KENYA'S FOREIGN TRADE BALANCE: AN EMPIRICAL INVESTIGATION

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Abstract

This paper investigates the major determinants of trade balance using annual data for the period 1963-2012. It explores the long run and short run determinants of trade deficit using Johansen co integration approach and Error correction modeling (ECM). The results of the investigation indicate that the coefficients of trade balance are positively correlated with budget deficits, FDI and exchange rates. The results show that FDI has a positive effect on trade balance because the trade balance in Kenya is negative. The estimation results also show that the real exchange rate depreciations improve the trade balance in a strong and significant way. This can be attributed to a huge negative trade balance and/or a large positive net foreign direct investment position, which is an indication that the trade balance is much less sensitive to movements in the real effective exchange rate.

Keywords: Trade balance, co integration, FDI, budget deficit, Kenya

Introduction

Trade is sensitive to changes in macroeconomic policies of a country because it increases expenditures on imports, diverts resources and affects financial markets through capital flows. Similarly balance of trade plays a vital role in national income accounting of a country and it appears in the GDP equation as net export (NX).

Trade balance is the difference between the monetary value of exports and imports in an economy over a certain period of time or simply the difference between what goods a country produces and how many goods it buys from abroad. The sum can take the form of a deficit if imports overweigh exports or trade surplus if exports are more than imports or equivalent when the values of exports and imports are equal.

This concept is known since the sixteenth century, but for these many centuries, economists have debated its significance without agreement. As a result they are divided between those who are for and against trade surplus and trade deficits. Those who believe that trade deficits are harmful, have

often interpreted it as a sign of a country's economic weakness, and a source of increased and excessive foreign dependence, which is at the expense of domestic production and jobs. It also represents a sacrifice of future growth because the country purchases more than it produces, and investment in future growth is being traded for consumption in the present. Large trade deficits also create an environment conducive to financial crises that could damage the economy.

On the contrary, when a country's total annual exports exceed its total annual imports, it is said to have a trade surplus. This means that the country gets more resources than it spends a situation that attracts foreign currency, and generates jobs in the exporting country. Thus, whether a country runs trade deficit or surplus is not by itself indicative of the strength of that economy or of its prosperity. Deficits are only good for transitional economies, and they are a sign of strength if they are accompanied by rising domestic investment and/or rising government expenditures on infrastructure.

Imports in Kenya are used as inputs in production and they consist of any goods and services that are made in a foreign country and bought by a country's residents, even if the said residents were traveling abroad. Services provided while traveling, such as transportation, hotels and meals, are also technically imports regardless of whether the company that makes the good or service is a domestic company.

Trade deficits are linked to economic development due to imports of capital goods, raw materials, intermediate products among others. In Kenya we can associate deficits to low export prices and low wages paid to workers, poor infrastructure, high prices of inputs, poor health and safety standards, poor environmental policies, and relatively high barriers to trade with trade partner countries. That notwithstanding, Kenya has reported a worrisome, deficit over decades, which means that large amounts of the Kenyan shilling leave the country. These outflows have driven the value of the Kenyan currency down, making it more costly to purchase imports. However when trade deficits arise on the current account, there is an equal and opposite trade surplus on the financial account of the balance of payments, which indicate that foreigners are purchasing domestic assets. Therefore trade deficits cannot be condemned wholly and even the economic theory dictates that a trade deficit is not purely bad as it will corrects itself over time.

Trade Balance in Kenya

Kenya's trade balance has continuously remained in deficit except for two years in the country's 50 years of independence i.e. 1964 and 1977 when it recorded US$ 5.7m and US$ 18.1m respectively. In 1963, Kenya's trade deficit was US$ 8.1m. It continued to increase every 5 years reaching a peak of US$ 5649m, US$ 6303m, in 2008 and 2010 respectively in that order and

US$ 1019m in May of 2012. In February of 2013 Kenya recorded a trade deficit of US$ 808.5 m from US$ 682.9m recorded in February of 2012, as imports rose at a faster pace than exports.

