Current Account and Real Exchange Rate Dynamics in the Caribbean and Latin America compared to the G7 countries

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Abstract

This paper analyses the interaction between the real exchange rate and the current account in Jamaica and four Latin American Countries; Brazil, Chile, Costa Rica and Mexico using structural Vector Auto Regressive VAR's technique proposed by Lee and Chinn (2006). Similarly, we assume minimal criterion for identification that temporary shocks have no effect on the real exchange rate in the long run by implementing the long run Blanchard and Quah (1989) restrictions. This allows us to disaggregate the shocks in terms of temporary shocks which are interpreted as monetary shocks and permanent shocks which are interpreted as productivity shocks. Using Quarterly data from 2005Q1 Temporary monetary shocks play a bigger role in explaining variation in the real exchange for Brazil while permanent productivity shock play a bigger role in explaining variation in the real exchange rate for Chile, Costa Rica, Jamaica and Mexico. The later is similar to the results found in Lee and Chinn (2006) for the G7 countries where permanent shocks have a large long run effect on the exchange rate but relatively small effect on the current account, while temporary shocks have large effects on the current account and the exchange rate in the short run but not in the long run. Here too temporary shocks play a bigger role in explaining current account movement in Costa Rica, Chile, Jamaica and Mexico but not Brazil. Our results are consistent with the results Lee and Chinn (2006) and the sticky price model of Obsfeld and Roggoff (1995) where Permanent shocks to productivity have a small effect on current account and a real long term effect the exchange rate, while monetary shocks have a large effect on the current account in the short run, but no effect in the long run.

Key Words: real effective exchange rate, current account, VAR, Temporary and Permanent shocks
Jel Classification: F12, F31, F32, F41

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1. Introduction

The dynamics of real exchange rate and current account movement remains relevant for countries to understand the interaction between policy, international trade and aggregate output. In theory the sticky price model of Obsfeld and Roggoff (1995) indicates that permanent shocks to productivity should have a small effect on current account but a real long term effect the exchange rate, while temporary monetary shocks should have a large effect on the current account in the short run, but no effect in the long run. A permanent shock interpreted as technological advancement should induce a permanent appreciation of the real exchange rate. While a temporary shock interpreted as a monetary innovation should induce a temporary depreciation of the real exchange rate and an improvement of the current account. Empirical research on the issue is mainly concentrated on the G7 and Asian countries see for example, Lee and Chin (2006) and Affandi and Mochtar (2013). Little research has been done in the Caribbean and Latin America, who also need an understanding of the interrelationship between these variables.

The relationship between current account and the exchange rate must be investigated thoroughly. Especially since some countries, Jamaica for example, has recently entered a new Extended Fund Facility (EFF) arrangement with the International Monetary Fund IMF. Recommendations here imply that Jamaica can improve competitiveness by facilitating a depreciation of the exchange rate relative to the bench mark US dollar. Previous work on the issue in Jamaica by Franklin (2010) was completed before the signing of the new IMF agreement in 2011. A more up to date analysis is therefore required to incorporate any policy adjustment emanating from such agreements. Figure 2 below show current account balance for Brazil, Chile, Costa Rica, Jamaica and Mexico. Here we observe that the current account balance display some amount of variation. Over the last five years there is a trend of a constant decline in the current account balance for all five countries.

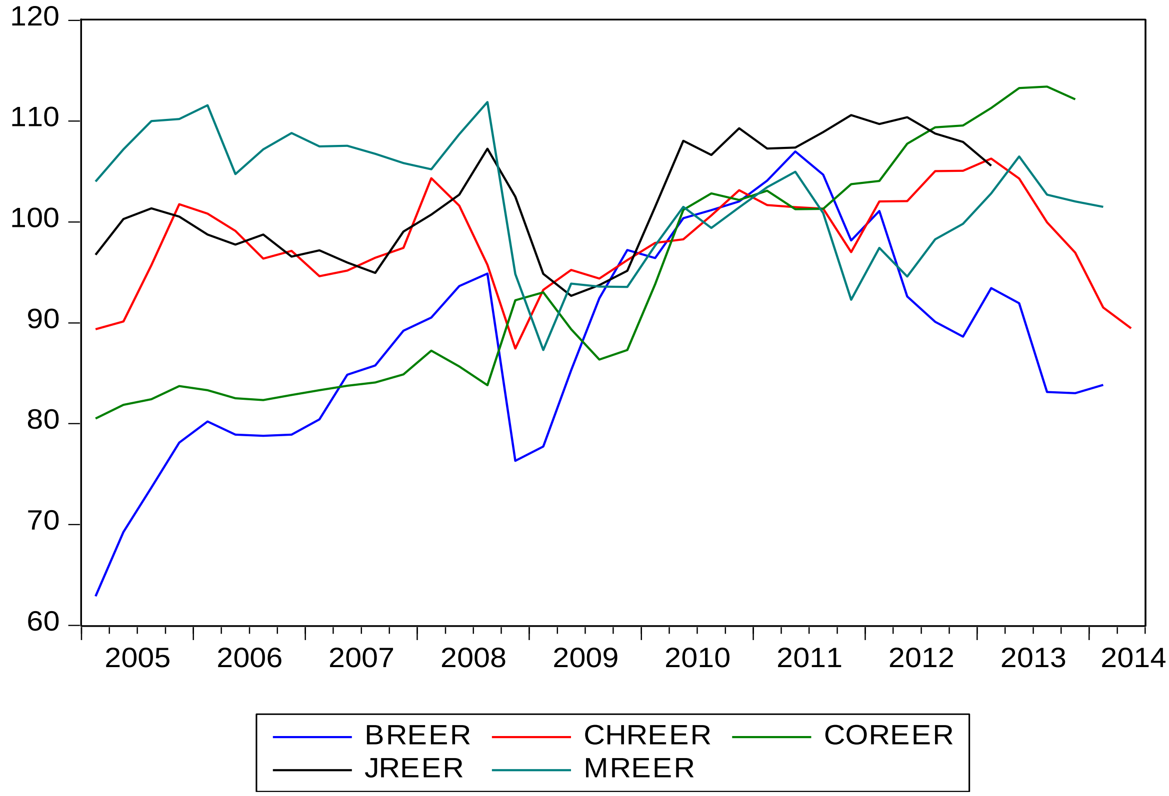


Figure 1: real effective exchange rate for Brazil, Chile, Costa Rica Jamaica and Mexico.

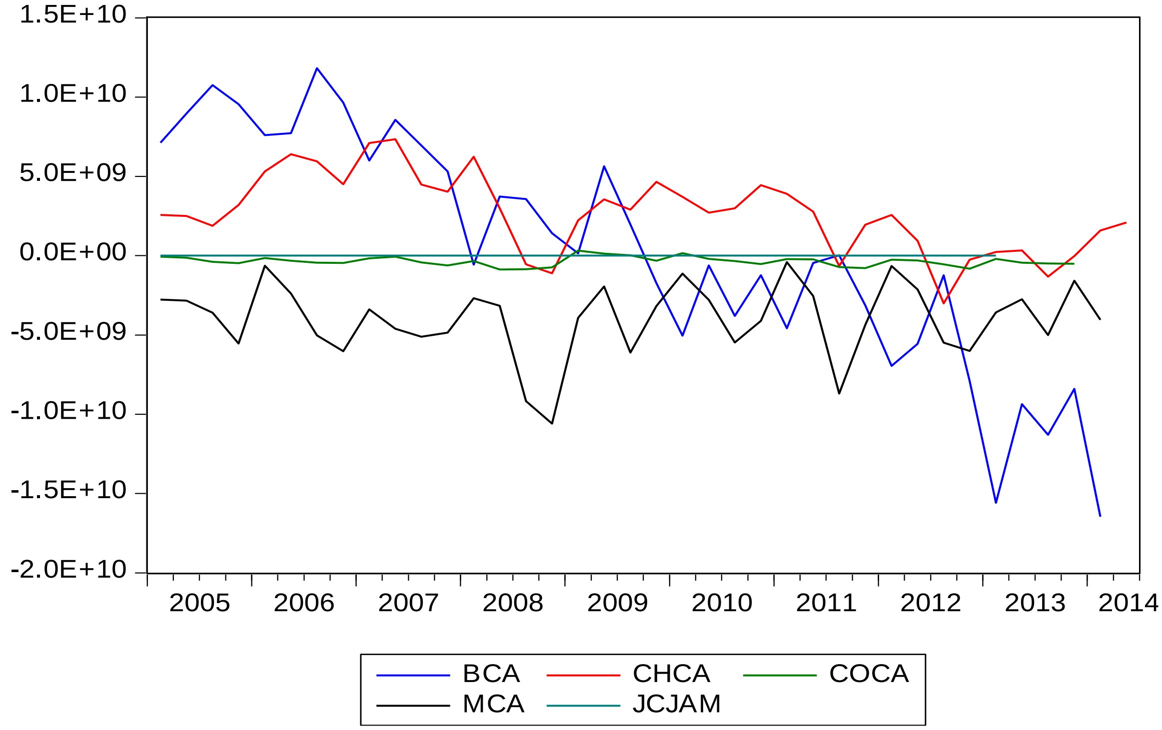


Figure 2: Current account balance for Brazil, Chile Costa Rica, Jamaica and Mexico.

