Exchange Rate Policy and Sources of Investment Financing: Further Evidence from Nigeria (1970-2012)

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Abstract
The paper examined the role of exchange rate in stimulating both domestic and foreign investment finance in Nigeria. The paper used secondary data from Nigeria and adopted error correction mechanism to estimate the models. The result showed that interest rate real GDP and trade openness are more important than exchange rate as the most critical factors in financing investment in Nigeria. The policy implication of this finding of non-relevance of exchange rate is that domestic cost of investment finance is the key to promoting investment in Nigeria. There is therefore, a need for sound monetary policy that eases the cost of borrowing in addition to any other macroeconomic stabilization policy that might be implemented in promoting and boosting investment finance in flow both from domestic and foreign markets.
Keywords: Exchange Rate Policy, Investment Financing, Nigerian Economy

1 Introduction

The current effort of Nigerian government to encourage inflow capital and financial resources to accelerate the development process is dependent on the prevailing macroeconomic policy environment. One of the key macroeconomic policies that have direct bearing on capital and investment flows is exchange rate policy. A country with flexible and stable exchange rate is likely to witness high turnover of financial flows across its borders. The strong influence of exchange rates on the balance of payments and other macroeconomic variables makes it one of the most important prices in an open economy.

Since the adoption of floating exchange rates in the developing countries in 1973, the question of whether exchange rate changes/uncertainty have independent adverse effects on investment, and trade and on different sectors of the economy has attracted a lot of attention in the literature (Adubi and Okumadewa 1999). A review of the literature shows that the effect of exchange rate fluctuation on investment is far from settled, Osinubi and Amaghionyeodiwe (2009), Arratibel et al., (2011) have attempted analysis the causal nexus between exchange rate and some other macroeconomic variables but the consensus is also far from be unanimous especially on the exchange rate and investment.

The bulk of the studies also ignored the dynamics of the individual countries used in the model and concentrated on the international experiences. The fact that countries like Nigeria had experimented with all form of possible exchange rate regime makes case for individual country specific analysis. More importantly, the exchange rate policy in Nigeria has remained stable and relative flexible in recent time but yet the inflow of capital and domestic resource mobilization has not been commensurately high as expected. In fact the recent financial crisis had affected the financial market such that there was a substantial outflow of portfolio investment while direct investment has not increased despite the stable exchange rate and other macroeconomic incentives put in place by government.

Therefore there is the need to examine the dynamic relationship between exchange rate and financial flows in Nigeria. The overall objective of this study is to investigate the impact of exchange rate fluctuation on aggregate domestic investment financing in Nigeria. The paper is organized into five sections. Section 2 provides the review of some salient empirical studies and identify the empirical to be filled while section 3 presents the methodology adopted while the empirical results is discussed in section 4. The paper is concluded in section 5 with policy implications:

2 Review of literature

The empirical literature on the impact of exchange rate fluctuation on investment has witness major contribution by different scholars over the years. But the empirical evidence provided by most of these studies has been mixed, and a consensus has not yet emerged. Mowatt and Zulu (1999) in a study of the South African investment in the Southern and Eastern African region, identified exchange rate as one of the major barriers to FDI in Zimbabwe, Botswana and Mozambique. Similarly, in a survey of the southern African countries, Jenkins and Thomas (2002) found that about 25 per cent of the total firms surveyed identified exchange rate risk as an important determinant of FDI in the sub-region. However, these studies did not analyse the relationship and the extent to which exchange rate fluctuations constrains FDI in these countries.

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An attempt was made by Bleaney and Greenaway (2001) to examine the impact of the level and fluctuation of real effective exchange rate on investment and growth for fourteen Sub Sahara Africa countries. The study found that exchange rate fluctuation has a strong negative effect on investment. However, the focus of the study was on total investment, not FDI. A study by Gorg and Wakelin (2001) on both outward US foreign investment in 12 developed countries and inward investment to the US from those same countries for the period 1983 to 1995 provides further evidence on the issue. The level of the real exchange rate (partner currency per US dollar) is calculated as the log of the annual mean of the monthly exchange rates for a given year. Exchange rate fluctuation is measured by the standard deviation of the exchange rate and is calculated as the annual standard deviation of the log of the monthly changes in the exchange rate. Controlling for labour costs, relative interest rates, partner country GDP, US GDP, freight cost, distance between the partner country and the US, and finally language, which is a dummy variable that is equal to 1 if the official language is English and 0 if otherwise, Gorg and Wakelin find that exchange rate fluctuation has no effect on US outward FDI.

