20	52.38315	22.46398	17.48033	7.672542
30	51.45800	22.50991	18.25206	7.780032
40	51.32832	22.47574	18.40458	7.791359
50	51.26696	22.47986	18.46515	7.788041
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	10.90798	11.48778	64.32302	13.28121
4	10.40944	25.06343	58.22823	6.298911
8	16.10893	23.88355	42.21584	17.79169
10	16.57880	23.98822	41.65438	17.77861
20	13.57795	28.16824	44.46550	13.78830
30	12.11690	29.99803	45.83244	12.05263
40	11.29188	31.07519	46.64254	10.99040
50	10.71529	31.77056	47.24198	10.27217
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	18.91117	11.63444	0.845592	68.60879
4	21.71632	11.71764	3.561718	63.00432
8	23.40039	11.73820	9.063048	55.79836
10	25.42566	11.50529	9.428952	53.64009
20	25.18099	11.94187	12.80263	50.07450
30	24.91318	11.86704	14.23651	48.98327
40	24.74705	12.11882	14.69166	48.44247
50	24.64696	12.25978	14.91151	48.18175

Uganda Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	74.15029	6.503103	15.76132	3.585279
4	60.85048	14.51078	19.32825	5.310491
8	57.47142	18.11182	18.65861	5.758161
10	55.99766	18.43525	19.76745	5.799640
20	55.15557	18.59454	20.44042	5.809471
30	54.78687	18.50217	20.88987	5.821090
40	54.57822	18.45495	21.13958	5.827254
50	54.45431	18.42771	21.28747	5.830519
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	5.076304	10.24225	69.40287	15.27858
4	11.04140	11.47388	63.22814	14.25658
8	12.52700	8.888121	66.72067	11.86421
10	12.98712	8.970656	66.93482	11.10740
20	11.91590	8.937859	68.87884	10.26741
30	11.55550	8.878530	69.71812	9.847850
40	11.37517	8.843279	70.13576	9.645789
50	11.27899	8.824926	70.35964	9.536448
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	2.164416	0.139513	8.231069	89.46500
4	2.938237	6.092978	10.12652	80.84226
8	2.977164	6.513707	10.53204	79.97709
10	2.997839	6.543216	10.54146	79.91749
20	3.045163	6.608755	10.61728	79.72880
30	3.049572	6.610726	10.65364	79.68606
40	3.051690	6.611194	10.67687	79.66024
50	3.052951	6.611547	10.69090	79.64460

Zambia Variance Decomposition of Real Exchange Rate Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	100.0000	0.000000	0.000000	0.000000
4	92.71119	0.084275	6.599926	0.604612
8	85.92260	5.522881	7.083736	1.470786
10	84.70833	6.411873	7.339471	1.540324
20	80.84866	7.310043	10.24703	1.594271
30	79.14609	7.377717	11.87720	1.599002
40	78.03843	7.383017	12.97780	1.600751
50	77.30868	7.392418	13.69412	1.604784
Variance Decomposition of GDP Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	1.316497	4.808749	93.87475	0.000000
4	12.72626	11.36382	75.80843	0.101489
8	8.441405	13.61227	77.13613	0.810199
10	7.219687	12.96731	79.14356	0.669441
20	6.440370	11.82246	80.70698	1.030188
30	5.930445	11.39061	81.53027	1.148671
40	5.776756	11.10128	81.87434	1.247625
50	5.658748	10.92780	82.12749	1.285960
Variance Decomposition of CPI Due to:				
Period	Demand Shock	Terms of Trade Shock	Supply Shock	Nominal Shock
1	0.120294	0.230905	0.013689	99.63511
4	0.593698	1.304436	0.051531	98.05033
8	1.037184	4.051386	0.470678	94.44075
10	1.285134	4.486594	0.513617	93.71465
20	1.336246	5.228048	0.617445	92.81826
30	1.340509	5.253558	0.690537	92.71540
40	1.341361	5.258108	0.715490	92.68504
50	1.341766	5.259559	0.735797	92.66288