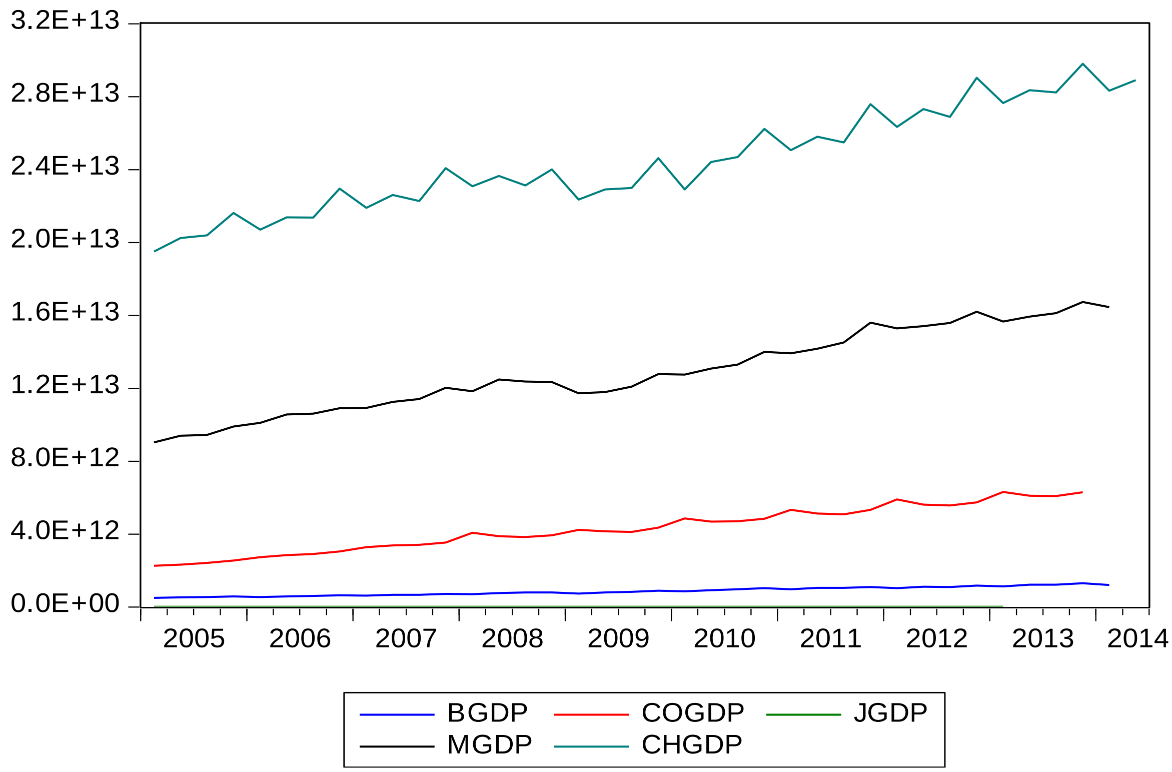


Figure 3: Real GDP for Brazil, Jamaica, Chile Costa Rica and Mexico

Jamaica's high propensity to consume foreign goods and services, with little to supply to the rest of the world resulting in continuous negative current account balances, see Figure 2 Above. The usual policy recommendation to correct a weak current account position is to allow the exchange rate to depreciate to increase a country's competitiveness. Such that the country's exports appear cheaper to foreigners and imports appear more expensive. The increase in external prices should reduce the country's demand for foreign currency given that the demand for goods with higher price will fall while at the same time exports should increase as Jamaica's goods and services are cheaper to the rest of the world. This should gradually eliminate any discrepancy between a country's imports and exports arising from a current account deficit.

This approach might present some problems if a country has inelastic demand for imports; (oil etc), if the country has high volume of imported inputs in its production process or if a country has high volume of debt denominated in foreign currency. In this case the price of domestic goods is a direct function of the exchange rate depreciation. The cost of the finished goods increase as the exchange rate depreciates mitigating any favourable price advantage it might have received from a fall in its exchange rate. Figure 1 above shows how the real effective exchange rate for Brazil, Costa Rica, Chile Jamaica and Mexico has changed overtime. Notice they all remain relatively stable jut up to the financial crisis where there is a significant decline in the reer for all five countries. After which they revert to increasing up to 2011.

Our objective is to analyse the interrelationship between the real exchange rate and current account in Jamaica and four Latin American Countries Brazil, Chile, Costa Rica and Mexico in a structural VAR framework. The research employs the methodology proposed by Lee and Chinn (2006) who examined the same issue for G7 countries. We identify our model by imposing the

Blanchard and Quah (1989) long run restriction that temporary shocks have no long run impact on the real exchange rate, consistent with the open economy macroeconomic models of Obstfeld and Rogoff (1995)and the intertemporal approach to the current account. Additionally, we assume that global shocks have no effect on the current account and the exchange rate. Country specific shocks however can impact both variables.

The rest of the paper is organised as follows; section 2 reviews the literature, section 3 outline the model and data employed, section provide the results from the impulse response functions and variance decomposition, while section 5 concludes. All remaining graphs and tables are provided in the appendix that follows.

2. Literature Review:

The literature proposes several different methods of analyzing the current account and real exchange rate phenomenon. Traditionally, the analysis of current account and real exchange rate has been carried out on largely separate tangents. Edison and Pauls (1993) in their assessment of the relationship between real exchange rate and real interest rate posits that real exchange rate relies upon either interest rate and purchasing power parity conditions or, as proposed by De Gregorio and Wolf (1994) and Chinn (1999), trends in productivity. Meanwhile, in terms of an intertemporal framework, econometric analysis of the current account has often been understood in terms of a composite good world (Sheffrin and Woo, 1990).

Franklin (2010) examined the issue for Jamaica using quarterly data from 1997 to 2009. The results of the paper shows that permanent shocks are marginally more effective than temporary shocks in explaining exchange rate and current account movement. Unit root tests employed in

Franklin (2010) found the reer to be stationary while current account to GDP ratio is nonstationary, contrary to the existing literature where the reer is nonstationary and the current account to GDP ratio is stationary. In such a case it is quite easy to misinterpret the VAR output and the shocks correspondingly. Our research is in keeping with the existing literature as we find the reer to be nonstationary and the current account to GDP is stationary in the case of Jamaica. By so doing we can better identify and distinguish permanent shocks to productivity an temporary monetary shocks. This will facilitate comparisons with the results of Lee and Chinn (2006) for the G7 countries without loss of generality or misunderstanding of the shocks to be identified from the model.

Several studies (Lee and Chinn (1998, 2006); Affandi and Mochtar (2013), et alia) decompose the current account and the real exchange rate into temporary and permanent shocks and argue that a temporary shock creates the combination of a current account surplus (deficit) and real exchange rate depreciation (appreciation). According to Affandi and Mochtar (2013), permanent factors are those that structurally affect current accounts in the long run such as supply side, productivity, as well as changes in preference. They define temporary factors on the other hand, as those that account affect current account only in the short run such as nominal variables (price, money supply, nominal exchange rate).

Lee and Chinn (1998) in their study on The Current Account and The Real Exchange Rate developed their methodology through the IS-LM model. Through this framework Lee and Chinn (1998) showed that under flexible prices, the neutrality of normal shocks will hold on real exchange rate in the long run. Consequently contribution of nominal shocks in explaining current account is abolished in the long run. On the other hand according to Affandi and Mochtar (2013), in the short run where the price is not flexible, their results show that money supply increases will depreciate the currency and increases in nominal shocks will revamp the current account.

Lee and Chinn (2006) make two assumptions in their analysis. First they assume that temporary shocks have no long run effect on the real exchange rate. This assumption is consistent not only with earlier intertemporal models (such as Obstfeld and Rogoff (1995) who hold real exchange rate constant in their model using the assumption of purchasing power parity of the current account) but also with recent intertemporal models of open economy (such as Betts and Devereux (2000) and Chari et al. (2002) where monetary shocks induce short-run fluctuations in the real exchange rate, via the pricing-to-market effect; however, such effects dissipate in the long run). Second, they make the assumption that global shocks have no effects on either of these variables; only country-specific ones have an effect. Both assumptions made are consistent with a broad spectrum of open-macro models.

Lee and Chinn (2006) examine the exchange rate and current account dynamics of the US, Canada, the UK, Japan, Germany, France, and Italy using the Structural Vector Autoregressive (VAR) method of estimation over the period 1979/1980 to 2000[2]. For real exchange rate, they employed the CPI-deflated real exchange rate series which is a multilateral, trade-weighted index, available at the monthly or quarterly frequency.

Under the minimal identifying assumptions that apply to most intertemporal open-macro models, Lee and Chinn (2006) results are concurrent with the literature. From their analysis they found that, with the exception of the US, temporary shocks play a larger role in explaining the variation in the current account, while permanent shocks play a larger role in explaining the variation in the real exchange rate.

Also they found that, temporary shocks depreciate the real exchange rate and improve the current account balance. Permanent shocks appreciate the real exchange rate and, in some countries,

[2] This was because real exchange rate data are only available for the period after 1979 or 1980

improve the current account balance in contradiction to many extant models (with the exception of the UK). Lee and Chinn went on to further state that while their results lend support to two-sector models, the empirical and theoretical analysis of this approach is left for future research.

Shibamoto and Kitano (2012) in their analysis of Structural Change in Current Account and Real Exchange Rate Dynamics assess the issue in the G7 countries extends the framework of previous literature that isolate temporary and permanent shock by examining a possible structural break in current account and real exchange rate dynamics. Their analysis uses the G7 country over the period, 1980–2007. From their analysis they found structural changes in two-variable dynamics for all G7 countries during the 1990s. Their results showed that temporary shocks have not been the main source of fluctuation in the current account since the 1990s and imply that the conventional mechanism has played a limited role in explaining the dynamics of the two variables.

