REAL EXCHANGE RATE MISALIGNMENT AND TRADE FLOWS IN NIGERIA (1960-2013)

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Abstract

The paper examined the effects of real exchange rate misalignment on trade flows in Nigeria between the year 1960 and 2013. Trade flows were divided into export flow, import and trade balance. The paper employed the behavioural equilibrium exchange rate (BEER) approach to obtain the equilibrium real exchange rate for Nigeria and a single equation co-integration approach to determine the effect of exchange rate misalignment on trade flows. It was observed that Nigeria's real effective exchange rate appreciated in most periods between 1960 and 1985 and depreciated in most periods between 1986 and 2013. The result of the study further indicates that real exchange misalignment has no significant effect on the volume of export but it has a significant depreciating effect on import and trade balance in the country. The study recommends a flexible exchange rate system to reduce real exchange rate misalignment and diversified export products to enable volume export responds to real exchange rate movements in the country.

Keywords: Real exchange rate, trade flows, export, import, misalignment DOLS.
JEL Clasification: F31

1. Introduction

Real exchange rate has been identified by various policy-makers as a major key factor in ensuring both the internal and external balances of the developing countries' economies. However, in the past two decades, this particular price has been observed to be out of equilibrium in most parts of the developing countries. This misalignment of exchange rate, as stated in the work of Auboin and Ruta (2011) can have a strong effects on the economy, as they affect the structure of output and investment. The distortion can lead to an inefficient allocation of resources and the incentive to engage in trade. As a result of this perceived problem, developing countries are encouraged to conduct their policy correctly in order to minimize the extent at which the actual real exchange rate deviates from the ideal rate over time.

This paper tends to examine the effects of the real exchange rate misalignment on trade flows (export, import and trade balance) in Nigeria between the period of 1960 and 2013. The choice of this macroeconomic indicator (trade flows) was guided by the fact that there is a dearth of work on this issue as far as Nigeria is concerned; also, as the country relies mostly on international trade for its survival, any study that tends to examine those factors that can distort the flow of foreign exchange to Nigeria should be described as appropriate and patriotic.

The exchange rate in Nigeria has suffered various fluctuations from 1960 to 2013. The fluctuations in the exchange rate may be generally dependent on the extent of the Central Bank's independence and some other monetary variables (Griffin, 2011). A close observation of this rate indicates that between 1960 and 1985, Nigeria's Naira against the US dollar experienced currency appreciation but for most periods between 1986 and 2013, Nigeria's currency had been depreciating (see Alliyu, 2008 for detail trends of Nigeria's exchange rate).

However, against many studies in this field (Razins and Collins, 1997; Edwards, 1998; Alliyu, 2008), this study computes Nigeria's real effective exchange rate (REER) using 17 trade partner countries that accounted for about 80 per cent of the total trade flows in the country within the period of the study. It is the difference between this computed REER and th equilibrium real exchange rate (in absolute terms) obtained through the behavioural equilibrium exchange rate (BEER) approach that constitutes the real exchange rate misalignment. Moreover, the study is motivated by the role the country's exchange rate plays in the maintenance of its external equilibrium and the extent of the nation's competitiveness in the international market, in a way that the exchange rate deviations from the ideal rate be monitored not to allow for divergences that could hamper the trade flows of the economy.

Apart from this introductory section, the paper is further divided as follows: the next section reviews the relevant literature, while chapter three deals with research methodology; the analysis of the results are in chapter four and the last chapter five concludes the work.

2. Review of Literature

2.1 Reduced-Form Equation Models of Real Exchange Rates

In most cases, empirical approaches to assessing real exchange rate misalignment are based on small, usually reduced-forms of equation-econometric models. In these models the real exchange rate is defined as the relative price of tradable to non-tradable goods that, simultaneously, are compatible with the attainment of internal and external equilibrium (Edwards,1998). As a basis for these analyses, many authors (Clark and Macdonald, 1988; Edwards and Savastano, 1999) developed theoretical models from which a reduced-form for the equilibrium real exchange rate (ERER) was derived. This reduced-form relates the long-run

equilibrium real exchange rate to a set of variables, called the real exchange rate "fundamentals." These "fundamentals" usually include the terms of trade, output growth (or productivity differentials), the country's openness to international trade, import tariffs and government spending. While some authors (Elbadawi and Soto, 1994; Baffes et al., 1997) have tried to use a relatively large number of "fundamentals" in their regression equations, others have restricted their analyses to a small number of variables.

