

## BALANCE OF PAYMENTS EQUILIBRIUM: A TEST OF MARSHALL-LERNER CONDITION IN NIGERIA

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### **Abstract**

*The study is set out to investigate the Balance of Payments Equilibrium position in Nigeria by testing the Marshall-Lerner condition using the Sodesten and Reed Approach to model the balance of payments. The methodology involves descriptive statistics and econometric methods. Specifically, the study used Vector Error Correction (VEC) method, testing the data property with the help of the Augmented Dickey Fuller (ADF) test and the Philip Perron test. The cointegration method was used to extract both the short and the long run relationships between balance of trade equation and the endogenous variables in the model. The results of the study support systematic currency depreciation in order to improve Nigeria trade balance vis-à-vis the rest of the world. However, massive currency appreciation may be detrimental to the health of the external sector as a result of exportable commodity constraint. Nigeria export basket is dominated by crude oil whose price is predetermined in the global oil market and may not respond to local currency depreciation.*

*Keywords: Balance of Trade, Marshall-Lerner Condition, Currency depreciation, Nigeria.*

### **1. Introduction**

Balance of payments equilibrium is one of the macroeconomic objectives and is critical to achieving other macroeconomic objectives in any country. It is however observable that several countries including some developed and developing countries have problems with their balance of payments which may eventually lead to imbalance in the internal or the external sectors of their economies. Generally speaking, imbalances are of two main types; internal and external. Internal imbalance results from the disequilibrium in the aggregate demand-aggregate supply framework. Burrows and Hitiris (1973) posit that an internal imbalance occurs when an economy is operating either in excess of, or significantly below potential output. The existence of a gap between the full employment level of output and the equilibrium level of output creates internal imbalance. External imbalance, on the other hand, results from disequilibrium in the balance of payments account and, since the balance of payments accounts is made of the current, capital and official settlement accounts, disequilibrium in any of these could trigger external imbalance.

These imbalances are the main focus of adjustment policies which are aimed at restoring sustainable long run equilibrium in both the aggregate demand – aggregate supply frameworks and the balance of payments account. Macroeconomic adjustment policies are policies that the government can use to reconcile national macroeconomic objectives with international market pressures. They include trade and capital controls, exchange rate policies, balance of payments financing, and monetary as well as fiscal policies. The fundamental objective of macroeconomic adjustments therefore is to eliminate disequilibrium between internal and external balance in the economy (Webb, 1991; Doroodian, 1993).

The Nigerian economy was predominantly agrarian in the pre-colonial era and remained largely so until the discovery of crude oil in the Niger Delta belt of the country. The major commodity exports as at the time were agricultural products which were subjected to price shocks in the world market. The discovery and exploration of oil in Nigeria changed the external sector equation, relegating agriculture to the background and promoting the petroleum exports at the expense of all other exportable commodities in Nigeria. Invariably, Nigeria became a mono-product economy and a structurally defective dualistic state with a large rural population that depended on subsistence agriculture for their survival and a small modern, urban population with a largely monetized economy.

Achieving balance of payments equilibrium is one of the fundamental macroeconomic objectives in any country including Nigeria. A stable balance of trade regime will lead to balance of payments equilibrium particularly if the capital and other accounts are well managed to give a positive balance. To ensure stability in both the current account section of the balance of payments and the overall balance of payments itself, the monetary authority in Nigeria have adopted several strategies. One of the strategies is devaluation of the domestic currency in order to improve the trade balance. The problem here is that it is difficult to ascertain whether the devaluation or depreciation policy achieved its objectives. One way to ascertain the effectiveness of devaluation or depreciation policy is through the Marshall-Lerner condition and the J curves verification. This study is therefore aimed at empirically investigating the effectiveness of devaluation in Nigeria, through the estimation of the Marshall-Lerner condition and the J curves effect. The broad objective of the study is to determine the extent to which macroeconomic adjustment have contributed to the balance of payments equilibrium in Nigeria from 1970 to 2012. The specific objectives are to:

- i. determine the long run relationship between currency and trade balance, and
- ii. examine the short run relationship between currency and trade balance.

The study is divided into five sections. Section one is the introduction while section two presents a review of relevant review. The methodology is presented in section three and in Section 4, the data are presented and analysed. Section five rounds off the paper with conclusions and policy implications.