Affandi and Mochtar (2013) investigated the relationship between structural changes in Indonesia and shifts in current account patterns in the periods before and after the Asian crisis. They adopted the approach of Lee and Chinn (1998, 2006) that was based on the frame work of Clarida and Gali (1994) with two variables namely the current account and the real exchange rate that are approximated by permanent and temporary variables and shocks at each variable were classified as real and nominal shocks respectively.

Affandi and Mochtar (2013) estimated a bivariate VAR of real exchange rate and ratio of current account to GDP by imposing long run Blanchard – Quah (1989) restrictions to distinguish nominal and real shocks. They estimated the relationship using data from 1990: 01 to 2012:02 capturing the impact of structural changes by first empirically testing sample from 1990 to 2012 after which they divided the sample into two sub samples covering pre 2000 (1990 – 1999) and post 2000 (2000 – 2012). This was similar to the approach of Shibamoto and Kitano (2012). Their results were concurrent with the those of Lee and Chinn (1998, 2006) and Chinn et al (2007) showing that permanent shocks (as a reflection of real or productivity shocks) create current account surplus coupled with real exchange rate improvements. On the other hand decreases in productivity will suppress the current account and deteriorate the real exchange rate. Affandi and Mochtar (2013) also found that temporary shocks (as reflected by nominal shocks) drive the current account surplus while conversely worsens the real exchange rate.

3. Empirical Framework:

To analyze current account and exchange rate dynamics in Jamaica, we employ a bivariate Vector Autoregressive model proposed by Lee and Chinn (2006), who analyzed the same topic for G7 countries, consider the following:

$$\begin{bmatrix} \Delta q_t \\ b_t \end{bmatrix} = C(L) \begin{bmatrix} \Delta q_{t-1} \\ b_{t-1} \end{bmatrix} + \begin{bmatrix} \mu_t^q \\ \mu_t^b \end{bmatrix} \quad (1)$$

Where Where Δq_t is the first diference of the real effective exchange rate and b_t is the current account to GDP ratio and

$$\mu_t = \begin{bmatrix} \mu_t^q \\ \mu_t^b \end{bmatrix} \quad (2)$$

is the vector of exchange rate and current account innovations.

With $E(\mu_t) = 0, E(\mu_t \acute{\mu}_t) = A$ and $E(\mu_t \acute{\mu}_s) = 0,\ for\ t \neq s$

The VAR can be represented by the following moving average process,

$$\begin{bmatrix} \Delta q_t \\ b_t \end{bmatrix} = \sum_{L=0}^{\infty} B(L) \begin{bmatrix} \varepsilon_{t-1}^{P} \\ \varepsilon_{t-1}^{T} \end{bmatrix} \tag{3}$$

where ε_t is a vector of permanent and temporary shocks respectively, the moving average representation of the model is given by

$$\varepsilon_t = \begin{bmatrix} \varepsilon_t^P \\ \varepsilon_t^T \end{bmatrix}$$

with $E(\varepsilon_t) = 0, E(\varepsilon_t \acute{\varepsilon}_t) = I$ and $E(\varepsilon_t \acute{\varepsilon}_s) = 0 \ for \ t \neq s$

we impose the Blanchard and Quah (1989) restriction that temporary shocks do not have a long run effect on the real exchange rate such that

$$[\sum_{L=0}^{\infty} B(L)]_{(1,2)} = 0 \tag{4}$$

The MA representation can be written as

$$\begin{bmatrix} \Delta q_t \\ b_t \end{bmatrix} = \sum_{L=0}^{\infty} D(L)\, \mu_{t-L} \tag{5}$$

Given that the variance covariance matrix

$$A = B(0)B(\acute{0}) \tag{6}$$

Using the fact that $B(L) = D(L)B(0)^{-1}$ $(L = 1,2,3, \dots)$ equation (3)above can be re-written as

$$[\, \sum_{L=0}^{\infty} D(L)\, B(0)^{-1}\,]_{(1,2)} = 0 \tag{7}$$

Such that

$$\mu_t = B(0)\varepsilon_t \tag{8}$$

Equations (4) and (5) allows us to find the matrix $B(0)$ such that from the permanent and temporary shocks can be identified where

$$\varepsilon_t = B(0)^{-1}\mu_t \qquad (9)$$

3.1 Data

Quarterly data from 2005:Q1 to 2013:Q4 on the real effective exchange rate, GDP and the current account balance are collected from the IMF International Financial Statistics IFS for Brazil, Chile, Costa Rica, Jamaica and Mexico. The current account was originally denominated in USD which was converted to Jamaica currency using the USD exchange rate for each respective quarter. Similar to Lee and Chinn (2006) we create a variable which expresses the current account as a percentage of GDP (both denominated in Jamaican currency). The Augmented Dickey Fuller unit root test and the Phillips Perron unit root test are employed to examine the stationarity properties of our variables, which is a necessary condition to ensure that the MA representation of out model converges. We counld not reject the null of a unit root for the REER in levels as the results of the unit root tests indicate that the REER is differenced stationary while the current account to GDP ratio is stationary in levels as the null hypothesis of a unit root is rejected similar to those of the G7 countries analyzed by Lee and Chinn (2006). Diagnostic tests indicate no autocorrelation and hetroskedasticity among the variables in the model.

4. Results:

4.1 Impulse Response Functions

Figures 4 to 8 below show how the reer and current account balance in each Caribbean and Latin American Country respond to a one standard deviation temporary monetary shock and one standard deviation permanent productivity shock respectively. The top panels shows how the reer respond to the temporary and permanent shock while the lower panel shows how the current account responds to both types of shocks. Here we interpret temporary shocks as monetary shocks and permanent shocks as productivity shocks.

4.1.1: Brazil

The results for Brazil are illustrated in figure 3 below. The real exchange rate immediately appreciates in the first two quarters after which it appreciates and the effect gradually disappears to zero in response to a temporary one standard deviation monetary shock. Likewise, the current account improves gradually in response to a one standard deviation standardize temporary monetary shock for Brazil. This is similar to the results found in Lee and Chinn (2006) for the G7 countries; Canada, France, Germany, Italy and the UK but not the US. In the US a one unit standard deviation temporary shock results in an instant depreciation of the currency and a corresponding improvement in the current account balance.

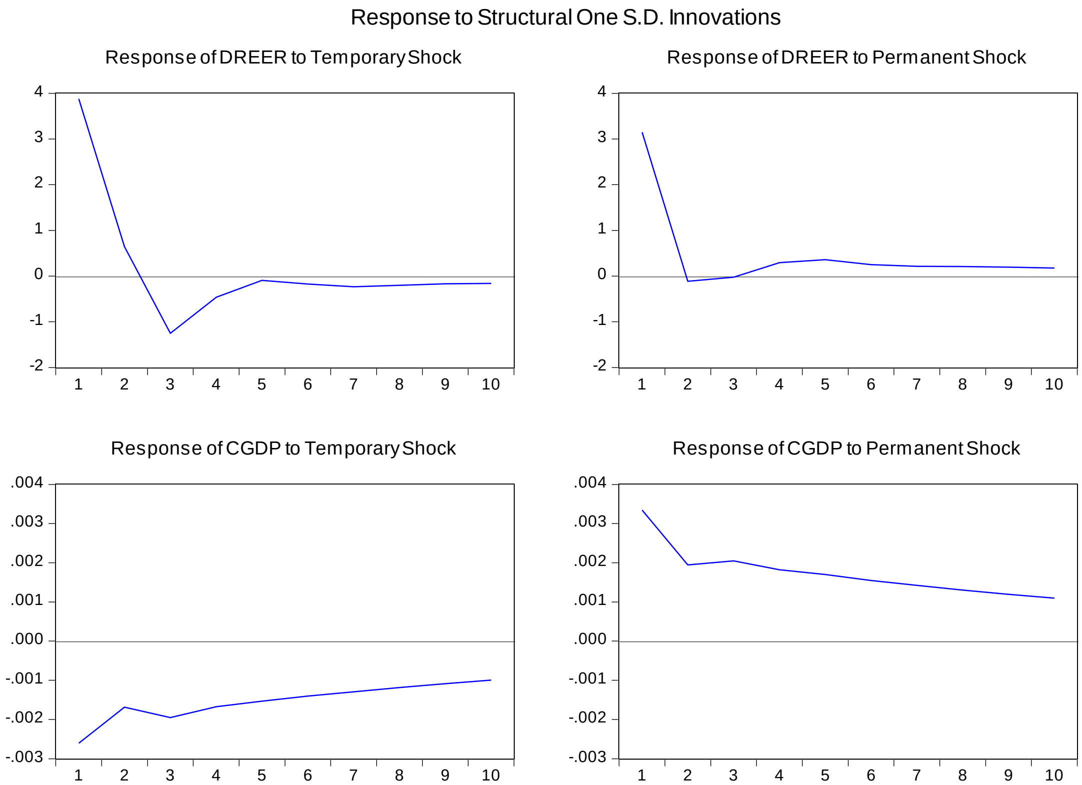


Figure 4: Brazil Impulse response for real exchange rate and current account response to temporary and permanent shocks

The real exchange rate for Brazil appreciates immediately in response to a one standard deviation permanent productivity shock, while the current account slightly worsens initially as the effects disappears gradually overtime. This result is congruent with prediction of single sector open economy models. Including the theoretical motivation presented in Lee and Chinn (2006), where an appreciation of the currency reduces a country's relative price competitiveness as a result the current account balance worsens. Our results for the response of the exchange rate to a productivity shock is similar to results found in Lee and Chin (2006) which also indicates that the real exchange rate appreciates in response to a positive productivity shock for the US and the G7 countries. This result is congruent for most open economy models including the theoretical motivation for Lee and Chin

(2006). The response of the current account poses a puzzle similar in Lee and Chinn (2006) as it improves in response to a currency appreciation.