The majority of single equation models follow a four-step approach for assessing real exchange rate misalignment. In the first step, historical data are used to estimate a (reduced- form) real exchange rate equation. The equation usually expresses the real exchange rate as the function of some economic fundamentals. Most recent studies have estimated this equation using co integration techniques.

The second step usually (but not always) consists of computing "normal" or "sustainable" values for the fundamentals. This is typically done by decomposing the fundamentals into "permanent" and "transitory" components using various techniques, such as the Hodrick Prescot filtration approach and the moving average method.

The third step consists of using the fitted values which are interpreted as the long-run sustainable values of the fundamentals, and the estimated regression coefficients to construct an "equilibrium" path for the real exchange rate. An important property of this approach is that, in contrast with simple PPP-based calculations, it generates an estimated equilibrium real exchange rate that does not have to be constant over time. Indeed, to the extent that there are changes in the fundamentals, the estimated index of the equilibrium real exchange rate obtained from the equation will vary through time.

In the fourth and final step, the degree of misalignment is computed as the difference, at any moment in time, between the equilibrium and the actual real exchange rate.

2.2 Real Exchange Rate Misalignment and Trade Flows

A number of authors have examined the effects of real exchange rate misalignment on trade flows. In most of the literature reviewed, the results obtained were similar, despite the use of different methodologies in their regression. For instance, Jongwanich (2009) examined the impact of the real exchange rate misalignment on export performance in developing Asia. His reduced-form model for export performance regressed the total volume of export on variables like the real exchange rate, FDI, real income, domestic production capacity and an index of real exchange rate misalignment. He employed a general-to-specific modeling procedure which was considered appropriate because the set of variables used were made up of a series of stationary and non-stationary data. The technique employed was the Johansen co-integration method. The WU-Hausman test for simultaneity, according to him, suggests no evidence

of simultaneity. All variables were measured in natural logarithm, to enable regression coefficients to be interpreted as elasticities. The result revealed a negative impact of misalignment on export performance in developing Asia.

Also the work of Gala and Lucinda (2006) for the European Union, investigated the impacts of real exchange rate misalignment on the trade flows in the region. The work employed the gravity model that controls simultaneity bias. In the model, the volume of trade between two countries increases with the product of their GDPs and decreases with their geographical distances. Using a pooled OLS method of regression, it was observed that, exchange rate misalignment has a negative effect on international trade.

Gala (2007) investigated the impact of exchange rate misalignment and volatility on Malaysian trade flows. The study used the reduced-form equation method to construct real exchange rate misalignment, and the GARCH (1,1) method to construct the exchange rate volatility. He specified a simple regression model for the volume of export and import. The volume of export was expressed to depend on the real exchange rate, foreign GDP and an index of misalignment, while, import demand was specified to depend on the real exchange rate, domestic GDP and an index of misalignment. Using the full information likelihood technique to estimate the two models, it was observed that, real exchange rate misalignment has adverse effects on both the volume of export and the import of Malaysia.

In their work, Olimov and Sirajiddinov (2008) examined the effects of the real exchange rate volatility and misalignment on foreign trade flows in Uzbekistan. The paper employed the two-step Engle-Granger technique to compute import demand and export supply price elasticities. In particular, a separate log-linear specification of long-run export and import equations that have among others as explanatory variables; RGDP, real exchange rate, measure of real exchange rate volatility and index of real exchange rate misalignment. The results obtained using the-cointegration technique was that the real exchange rate misalignment had depressing effects on the volume of trade, especially exports in Uzbeskistan.

In Nigeria, Agu (2002) examined the position for equilibrium exchange rates for Nigeria using the single equation procedure. Misalignment was found to be higher during the regulation period. The work proceeded to ascertain the influence of the misalignment and volatility of the RER on the trade balance, and capital account. His trade balance and capital account equations have as explanatory variables, terms of trade, openness of the economy, nominal effective exchange rate and an index of real exchange rate misalignment. He uses the OLS method for estimation. It was observed that the real exchange rate misalignment impeded both the trade balance and the capital account.

2.2 Gap in the Literature

The review of the literature on the subject matter pointed out two major areas of gap that are long due to be filled, namely methodology and time coverage.

