

## **A Dynamic Analysis of the Impact of Capital Flight on Real Exchange Rate in Nigeria**

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**Abstract:** *This study examines the dynamic effect of capital flight on the real exchange rate of the naira. Specifically this study seeks to investigate if a long-run relationship exists between real exchange rate and capital flight in Nigeria. This will be done using quarterly time series data covering the period 1981 to 2009. In this process the short-run dynamics of the interactions between the two variables will be analyzed.*

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### **I. Introduction**

Over the years, concerns have been expressed about the magnitude, causes and consequences of capital flight, not least because the lack of financial resources for appropriate economic development has pushed Nigeria and most other Sub-Sahara Africa (SSA) countries into external borrowing to augment domestic resources in their quest for economic growth. According to Lawson (2007), capital flight from developing countries including Nigeria not only aggregates the shortage of resources for development; it indirectly leads to a decline in domestic investments as well as a reduction in the potential tax receipts of the government. The sluggish growth and persistent balance of payment (BOP) deficits in most developing countries, despite private transfers and long term capital inflows, have been attributed to capital flight (Ajayi, 2000). Growth is reduced partly because investment has been diverted abroad and also because necessary imports are limited by the foreign exchange drain from both the flight itself and the fact that earnings on such assets are often not repatriated (Pastor, 1990).

These conditions apparently raise questions especially with regards to the effects of capital flight on the value of the domestic currency abroad. This is because the general macroeconomic effects of capital flight attained above often have the tendency of pushing down the exchange rate of a currency. Indeed Obadan, (2006) argued that some of the factors that led to the depreciation of the Nigerian exchange rate include weak production base, import dependent production structure, fragile export base and weak non oil export earnings, expansionary monetary and fiscal policies, inadequate foreign capital inflow, excess demand for foreign exchange relative to supply, fluctuations in crude oil earnings, unguided trade liberalization policy, speculative activities and sharp practices (round-tripping) of authorized dealers, over-reliance on imperfect foreign exchange market, heavy debt burden, weak balance of payments position and capital flight.

This study is very important because the Nigerian exchange rate has continued to depreciate against the American dollar since the 1980s, particularly following the deregulation of the foreign exchange market. Besides, the instability in the exchange rate has far reaching implications such as high rates of inflation and unemployment, declining investment, low production and low competitiveness of exports, balance of payments disequilibrium, inefficiency in resource allocation and low standard of living, to mention just a few. Thus, examining factors that determine real exchange rate movement becomes very important. It is argued that if massive outflow of capital from Nigeria can be checked the search for foreign exchange through means like borrowing would be limited and the real exchange rate would be stabilized.

### **II. Empirical Literature**

Many scholars have conducted empirical research in order to examine factors that influence the movement of the exchange rate. For instance, Faulkner and Makrelor (2008) used the single Engel Granger techniques to examine the drivers of the manufacturing equilibrium exchange rate over the period 1995 to 2006 in South Africa. The authors' results showed that unit labor cost, productivity, government expenditure and openness are the main drivers of the manufacturing exchange rate.

Frankel (2007) revealed that real exchange rate is positively related to terms of trade, real interest differential and lagged real exchange rate. However, capital account liberalization, risk premium and per capita income have negative effects on real exchange rate.

Yu Hsingh (2006) empirically examined the determinants of short term real exchange rates for Venezuela. The author confirmed that government deficit has positive effect on exchange rate, while broad money supply, world interest rate, county risk, and the expected rate of inflation have negative impact on exchange rate. The author suggested that, authorities should avoid fiscal indiscipline in order to prevent the exchange rate from real appreciation since it will check the country's exports from declining.

Petersoon (2005) investigated the variables that affect exchange rate movements in Sweden, the United Kingdom and Japan against the US dollar for the period of 1995 to 2004. The results indicate that interest rate differential is statistically significant in explaining changes in exchange rate in the three countries. In addition, interest rate has negative effect on exchange rate in Sweden and the United Kingdom. However, the influence of money supply, industrial production and inflation differential on exchange rate varies between the countries.

Odedokun (1997) studied a group of 38 African countries, by examining the impact of macroeconomic policies, devaluation and fundamentals on real exchange rate movement. The author found that public sector fiscal deficits, growth of domestic credit, domestic absorption-GDP ratio, government consumption-GDP ratio, private consumption-GDP ratio, improvement in terms of trade, income per capita and black market exchange rate premium lead to real exchange rate appreciation. On the contrary, devaluation, investment-GDP ratio, consumer-wholesale price ratio in trading-partner countries and economic growth in industrial countries result in real exchange rate depreciation.

Drine and Rault (2003) analyzed the main determinants of the real exchange rate in the Middle East and North Africa (MENA) countries. The authors' findings illustrate that output per capita, government consumption, real interest rate differentials, and the degree of openness of the economy influence the real exchange rate. In Zambia, Beatrice (2001) employed a co-integration technique to investigate the long-run determinants of real exchange rates for imports and exports and of the internal real exchange rate. The results showed that real exchange rate for imports is affected by terms of trade, government consumption, and investment share. Moreover, terms of trade, central bank reserves and trade taxes have long-run impact on the real exchange rate for exports. It was also found that terms of trade, investment share and the rate of growth of real GDP have long-run effect on the internal real exchange rate. Lastly, foreign aid and openness have short-run influence on the real exchange rate indices.