## **2. Literature Review**

Historically, the Nigerian economy has been subjected to severe and continuous macroeconomic instability which has led the economy into several crises. Notable among these are the inflationary pressure of the mid 1970s when the Federal Government through Udoji Commission granted an increase of about 300% in the salaries and emoluments of the civil servants (Anazodo, Okoye, & Chukwuemeka, 2012). This led to the injection of huge amounts of money into the economy beyond what it could accommodate. The direct consequence of this policy was a high level of inflation. Sequel to this was oil price shocks that occurred as a result of the oil glut of the early 1980s which affected most oil producing exporting countries including Nigeria. The fall in crude oil price of early 1980s resulted in oil revenue shock in Nigeria, coupled with unabated preferences for imports. This resulted in current account deficit as revenue from exports was insufficient to offset the bills accruing from imports. The period also witnessed decline in capital flows into the country as many countries in the world were battling with the effects of slower economic growth. This led to a full blown balance of payments crisis and huge debt profile in Nigeria.

The preference of Nigerians for foreign made goods has continued to be both alarming and disturbing especially when considered in the light of its effect on local

industries. The general notion among some Nigerians is that locally made goods are inferior to imported goods in terms of quality and performance to the extent that some local manufacturers have resorted, in a bid to remain relevant, to claiming a foreign origin for their products. (Odularu, 2007; Ogunnaike 2010) Similarly, the commodities terms of trade (T.O.T) were deteriorating at that time as most primary commodity exporters, Nigeria inclusive experienced weaknesses in their negotiating power as the more advanced countries that bought commodities could dictate the tune of the bargain as supply seems to be greater than demand in the world market for most of those commodities. The macroeconomic crises of the 1980s became so severe that the government intervened with the use of structural adjustment programme (SAP) which was primarily a policy promoted by the International Monetary Fund (IMF).

The major assumption of SAP was that Nigerian domestic currency was overvalued. This was thought to explain why her exports were costlier in the world market and imports from other countries remain very cheap to the citizens of the country. In order to correct the perceived anomalies, the foreign exchange market which operated under a fixed regime was deregulated so that the forces of demand and supply would be allowed to determine the exchange rate of the naira to international convertible currencies such as the US dollar, pound sterling etc. The deregulation of Nigerian foreign exchange triggered another macroeconomic crisis which involved the sudden loss of value of the domestic currency coupled with supply side constraints of the domestic economy. This later affected the manufacturing sector which could not cope with escalating cost of production occasioned by energy crisis in form of epileptic power supply, by end of 1980s Nigerian economy was already in the state of dilemma that affected the financial sector and led to the banking sector crisis in the early 1990s.

Though structural adjustment programme (SAP) was terminated in the mid 1990s, its effects are still evident in the Nigerian economy. The government introduced other measures to restore the foreign exchange market to its pre-crisis stage. These measures include second tier foreign exchange market (SFEM), which was later replaced by foreign exchange market (FEM) and inter-bank foreign exchange market (IFEM) (Adeoye, 2007). The situation in the payments side of the Nigerian external sector worsened as importation exceeded exports of tradable goods. That was the beginning of the country's debt crisis as the external reserves were unable to pay for the country's import obligations; import bills kept piling up and being rolled over into debt. The current study, therefore, is an attempt to find a lasting solution to the problem of Nigerian balance of payments. The importance of external sector equilibrium to any country's macroeconomic stability cannot be overemphasized because balance of payments deficit remains one of the most significant macroeconomic distortions in any country. The severity of a deficit position of the Nigerian balance of payments and its consequences on the stability of internal and external sectors of the economy provides the impetus for the current study.