Most of the methodologies employed in the previous studies especially in the calculation of the real effective exchange rate are defective. In most cases the number of trading partners involved failed to constitute a greater percentage of the actual trade partners of the particular countries under consideration. Also, the number of years usually used were not long enough to allow for a greater degree of freedom. In this study, 54 years were used to cater to various structural changes within the period of analysis.

3. Research Methodology

In line with previous studies on the subject matter (Baffes et al., 1997:2-8; Jimoh, 2006:89; Dosse, 2007:59-60, etc), this study adopts an equilibrium real exchange rate expression as stated below:

$$R_t = \left[g_n, NKI, {}^{P_x^*}\!/_{P_m^*}, OPEN, M_2, e_{t-1} \right] \quad \text{.....3.1}$$

Where R_t is the real effective exchange rate over time, g_n represents total government expenditure, NKI is net capital inflow, P^*_x/P^*_m captures the country's terms of trade, OPEN is the openness of the economy, M_2 represents broad money supply, while, e_{t-1} is the lagged the of nominal effective exchange rate.

As a first step to obtain the behavioral equilibrium exchange rate (BEER) from equation 3.1, in line with previous works that have used this approach, this study assumed that the long-run relationship delivered by theory was in log-linear transformation of the variables. Thus equation 3.1 is written as:

$$LogR_t = \alpha' H_t + \mu_t \quad \text{.....3.2}$$

Where H_t is the vector of the values for the fundamentals, μ_t is the disturbance term. According to the theory, the shocks that cause the exchange rate to diverge from its equilibrium in the short-run should produce eventual convergence to the relationship. A specification that captures this notion is the dynamic error-correction model. This thus, expressed equation 3.2 as follows:

$$\Delta LogR_t = \theta\left(\log R_{t-1} - \alpha' H_{t-1}\right) + \sum_{i=1}^{p} \beta_i \Delta LogR_{t-i} + \sum_{i=0}^{p} \eta_i' \Delta H_{t-j} + \nu_t \quad \text{.....3.3}$$

Where $H_t = \left[g_n, NKI, {}^{P_x^*}\!/_{P_m^*}, OPEN, M_2, e_{t-1} \right]$ is the vector of fundamentals, and v_t isthe error term with mean zero and stationary over time.

The study estimated equation 3.3 by first testing for the unit root properties of all the variables using the ADF statistic, then, tested for the existence of co-integration relationship between the set of fundamentals and the real effective exchange rate using the Johansen co-integration approach. The co-integration vector among them could then be interpreted as the equilibrium (long-run) relationship.

The study then estimated the co-integrated equation using the Johansen's maximum-likelihood methodology. Criteria such as Alkaike information criteria (AIC), Schwatz criteria (SC) and Likelihood ratio (LR) were used for lag-length of variables and model selection.

The co-integrating vector from equation 3.3 represents the equilibrium real exchange rate. In order to make the BEER result comparable to other methods such as the fundamental equilibrium exchange rate (FEER), the real exchange rate fundamentals identified in equation 3.3 were separated into transitory and permanent components. The study employed the Hodrick–Prescott filter method to separate the values of the fundamentals into transitory and permanent components.

Therefore, the real exchange rate misalignment (mal_t) is measured as:

$$mal_t = \left[\frac{R_t - R_t^*}{R_t^*} \right] * 100 \qquad \text{..... 3.4}$$

Where, R_t is the real effective exchange rate over time and R^*_t represents the real effective equilibrium exchange rate over time.

The above tests were carried out to avoid the problem of spurious regression and enable the estimates to have their long-run values. The idea of the error-correction model (equation 3.3) would produce the dynamic estimates of the variables by giving the both short-run and the long-run coefficients of the variables.

In order to determine the effect of real exchange rate misalignment on trade balance in Nigeria, an augmented model based on existing literature (Bahmani-oshooee, 1998:6-9; Olimov and Sirajiddinov, 2008:10- 16) was employed. The model is stated as follows:

$$\ln {TB_t}/{GDP_t} = \phi_0 + \phi_1 \ln {P_x^*}/{P_{m\,t}^*} + \phi_2 \ln OPEN_t + \phi_3 \ln Y_t + \phi_4 \ln Y_t^* + \phi_5 mal_t + \xi_t \text{ .... 3.5}$$

Where, TB_t represents trade balance over time, $OPEN_t$ is the openness of the economy over time, Y_t is the domestic output, Y_t^* is the weighted foreign output and mal_t represents the variable of misalignment in absolute terms over time. However, in order to effectively drive home the objective of the study under this sub-section, the study estimated separately the export supply and the import demand equations before proceeding to the trade balance equation as specified

in equation 3.5. Accordingly, in line with the work of Egwaikhide (1999:23) and Aliyu (2007:35) on export and import specifications for Nigeria, this study estimated an export equation that included, in addition to the explanatory variables in equation 3.5, foreign direct investment (FDI) and estimated an import demand equation that included levels of external reserve (ER).