Macdonald and Ricci (2003) found that terms of trade, real interest rate differential, net foreign assets, and GDP per capita have positive influence on real exchange rate in South Africa. On the other hand, the degree of openness and overall fiscal balance has negative impact on real exchange rate. Speller (2006) investigated the exchange rate determinants in the industrialized commodity currency economies. The results illustrate that the price of the commodity exports was an important determinant of the real exchange rate in the group of countries studied.

In Angola, Takaendesa (2006) confirmed that terms of trade, real interest rate differential, domestic credit, openness and technological progress have long-run impact on real exchange rate. Overall, terms of trade, domestic credit and openness have significant influence on real exchange rate in the short-run. While terms of trade and domestic credit have both short-run and long-run effect on real exchange rate.

Gelbard and Jun Nagayssu (2004) examined the determinants of Angolas' real exchange rate. They found that the most important determinants of real exchange rate are oil prices and foreign interest rate. However, their results did not support the argument that monetary growth influences exchange rate. Thus, they advised that a flexible exchange rate is more appropriate than a fixed exchange rate regime.

The econometric result of Aron et al (1997) is indeed revealing. Firstly they showed that capital flows lead to exchange rate appreciation. Secondly trade openness, government expenditure; non-gold terms of trade and real price of gold have both short-run and long-run effects on real exchange rate. That is, more openness, worsening terms of trade and reduced capital flows lead to real depreciation. However, unsustainable government expenditure results in exchange rate overvaluation. Moreover, nominal devaluation has a significant negative effect on the real exchange rate, while the lagged nominal devaluation has a significant positive effect on real exchange rate. Furthermore, excess domestic credit supply has a significant positive influence on real exchange rate, thus increases in domestic credit supply lead to exchange rate appreciation. Lastly, lagged growth differentials have positive and significant impact on real exchange rate.

In Nigeria, Obadan (2006) reported that, whereas improvement in terms of trade leads to appreciation in nominal exchange rate, increases in net capital inflows result to real exchange rate appreciation. Furthermore, increases in monetary aggregates lead to real exchange rate depreciation.

Olomola and Adejumo (2010) examined the effect of oil price shock on output, inflation, the real exchange rate and the money supply in Nigeria using quarterly data from 1970 to 2003. The VAR method was employed to analyze the data. The findings were contrary to previous empirical findings in other countries; oil price shock does not affect output and inflation in Nigeria. However they did find that oil price shocks do significantly influence the real exchange rates. The implication is that a high real oil price may give rise to wealth effect that appreciates the real exchange rate. This may squeeze the tradable sector, giving rise to the "Dutch Disease".

Quite a number of factors have been identified in the literature as accounting for citizens' decisions to reallocate their wealth abroad. Among other reasons, political factors, macroeconomics mismanagement and policy distortions serve as incentives for residents to take their assets out of the country (Onwioduokit, 2001). For Nigeria specifically, Ajayi (1992) and Ojo (1992) identified factors such as level of foreign exchange

reserves, changes in exchange rates, growth rate of the economy, real interest rate differentials, changes in inflation rates, financial repression, fiscal balance and external loan disbursement. Cuddington (1987) identified disbursement of new loans to developing countries as an additional cause. Other causes can be exchange rate misalignment, financial sector constraints and/or repression, fiscal deficits, and external incentives.

### III. Methodology And Model Specification

In this study, the co-integration and Error Correction Methodology (ECM) will be used. Co-integration analysis investigates the long-run properties of the adopted relationship while the ECM estimates the short-run dynamic model. The model specifies real exchange rate (RER) as being determined by the rate of capital flight from Nigeria (CAPF) the effect of SAP, proxied by a SAP dummy (SAPD), the level of openness of the economy (OPN), inflation rate (INFL) and foreign exchange reserves (RES).

Thus, the ECM is represented as:

$$\Delta RER_t = \alpha_1 + \alpha_2 \Delta CAPF_t + \alpha_3 \Delta TOPN_t + \alpha_4 \Delta INFL_t + \alpha_5 \Delta RES_t + \alpha_6 SAPD_t + \beta ECM_{t-1} + \epsilon_1$$

Where  $\alpha_{1-6}$  = Parameters to be estimated

$\beta$  = Error correction term

$\epsilon_1$  = Stochastic term

$$RER = \frac{pus}{cpi} ner$$

and

RER = Real naira to US dollar exchange rate

CPI = Nigeria's domestic price index

NER = Nominal exchange rate

Capital flight is measured using the World Bank Method as outlined in Lawanson (2007).

$$CAPF_t = FDI_t + \Delta Debit - (CAD_t + TRES_t)$$

Where FDI = Foreign Direct Investment

DEBT = External Debt Stock

CAD = Current Account Deficit

TRES = Total External Reserves

Given the above model and defined variables the study would determine the expected negative impact of capital flight on real exchange rate and also find out if a long-run relationship exists between them.