4.1.2: Chile

The results for Chile are illustrated in figure 4 below. A positive one standard deviation monetary shock cause the reer to depreciate initially after which it appreciates for two consecutive quarters, meandering till the effects die out. The current account balance worsens for the first two quarters in response to a positive monetary shock meandering as the effects disappear to zero. This is the opposite of what happened for Brazil and the G7 Canada, France, Germany, Italy and the UK but not the US, from Lee and Chinn (2006) but follows similar analogy.

The real exchange rate for Jamaica appreciates immediately in response to a one standard deviation standardized permanent productivity shock, while the current account improves slightly initially, worsens after the second quarter but revert to improvement after the third quarter. This result is congruent with the results for Brazil and prediction of single sector open economy models. Including the theoretical motivation presented in Lee and Chinn (2006), where an appreciation of the currency reduces a country's relative price competitiveness as a result the current account balance worsens. Our results for the response of the exchange rate to a productivity shock is similar to results found in Lee and Chin (2006) which also indicates that the real exchange rate appreciates in response to a positive productivity shock for the US and the G7 countries. This result is congruent for most open economy models including the theoretical motivation for Lee and Chin (2006). The response of the current account poses a puzzle similar in Lee and Chinn (2007) as it improves in response to a currency appreciation.

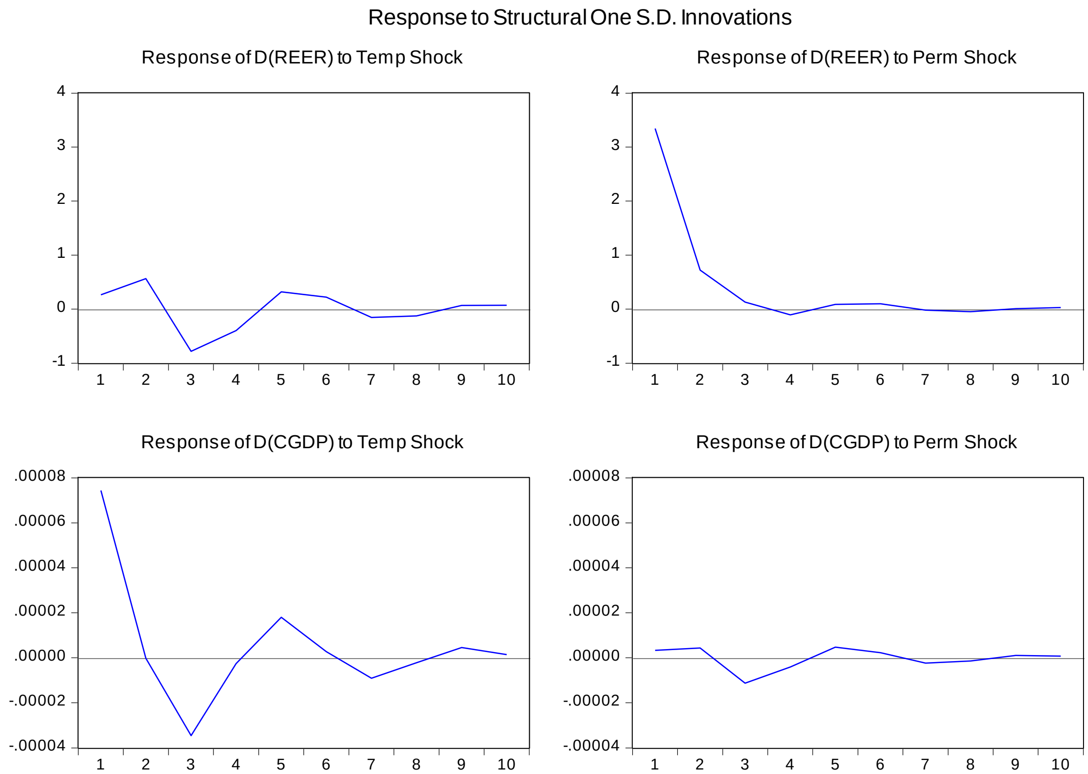


Figure 5: Chile Impulse response for real exchange rate and current account response to temporary and permanent shocks

4.1.3: Costa Rica

The results for Costa Rica are provided in table 6 below. Unlike the other countries the real exchange rate doesn't really respond to a temporary monetary shock, it shows slight appreciation which gradually disppers overtime. The current account worsens slightly as well in response to a one standard deviation temporary monetary shock. This is similar to the results found in Lee and Chinn (2006) for the G7 countries; Canada, France, Germany, Italy and the UK but not the US. In the US a one unit standard deviation temporary shock results in an instant depreciation of the currency and a corresponding improvement in the current account balance.

The real exchange rate for Costa Rica immediately depreciates in response to a one standard deviation permanent productivity shock, while the current account worsens initially and improves after the first two quarters as the effects disappears to zero after the first three quarters. This result is congruent with prediction of single sector open economy models. Including the theoretical motivation presented in Lee and Chinn (2006), where an appreciation of the currency reduces a country's relative price competitiveness as a result the current account balance worsens. Our results for the response of the exchange rate to a productivity shock is similar to results found in Lee and Chin (2006) which also indicates that the real exchange rate appreciates in response to a positive productivity shock for the US and the G7 countries. This result is congruent for most open economy models including the theoretical motivation for Lee and Chin (2006). The response of the current account poses a puzzle similar in Lee and Chinn (2007) as it improves in response to a currency appreciation.

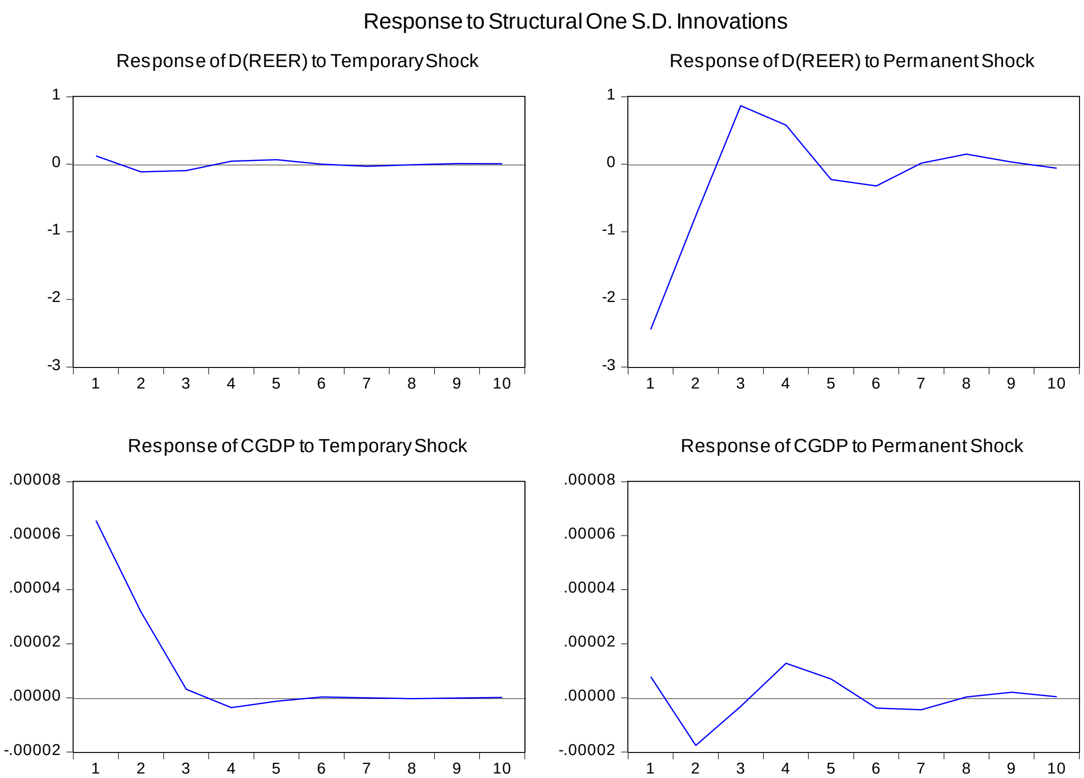


Figure 6: Costa Rica Impulse response for real exchange rate and current account response to temporary and permanent shocks

4.1.4: Jamaica

The results for Jamaica show that the real exchange rate immediately appreciates in the first two quarters after which it appreciates and the effect gradually disappears to zero in response to a temporary one standard deviation standardized monetary shock. Likewise, the current account improves gradually in response to a one standard deviation standardize temporary monetary shock for Jamaica. This is similar to the results found in Lee and Chinn (2006) for the G7 countries; Canada, France, Germany, Italy and the UK but not the US. In the US a one unit standard deviation temporary shock results in an instant depreciation of the currency and a corresponding improvement in the current account balance.