The study employed the single co-integration approach developed by Stock and Watson (1993) to estimate equation (3.5). The method (DOLS) performed better in a small sample and it did not require all variables to be integrated in the same order to enter the co-integration space.

3.1 Data Sources

All international data were obtained from the International Financial Statistics(IFS), IMF direction of trade statistics and the World Development Indicators. Internal data were obtained from the Central Bank of Nigeria Statistical Bulletin (various issues).

4. Analysis of Results

All variables entering the BEER model were tested for unit roots using the Augmented Dickey-fuller (ADF) test. The result is reported in Table 4.1.

Table 4.1: ADF unit root test

Exogenous: Constant

Variable	Level	1st Diff.	Order of Integration
In(real effective exchange rate(REER)	-1.7639	-14.8436*	I (1)
In(openness of the economy(OPEN)	-2.2399	-10.1637*	I (1)
In(total govt. expenditure(TGE)	-1.5691	-8.0051**	I (1)
In(broad money supply(M2)	0.5009	-6.4681**	I (1)
In (terms of trade(TT)	-1.0759	-6.4835**	I (1)
In(nom. Effective exch. Rate(NEER)	-2.3049	-6.7784*	I (1)
(net capital flow(NKI)	-1.1889	-13.3132*	I (1)
Critical: 1% = - 4. 1611	5%= -3.5164	10% = - 3.1830	

The result of the unit root tests as shown in Table 4.7 indicates that all variables are not stationary at levels. Thus, variables such as lnREER, lnTT, lnOPEN, lnTGE, InM_2, lnNEER and NKF were confirmed to be I(1). Following this result, the study was prompted to test for co-integration between the dependent variable and those variables that were integrated of order one. The result is presented in Tables 4.2a and 4.2b.

Table 4.2a: Unrestricted co-integration rank test

Series: ln(REER) , ln(TT), ln(TGE), ln(OPEN),ln (NKI)
Lag interval (in first difference): 1 to 1

Hypothesized no of CE (s) (Null Hyp)	Eigen value	Trace statistic	0.05 Critical value
r = 0	0.88	239.73	187.47
r ≤ 1	0.64	138.86	150.56
r ≤ 2	0.47	89.78	117.71
r ≤ 3	0.33	60.24	88.80
r ≤ 4	0.27	41.17	63.88
r ≤ 5	0.25	26.35	42.915

Trace test indicates 1 co-integrating equation at the 0.05 level

From Table 4.2a, it could be observed that the trace statistic is significant when the unrestricted co-integration rank equals one (r=1), thus, indicating one co-integrating equation among the variables. Furthermore, the result of the max-eigen value test supports the trace test. This is presented in Table 4.2b.

Table 4.2b. Unrestricted co-integration rank test (Max-Eigen)

Series: In (REER), In(TT),ln(TGE) ln(OPEN),ln (NKI)
Lag Interval (in first difference): 1 to 1

Hypothesized No of CE(s) (Null Hyp)	Eigen value	Max–Eigen statistic	0.05 critical value
r = 0	0.88	100.86	56.71
r ≤ 1	0.64	49.08	50.55
r ≤ 2	0.47	29.53	44.49
r ≤ 3	0.33	19.06	38.33
r ≤ 4	0.27	14.83	32.12
r ≤ 5	0.25	13.98	25.82

Max-eigenvalue test indicates 1 co-integrating equation at the 0.05 level of significance.

These results confirmed a long-run relationship between Nigeria's real effective exchange rate (REER) and its major fundamentals. After establishing co-integration among the I (1) variables and the existence of one co-integrating vector as confirmed by both the trace statistic and the max-eigen value, an error-correction model based on equation (3.3) was estimated in order to obtain the co-integrating vector.