This increase in the value of imports was largely due to the increase in prices of Petroleum; oil lubricants, fertilizers, and food grains among others. The year 1997 was a turning point in Kenya's trade balance when it recorded a deficit of US$ 885.9m, thereafter there was huge increases in trade deficit due to slow growth of export and fast growth in imports. These exports comprised majorly of agricultural products which are central to Kenya's export industry with horticulture and tea being the most important. The other main export items include textiles, coffee, tobacco, iron and steel products, petroleum products and cement. Kenya's main export destinations are the UK, Netherlands, Uganda, Tanzania, United States and Pakistan. Kenya's imports cover mostly machinery and transportation equipment, petroleum products, motor vehicles, iron and steel, resins and plastics. While the main import partners include India, China, UAE, South Africa, Saudi Arabia, United States and Japan.

The major determinants of trade are the ones that unequally induce exports and imports. Assuming therefore that the sum of export and import is highly elastic with respect to real depreciation, then the Marshall Lerner condition and J curve is met. This paper therefore, focuses on three major determinants of trade balance, namely the exchange rate, FDI and budget deficit. Theoretically, the real effective exchange rate should be an important determinant of exports and imports because it is an essential economic indicator of economy's international competitiveness, and therefore, has a strong influence on country's foreign trade developments. It is also expected that Kenya will have a positive net FDI position if the trade balance is negative and if the FDI is negative then the trade balance is positive and vice versa because trade balance and the net international investment position are connected by the accounting identity. However if there is decline in the exchange rates in the country then this reflects a reduction in the cost of producing domestic goods and an increase in export competitiveness. The budget deficit is also expected to have a positive and significant impact on the trade balance to indicate that a reduction in the budget deficit improves the trade balance.

Literature Review

The link between trade and macroeconomic variables emanates from the fundamental macroeconomic identity which describes the real side of the economy as explained by the absorption model. The Keynesian absorption theory suggests that an increase in the budget deficit would induce domestic absorption and thus, import expansion, thereby causing a current account deficit. This model links macroeconomic variables such as consumption,

savings, investment and income with the external balances. A positive association between the government budget and trade balance can be shown and supported in the context of a simple Keynesian open-economy model. Therefore a persistent deficit in the balance of trade in the long run may lead to an increase in foreign debt burden, thereby leading to disruption of the market mechanism, currency depreciation and a decline in economic growth.

There is an extensive set of literature which explains the effects of trade imbalances on macroeconomic variables. Fleming (1962) and Mundell (1963) explained that an increase in budget deficit induced upward pressure on interest rates, thereby causing capital inflows and an appreciation of the exchange rate that in turn increased the current account deficit. Volcker (1987), Kearney and Monadjemi (1990) and Smyth et al. (1995); among other researchers argued that government deficits may cause trade deficits through different channels.

Himarios (1989) and Bahmani-Oskooe, (2001) found a strong association between balance of trade and real effective exchange rate. Rahman (1997), Mahdavi and Sohrabian(1993-1994), Greenwood(1984) and Mustafa (1996), and a number of other researchers explained the changes in real effective exchange rate and how such changes would affect the balance of trade positively in some nation without being consistent for all nations.

Lardy (1996) , Zhang (1999) and Liu (2001) studied foreign direct investment and balance of trade with reference to China, using panel data for the period1987-1999 on a pooled least square method framework. They found out that FDI affects expansion of export and economic growth in china significantly. Similar conclusions were also arrived at by Tse (1997) that FDI positively impacted provincial and regional manufacturing, export growth in China.

Liew (2003) did a study on the ASEAN (Association of South East Asian Nations) and found that the balance of trade affected those nations who changed their real effective exchange rate and not the nominal effective exchange rate.

Findings from these studies suggest that**,** the balance of trade is a key component of current account and by extension macro economics of the country through the balance of payment. This paper therefore tests and analyses variables that have a long-run relation with Kenya's trade balance.

Framework of Analysis

This paper hypothesizes that the trade balance is a function of real effective exchange rate, FDI and the budget deficit. Our analysis therefore focuses on the trade ratio and the value of exports to imports (X/M). In this regard, we follow classical theory, of Marshall-Lerner which holds that when

β_0 is positive ($\beta_0>0$) then depreciation leads to improved trade balance. However, in the short-run we expect $\beta_{0\ to}$ be negative ($\beta_0<0$).