Davide and Sara (2008) analyze the role of exchange rate fluctuation in explaining the evolution of FDI inflows in the European Monetary Union (EMU) countries. Their paper suggests that the effect of exchange rate fluctuation on FDI crucially depends on a country's degree of openness. They also found that while exchange rate fluctuation has positive or null effect for relatively closed economies, it has a negative impact on economies with a high level of openness. Joseph et al., (2009) examine the impact of exchange rates on foreign direct investment (FDI) inflows into the United States in the context of a model that allows for the interdependence of FDI over time. Interdependence is modeled as a two-state Markov process where the two states can be interpreted as either a favorable or an unfavorable environment for FDI in an industry. Unbalanced industry-level panel data from the US wholesale trade sector are used in the analysis and yield two main results. First, they found that FDI is interdependent over time. Second, under a favorable FDI environment, the exchange rate has a positive and significant effect on the average rate of FDI inflows.

With respect to Nigeria specific studies, Adamu (2005) explores the impact of exchange rate fluctuation on private sector investment and confirm that it has an adverse effect on private domestic investment. This finding is in agreement with the conclusion reached in Serven (2002). One of the limitations of the study is that public sector domestic investment was ignored which signals that the results might not reflect the overall behaviour of total domestic investment. Alaba (2003) aims at determining the magnitude and direction of the effects of exchange rate movement and its fluctuation on FDI flows to agriculture and manufacturing sectors in Nigeria. Employing the GARCH measure of fluctuation, the error correction methodology was used for the empirical investigation in testing the effects of both the official and parallel market exchange rates on FDI flows to agriculture and manufacturing. While the results show that the official market exchange rate movement significantly reduces FDI inflows to agriculture, the same is, however, insignificant for the manufacturing FDI. For the fluctuation coefficients, official market exchange rate fluctuation was not found to be significant for FDI inflows to both manufacturing and agriculture. Conversely, the estimated parallel market exchange rate coefficients suggest that both systematic movement of the exchange rate and its fluctuation are significant for flow of FDI to both agriculture and manufacturing in Nigeria with the parallel market rates, yielding both negative and positive signs for exchange rate fluctuation in the two sectors. He concluded that while exchange rate fluctuation attracted investment in agriculture, it rather deterred FDI in the manufacturing sector, thus suggesting ambiguity on the effects of exchange rate movements and its fluctuation on FDI inflows.

Ogunleye (2009) did an extensive work aimed at providing a comprehensive analysis of the exchange rate fluctuation-FDI nexus in sub Sahara Africa (SSA) by examining nine countries in the region, with the countries cutting across exchange different exchange rate and FDI policies and arrangements. Both country-specific time-series and panel model estimation techniques were employed. The study found that exchange rate fluctuation generally constrains FDI inflows to SSA. This is equally established for both the CFA and non-CFA group of countries, though with varying degrees.

Osinubi and Amaghionyeodiwe (2009) investigate the empirical evidence on the effect of exchange rate fluctuation on foreign direct investment (FDI) in Nigeria, using secondary time series data from1970 to 2004. In doing this, they utilized the error correction model as well as ordinary least square (OLS) method of estimation. Their results reveal a significant positive relationship between real inward FDI and exchange rate. This implies that, depreciation of the Naira increases real inward FDI. Also, their results indicate that the structural adjustment programme (introduced in Nigeria in 1986) had a negative impact on real inward FDI, which could be due to the deregulation that was accompanied by exchange rate fluctuation.

3.0   Empirical Methods and Materials

The empirical relation between exchange rate fluctuation and investment has been investigated through various approaches since the 1970s. Some of the notable methodological techniques that are used in estimating such relationships range from the Ordinary Least Squares (OLS) method, Panel data studies, Vector Auto-regression (VAR) approach, Generalized Method of Moments (GMM), to Vector Error Correction Mechanism (VECM)

techniques. Accordingly, studies like Aizenman (1992) and Devereux and Engle (2001) among others employ the general equilibrium approach while Caballero and Corbo (1989) utilize the OLS and the instrumental variable (IV) techniques in their analysis. Since the main focus is to have a better understanding on how exchange rate fluctuations affect private investment and FDI, an econometric technique of error correction model shall be used. Other techniques are unit root test, cointegration test, Granger causality test and stability test. Exchange rate fluctuation is represented by growth rate of exchange rate. It is postulated that the cost rather the quantity or availability is the constraint to investment fund mobilization. Therefore the paper follows Adamu (2005) and specified the following equation.