In the first place, equation 3.3 was estimated using the actual values of the fundamentals to obtain BEER. The permanent components of the fundamentals using the HP filter was then substituted into the estimated regression to obtain

the permanent equilibrium exchange rate (PEER), the analysis of which is given in this sub-section. The result of the long-run co-integration regression is presented in Table 4.3a

Table 4.3a: Estimated co-integration vector

Dependent variable: InREER

Variable	Coefficient	t-values
Constant	42.367	-
ln (openness(OPEN)(1)	47.25*	8.13
In(terms trade(TT)(1)	-3.13*	-5.77
In(total govt. exp(TGE)(1)	0.004*	11.32
ln(net capital inflow(NKI)(1)	-0.0012*	-6.733

***** indicates significance at 1% level.

Going by the long-run regression estimates of Table 4.3a the coefficient estimates obtained corroborated the prediction of the theoretical models. All effects had the expected signs and were statistically significant. The variable openness produced a significantly depreciating effect on the real effective exchange rate, an indication that a more liberalized and open-trade regime, depreciates equilibrium real exchange rate. Precisely, the result showed that a 20 per cent increase in openness would lead to approximately 47 per cent depreciation in the real effective exchange rate. This result corroborated the outcome of Ogun (2004), Jimoh (2006) and Aliyu (2008) on the long-run effect of the openness of the economy on the real effective exchange rate.

Another important variable within the model was the terms of trade. The result obtained indicated that improvement in terms of trade would lead to equilibrium real exchange rate appreciation. An improvement in terms of trade would have a positive effect on the current account balance (other things being equal), real income of individual would increase and more would be spent on both tradable goods and non-tradable goods causing the real effective exchange rate to appreciate. According to the result, the rate of appreciation was not proportionate, for instance, a 5 per cent improvement in the terms of trade would lead to approximately 3 per cent appreciation of real effective exchange rate. The result, though with different magnitude, supported what was obtained in Elbadawi (1994) for some selected developing countries (Ghana, Chile and India) and the work of Ogun (2004), Jimoh (2006) for Nigeria.

Also, the total government expenditure came out positive and was statistically significant at the 1per cent level. The implication of this result was that, within the period of analysis, the Nigerian government expenditure was proportionately more on imported goods and as a result an increase in such expenditures led to real effective exchange rate depreciation. This result went against what was obtained in the work of Edwards (1988a) for selected LDCs

and Elbadawi (1994) for Chile and India where he obtained for these countries an appreciation effect of government expenditure on real effective exchange rate.

4.1 The Short-Run Vector Error-Correction Estimates

The error-correction estimation gives the short-run dynamic specification of the real effective exchange rate determination (equation 3.6). The result of this specification is presented in the Table 4.3b.

Table 4.3b: Short-run vector error correction estimates

Dependent Variable: D lnREER

Variable	Coefficient	t-value	Other statistics
Constant	-1.06**	-2.46	$R^2 = 0.87$
DIn(real effective exch. rate (REER) -1	-0.13	-0.63	$R^2 = 0.76$ F = 14.40
D In(openness (OPEN)-1	1.15***	1.55	
D In(total govt exp. (TGE)-1	0.001**	3.43	
D In(net capital inflow (NKI)-1	0.009	0.55	
D In(terms of trade (TT)-1	-10.71	-0.44	
Error correction term(-1)	-0.74*	-3.81	
D ln(broad money)-1	0.143	0.96	
D In(nominal effective exch rate (NEER)-1	0.149**	2.28	
SAP	0.362***	1.72	
Civil rule dummy	0.537**	2.43	
June12 crisis	-0.054***	-1.87	

***, **and *** denote significance at 1%, 5% and 10% levels respectively.**

Table 4.3b shows the analogous short-run estimation of what is presented in the long-run regression model (Table 4.3a). The choice of lag length (lag 1) was guided by different criteria such as LR, AIC and SC. All other statistics, such as R^2 (0.87), adjusted- R^2 (0.76) and F-statistics (14.40) showed that the model was of good fit. The results evidently supported the error-correction model with the coefficient of error-correction term, less than one, negative and statistically significant. The coefficient obtained was 0.74 approximately. This reflected the dynamic self-correcting mechanism of the error-correction model. Apart from this, both the additional variables introduced in the dynamic model (broad money supply (M2) and the one lagged period of nominal exchange rate) came out positive but the coefficient of broad money proved statistically insignificant. The implication of its positive sign was that an increase in money supply could tend to increase the price of domestic goods relatively to the imported ones,

demand shift to the later, worsen current account and the real effective exchange rate depreciates.