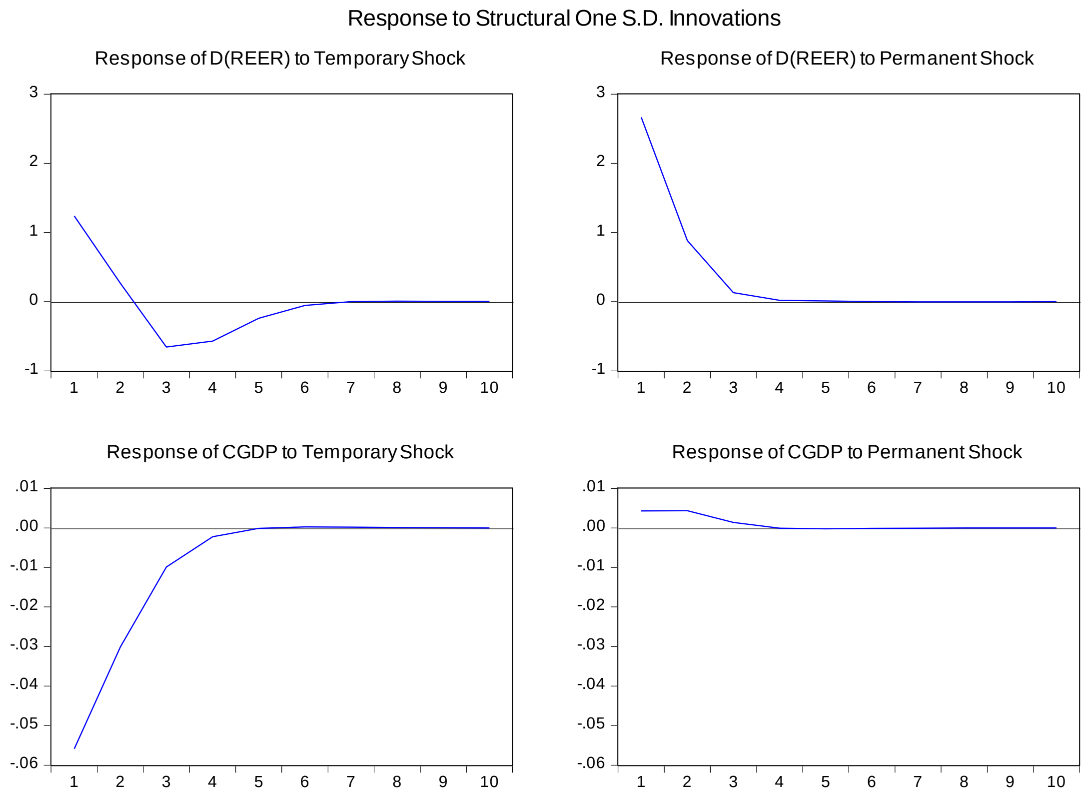


Figure 7: Jamaica Impulse response for real exchange rate and current account response to temporary and permanent shocks

The real exchange rate for Jamaica appreciates immediately in response to a one standard deviation standardized permanent productivity shock, while the current account slightly worsens initially as the effects disappears to zero after the first three quarters. This result is congruent with prediction of single sector open economy models. Including the theoretical motivation presented in Lee and Chinn (2006), where an appreciation of the currency reduces a country's relative price competitiveness as a result the current account balance worsens. Our results for the response of the exchange rate to a productivity shock is similar to results found in Lee and Chin (2006) which also indicates that the real exchange rate appreciates in response to a positive productivity shock for the US and the G7 countries. This result is congruent for most open economy models including the theoretical motivation for Lee and Chin (2006). The response of the current account poses a puzzle similar in Lee and Chinn (2007) as it improves in response to a currency appreciation.

4.1.5: Mexico

The results for Mexico are given in figure 8 below. The real exchange rate immediately appreciates in the first two quarters after which it appreciates and the effect gradually disappears to zero in response to a temporary one standard deviation standardized monetary shock. Likewise, the current account improves gradually in response to a one standard deviation standardize temporary monetary shock for Jamaica. This is similar to the results found in Lee and Chinn (2006) for the G7 countries; Canada, France, Germany, Italy and the UK but not the US. In the US a one unit standard deviation temporary shock results in an instant depreciation of the currency and a corresponding improvement in the current account balance.

The real exchange rate for Mexico appreciates immediately in response to a one standard deviation permanent productivity shock, while the current account slightly worsens initially as the effects disappears to zero after the first three quarters. This result is similar to the results for Brazil and Jamaica which is congruent with prediction of single sector open economy models. Including the theoretical motivation presented in Lee and Chinn (2006), where an appreciation of the currency reduces a country's relative price competitiveness as a result the current account balance worsens. Our results for the response of the exchange rate to a productivity shock is similar to results found in Lee and Chin (2006) which also indicates that the real exchange rate appreciates in response to a positive productivity shock for the US and the G7 countries. This result is congruent for most open economy models including the theoretical motivation for Lee and Chin (2006). The response of the current account poses a puzzle similar in Lee and Chinn (2007) as it improves in response to a currency appreciation.

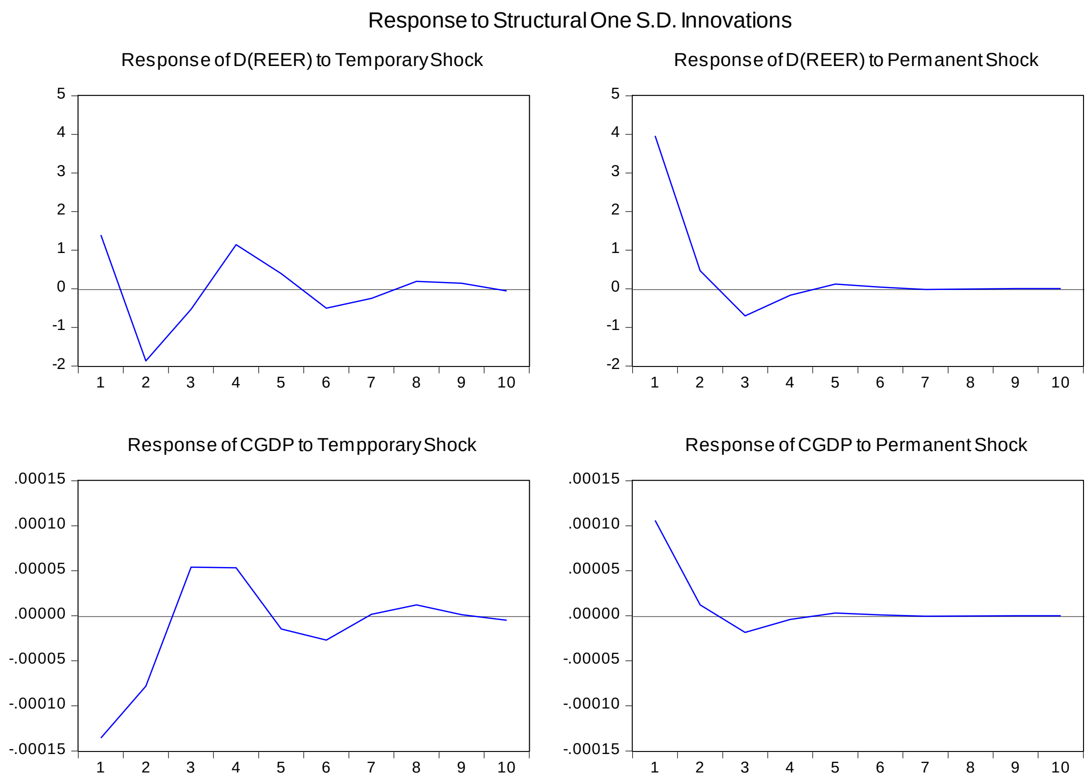


Figure 8: Mexico Impulse response for real exchange rate and current account response to temporary and permanent shocks

4.2: Variance Decomposition

Upon analyzing the impact of temporary monetary shocks and permanent productivity shocks on the reer and the current account to GDP ratio in the Caribbean and Latin America, it is important to understand how the variation in both variables is decomposed. The Variance decomposition for the reer and current account to GDP ratio is provided in tables 9 to 18 below. Temporary monetary shocks play a bigger role in explaining variation in the reer for Brazil while permanent productivity shock play a bigger role in explaining variation in the reer for Chile, Costa Rica, Jamaica and Mexico. More than 60 percent of the variation in the reer for Brazil is due to temporary shocks. More than 90 percent of the variation in the reer is as a result of permanent monetary shock in Chile. Percent of the variation in the reer is due to permanent productivity shock for Costa Rica. Between 76 and 80 percent of the variation in the reer is due to permanent productivity shock. 68 to 89 percent of the variation in there for Mexico is due to permanent productivity shock,

As it regards the current account, permanent productivity shock play a bigger role in explaining current account movement in Brazil while temporary productivity shocks play a bigger role in expanding current account variation in Costa Rica, Chile, Jamaica and Mexico. Between 56 and 62 percent of the variation in the current account to GDP ratio for Brazil is due to permanent productivity shocks. Temporary shocks account for more than 97 percent of the variation in the current account for Chile. More than 90 percent of the variation in the current account is due to temporary monetary shock in Costa Rica. 99 percent of the variation in the current account for is as a result of temporary monetary shock in Jamaica. 62 to 72 percent of the variation in the current account is due to temporary monetary shock in Mexico. In this case the results for

broadly consistent with that of the G7 countries found in of Chinn and lee (2006) and the sticky price model of Obsfeld and Roggoff (1995). Permanent shocks to productivity have a small effect on current account and a real long term effect the exchange rate, while monetary shocks have a large effect on the current account in the short run, but no effect in the long run.