The relationship between the balance of trade and its determinants can be captured by a generic function of the following form:

BOT = f (EXC, BUD, FDI)

Where

BOT: Balance of Trade
FDI: Foreign Direct Investment
EXC: Real Effective Exchange Rate
BUD: Budget deficits

A rising from this functional relationship we derive the following estimable equation.

$$\mathbf{BOT= \beta_0 + \beta_1\ EXC + \beta_2\ FDI+ \beta_3 BUD+ \varepsilon_t}$$

To test for stationarity we carry out the Johansen test, by first formulating the VAR as follows:

$Y_t = \Gamma_1 Y_{t-1} + \Gamma_2 Y_{t-2} \ldots\ldots + \Gamma_p Y_{t-p} + \varepsilon_{t.}$

Now, let Z_t denote the vector of $K\ (p-1)$ variables,

$Z_t = [\_Y_{t-1}, Y_{t-2} \ldots Y_{t-p+1}]$.

Z_t contains the lags 1 to $p-1$ of the first differences of all $_K$ variables. Now, using the T available observations, we obtain two $T \times {}_K$ matrices of least squares residuals.

Stationarity Test Procedures

To test for stationarity of variables, we used the Augmented Dickey Fuller (ADF) by estimating the following equation.

$$\Delta y_t = \beta_1 + \beta_{1t} + \alpha\ y_{t-1} + \gamma\ \Sigma \Delta y_{t-1} + \varepsilon_t$$
$$t=1$$

First we examined the variables to determine their order of integration, by running the Augmented Dickey-Fuller (ADF) and Phillip-Peron (PP) unit root tests for each variable. All the variables were found not to be stationary at levels but stationary after first difference at an integration order of (1(1)).

We then proceeded to test for the long-run relationship among the variables. We carried out a co integration test in order to determine the number of co integrating vectors for different combinations of variables. To determine the number of lags we carried out Johansen co integration test using Maximum Eigen value statistic and likelihood ratio (L.R) and we found that the short-run dynamics were restricted to two lags period.

We then employed the error-correction model (ECM) to interpret the coefficients. The results showed a very quick adjustment as evidenced in Table 5.

Table 5

Variable	Coefficient	t-Statistic	.
C	-136.0037	-2.142800	
D(EXC)	22.43953	1.650601	
D(BUD)	-0.891889	-2.365695	
D(FDI)	0.196115	0.421472	
U(-1)	-0.438601	-2.710853	
Adjusted R- square	0.104226		
F-statistics	2.338059		
Dw	1.576869		

The error correction representation was of the form:

$$Y_t = Y_{t-1} + \Delta Y_t$$

$$\Delta Y_t = \mathbf{\Pi} Y_{t-1} + -\sum_{i=1}^{P-1} \Phi \, \Delta I \, \Delta Y_{t-1} + \epsilon_t$$

Where $\mathbf{\Pi}$ and the $\mathbf{\Phi}*$ are functions of the $\mathbf{\Phi}^s$. specifically,

$$\mathbf{\Phi}\Delta j = -\sum_{i=J+1}^{P} \mathbf{\Phi} i, j = 1. . . p - 1$$

$$\mathbf{\Pi} = - (\boldsymbol{I} - \mathbf{\Phi}1 - . . . - \mathbf{\Phi}p) = -\mathbf{\Phi} \quad (1)$$

The stationarity of u_t was checked based on the following equation employed in the general ADF test with error term as dependent variable.

$$\Delta u_t = \acute{a} + \beta_{1t} + \beta_2 u_{t-1} + \Sigma\beta_3 \Delta u_{t-1}$$

Where, u_t is the residual of the co integrated equation.

Table 3 shows that the error terms in the co integrating equations were stationary meaning that both regressions were co integrated. It further suggested that there was a long run relationship between those variables. The co integration test based on the Johansen procedure was also carried out and it indicated that there were three co integrating equation at 5% significance level for the basic model as shown in Table 4.

Table 4: Co integration Test

Eigen value	**Likelihood ratio**	**5% critical value**	**Hypothesized no. of co integration equations**
0.656341	98.65421	47.21	None **
0.550443	49.52140	29.68	At most 1**
0.221682	12.74470	15.41	At most 2
0.026092	1.216182	3.76	At most 3

*(**) denotes rejection of the hypothesis at the 0.05 significant level.
LR. Test indicates 2 countertrading equations at 5% level of significance.