The existence of the balance of payments disequilibrium in Nigeria is a matter of great concern to all stakeholders in the Nigerian economy particularly the government and her agencies concerned with the management of the economy, as well as investors and other international institutions such as the IMF whose fundamental goals include stability of the balance of payments position of member nations like Nigeria. If proper care is not taken, Nigeria may experience the Mexican balance of payments crisis of 1994 which was properly documented in Agenor & Montiel (2008). Mexico was at the time experiencing slow growth shortly before the crisis; the problem was complicated by a fragile financial system, a high

current account deficit and poor policy responses on the part of Mexican authorities to the crisis. Mexico's balance of payments crisis led the country into currency crisis and heavy losses recorded in the country's reserve assets. The conditions that led to the Mexican crisis are present in Nigeria macroeconomic environment. The financial system in Nigeria is fragile as many of the deposit money banks failed the stress tests recently conducted by the Central Bank of Nigeria; this has led to a considerable reduction in the number of deposits money banks; down from 99 before the recapitalization exercise of 2006, to 25 and much later to 24. Similarly, the current account position has been in deficit for some time now; if not for income from crude oil sales, the nation's current account would have been adversely affected by high import bills emanating from machinery and equipment.

According to Umo & Fakiyesi (1995), Nigeria's balance of payments problem has been a major challenge to the country's development efforts. It has undermined several short-run solutions and interventions by governments and the problem remains largely unresolved. Little, Scitovsky and Scot (1970) and Bhagwati (1978) opined that trade policy and subsequent reform agenda of developing countries impact meaningfully on the overall balance of payments position of those countries particularly taking into accounts the basic features of these economies that are receptive to external shocks arising from primary commodity price volatility. Worthy of note of such trade reform in the case of Nigeria is the Import Substitution Industrialization, which was intended to reduce the country's heavy reliance on imported goods in order to reduce the pressure on the balance of payments position. The reform did not achieve its stated goals because of the structural defects of the Nigerian economy coupled with inadequate industrial infrastructure needed to achieve take off. Egwaikhede (1992) particularly notes that import substitution industrialization reform, rather than making Nigeria a net exporter of industrial goods, aggravated foreign exchange crisis during the period and the effect of this was noticeable on the deficit position of the overall trade balance of the country.

Omankhanlen and Mukoro (2011) in a recent study on Nigeria balance of payments adjustment used time series data spanning 1986-2007 to investigate the monetary approach to balance of payments. The methodology involves ordinary least square (OLS) single equation technique while observing the impacts of both monetary and real variables on the current account balance. The explanatory variables include in the model are total domestic credit, gross domestic products and government expenditure capturing the real effect in the model. The study finds that aggregate domestic credit is significant in explaining non stochastic movement in the current account balance. There exists a positive correlation between the nation's size of the economy and her current account balance during the period under investigation. The study suggests that for Nigeria to experience stability in the balance of payments, the policy thrust should be a mix between monetary and real variables targeting. This is because a monetary phenomenon cannot sufficiently explain Nigeria patterns of balance of payments as fiscal issues play a significant role in bringing the external sector to equilibrium.

The current study is an attempt at a comprehensive empirical investigation of the balance of payments and macroeconomic adjustment policy in Nigeria with a nested model that incorporates the monetary approach to balance of payments with the real or fiscal variables as instruments as suggested by Nwaobi (2003). This is in order to provide a radical departure from the monetary approach to balance of payments in Nigeria, which had been the thrust of earlier studies done on Nigeria. In a similar study, Oladipupo (2011) examined the impact of exchange rate on balance of payments in Nigeria using time series data

covering 1970-2008. The method of analysis used was ordinary least square (OLS) and the result obtained suggest that exchange rate is significant and has a negative relationship with balance of payments while domestic credit and real output are significant and have a positive relationship on the balance of payments in Nigeria within the period under study.

Akpaung (2013) opined that any observed disequilibrium in the balance of payments can be eliminated through an adroit manipulation of monetary variables especially domestic credit, under a fixed exchange rate regime, absence of sterilization by the monetary authorities and stable demand for money function. The study concluded that for Nigeria to avoid crisis in the balance of payments, the growth of the domestic credit should be curtailed so that economic agents can limit their consumption relative to their income, to reverse the pressure on the current account. Adamu and Istede (2008) were of the opinion that the disequilibrium in the balance of payments may be temporary or fundamental. Temporary disequilibrium occurs as a result of random walk in the trade, exchange rate volatility and seasonal variation in income. Temporary disequilibrium is self-correcting. Fundamental disequilibrium occurs when there is severe and prolonged balance of payments imbalance which can only be corrected by policy options and direct interventions in the workings of the variables that determine the level of balance of payments equilibrium. The existence of chronic and persistence balance of payments disequilibrium and the impending danger of perceived gap between future revenue from oil and fiscal responsibility of the Nigeria state when oil must have become an old economy is one of the fundamental issues the current research intends to address.

