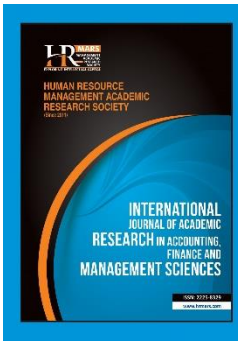

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To Link this Article: http://dx.doi.org/10.6007/IJARAFMS/v5-i2/1693 DOI:10.6007/IJARAFMS /v5-i2/1693

Received: *12* April *2015,* ***Revised:*** *18* May 2015*,* ***Accepted:*** *09* June 2015

Published Online: *25* June 2015

In-Text Citation: (Okwuchukwu, 2015)

To Cite this Article: Okwuchukwu, O. (2015). Exchange Rate Volatility, Stock Market Performance and Foreign Direct Investment in Nigeria. *International Journal of Academic Research in Accounting Finance and Management Sciences*, *5*(2), 222–239.

Vol. 5, No. 2, 2015, Pg. 222 - 239

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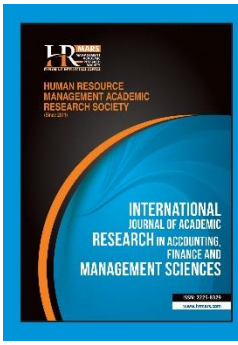
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Exchange Rate Volatility, Stock Market Performance and Foreign Direct Investment in Nigeria

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Abstract
This study investigated the impact of exchange rate volatility and stock market performance on the inflow of foreign direct investment to Nigeria using time series data from 1980 to 2013. It employed the ordinary least square technique and error correction mechanism in its estimations. The result revealed that exchange rate volatility has negative and significant effect on the inflow of foreign direct investment to Nigeria both in the long run and in the short run. It further revealed that market capitalization, proxy for stock market performance was positively signed and statistically significant. Apparently, a stable and well developed capital market will definitely attract direct foreign investment to Nigeria. The study recommends the pursuance of sound exchange rate management system and policies that will lead to increase in domestic production of export commodities. The study further recommends deepening of the capital market to provide the needed funds for investment and avoidance of dollarization of the economy to reduce the stress on foreign exchange earnings. Sound foreign reserve management practices are imperative for Nigeria as measures of maintaining the value of the naira and reduce the impact of international capital shocks.
Keywords: Exchange Rate Volatility, Foreign Direct Investment, Dollarization, Foreign Reserve, Real Gross Domestic Product Growth

Introduction

Foreign Direct Investment (FDI) is an international flow of capital that provides a parent company or multinational organization with control over foreign subsidiaries. Basically, foreign capital flows refer to movement of financial resources from one country to another, thereby enhancing the economic growth and development of the host country. The host country is typically constrained by low domestic savings and investment (Obiechina, 2010). By 2005, inflows of FDI around the world rose to $916 billion, with more than half of these flows received by businesses within developing countries (World Investment Report, 2006). Foreign capital flows can be decomposed into official development assistant, export credits and foreign private flows. Foreign private investment is the stock of physical assets and financial securities held in one country by investors of another country. While the former is

called Foreign Direct Investment (FDI), the latter is called Foreign Portfolio Investment (FPI). Foreign capital flows are influenced by an array of factors which include the stability or otherwise of macroeconomic variables, insecurity, corruption and other socio-political factors (Edo, 2011).

One of the many influences on FDI activity is the behaviour of exchange rates. Exchange rates, defined as the domestic currency price of a foreign currency, matter both in terms of their levels and their volatility (Odili, 2014). Exchange rates can influence both the total amount of foreign direct investment that takes place and the allocation of this investment spending across a range of countries (Goldberg, 2006). When a currency depreciates, meaning that its value declines relative to the value of another currency, the exchange rate movement has two potential implications for FDI. First, it reduces that country's wages and production costs relative to those of its foreign counterparts. All things being equal, the country experiencing real currency depreciation has enhanced "locational advantage" or attractiveness as a location for receiving productive capacity investments. By this "relative wage" channel, the exchange rate depreciation improves the overall rate of return to foreigners contemplating an overseas investment project in this country (Goldberg, 2006).