Table 4.4: The Equilibrium Real Effective Exchange Rate Based on BEER PEER Approach and the Corresponding Misalignment

Year	REER	PEERHP	Misalignment(%)
1960	-0.674	2.675	-125.18
1965	2.968	2.923	1.53
1970	1.697	2.111	-19.61
1975	0.801	1.311	-30.73
1980	0.802	1.252	-35.90
1985	1.115	0.161	5.88
1986	1.304	1.365	-4.50
1990	2.736	2.142	27.71
1994	3.451	3.764	-8.31
1995	3.479	3.874	-10.20
2000	4.997	4.687	6.60
2005	5.244	4.908	6.85
2006	5.235	5.108	2.47
2007	5.200	5.928	-12.28
2008	5.175	5.673	-8.76
2009	5.390	5.232	3.02
2010	5.524	5.421	0.10
2011	5.637	5.565	0.07
2012	5.651	5.687	0.04
2013	6.117	6.312	0.19

NB: (1) A positive value of misalignment implies currency undervaluation while a negative value signifies overvaluation of currency.

(2) REER and PEER are in their logarithm values.

(3) Exponential values of log(REER) log(PEERHP) give back the actual values. Table 4.4 shows that the country's currency was under-valued (based on the signs) in the years 1965, 1985, 1990, 2000, 2005, 2006, 2009, 2010, 2011, 2012 and 2013. The currency was overvalued in the years 1960, 1970, 1975, 1980, 1986, 1994, 1995, 2007 and 2008.

4.3 Misalignment and Trade Flows in Nigeria

In order to provide a comprehensive analysis of the effects of real exchange rate misalignment on trade flows, the study started by examining the effects

of the real effective exchange rate misalignment on export, import; then the trade balance over the period of study. Thus, the result of adding the variable of misalignment to export equation as stated in section three gave the following estimates.

Table 4.5: DOLS Estimates of Export and Misalignment in Nigeria

Dependent variable: Export/GDP
Fixed leads and Lag (2,2)
Longrun variance: 4.0000

Variable	Coef/t-value
Weighted foreign GDP	0.03 (1.05)
Domestic potential GDP	0.09*** (1.42)
Foreign direct investment	0.04** (2.43)
Openness of the economy	1.01* (6.53)
Absolute misalignment	0.02 (0.64)
Constant	-0.66** (-3.47)
R^2	0.96
Adjusted R^2	0.94
DW	1.74

(*), (**) and (***) denote significance at 1%, 5% and 10% levels respectively
Numbers in parenthesis are t- statistics.

As described in section three, all variables entering the export equation are expressed in their natural logarithm form except the extent of misalignments which are in percentages. Table 4.5 indicates that absolute misalignment indicators have deteriorating effects on the volume of export supply. The two approaches gave a non-statistically significant effect. The implication of this result could be that, the extent of misalignments coupled with the nature of Nigeria's export of goods in the world market, may not allow the theoretical positive depreciating effects of the real effective exchange rate on export to be significantly felt.

The most significant variable that determined the volume of export under the period of study was the openness of the economy. It was statistically significant at 1 per cent level. Other variables influencing export were foreign direct investment (FDI) and the level of domestic output.

The next analysis was on the effect of the real exchange rate misalignment on the volume of import. The result is presented in the Table 4.6.

Table 4.6: DOLS Estimates of Import and Misalignment in Nigeria

Dependent variable: Import/GDP
Fixed leads and lags: (2,2)
Long-run variance: 4,0000

Variable	Coef/T-value
Domestic GDP	0.17*** (1.83)
Terms of trade	0.01 (0.27)
External reserve	-0.07*** (-1.44)
Openness of the economy	0.98* (6.40)
Absolute misalignment	-0.06*** (-1.89)
Constant	-1.71** (-2.46)
R^2	0.95
Adjusted R^2	0.91
DW	1.79

(*), (**) and (***) denote significance at 1%, 5% and 10% levels respectively.
Numbers in parenthesis are t- statistics.

Table 4.6 shows the estimates of the various determinants of import in Nigeria. The only additional variable was the absolute misalignment of the real effective exchange rate over time. As indicated in the table, four major variables (domestic output, external reserve, openness of the economy and real effective exchange rate misalignment) were identified as the major determinants of import flow to the country over the period of study.