From the foregoing, the problems of balance of payments disequilibrium have serious implication for economic growth, employment generation and overall macroeconomic stability of the country. If these problems linger, they can destabilize the economy and engineer social crisis. The country debt profile will rise and credit becomes unavailable from international windows. A full blown economic recession may set in, this may be detrimental to the overall wellbeing of Nigeria and may threatens the continuous existence of the nation, this may have serious implication for African continent as Nigeria is the largest economy in the continent ahead of South Africa and Egypt.

### **3. Methodology**

The method of research involved the use of co-integration technique and vector error correction estimation. The current account balance is closely associated with the balance of trade and this accounts for a comparatively large proportion of the current account balance. This study therefore considers the determinants of the balance of trade, while highlighting the Marshall-Lerner condition. Wu (2010) maintains that the traditional elasticity approach (of Marshall-Lerner condition) appeals to the relative price effect and underscores the role of the elasticities of demand and supply of imports and exports respectively on the balance of payments equilibrium, via the balance of trade, and the kind of macroeconomic adjustment required. A modification of the Sodersten & Reed (1980) approach to deriving the Marshall-Lerner condition is adopted in this theoretical framework and is extended to discover the role of domestic and foreign national output in determining the balance of trade – thus resulting in both static and dynamic models.

The theoretical framework in this section utilises the two-country framework. The two countries in question are the home country and the rest of the world. It is assumed that the home country demands foreign imports and supplies its exports to the rest of the world,

which in turn becomes the import demand for the rest of the world. The home demand function is assumed to be a function of the home price equivalent of foreign prices and home income while the rest of the world demand function is assumed to be a function of the foreign price and foreign (or world) income. Both the home and rest of the world countries are assumed to be price takers who cannot influence the supply price of home exports and home imports respectively and it is also assumed that price is the sole determinant of supplies for both countries.

Assuming imports  $M_t$  from the foreign market at the naira denominated price of  $p_{ht}$  while the foreign exporters willing to sell at the price of  $p_{ft}$  with the ruling exchange rate as at the time given as  $\text{N}ex_t/\$1$  which is naira expressed as a ratio of the dollar equivalent, the elasticity of demand for imports by Nigeria and the elasticity of supply of exports by the foreign country are respectively:  $\theta_{dt}$  and  $\theta_{st}$  and they are given as:

$$\theta_{dt} = -\frac{dM_t}{M_t} \cdot \frac{p_{ht}}{dp_{ht}} \quad 3.1$$

and

$$\theta_{st} = \frac{dM_t}{M_t} \cdot \frac{p_{ft}}{dp_{ft}} \quad 3.2$$

The demand for foreign exchange to finance imports is given as:

$$D_t = M_t \cdot p_{ft} \quad 3.3$$

and the total derivative of the demand for foreign exchange is given as:

$$dD_t = p_{ft}dM_t + M_t dp_{ft} \quad 3.4$$

On re-expressing equation 3.4 above, the following results are obtained:

$$\frac{dD_t}{D_t} = \frac{dM_t}{M_t} \left( 1 + \frac{1}{\frac{dp_{ft}}{p_{ft}} \cdot \frac{p_{ft}}{M_t}} \right) \quad 3.5$$

On substituting in  $\theta_{st}$  from equation 3.2 in equation 3.5, we have:

$$\frac{dD_t}{D_t} = \frac{dM_t}{M_t} \left( 1 + \frac{1}{\theta_{st}} \right) \quad 3.6$$

but given the condition:

$$p_{ht} = ex_t \cdot p_{ft} \quad 3.7$$

On differentiating equation 3.7 totally we have:

$$dp_{ht} = ex_t \cdot dp_{ft} + p_{ft} dex_t \quad 3.8$$

and re-expressing equation 3.8 the following results are obtained:

$$\frac{dp_{ht}}{p_{ht}} \cdot \frac{M_t}{dM_t} = \frac{dp_{ft}}{p_{ft}} \cdot \frac{M_t}{dM_t} + \frac{dex_t}{ex_t} \cdot \frac{M_t}{dM_t} \quad 3.9$$