The exchange rate level effects on FDI through this channel rely, on a number of basic considerations. First, the exchange rate movement needs to be associated with a change in the relative production costs across countries, and thus should not be accompanied by an offsetting increase in the wages and production costs in the destination market for investment capital. Second, the importance of the "relative wage" channel may be reduced if the exchange rate movements are anticipated. Anticipated exchange rate volatility may be reflected in a higher cost of financing the investment project, since interest rate parity conditions equalize risk-adjusted expected rates of returns across countries (Goldgerg, 2006). By this argument, stronger FDI implications from exchange rate movements arise when these are unanticipated and not otherwise reflected in the expected costs of project finance for the FDI.

Some experts on FDI implications of exchange rate volatility dismiss the empirical relevance of the interest-parity type of caveat. Instead, it is argued that there are imperfect capital market considerations, leading the rate of return on investment projects to depend on the structure of capital markets across countries. For example, Froot and Stein (1991) argue that capital markets are imperfect and lenders do not have perfect information about the results of their overseas investments. In this scenario, multinational companies, which borrow or raise capital internationally to pay for their overseas projects, will need to provide their lenders some extra compensation to cover the relatively high costs of monitoring their investments abroad. Multinationals would prefer to finance these projects out of internal capital if this were an option, since internal capital is increasing in the parent company's wealth. Consider what occurs when exchange rates move. A depreciation of the destination market currency raises the relative wealth of source country agents and can raise multinational acquisitions of certain destination market assets. To the extent that source country agents hold more of their wealth in own currency-denominated form, a depreciation of the destination currency increases the relative wealth position of source country investors, lowering their relative cost of capital. This allows the investors to bid more aggressively for assets abroad.

Empirical support for this channel is provided by Klein and Rosengren (1994), who show that the importance of this relative wealth channel exceeded the importance of the relative wage channel in explaining FDI inflows to the United States during the period from 1979

through 1991. Blonigen (1997) makes a "firm-specific asset" argument to support a role for exchange rates volatility in influencing FDI. Suppose that foreign and domestic firms have equal opportunity to purchase firm-specific assets in the domestic market, but different opportunities to generate returns on these assets in foreign markets. In this case, currency movements may affect relative valuations of different assets. While domestic and foreign firms pay in the same currency, the firm-specific assets may generate returns in different currencies. The relative level of foreign firm acquisitions of these assets may be affected by exchange rate volatility.

Capital flows in the form of foreign direct investment to developing countries has been described as low in the past few decades (Nwankwo, 2013). The standard neoclassical theory of growth predicts that capital should move from developed countries to developing countries (Lucas, 1990). According to (Fernandez-Ares and Montre, 1996), the direction and the final destination of foreign direct investment has been highly polarized owing to the militarization of most less developed countries which further reduced the interest of advanced countries like United kingdom, United States of America, Canada and Germany on developing countries economy. There had been a restriction also on which country to channel foreign direct investment. This scenario has further truncated the ability of developing countries to break loose from the grinding yoke of poverty and under development. However, in recent years, there has been increase in the flow of international capital, due to a constellation of factors like economic integration, financial markets liberalization and technological advancement. It is now obvious that given the vicious cycle of poverty, emerging economics like Nigeria can progress to steady state economic growth by relying significantly on inflow of foreign capital. The period between 1973 and 1981 witnessed massive capital flows to countries in many parts of the developing world, largely in the form of private syndicated bank loans directed to the public sector.