Estimation Results.

Using the time series data for the period, 1963-2012 our study found out that only a few of the macroeconomic variables, were non stationary but

were significant in explaining the trade balance in Kenya. In the short run adjustments, the Vector Error correction model (VECM) showed that the disequilibrium will be adjusted within one year. It further showed that only two out of the five vectors were co integrated according to maximum trace value statistics. However with the help of Eigen value and Likelihood ratio statistics, an optimal of 2 lags was selected. When we ran the model, the following equation was found to explain our case.

BOT =155.3649+1.575526BUD+8.268817EXC+1.73404FDI

(0.36094) (2.48522) (1.08561)

These results show that, foreign direct investment, budget deficit and real effective exchange rate significantly affected the trade balance. However we established a long run positive relationship between exchange rates and Trade balance. The equation reveals that the estimated long-run exchange rate elasticity had a positive sign, with an indication that (real) devaluation would lead to an improvement in the trade balance. The coefficient is a sign of currency appreciation which could increase the balance of trade deficit and loss in competitiveness in the world market. It further indicated that for a one percent increase in the real exchange rate, keeping the other variables constant, the real trade balance on the average increased by about 8 percent. The, t-statistics also showed that its coefficient was significant and therefore the findings of this test are clear.

On the other hand, the budget deficit and FDI had expected signs and the variables were found to be significant. The given coefficient showed that FDI had a positive impact on balance of trade. These findings therefore suggest that as the FDI flow increases it may motivate the investors to increase the production of domestic substitutes to imports which can improve the trade balance. The trade balance will also reduce because FDI would positively impact on export as more goods and services are produced through import substitution strategy. The results further showed that the Coefficient of budget deficit was positive but insignificant. This is in line with the assumption that increase in the government's budget deficit leads to an increase in the trade deficit as given by Mundell-Fleming model.

The equation represents the estimated long-run relationship between trade balance, the real exchange rate, budget deficit and FDI. Thus, the empirical evidence shows that the ML conditions seem to hold in the case of Kenya and the model is not spurious because the R^2 is less than DW, and the Error correction term is negative and significant. Thus the main findings of the paper are that real exchange rate depreciation has a significant positive long run impact on the trade balance in Kenya and that in the short run trade balance first deteriorates before it later improves and even the speed of adjustment coefficient is significant.

In order to test whether Marshall-Lerner condition and J-curve effects exist, we studied the short run and long run effect of the real exchange rate on the Kenyan trade balance in a dynamic model. The results support the empirical validity of the Marshall-Lerner condition through VECM, indicating that depreciation improves the trade balance. This result corroborates the findings of Baharumshah (2001), Shirvani and Wilbratte (1997), Sugema (2005), Akbostanci (2002) and Thorbecke (2006).

Thus just like in many other countries, a long run co integrating trade balance relation is found for Kenya showing that a one percent real appreciation leads to 8.2 percent improvement in trade balance. On average, a 1 percent real appreciation of the real effective exchange rate index reduces the trade balance by 8.2 percentage points. The corresponding error correction models (ECM) of trade balance capture its short run movements and indicate the existence of the J-curve effect. The estimated ECM results shown in **Table 3** indicate that exchange rate depreciation has negative impact on the trade balance. Hence one obtains the J-curve effect of depreciation on the trade balance.

Table 3. Residual test

Variable	**Coefficient**
U(-1)	-6.58341 (-4.738261)
C	8.069385 (0.128009)
Adjusted R squared	0.318025
Dw	2.220464
F- Statistics	**22.45112**

Conclusion

The result shows that there are long run associations among the variables. The long-run relationship between the trade balance and the real exchange rate is in line with expectations and what economic theory suggests. The results also indicate that an appreciation of the exchange rate worsens trade balance but that it can also lead to a short term improvement in the balance of trade.