On substituting in the values of  $\theta_d, \theta_s$  from the equations 3.1 and 3.2 respectively the following results are obtained:

$$-\frac{1}{\theta_{dt}} = \frac{1}{\theta_{st}} + \frac{dex_t}{dM_t} \cdot \frac{M_t}{ex_t} \quad 3.10$$

On revising equation 3.10:

$$\frac{dM_t}{M_t} = -\frac{dex_t}{ex_t} \frac{\theta_{dt}\theta_{st}}{\theta_{dt} + \theta_{st}} \quad 3.11$$

On substituting the value of  $\frac{dM_t}{M_t}$ , derived above, into equation 3.6 the following results are obtained:

$$\frac{dD_t}{D_t} = -\frac{dex}{ex} \cdot \theta_{dt} \frac{1 + \theta_{st}}{\theta_{st} + \theta_{dt}} \quad 3.12$$

On the other hand, assuming that Nigeria exports  $X_t$  crude oil at the domestic price  $p_{ht}$  and it is bought in the foreign market at the price  $p_h$ , given that the exchange rate at the time is  $\$ex_t/\$1$ . If the elasticities of supply of export by Nigeria and demand for exports by the foreign market are:  $\theta'_{st}$  and  $\theta'_{dt}$  respectively, then we have that:

$$\theta'_{st} = \frac{dX_t}{dp_{ht}} \cdot \frac{p_{ht}}{X_t} \quad 3.13$$

and

$$\theta'_{dt} = -\frac{dX_t}{dp_{ft}} \cdot \frac{p_{ft}}{X_t} \quad 3.14$$

The supply for foreign exchange from exportation is given as:

$$S_t = X_t \cdot p_{ft} \quad 3.15$$

and the total derivative of the demand for foreign exchange is given as:

$$S_t = p_{ft}dX_t + X_t dp_{ft} \quad 3.16$$

On revising equation 3.16 the following results:

$$\frac{dS_t}{S_t} = \frac{dX_t}{X_t} \left[ 1 + \frac{1}{\frac{dX_t}{dp_{ft}} \cdot \frac{p_{ft}}{X_t}} \right] \quad 3.17$$

On substituting in the value of  $\theta'_d$  from equation 3.17 and revising it, we get the following result:

$$\frac{dS_t}{S_t} = \frac{dX_t}{X_t} \frac{\theta'_{dt} - 1}{\theta'_{dt}} \quad 3.18$$

Recall equation 3.8:

$$p_{ht} = ex_t \cdot dp_{ft} + p_{ft} dex_t \quad 3.8$$

On multiplying both sides of equation 3.13 with the expression  $\frac{X_t}{dX_t}$  and revising the result, the following values are obtained:

$$\frac{dp_{ht}}{dX_t} \cdot \frac{X_t}{p_{ht}} = \frac{dp_{ft}}{dX_t} \cdot \frac{X_t}{p_{ft}} + \frac{dex_t}{ex_t} \cdot \frac{X_t}{dX_t} \quad 3.19$$

We substitute in the values of:  $\theta'_{st}, \theta'_{dt}$  from equations 3.13 and 3.14 respectively and revise the resulting equation to get:

$$\frac{dX_t}{X_t} = \frac{dex_t}{ex_t} \cdot \frac{\theta'_{st}\theta'_{dt}}{\theta'_{st} + \theta'_{dt}} \quad 3.20$$

On substituting the value of  $\frac{dX_t}{X_t}$  in equation 3.20 into equation 3.18, we get:

$$dS_t = S_t \frac{dex_t}{ex_t} \cdot \theta'_{st} \frac{\theta'_{dt} - 1}{\theta'_{st} + \theta'_{dt}} \quad 3.21$$

The two equations that examine the demand for and supply of foreign reserves are presented below:

$$dD_t = -\frac{dex}{ex} \cdot \theta_{dt} \frac{1 + \theta_{st}}{\theta_{st} + \theta_{dt}} \quad 3.12$$

$$dS_t = \frac{dex_t}{ex_t} \cdot \theta'_{st} \frac{\theta'_{dt} - 1}{\theta'_{st} + \theta'_{dt}} \quad 3.21$$

Definition of variables:  $X, M, D_t, S_t, p_f, dex/ex, \theta_d, \theta_s, \theta'_d$  and  $\theta'_s$  are exports, imports, demand for foreign exchange, supply of foreign exchange, foreign price, percentage change in exchange rate, elasticity of demand for import by domestic firms, elasticity of supply of imports by foreign firms, elasticity of demand for exports by foreign firms and elasticity of supply of exports by domestic firms respectively.