5. Conclusion

This paper analyses the interaction between the real effective exchange rate and current account using in Jamaica and four Latin American Countries; Brazil, Costa Rica, Chile and Mexico using quarterly data from 2005Q1 to present. A structural Vector Auto regressive model is employed and shocks are dichotomized into temporary monetary shocks and permanent productivity shocks by imposing the long run Blanchard and Quah (1989) restriction. Similarly, we assume minimal criterion for identification that temporary shocks have no effect on the real exchange rate in the long run. Our results show that temporary monetary shocks play a bigger role in explaining variation in the real exchange for Brazil while permanent productivity shock play a bigger role in explaining variation in the real exchange rate for Chile, Costa Rica, Jamaica and Mexico. The later is similar to the results found in Lee and Chinn (2006) where permanent shocks have a large long run effect on the exchange rate but relatively small effect on the current account, while temporary shocks have large effects on the current account and the exchange rate in the short run but not in the long run. Here too temporary shocks play a bigger role in explaining current account movement in Costa Rica, Chile, Jamaica and Mexico but not Brazil. Our results are consistent with the results Lee and Chinn (2006) and the sticky price model of Obsfeld and Roggoff (1995) where Permanent shocks to productivity have a small effect on current account and a real long term effect the exchange rate, while monetary shocks have a large effect on the current account in the short run, but no effect in the long run.

6: Appendix

Variance Decomposition for the real exchange rate and current account for Brazil, Costa Rica, Chile, Jamaica and Mexico.

Brazil	reer			Current Acc/GDP		
Period	Std Error	Temp Shock	Perm Shock	Std Error	Temp Shock	Perm Shock
1	4.993	60.266	39.733	0.004	37.749	62.251
2	5.035	60.882	39.117	0.005	39.124	60.876
3	5.188	63.160	36.839	0.005	41.217	58.783
4	5.217	63.246	36.753	0.006	41.935	58.064

5	5.231	62.962	37.037	0.006	42.268	57.731
6	5.239	62.859	37.140	0.006	42.518	57.481
7	5.249	62.829	37.170	0.007	42.717	57.282
8	5.257	62.786	37.213	0.007	42.860	57.139
9	5.263	62.739	37.260	0.008	42.966	57.033
10	5.269	62.702	37.297	0.007	43.048	56.951

Table 1: Brazil Variance Decomposition of reer and current account into temporary and permanent shocks

Chile

Chile	reer			Current Acc/GDP		
Period	Std Error	Temp Shock	Perm Shock	Std Error	Temp Shock	Perm Shock
1	3.352	0.625	99.374	0.007	99.798	0.201
2	3.475	3.204	96.795	0.007	99.448	0.551
3	3.565	7.850	92.149	0.008	97.700	2.299
4	3.588	8.984	91.015	0.008	97.465	2.534
5	3.604	9.691	90.308	0.008	97.280	2.719
6	3.612	10.024	89.976	0.008	97.211	2.788
7	3.615	10.184	89.815	0.008	97.170	2.829
8	3.618	10.294	89.705	0.008	97.146	2.853
9	3.618	10.327	89.672	0.008	97.138	2.861
10	3.619	10.361	89.638	0.008	97.130	2.869

Table 2: Chile Variance Decomposition of reer and current account into temporary and permanent shocks

Costa Rica

Costa Rica	reer			Current Acc/GDP		

	Std Error	Temp Shock	Perm Shock	Std Error	Temp Shock	Perm Shock
1	2.449	0.256	99.743	0.006	98.596	1.403
2	2.568	0.431	99.568	0.007	93.458	6.541
3	2.711	0.509	99.490	0.007	93.311	6.688
4	2.773	0.513	99.486	0.007	90.712	9.287
5	2.783	0.566	99.433	0.007	89.978	10.021
6	2.801	0.559	99.440	0.007	89.762	10.237
7	2.801	0.570	99.429	0.007	89.468	10.531
8	2.805	0.570	99.429	0.007	89.466	10.533
9	2.806	0.571	99.428	0.007	89.403	10.596
10	2.806	0.572	99.428	0.007	89.401	10.598

Table 3: Costa Rica Variance Decomposition of reer and current account into temporary

Jamaica

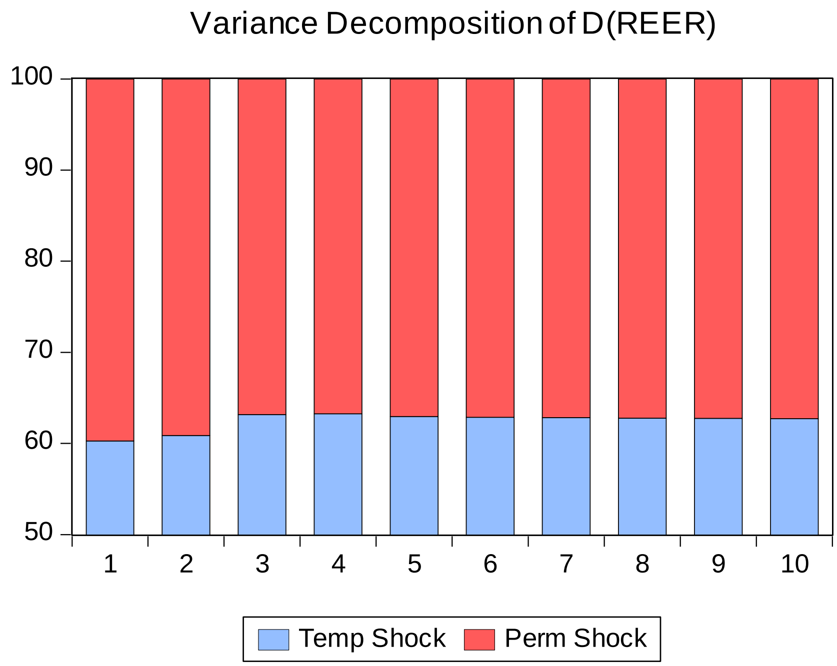
Jamaica	reer			Current Acc/GDP		
	Std Error	Temp Shock	Perm Shock	Std Error	Temp Shock	Perm Shock
1	2.939	17.755	82.244	99.407	0.592	99.40758
2	3.080	16.916	83.083	99.079	0.920	99.07998
3	3.152	20.500	79.499	99.055	0.944	99.05503
4	3.203	23.006	76.993	99.056	0.943	99.05611
5	3.212	23.436	76.563	99.054	0.945	99.05469
6	3.213	23.459	76.540	99.054	0.945	99.05431
7	3.213	23.459	76.540	99.054	0.945	99.05427
8	3.213	23.459	76.540	99.054	0.945	99.05427
9	3.213	23.460	76.539	99.054	0.945	99.05427
10	3.213	23.460	76.539	99.054	0.945	99.05427

Table 4: Jamaica Variance Decomposition of reer and current account into temporary and permanent shocks

Mexico

Mexico	reer			Current Acc/GDP		
	Std Error	Temp Shock	Perm Shock	Std Error	Temp Shock	Perm Shock
1	4.196106	10.987	89.012	0.0001	62.085	37.914
2	4.617619	25.471	74.528	0.0001	68.302	31.697
3	4.701265	25.851	74.148	0.0001	70.065	29.934
4	4.841161	29.954	70.045	0.0001	72.062	27.937
5	4.858344	30.389	69.610	0.0002	72.188	27.811
6	4.884699	31.130	68.869	0.0002	72.659	27.340
7	4.891198	31.311	68.688	0.0002	72.661	27.338
8	4.894830	31.413	68.586	0.0002	72.752	27.247
9	4.896788	31.467	68.532	0.0002	72.753	27.246
10	4.897157	31.478	68.521	0.0002	72.769	27.230

Table 5: Mexico Variance Decomposition of reer and current account into temporary and permanent shocks



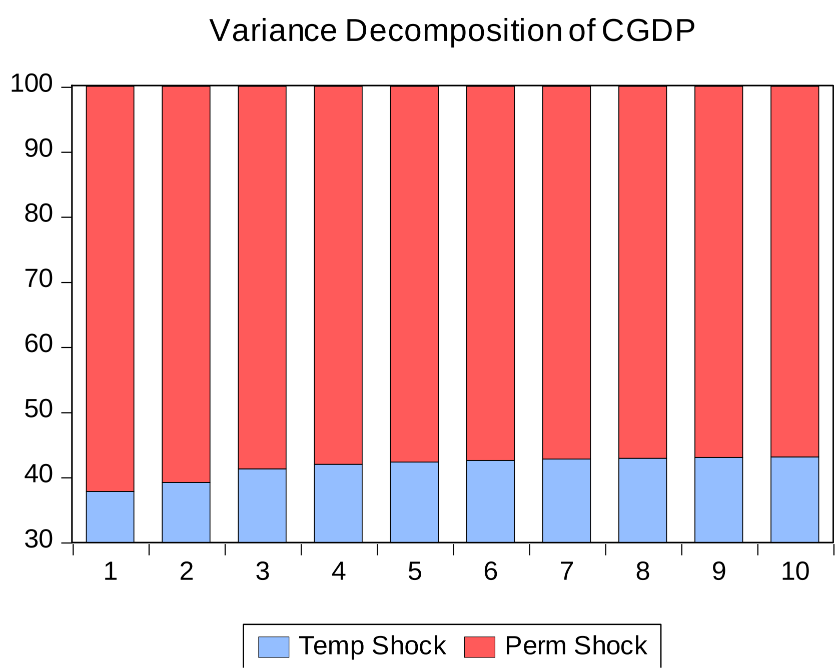


Figure 9: Brazil Variance Decomposition of reer and current account into temporary and permanent shocks