For Kenya to remain competitive in the global market, and reduce her trade balance which has remained negative for 50 years, the government needs to address real threats to trade through appropriate policies. Kenya needs to formulate and adjust external trade policies to address the trade gap by embracing policies which enhance foreign trade. This may be significant in boosting exports and reducing the cost of production which is currently very high compared to other countries in the region. We recommend that the government provides social and physical infrastructure to rural producers

and exporters in rural Kenya (roads, rail), reduce the high price of electricity, high rate of interest, high rate of taxes and adjust the tariff structures appropriately. In addition the government should ensure exchange rates moderation, import reduction, export promotion and crime reduction. All these may be very useful in increasing Kenya's exports while reducing the balance of trade deficits.

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APPENDIX

Table 1: Regression Results (Estimated Equation)

Variable	Coefficient	Standard error	t-value	Probability	REMARKS
Constant	486.9877	156.5480	3.11078	0.0033	Significant
Budgetb	-2.105713	0.3347	-6.2918	0.000	Significant
Exchange	-22.47137	3.939192	-5.704563	0.0000	Significant
FDI	-2.800799	0.985796	-2.841156	0.0069	Significant
U(-1)	0.394677	0.255321	1.545807	0.1297	Significant
R^2	0.809387				NOT Non sense model
Dw-statistics	1.656092				

Table 2: Estimation results

Dependent Variable: BOT
Method: Least Squares
Date: 09/27/12 Time: 11:08
Sample(adjusted): 1964 2010
Included observations: 47 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	486.9877	156.5480	3.110789	0.0033
BUDGETB	-2.105713	0.334673	-6.291848	0.0000
EXCHANGE	-22.47137	3.939192	-5.704563	0.0000
FDI	-2.800799	0.985796	-2.841156	0.0069
U(-1)	0.394677	0.255321	1.545807	0.1297

R-squared	0.809387	Mean dependent var	-1025.374
Adjusted R-squared	0.791234	S.D. dependent var	1471.363
S.E. of regression	672.2795	Akaike info criterion	15.95951
Sum squared resid	18982311	Schwarz criterion	16.15634
Log likelihood	-370.0486	F-statistic	44.58555
Durbin-Watson stat	1.656092	Prob(F-statistic)	0.000000

Table 3. Residual test.

ADF Test Statistic	-4.738261	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(U)
Method: Least Squares

Sample(adjusted): 1964 2010
Included observations: 47 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
U(-1)	-0.658341	0.138941	-4.738261	0.0000
C	8.069365	63.03739	0.128009	0.8987

R-squared	0.332850	Mean dependent var	8.369050
Adjusted R-squared	0.318025	S.D. dependent var	523.3143
S.E. of regression	432.1624	Akaike info criterion	15.01710
Sum squared resid	8404394.	Schwarz criterion	15.09583
Log likelihood	-350.9019	F-statistic	22.45112
Durbin-Watson stat	2.220464	Prob(F-statistic)	0.000022

Table 4: Co integration test

Eigen value	Likelihood ratio	5% critical value	Hypothesized no. of co integration equations
0.656341	98.65421	47.21	None **
0.550443	49.52140	29.68	At most 1**
0.221682	12.74470	15.41	At most 2
0.026092	1.216182	3.76	At most 3

*(**) denotes rejection of the hypothesis at the 0.05 significant level.
LR. Test indicates 2 countertrading equations at 5% significant

Table 5. ECM
Dependent Variable: D(BOT)
Method: Least Squares

Sample(adjusted): 1964 2010
Included observations: 47 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-136.0037	63.47008	-2.142800	0.0380
D(EXCHANGE)	22.43953	13.59476	1.650601	0.1063
D(BUDGETB)	-0.891889	0.377009	-2.365695	0.0227
D(FDI)	0.196115	0.465310	0.421472	0.6756
U(-1)	-0.438601	0.161794	-2.710853	0.0097
R-squared	0.182119	Mean dependent var		-133.9332
Adjusted R-squared	0.104226	S.D. dependent var		423.2530
S.E. of regression	400.5892	Akaike info criterion		14.92404
Sum squared resid	6739812.	Schwarz criterion		15.12086
Log likelihood	-345.7149	F-statistic		2.338059
Durbin-Watson stat	1.576869	Prob(F-statistic)		0.070785

Table 6.Vector Error Correction Model (Short run reaction)

The equation is given by;