The variable of interest, misalignment turned out with a negative sign. This could mean that the shocks that were responsible for the real effective exchange rate misalignments created an appreciating effect on the real effective exchange rate in some periods under study and this increased the import demand to the country.

All statistics used to confirm the reliability of the estimates, showed that the model was reliable and passed the goodness of fit test. For instance, with R^2 (0.95) and adjusted- R^2 (0.91) proved the goodness of fit for the model. The value of Dubin-Waston (DW) statistic of 1.79 indicated the likely absence of serial a correlation in the error term.

What followed was the analysis of the effects of the real exchange rate misalignment on net trade balance in Nigeria. The result of the Dynamic Ordinary least square is presented in Table 4.7.

Table 4.7: DOLS Estimates of Trade Balance and Misalignment in Nigeria

Dependent variable: Trade balance/ GDP
Fixed leads and lags: (2,2)
Long-run Variance: 4,000

Variable	Coef/T-value
Terms of trade	0.40**
	(2.71)
Openness of the economy	0.44*
	(5.24)
Weighted foreign output	-0.004***
	(-1.76)
Domestic output	0.07**
	(2.62)
Absolute misalignment	2.11**
	(2.06)
Constant	-0.06*
	(-3.44)
R^2	0.78
Adjusted R^2	0.72
DW	1.88

(*), (**) and (***) denote significance at 1%, 5% and 10% levels respectively.
Numbers in parenthesis are t- statistics.

In Table 4.7, all variables are in their natural logarithm form except the absolute value of misalignment. They all came out as expected and was statistically significant. The variables influencing Nigeria's trade balance did so at various levels of statistical significance and different coefficient magnituds. For instance, continued increase in absolute values of misalignment reduced the trade balance of the country. This it did through increased real effective the exchange rate over time which affected both export and import adversely and in turn affects net trade balance of the country. The level of domestic activity (domestic output) turned out positive. This meant, increase in domestic activity tended to enhance trade balance, to the extent that a 1 per cent rise in domestic output could improve the trade balance by about 7 per cent. Openness of the economy, according to estimates of the result had a positive relationship with the country's trade balance and proved statistically significant at 5 per cent level. The implication of this result is that (other things being equal) the more open the Nigerian economy, the better for the country in terms of trade flows.

5. Recommendation and Conclusion

The study employed the BEER approach to obtain equilibrium real effective exchange rate over the period 1960-2011 in Nigeria. The differences between the ideal values of the real effective exchange rate and the actual real effective exchange rate (in absolute terms) gave the misalignment indicators. The effects of the real effective exchange rate misalignment indicators on trade flows were later examined. The estimates of the results confirmed the adverse effects on trade flows in Nigeria.

The appropriate policy recommendation from this study is that, since the regression result obtained indicates higher misalignment of exchange rate in the fixed exchange rate regimes and vice versa for the flexible regimes in the country, thus, to minimize the extent of real exchange rate misalignment, adequate flexibility is required. Thus, the study recommends a flexible exchange rate system for the country. This could be done by reducing the government's frequent intervention in the foreign exchange market. Moreover, once, the extent of the real exchange rate misalignment is minimized or curtailed, the adverse effects it has on the trade flows of the country will also be reduced. Thus, an appropriate choice of the exchange rate regime will minimize the effect of misalignment on various components of trade.

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References

Agu, C. (2002). Real exchange rate distortions and external balance position of Nigeria: Issues and policy option. *Journal of African finance and economic development,* Vol. 45, (5).

Aliyu, S. R (2007). Import-export demand functions and balance of payment stability in Nigeria: A cointegration and error correction modelling". *Munich Personal RePEc ArChive (MPRA),* Paper No. 10396

Aliyu, S. R (2008). Real exchange rate misalignment: An application of behavioural equilibrium exchange rate (BEER) to Nigeria. *Munich Personal REPEC Archive. Working Paper* Series, No. 10343.

Auboin, M.& M. Ruta. (2011). The relationship between exchange rate and international trade: A review of economic literature. *Staff working paper*, WTO 2011-17.

Baffes J., I. Elbadawi, & S. O'Connell. (1997). Single equation estimation of the equilibrium real exchange rate: *In* Hinkle,L., and P.Montiel(Eds.). *Exchange rate misalignment: Concepts and measurement for developing countries*. New York Oxford University Press.