The derivative of the natural log transformation of the balance of trade  $B_t$ , measured as the ratio of the supply of foreign exchange  $S_t$  to demand for foreign exchange  $D_t$ , is defined as:

$$\frac{dB_t}{B_t} = d \ln B_t = d \ln \frac{S_t}{D_t} = d \ln S_t - d \ln D_t = \frac{dS_t}{S_t} - \frac{dD_t}{D_t}$$

where  $B_t = \frac{S_t}{D_t}$  and hence we have:

$$\frac{dB_t}{B_t} = \frac{dS_t}{S_t} - \frac{dD_t}{D_t} \quad 3.22$$

On substituting in the values of  $dS_t$  and  $dD_t$  of equations 3.12 and 3.21 respectively into equation 3.29 we have:

$$\frac{dB_t}{B_t} = \frac{dex_t}{ex_t} \theta'_{st} \frac{\theta'_{dt} - 1}{\theta'_{st} + \theta'_{dt}} + \theta_{dt} \frac{1 + \theta_{st}}{\theta_{st} + \theta_{dt}} \quad 3.23$$

We consider that the elasticity of supply for imports by the foreign firms to be infinite since the market is assumed to be perfectly competitive and the elasticity of supply of exports is also considered to be infinite since the domestic firm exports in a perfectly competitive market. We then have that:  $\lim \theta_s \rightarrow \infty$  and  $\lim \theta'_s \rightarrow \infty$ . On re-writing the balance of trade equation to capture the aforementioned we have:

$$\frac{dB_t}{B_t} = \frac{dex_t}{ex_t} \theta_{dt} + \theta'_{dt} - 1 \quad 3.24$$

where  $\lim \theta_{st} \rightarrow \infty$  and  $\lim \theta'_{st} \rightarrow \infty$

From equation 3.24 we have:

$$\frac{d \ln B_t}{d \ln ex_t} = \theta_{dt} + \theta'_{dt} - 1 \quad 3.25$$

Equation 3.25 reveals that depreciation in the exchange rate  $ex_t$  would have a positive effect on the balance of trade  $B_t$  if and only if:  $\theta_{dt} + \theta'_{dt} - 1 > 0$  and in the event that this condition is violated the converse is the case – and this is known as the Marshall-Lerner condition.

The analysis hitherto has considered just the price elasticities of demand for imports and exports for both the home and foreign countries respectively. Gauging the effects of home and foreign income on the balance of trade of the domestic economy after accounting for the impact of exchange rate changes, the model for the study is given as:

$$\ln B_t = \alpha_0 + \alpha_1 \ln ex_t + \alpha_2 \ln Y_{ht} + \alpha_3 \ln Y_{ft} + u_t \quad 3.26$$

#### 4. Data Analysis and Results

This section is dedicated to data analysis and results discussions. The first sub-section involved the test of stationarity for the variables used in the balance of trade model.

##### Stationarity Test

Table 4.1 Augmented Dickey Fuller and Phillip Perron Test Results

Variable name	Unit root test	At level	At first difference	Test specification	Order of integration
LOG(B)	ADF test	-4.1328 (0.0116)	-	Trend and Intercept	I(0)
	PP test	-3.4723 (0.0553)	-14.4904 (0.0000)	Trend and Intercept	I(1)
LOG(EX)	ADF test	-1.7304 (0.7203)	-5.1808 (0.0007)	Trend and Intercept	I(1)
	PP test	-1.9761 (0.5975)	-5.1783 (0.0007)	Trend and Intercept	I(1)
LOG(YH)	ADF test	-1.4962 (0.8156)	-4.3039 (0.0078)	Trend and Intercept	I(1)
	PP test	-1.4962 (0.8156)	-8.4921 (0.0000)	Trend and Intercept	I(1)
LOG(YF)	ADF test	-3.0494 (0.1316)	-4.0311 (0.0150)	Trend and Intercept	I(1)
	PP test	-2.5193 (0.3178)	-3.9698 (0.0175)	Trend and Intercept	I(1)