D(BOT) = C(1)* (BOT(-1) + 96.5736304502*FDI(-1) + 10.9766792984 *BUDGETB(-1) - 1.12649357884* EXCHANGE(-1) - 7282.32351574) + C(2)*D(BOT(-1)) + C(3)* D(BOT(-2)) + C(4)*D(FDI(-1)) + C(5)*D(FDI(-2)) + C(6)*D(BUDGETB(-1)) + C(7)* D(BUDGETB(-2)) + C(8) * D(EXCHANGE(-1)) + C(9)* D(EXCHANGE(-2)) + C(10)

Coefficient	Value	Standard error	t-statistics	Probability
C_1	6.9E-05	0.012554	0.005498	0.9956
C_2	0.078345	0.161658	0.484636	0.6309
C_3	0.727283	0.163819	4.4395	0.0001
C_4	-0.8523	0.920260	-0.9262	0.3605
C_5	0.500917	0.595383	0.84133	0.4057
C_6	0.517499	0.416201	1.24334	0.2218
C_7	0.535524	0.4094	1.307817	0.1992
C_8	15.37305	11.98068	1.2831	0.2076
C_9	-22.12892	11.79506	-1.876118	0.0688
C_{10}	-42.23940	70.75652	-0.5970	0.5543
R^2	**0.6123**			
Dw Test	**1.72**			

HO: $C_1+C_2+C_3+\ldots\ldots\ldots\ldots+C_{10} =$ 0 (Coefficient not jointly significant)
HA: $C_1+C_2+C_3+\ldots\ldots\ldots\ldots+C_{10} \neq$ 0 (Coefficient are jointly significant)

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
t-statistic	-0.257836	36	0.7980
F-statistic	0.066479	(1, 36)	0.7980
Chi-square	0.066479	1	0.7965

Null Hypothesis: C(4)+C(5)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(4) + C(5)	-0.351383	1.362816

Restrictions are linear in coefficients.

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
t-statistic	-0.407684	36	0.6859
F-statistic	0.166206	(1, 36)	0.6859
Chi-square	0.166206	1	0.6835

Null Hypothesis: C(8)+C(9)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.

C(8) + C(9)	-6.755868	16.57135

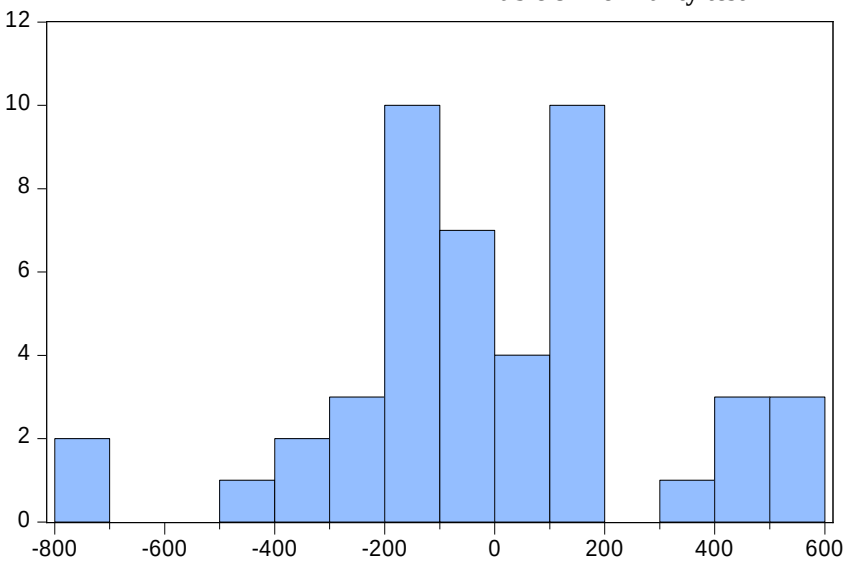
Restrictions are linear in coefficients.

Table 7 Serial correlation test.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.910241	Prob. F(2,34)	0.4120
Obs*R-squared	2.337829	Prob. Chi-Square(2)	0.3107

Table 8- Normality test



Series: Residuals	
Sample 1966 2011	
Observations 46	
Mean	-4.94e-15
Median	-14.01494
Maximum	572.0087
Minimum	-742.8447
Std. Dev.	297.4180
Skewness	-0.143373
Kurtosis	3.256106
Jarque-Bera	0.283310
Probability	0.867921