Bahmani-Oskooee. (1998) . Cointegration approach to estimate the long-run trade elasticities in LDCs. *International Economic Journal,* Vol.12. No 3.

Clark P. B., & R. MacDonald. (1998). Exchange rates and economic fundamentals: A methodological comparison of BEER and FEER" *In* R.

MacDonald and J.L. Stein (Eds.). *Equilibrium Exchange Rates.* London (U.K): Klawer Academic Publishers.

Dosse, T. (2007). Real exchange rate misalignment and economic growth in developing countries, *South-Western Economic Review,* Vol 3.

Edwards, S. (1988a). Exchange rate misalignment in developing countries. *World Bank Occasional Paper*. No 2, Washington DC,

Edwards, S.(1998). Capital flows, real exchange rates, capital controls: Some Latin American experiences. *NBER working paper series.6800.*

Edwards, S., & M.A. Savastano. (1999). Exchange rate in emerging economies: What do we know? What do we need to know? *In* Anne O.K *(Ed.). Economic Policy Reform: The second stage*. Chicago Press.

Egwaikhide, F. O. (1999). Determinants of imports in Nigeria: A dynamic specification. *African Economic Research Consortium (AERC), Research paper* No 91.

Elbadawi, I. A., & R. Soto. (1994). Capital flows and long-term equilibrium real exchange rates in Chile. *Policy research paper.* World Bank WPS 1306

Elbadawi, I. (1994). Estimating long run equilibrium real exchange rates. *In* John Williamson (Ed.). *Estimating Equilibrium Exchange Rates,* Institute for International Economics, Washington D.C., 93-133.

Gala, P. (2007). Real Exchange rate levels and economic development: Theoretical analysis and empirical evidence. *NBER Working Paper,* No 276.

Gala P., & C. R, Lucinda. (2006). Exchange rate misalignment and growth: Old and new econometric evidence. Enomi a, Brasilia (DF). Vol.7, No 4:165-187.

Griffin, C. H.(2011). Effectiveness of Central Bank independence via its internal characteristics. *International Journal of Banking and Finance,* Universiti Utara Malaysia, Vol.8. No 2.

Jimoh A. (2006). Exchange rate regimes and divergence from equilibrium real exchange rate, evidence from Nigeria. *Asian-African Journal of Economics and Econometrics.* Vol.6., No 2.

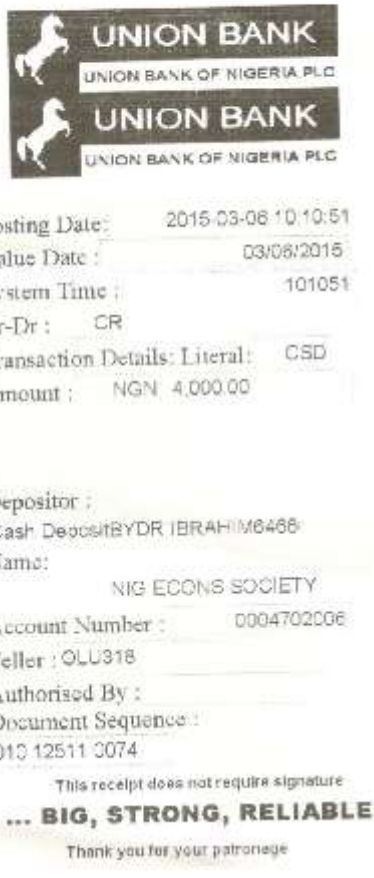
Jongwanich, J. (2009). Equilibrium real exchange rate, misalignment, and export performance in developing Asia. Asian Development Bank working paper series No.151.

Ogun, O.(2004). Real exchange rate behaviour and non-oil export growth in Nigeria." *African Journal of Economic Policy* (AJEP), Vol 11, No.1.

Olimov U., & N. Sirajiddinov .(2008). The effects of the real exchange rate volatility and misalignments on foreign trade flows in Uzbekestan. *Munich Personal RePEC Archive (MPRA) Working paper* No. 9749 July, 2008.

Razins, O., & S. M. Collins. (1997). Real exchange rate misalignments and growth" *NBER Working Paper_* 6174. Cambridge, mass.

Stock, J., & M. Watson. (1993). A simple estimator of cointegrating vectors in Higher Order Integrated Systems". *Econometrica*, 61,783-820.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