$$INV_{it} = \delta_0 + \delta_1 EXRT_t + \delta_{it} Z_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(1)$$

Where; INV_{it} represents the two form of investment financing, domestic and foreign investment finance and $EXRT$ is the exchange rate, Z represent the other determinants of investment such as level of economic activities, inflation rate interest rate and trade openness. All the data are sourced from the Central Banks of Nigeria.

This study takes into consideration the problem of non-stationarity that are common when macroeconomic variable are involved. The paper therefore test for stationarity using Augmented Dickey Fuller (ADF) technique before proceeding to co-integration test for testing the existence of long run relationship between the dependent and independent variables, and error correction techniques (ECM) for establishing a long run adjustment between the variable of interest. The ADF test is a test against the null hypothesis that there is a unit root of I(1) series; The unit root test equation is of the form:

$$\Delta X_t = \alpha X_{t-i} + \beta \Delta X_{t-i} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

A set of variables may not be stationary but a combination of them may do and hence they may be cointegrated, therefore the cointegration status of the model must be established, (Saibu 2013). The presence of co-integration means that long-run relationship exists among the non-stationary variables (Granger and Engel, 1985). However, when a set of non-stationary variables but cointegrated, the long run properties of the variables are lost and hence there is need to make provision in the short run model that emerge by incorporation an error correction term (ECM) to capture the long run properties in the short run model. The *ECM* coefficient shows how quickly variables return to equilibrium and it should have a statistically significant coefficient with a negative sign. Error correction technique correct for disequilibrium between short run and long run behaviour of the dependent variable. The error correction model can be specified as;

$$\Delta Y_t = \beta_0 + \beta_1 \Delta X_t + \beta_2 \Delta Z_t + \beta_3 \Delta N_t \ldots\ldots\ldots.. + \beta_n u_{t-i} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots.\ldots\ldots\ldots\ldots\ldots..(3)$$

Where: Δ= difference parameter, μ_{t-1}=one period lagged value of the error from the cointegrating regression and ε_t= a random error term

4.0 Empirical Results

The starting point of the analysis is the determination of the time series properties of the variable. Table 1 presents the results of unit root test. All the variables are non-stationary at level. This is because the ADF value of each variable is less than the McKinnon 1% critical values. Table 2 below presents the result of Johansen cointegration test of long run relationship between domestic and foreign investment and exchange rate fluctuation in Nigeria model one and model two respectively. The result shows that there exist five (5) cointegrating equations at 5% level of significance in the result. This implies that the hypothesis of no cointegration between domestic and foreign investment and exchange rate fluctuation in Nigeria is rejected. The implication of this result is that there exist a long run relationship between domestic and foreign investment and exchange rate fluctuation.

Table 1: ADF Unit Root Test

Variable	Level	First Difference	1% Critical Value	Remark
FINV	-2.40	-5.05	-4.22	I(1)
RGDP	-2.33	-5.11	-4.22	I(1)
DINV	-1.71	-6.47	-4.21	I(1)
INF	-3.37	-5.47	-3.61	I(1)
INTR	-1.46	-6.06	-3.62	I(1)
VEXR	-0.94	-4.93	-4.27	I(1)
OPN	-2.10	-5.96	-3.62	I(1)

Table 2: Cointegration Test Results

Series: LOG(FINV) LOG(DINV) LOG(RY) INF INTR VEXR OPN

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.96	311.12	146.76	158.49	None **
0.85	192.34	114.90	124.75	At most 1 **
0.75	124.99	87.31	96.58	At most 2 **
0.58	74.40	62.99	70.05	At most 3 **
0.43	43.25	42.44	48.45	At most 4 *
0.32	23.05	25.32	30.45	At most 5
0.23	9.30	12.25	16.26	At most 6

*(**) denotes rejection of the hypothesis at 5 %(1%) significance level

L.R. test indicates 5 cointegrating equation(s) at 5% significance level

Having established the order of integration and cointegration next step is the estimation of equation (1) subject to the adjustment based on the time series properties of the mode. The adjustment is incorporated in the ECM model which estimated, the result of the estimation is provided in Table 3. Firstly, there are no significant different between the effect of exchange rate fluctuation on foreign direct investment and its effect on domestic investment. Our findings show that exchange rate fluctuation has an insignificant impact on the two variables.