### IV. Presentation And Analysis Of Result

In this section, the results of the error correction model that was specified in the previous section is presented and analyzed in order to draw out the empirical implication of the study. In order to perform this investigation, certain procedures are followed. First, the test for stationarity of each of the data series is carried out. This is necessitated by the fact that most economic time series are time dependent (Iyoha, 2004). Moreover, it has been postulated that when these series are differenced, the time dependence can be eliminated and an estimated relationship among the variables would be spurious. The second direction of the analysis is to test whether the groups of time series move together in the long-run (i.e cointegration test). Finally, the error correction model, which shows the dynamic short-run behavior of the dependent variable, is estimated and evaluated.

### V. Unit Root Test For Variables

The Augmented Dickey Fuller (ADF) test is used for the test for unit roots in each of the variables. Indeed, if a non-stationary time series (in levels) becomes stationary after first difference, it is said to possess a unit root.

**Table 4.1: Result Of The Adf Unit Root Test (First Difference)**

Variables Statistic	ADF ADF value	Test	95% Critical	Order of Integration
DREXRT	-33	-2.985		1(1)
DCAPF	-3.216	-2.985		1(i)
DRES	-2.960	-2.985		1(0)
DTOPEN	-4.741	-2.985		1(1)
DINFL	-4.899	-2.985		1(1)

The ADF result presented above does not take into consideration the trend variables since trend in the series has not been proven. The results obtained provide strong evidence that all the time series in their first

difference are stationary, except that of reserves. We have also decided to include the reserve variables since its ADF value is quite close to the critical value. Thus, we accept the hypothesis of the existence of unit roots for each of the variables.

### VI. Cointegration Analysis

Since the variables are all integrated of order one, there are strong reasons to believe that common long-run properties exist among them. The cointegration test is carried out by first running a model with REXRT as dependent variable and obtain the resulting residuals. These residuals are then tested for unit roots.

Variable	ADF lag	ADF Test	95% Critical Statistic value	Remark
Residual	2	-3.305	-5.380	Non-Stationary

From the result shown above, the ADF statistics of the residuals is less than the 95% ADF value. This means that the residuals are not stationary. In that case, it is seen that the series do not move together in the long-run. Any destabilization in the short-run may not be self-corrected overtime since the system does not have any pattern of coordination in the long run.

### VII. The Error Correction Model

The representation of the ECM is presented in table 3 below; the parsimonious representation was chosen using the R-Bar squared criterion, where the equation with the highest R-Bar squared is selected

Variables	Coefficient	I-RL
dCAPF	0.055(E-5)	0.07
dINFL	-0.006	-1.612
dINFL	(-1) 0.008	2.586
dRES	-0.01	-1.157
dTOPEN	0.749	1.172
dINPT	0.709	3.105
dSADP	0.366	1.251
eCM(-1)	-0.354	-2.197
R <sup>2</sup> = 0.672		R <sup>2</sup> = 0.497
F (719) = 4.96		DW-Statistics = 2.23

The Re-squared of the model is quite high and shows that over 67 percent of the short run behavior of real exchange rate is captured by the four explanatory variables and the dummy and ECM. This impressive goodness of fit outcome of the model is also confirmed by the highly significant F-statistics which passes the test at the 1 percent level. This shows that a significant short-run relationship exists between real exchange rate and the independent variables.

Considering each of the coefficients of the explanatory variables, it is seen that all the coefficients have the expected signs in accordance with aprior determination, except that of the SAP dummy, moreover, only the coefficient of the one period lagged inflation is significant, suggesting that the real exchange rate responds to inflationary movements with a delay of one period. Also, the effect is positive; a rise in inflation would cause the exchange rate to depreciate.

The variable of interest, CAPF is not significantly different from zero, even at the 10 percent level. This shows that in short-run, the real exchange rate does not respond to capital flight. Rather other factors such as domestic price level drive the real rate of naira exchange to other currencies.

Moreover, the error term is negative and highly significant at the 5% level. This reveals that short-run deviation of real exchange rate equilibrium can be effectively restored to its steady state level in the long run. The DW statistics value of 2.23 also indicates absence of autocorrelation in the model.

### VIII. Summary And Conclusion

Capital flight has become a worrisome phenomenon in the Nigerian economy. Apart from its effects on domestic's investment and capital formation, there are other effects on the external sector of the economy. This study attempted to investigate the effect of capital flight on the real exchange rate of the naira by using an error correction specification. One issue that challenges studying on capital flight is the actual measurement of capital flight. This study used the basic measurement as suggested by the World Bank. The result from the estimation procedure revealed that though there is a dynamic short-run behaviour exchange rate with respect to capital flight (and the other variables), a long-run relationship does not exist. Moreover, the results also showed that capital flight from Nigeria does not have a dynamic impact on the real exchange rate, rather the exchange rate responds to the domestic price level.

It is therefore recommended that in pursuing a stable external value of the naira, attention should not be focused on the capital flight, but rather on ensuring domestic price stability. In the same vein, long-run policies to determine the real exchange rate may not include the level of capital flight from Nigeria.

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