The trends of foreign direct investment in recent times whether public or private is positively related to democratization and the business environment existing in the recipient developing countries (Egwuatu, 2007). This indicates that the more developing countries are favorably disposed to democracy and conductive business environment, the more foreign direct investment they can attract. Sub – Saharan Africa as a region now has to depend very much on foreign direct investment for so many reasons, some of which have been highlighted by (Asiedu, 2009). It should be noted that rapid growth requires high level of investment, which in the absence of foreign direct investment must derive from high savings rates. Although rapid gross national product gains are possible through such ''inward'' looking policies, they are historically rare in Nigeria. The preference for improving the Nigerian investment climate stems from its acknowledged advantages (Akinlo, 2004). In fact, the New Partnership for African Development (NEPAD), a programme floated by Africa's statesmen to address the downward spiral of poverty and set Africa on the road to globalization was launched to increase available capital in the sub region to US$64 billion through a combination of reforms, resource mobilization and enabling environment for investment (Funke and Nsouli, 2003).

It is the desire to attract investment, particularly foreign direct investment that has informed many economic reforms in Nigeria. The economic rationale for offering special incentives to attract foreign direct investment frequently derives from the belief that it promotes growth not only directly by augmenting capital formation in the recipient countries, but also indirectly by improving employment and human capital development, helping technology transfers and strengthening competition (Qi, 2007). Unfortunately, the effort to

attract the most needed foreign direct investment and catch-up with the industrialized world appears to be marked with great difficulties and futility in Nigeria. This development is worrisome, giving very little hope of economic growth and development for Nigeria. Worse still, the pattern of the foreign direct investment that does exist is often skewed towards exploration and mining, meaning that the foreign direct investment inflow into sub-Saharan African countries has been centred on natural resources, although the size of the domestic market may be a consideration.

The literature is relatively scanty on exchange rate volatility, stock market performance and FDI nexus. There is therefore paucity of empirical evidence on the impact of exchange rate volatility and stock market performance on international capital flows both in developed and emerging economies. This study is an attempt to expand the frontier of knowledge by providing valid answers to the following research questions: *To what extent has exchange rate volatility influenced FDI in Nigeria? What is the effect of Market capitalization of the Nigeria's stock market on FDI in Nigeria?*

The motivation for this study is the need to provide valid answers to the above questions, via econometric investigation for the period between 1980 and 2013. This will be of immense benefits to policy makers, local and foreign investors and other stakeholders. The research hypotheses for investigating the effect of the parameters on the dependent variable are stated in the null as follows:

- *Exchange rate volatility has no significant impact on FDI inflow to Nigeria.*
- *Market capitalization of the Nigeria's stock market does not significantly influence FDI in Nigeria.*

Theoretical Underpinnings

Theoretical arguments for volatility effects are broadly divided into *"production flexibility"* arguments and *"risk aversion"* arguments. To understand the *'production flexibility'* arguments, consider the implications of having a production structure whereby producers need to commit investment capital to domestic and foreign capacity before they know the exact production costs and exact amounts of goods to be ordered from them in the future. When exchange rates and demand conditions are realized, the producer commits to actual levels of employment and the location of production. As Aizenman (1992) nicely demonstrated, the extent to which exchange rate variability influences foreign investment hinges on the sunk costs in the investment, the competitive structure of the industry, and overall convexity of the profit function in prices. In the production flexibility arguments, the important presumption is that producers can adjust their use of a variable factor following the realization of a stochastic input into profits. Without this variable factor, i.e. under a productive structure with fixed instead of variable factors, the potentially desirable effects on profits of price volatyility are diminished. By the production flexibility arguments, more volatility is associated with more FDI *ex ante*, and more potential for excess capacity and production shifting *ex post*, after exchange rates are observed.

An alternative approach linking exchange-rate variability and investment relies on *'risk aversion'* arguments. The logic is that investors require compensation for risks that exchange rate movements introduce additional risk into the returns on investment. Higher exchange-rate variability lowers the certainty equivalent expected exchange-rate level, as in (Cushman, 1988). Since certainty equivalent levels are used in the expected profit functions of firms that make investment decisions today in order to realize profits in future periods. If exchange rates are highly volatile, the expected values of investment projects are reduced, and FDI is reduced