Source: Extracted by the author from E-view output

The balance of trade equation is pre-tested for the existence of unit roots to detect the order of integration of the variables in the balance of trade model. The unit root test results are shown in the Table 4.1, from which can be seen that the augmented Dickey Fuller test indicates that the variables in the model are stationary at first difference with the exception of the natural log transformation of the balance of trade. The Phillip Perron test results on the other hand show that all the variables are stationary at first difference. This allows us to go ahead with the estimation of VEC model of the balance of trade equation earlier specified.

As the short run results on Table 4.2 below show, the error correction reveals that a 0.9549% growth in the balance of trade is achieved in the event of a unit percent disturbance away from the long run steady state. The degree of adjustment is hence quite high as seen from the error correction coefficient and this coefficient is statistically significant at the 5% level. The short run coefficients reveal that a change in the balance of trade in the past one period has the effect of growing the current level of the balance of trade by 0.4132%. The change in the exchange rate depreciation in the past one period by one percent has the effect of growth the balance of trade by 0.1442%, the growth in the gross domestic product by one percent has the effect of retarding the balance of trade by 0.5720% and the growth in the world gross domestic product by one percent has the effect of growing the balance of trade by 2.6648%.

Of all the coefficients considered only the short run coefficient of the exchange rate is not significant at the 5% level.

**Table 4.2 Short and Long Run Vector Error Correction Analysis**

Dependent Variable	D(LOG(B))	Dependent Variable	D(LOG(B))
Regressors of Cointegrating Equation	Long Run Coefficients (Standard Errors) [p-values]	Error Correction: CointEq1	Short Run Coefficients (Standard Errors) [p-values]
LOG(EX(-1))	0.142994 (0.04673) [-3.05995]		-0.954871 (0.16675) [-5.72625]
LOG(YH(-1))	0.256800 (0.10494) [-2.44705]	D(LOG(B(-1)))	0.413152 (0.14799) [ 2.79185]
LOG(YF(-1))	-0.272097 (0.14012) [ 1.94193]	D(LOG(EX(-1)))	0.144238 (0.15121) [ 0.95388]
C	2.067636	D(LOG(YH(-1)))	-0.572002 (0.19645) [-2.91170]
		D(LOG(YF(-1)))	2.664845 (0.82091) [ 3.24620]
		C	-0.170275 (0.07813) [-2.17946]

Source: Extracted by the author from E-view output

## 5. Conclusion and Policy Implications

The study set out to achieve two fundamental objectives: to examine the short and long run relationship between currency and trade balance. The results of the study support a systematic currency depreciation in order to improve Nigeria trade balance vis-à-vis the rest of the world. However, massive currency appreciation may be detrimental to the health of the external sector as a result of exportable commodity constraints. Nigeria export basket is dominated by crude oil whose price is predetermined in the global oil market and may not response to local currency depreciation. Currency depreciation can only be beneficial in the case where exportable commodities are diverse and are not subject to price distortions.

The implications of the empirical findings summarized in the previous section are discussed in this section and are presented below:

- i. Policy measures that require a 1% devaluation in the exchange rate have a 0.14% basis point growth on balance of trade and this is instrumental for targeting the growth in balance of trade
- ii. However despite the positive growth impact of exchange rate devaluation on balance of trade in the long run, the dynamic effect of a 1% devaluation in the exchange rate has the effect of engendering positive growth rate in the balance of trade which diminishes over time with the degree of dissipation accelerating in the fourth year to zero. In the first year a growth of 0.41% was recorded in the balance of trade and in the second and third the impact coefficients are: 0.06% and 0.01% respectively. Thus the use of exchange rate devaluation in ensuring balance of trade growth is only relevant for the next three years and the so called empirical pattern, the J-curve, is not observed in the case of Nigeria and this is

further revealed in the impulse response of the growth of balance of trade to nominal exchange rates.

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