Secondly, our result shows an insignificant relationship between exchange rate fluctuation and investment (domestic and foreign). It, therefore, conforms to the school of thought which stresses the neutrality of exchange rate fluctuation on investment expenditure. Authors like George et al (2005), Clark et al (2008) and IMF (1984) did not find any robust negative relationship between exchange rate fluctuation and investment. To them, exchange rate fluctuation is attributed to inherent instability in macroeconomic variables of an economy. And that the general presumption that trade is adversely affected by an increase in the exchange rate fluctuations depends on a number of specific assumptions and does not necessarily hold in all cases, especially in general equilibrium models where other variables change along with exchange rates.

These models show that exchange rate fluctuation is the result of the fluctuation in underlying shocks to the economic and the policy regime which determines how the shocks are reflected in exchange rates and other variables. Thirdly, trade liberalization promotes both domestic and foreign investment in Nigeria. This conforms to the findings of Olugbenga and Olowole (2008), the trade liberalization and economic reform policies implemented in the post – 1986 structural adjustment period contributed to Nigeria's investment performance. The robustness of the two models is not in doubt. The ECM term is negative -0.19 and significant at 5% per cent level and the heteroskedasticity test statistics also confirmed that the parameter estimates from the models are efficient and stable.

Table 3: Regression Result

Dependent variable	Model 1(FINV)	Model 2 (DINV)
Constant	0.141 (3.675)	0.070 (0.936)
Real GDP (RGDP)	0.133* (3.124)	0.429* (2.796)
Inflation rate (INF)	0.001(1.070)	0.001 (0.553)
Interest Rate (INTR)	-0.016* (-2.024)	-0.178* (-2.984)
Trade Openness (OPN)	0.080* (3.589)	0.010* (2.895)
Exchange Rate (EXRT)	-0.274 (-0.182)	-1.044 (-0.420)
Domestic Investment (DINV)	0.224* (2.167)	
Foreign Investment (FINV)		0.578* (2.088)
ECM(-1)	-0.190* (-2.247)	-0.191* (-3.672)
R^2	0.675	0.7178
Adjusted R^2	0.519	0.5587
F-stat (prob. Value)	4.487 (0.008)	5.9973 (0.000)
Durbin Watson	1.708	1.899

Table 4: White Heteroskedasticity test

	White Heteroskedasticity Test	
	Model I	Model II
F-statistic	2.274(0.094)	0.347(0.970)
Obs*R-squared	4.190(0.982)	5.396(0.943)

Note: the values in parenthesis are probability values

5.0 Conclusion and Policy Implications

From the result, it can be concluded that exchange rate fluctuation has an insignificant effect on domestic and foreign investment in Nigeria. This result conforms to the findings of Campa and Goldberg (1999) Lafrance and Tessier (2001), and Harchaoui et al (2005) among others, which report no relationship between exchange rate fluctuation and domestic income. It also corroborates the findings of Alaba (2003) ad Clark et al., (2004). Significant determinants of domestic foreign direct investment include domestic income and domestic interest rate, trade openness. The policy implication of this finding of non-relevance of exchange rate is that domestic cost of investment finance is the key to promoting investment in Nigeria.

There is therefore, a need for sound monetary policy that eases the cost of borrowing. Though, exchange rate was not significant, the role of stable exchange rate cannot be over emphasized, government should put in place, a stable exchange rate management. This will reduce the uncertainty associated with exchange rate flexibility. Since most investment firms in Nigeria depend largely on imported inputs ranging from raw materials, machinery, foreign technical experts. Government should put in place, a stable macroeconomic policies management that will enhance the performance of the financial sector. This will reduce the uncertainty associated with the financial system. Since most industries in Nigeria depend largely on financial resources for the operations of businesses and for importation of inputs ranging from raw materials, machinery, foreign technical experts etc. Nigeria's entrepreneurs should be given preference in terms of loans and advance. Sound macroeconomic and exchange rate policies will help put these shocks under effective control and dampen exchange rate fluctuation.

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