accordingly. These two arguments, based on "production flexibility" versus "risk aversion", provide different directional predictions of exchange rate volatility implications for FDI. The argument that producers engage in international investment diversification in order to achieve *ex post* production flexibility and higher profits in response to shocks is relevant to the extent that *ex post* production flexibility is possible within the window of time before the realization of the shocks. This suggests that the production flexibility argument is less likely to pertain to short term volatility in exchange rates than to realignments over longer intervals. When considering the existence and form of real effects of exchange rate variability, a clear distinction must be made between short term exchange rate volatility and longer term misalignments of exchange rates. For sufficiently short horizons, *ex ante* commitments to capacity and to related factor costs are a more realistic assumption than introducing a model based on *ex post* variable factors of production. Hence, risk aversion arguments are more convincing than the production flexibility arguments posed in relation to the effects of short-term exchange rate variability. For variability assessed over longer time horizons, the production flexibility motive provides a more compelling rationale for linking foreign direct investment flows to the variability of exchange rates. As exposited above, the exchange rate effects on FDI are viewed as exogenous, unanticipated, and independent shocks to economic activity. Of course, to the extent that exchange rates are best described as a random walk, this is a reasonable treatment. Otherwise, it is inappropriate to take such an extreme partial equilibrium view of the world. Accounting for the co-movements between exchange rates and monetary, demand, and productivity realizations of countries is important. As Goldberg and Kolstad (1995) show, these correlations can modify the anticipated effects on expected profits, and the full presumption of profits as decreasing in exchange rate variability. Empirically, exchange rate volatility tends to increase the *share* of a country's productive capacity that is located abroad. Analysis of two-way bilateral foreign direct investment flows between the United States, Canada, Japan, and the United Kingdom showed that exchange rate volatility tended to stimulate the share of investment activity located on foreign soil. For these countries and the time period explored, exchange rate volatility did not have statistically different effects on investment shares when distinguished between periods where real or monetary shocks dominated exchange rate activity. Real depreciations of the source country currency were associated with reduced investment shares to foreign markets, but these results generally were statistically insignificant (Goldberg, 2006).

Although theoretical arguments conclude that the share of total investment located abroad may rise as exchange rate volatility increases, this does not imply that exchange rate volatility depresses domestic investment activity. In order to conclude that domestic aggregate investment declines, one must show that the increase in domestic outflows is not offset by a rise in foreign inflows. In the aggregate United States economy, exchange rate volatility has not had a large contractionary effect on overall investment (Goldberg, 1993). Overall, the current state of knowledge is that exchange rate volatility can contribute to the internationalization of production activity without depressing economic activity in the home market. The actual movements of exchange rates can also influence FDI through relative wage channels, relative wealth channels, and imperfect capital market arguments.

Review of Empirical Literature

Varied results had been found on the influence of exchange rate volatility on foreign direct investment inflows. The literature is divided on the issue of effect of exchange rate volatility on FDI, with some studies finding a positive effect of exchange rate volatility on FDI,

some studies showing no effect and others finding a negative effect. Foad (2005) asserts that a positive effect can be justified with the view that FDI is export substituting. That is increase in exchange rate volatility between the headquarters and the host countries induce a multinational company to serve the host country through a local production facility rather than exports, thereby insulating against currency risk. Empirical investigation of firm level data on the US foreign direct investment (FDI) to Korea according to Jeon and Rhee (2008), showed that foreign direct investments inflows had significant association with real exchange rate and expected exchange rate changes just as the results of Ramiraz (2006), had affirmed the same. However, Brahmasrene and Jiranyakul (2001); Dewenter (1995) found no statistically significant relationship between the level of the exchange rate and foreign direct investment inflows (see Ajayi, 2006 and Naudé and Krugell, 2007 for survey of evidence). Yousaf *et al* (2013) examine the impact of exchange rate volatility on FDI in Pakistan from 1980 to 2011. The study employed the OLS regression model and volatility analysis. The results demonstrate that exchange rate volatility and inflation deter FDI while exchange rate has positive relationship with it. Ellahi (2011) examines the impact of exchange rate volatility on FDI in Pakistan. Using the ARDL model, he included an array of key macroeconomic variables in the model. The result shows *inter alia* that exchange rate volatility has negative impact on FDI inflow in the short run and has positive impact in the long run.