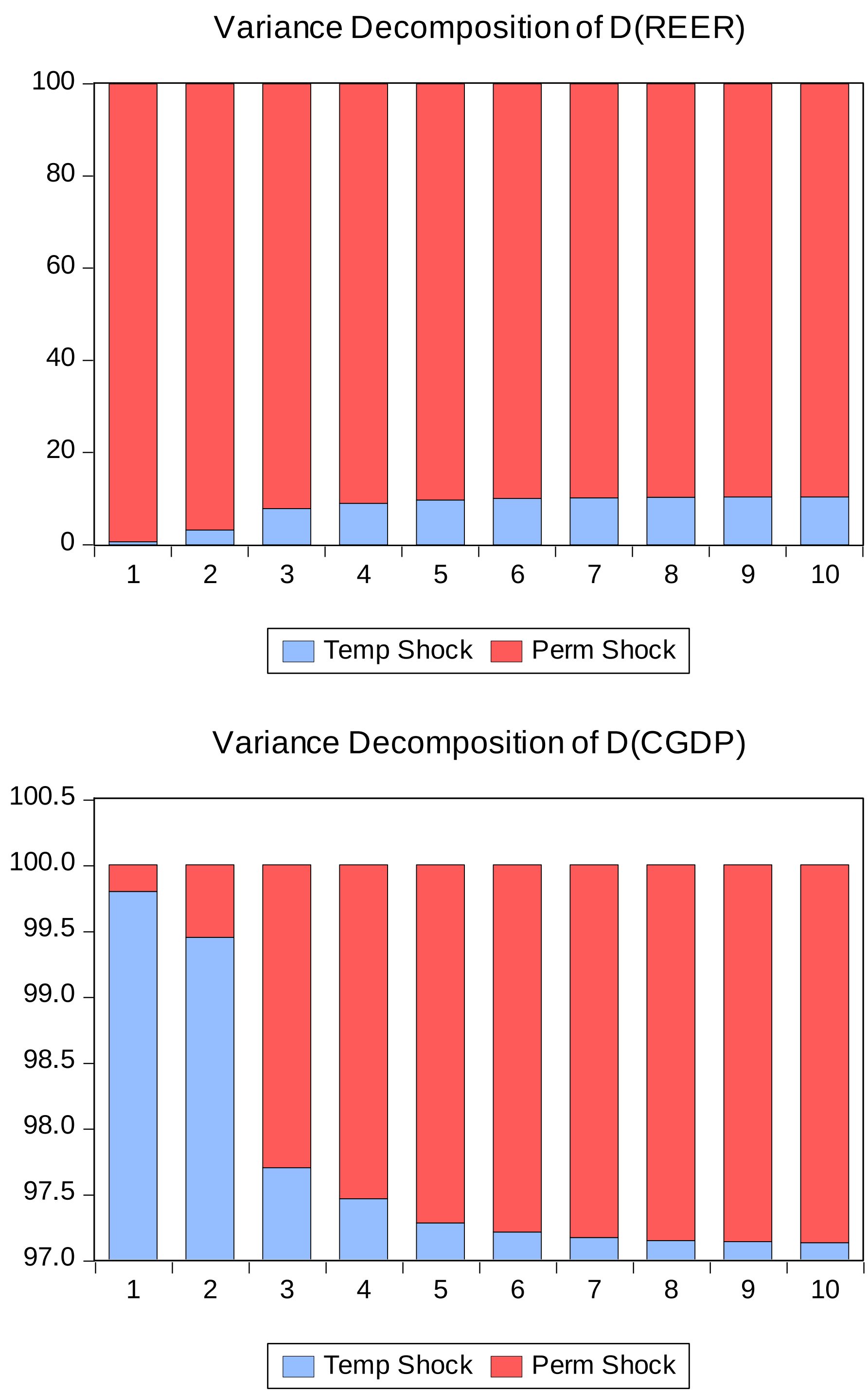


Figure 10: Chile Variance Decomposition of reer and current account into temporary and permanent shocks

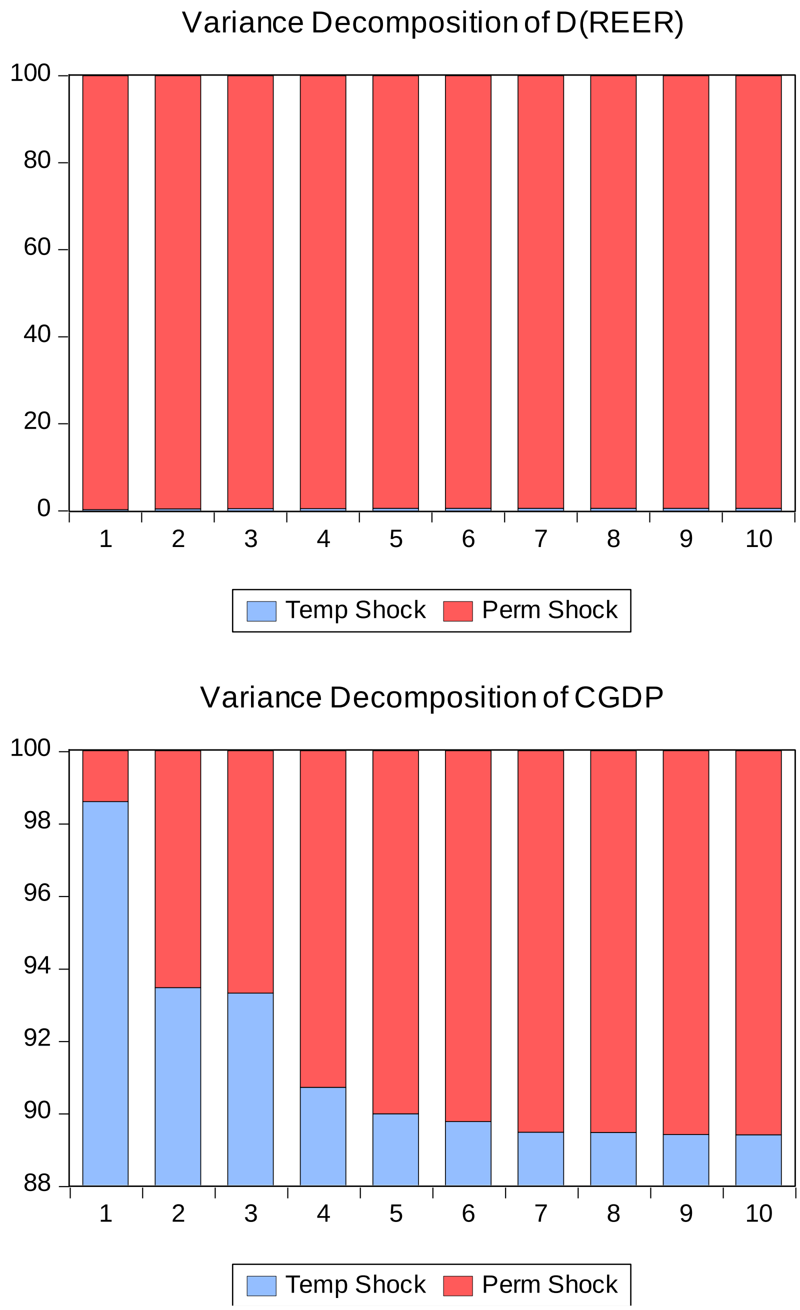


Figure 10: Costa Rica Variance Decomposition of reer and current account into temporary and permanent shocks