Justification for the adverse impact of exchange rate volatility on FDI can be found in the irreversibility literature pioneered by (Dixit and Pindyck, 1994). A direct investment in a country with a high degree of exchange rate volatility will have a more risky stream of profits. As long as this investment is partially irreversible, there is some positive value to holding off on this investment to acquire more information.

As Foad (2005) observed, given that there are a finite number of potential direct investments, countries with a high degree of currency risk will lose out on FDI to countries with more stable currencies. Osinubi and Amaghioyeodiwe (2009) identified Nigeria as one of the countries with high degree of currency risk. The authors empirically investigated the effects of exchange rate volatility on Foreign Direct Investment (FDI) in Nigeria, using secondary time series data from 1970 to 2004. Employing the error correction technique and OLS model, the results suggest, inter alia that exchange rate volatility need not be a source of worry for foreign investors. The study also reveals a significant positive relationship between real inward FDI and exchange rate. This implies that depreciation of the Naira increase real inward FDI.

Obiora and Igue (2006), investigated the likely effect of exchange rate volatility on foreign direct investment in Nigeria. In their result exchange rate volatility was found to have a negative and significant effect on Nigeria's exports to the US. Kyereboah-Coleman and Agyire-Tettey (2008), had a study on Ghana on the volatility of real exchange rate showed that the volatility of the real exchange rate had a negative influence on foreign direct investment (FDI) inflows while Alaba (2003) attempted to bridge the gap on the exchange rate volatility-FDI nexus for Sub Sahara African (SSA) countries. The study employed the error correction methodology and GARCH measure of volatility. The results show that official market exchange rate volatility was not found to be significant for FDI inflows to both manufacturing and agricultural sectors in Nigeria. Ogunleye (2008) examined the exchange rate volatility-FDI nexus in SSA by examining nine countries in the region, country-specific time series and panel model estimation techniques were employed. The study found that exchange rate volatility generally constrains FDI inflows to SSA.

Udoh and Egwaikhide (2008) investigate the impact of exchange rate volatility, inflation uncertainty and other key macroeconomic variables on FDI in Nigeria, from 1970 to 2005. Employing the GARCH model, their results concluded that inflation uncertainty and exchange rate volatility negatively affect FDI in Nigeria. Unlike the exchange rate volatility-FDI nexus, the exchange rate volatility-FPI nexus have not enjoyed much empirical investigation. However, in an influential study, Han and Ray (2006) develop an equilibrium framework in which exchange rate returns, equity returns and capital flows are jointly determined under incomplete foreign exchange risk trading. The authors also argue that currency order flows and portfolio flows are intimately related within the portfolio rebalancing framework since they both reflect investors' behaviour. Their study provides a theoretical framework for analyzing the implications of incomplete foreign exchange risk for the correlation structure of exchange rate fluctuations and equity returns as well as net portfolio flows; even though it does not include statistical tests for the impact of exchange rate uncertainty on portfolio flows internationally. The underlying idea is that exchange rate volatility increases transaction costs and reduces potential gains from international diversification by making the acquisition of foreign securities such as bonds and equities more risky, which in turn affects portfolio flows across borders negatively (Caporale *et al*., 2013). Eun and Rasnick (1988) had previously shown that exchange rate uncertainty is non-diversifiable and has an adverse impact on the performance of international portfolios. This finding is also consistent with the evidence presented in the study by Levich *et al*. (1998) who surveying 298 US institutional investors, found that foreign exchange risk hedging constitutes only 8% of total foreign equity investment.

Trade openness had also been found to be positively associated with foreign direct investment (FDI) inflows (Yun *et al*., 2000; Feils and Rahman, 2008). Kamaly (2007) in his study shed some light on the direction and determinants of the aggregate mergers and acquisitions activity directed to developing countries in the 1990s, concluding that openness has a significant effect on merger and acquisition, but quantitatively its effect was minimal while depreciation in the domestic exchange rate had strongly and positively affected merger and acquisition. In addition, higher level of stock market activity and depth in developing countries decreased the amount of mergers and acquisitions directed to them.