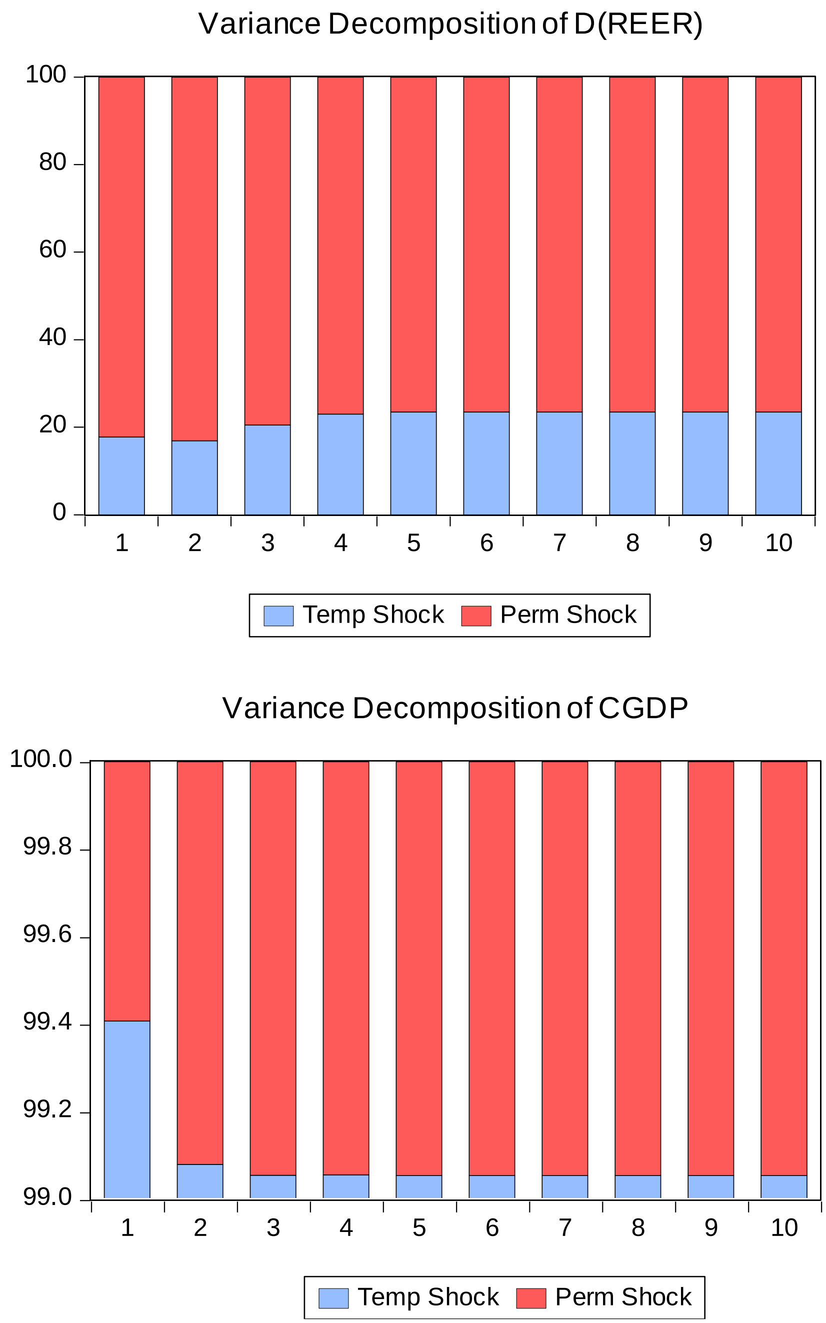
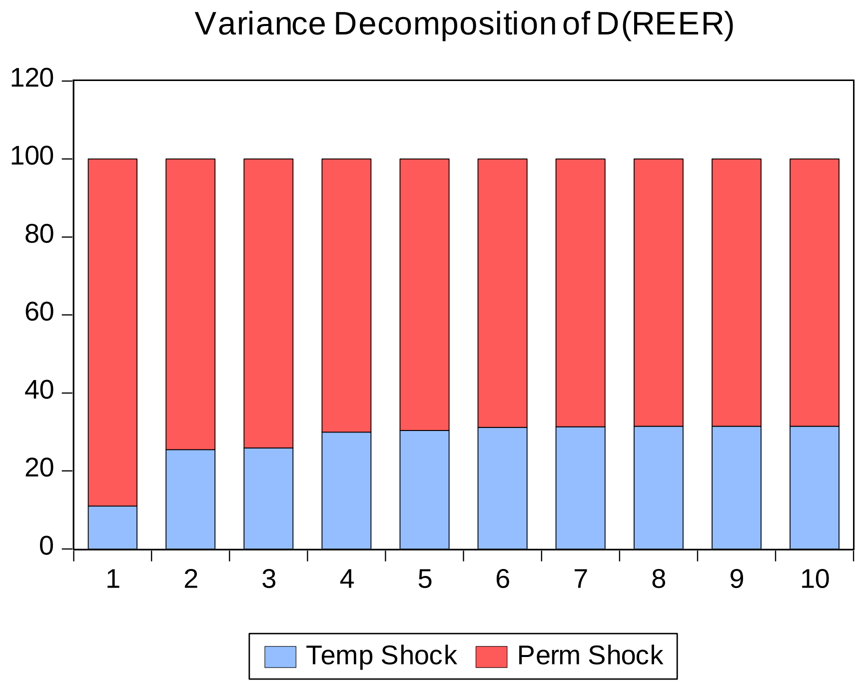


Figure 11: Jamaica Variance Decomposition of reer and current account into temporary and permanent shocks



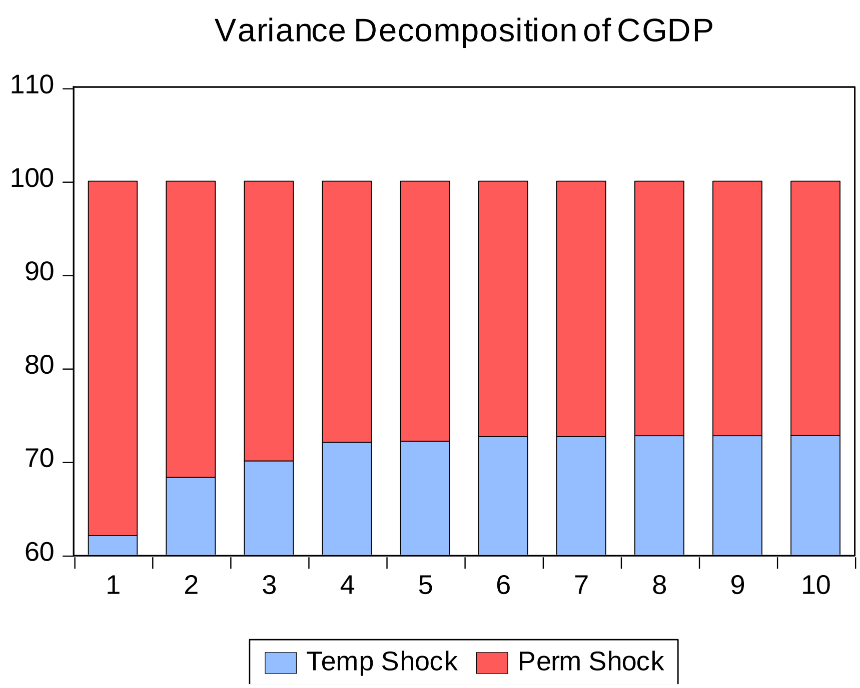


Figure 12: Mexico Variance Decomposition of reer and current account into temporary and permanent shocks

Brazil Structural VAR Estimates

Date: 10/06/14 Time: 11:46

Sample (adjusted): 2005Q4 2014Q1

Included observations: 34 after adjustments

Estimation method: method of scoring (analytic derivatives)

Convergence achieved after 14 iterations

Structural VAR is just-identified

Model: Ae = Bu where E[uu']=I

Restriction Type: long-run text form

Long-run response pattern:

0	C(2)
C(1)	C(3)

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.026411	0.003203	8.246211	0.0000
C(2)	6.657479	0.807338	8.246211	0.0000
C(3)	0.029535	0.005774	5.114790	0.0000

Log likelihood 34.61388

Estimated A matrix:

1.000000	0.000000
0.000000	1.000000

Estimated B matrix:

3.876307	3.147431
-0.002603	0.003343

Chile Structural VAR Estimates

Date: 10/06/14 Time: 12:08

Sample (adjusted): 2005Q4 2014Q2

Included observations: 35 after adjustments

Estimation method: method of scoring (analytic derivatives)

Convergence achieved after 20 iterations

Structural VAR is just-identified

Model: Ae = Bu where E[uu']=I

Restriction Type: long-run text form

Long-run response pattern:

0	C(2)
C(1)	C(3)

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	5.06E-05	6.05E-06	8.366600	0.0000
C(2)	4.231978	0.505818	8.366600	0.0000
C(3)	-3.10E-06	8.56E-06	-0.361792	0.7175
Log likelihood	191.2759			

Estimated A matrix:

1.000000	0.000000
0.000000	1.000000

Estimated B matrix:

0.265152	3.342493
7.44E-05	3.35E-06

Costa Rica Structural VAR Estimates

Date: 10/06/14 Time: 13:45

Sample (adjusted): 2005Q4 2013Q4

Included observations: 33 after adjustments

Estimation method: method of scoring (analytic derivatives)

Convergence achieved after 19 iterations

Structural VAR is just-identified

Model: Ae = Bu where E[uu']=I

Restriction Type: long-run text form

Long-run response pattern:

0	C(2)
C(1)	C(3)

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	9.56E-05	1.18E-05	8.124038	0.0000
C(2)	2.176978	0.267967	8.124038	0.0000
C(3)	-6.36E-07	1.66E-05	-0.038213	0.9695
Log likelihood	194.5027			

Estimated A matrix:

1.000000	0.000000
0.000000	1.000000

Estimated B matrix:

0.124121	-2.446389
6.56E-05	7.82E-06

Jamaica Structural VAR Estimates

Date: 10/07/14 Time: 13:15

Sample (adjusted): 2005Q4 2013Q1

Included observations: 30 after adjustments

Estimation method: method of scoring (analytic derivatives)

Convergence achieved after 10 iterations

Structural VAR is just-identified

Model: Ae = Bu where E[uu']=I

Restriction Type: long-run text form

Long-run response pattern:

0	C(2)
C(1)	C(3)

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.097634	0.012604	7.745967	0.0000
C(2)	3.701132	0.477814	7.745967	0.0000
C(3)	0.009579	0.017868	0.536081	0.5919

Log likelihood -29.08041

Estimated A matrix:

1.000000	0.000000
0.000000	1.000000

Estimated B matrix:

1.238661	2.665865
-0.055894	0.004315

Mexico Structural VAR Estimates

Date: 10/06/14 Time: 14:37

Sample (adjusted): 2005Q4 2014Q1

Included observations: 34 after adjustments

Estimation method: method of scoring (analytic derivatives)

Convergence achieved after 17 iterations

Structural VAR is just-identified

Model: Ae = Bu where E[uu']=I

Restriction Type: long-run text form

Long-run response pattern:

0	C(2)
C(1)	C(3)

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.000137	1.67E-05	8.246211	0.0000
C(2)	3.691435	0.447652	8.246211	0.0000
C(3)	9.87E-05	2.64E-05	3.734373	0.0002
Log likelihood	151.2879			
Estimated A matrix:				
1.000000	0.000000			
0.000000	1.000000			
Estimated B matrix:				
1.390927	3.958867			
-0.000136	0.000106			

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