Model Specification

The theoretical strand on which the research is based emphasized the role of a stable domestic market in the recipient country for it to be able to attract foreign investment. An unstable macroeconomic setting that is characterized by rapidly fluctuating exchange and interest rates as well as prices would act as disincentives to foreign investors. The model is thus specified based on past theoretical and empirical research of Omorokunwa and Ikponmwosa (2014) as:

$$FDI = f(RGDPG, EXRV, INFLR, MCAP, OPN, INTR) \quad (1)$$

where, FDI = Foreign direct investment, RGDPG = Real GDP growth, EXRV = Exchange rate volatility, INFLR = Inflation rate, MCAP = Market capitalization, OPN = Trade openness INTR = Interest rate.

In its econometric form, the model is re-specified as:

$$\ln FDI = a + \beta_1 \ln RGDPG + \beta_2 \ln EXRV + \beta_3 \ln INFLR + \beta_4 \ln MCAP + \beta_5 \ln OPN + \beta_6 \ln INTR + ECM(-1) + U \quad (2)$$

where, a = the intercept, b_1 to b_6 = the coefficients of the variables to be estimated, ECM(-1) = Error correction mechanism, U=The error term. Our *a priori* expectation is that the signs of the parameters (RGDPG, MCAP, OPN) are expected to be positive while the parameters (EXRV, INFLR, INTR) are negative. All the variables are in their log forms. The long run equilibrium and the short run dynamics of this model were equally estimated. Data for this study were gathered mainly from secondary sources which include the Central Bank of Nigeria's Statistical Bulletin (various issues) and National Bureau of Statistics. For this study aggregate time series data was used because of its stationarity characteristics. This implies that the mean and standard deviation do not systematically differ over a period of time. In addition, aggregate data are normally very useful in establishing long term econometric relationship between variables (Hoover, 2014). The exchange rate volatility values were computed by the researcher. The computations were based on theoretical validation of research results carried out in the past (see Cho *et al*., 2002, Bhmani-Oskooee and Mitra, 2008), in which they used a measure of variance (risk), 'standard deviation' of the first difference of the exchange rate variable to construct the exchange rate volatility variable. Based on this theoretical foundation, this study used the standard deviation of the first difference of the exchange rate variable to compute the exchange rate volatility.

Data Analysis and Results

The empirical investigation adopted in this study followed three main steps. First, the Augmented Dickey Fuller (ADF) test of stationarity. Second, the Johansen test of co-integration (1988-1991) and third, the error correction mechanism analysis.

Unit Root Test

Time series data are said to be non-stationary if the mean and variance of the time series are not constant over time otherwise it is stationary. The Augmented Dickey-Fuller (ADF) unit root test was employed to test the stationarity of the variables. The tests were conducted using E-views 8.0 statistical package which automatically selects the number of lagged dependent variables in order to correct for the presence of serial correlation (Asteriou and Hall, 2007). ADF test was conducted for unit roots in the levels (for both constant without trend and constant with trend) and given that the variables were non-stationary at levels, and in line with Box and Jenkins (1978) who argued that non-stationary time series in levels may be made stationary by taking their first differences, the first difference (for both constant without trend and constant with trend) were conducted. The result is presented in Table 1 below.

Table 1
The Results of Augmented Dickey-Fuller (ADF) Test

	Level		First Difference	
Variables	Constant without Trend	Constant with Trend	Constant without trend	Constant with trend
FDI	-1.677886	-1.891133	-6.107774**	-6.215644**
RGDPG	-0.835094	-2.018564*	-8.400662**	-8.271323**
EXRV	-0.658048	-1.021483	-3.258661**	-3.017602**
INFLR	-0.420015	-1.619287	-3.857173**	-3.753061**
MCAP	-1.364195	-2.137177*	-5.801247***	-5.710536***
OPN	-0.174060	-1.086610	-4.923169**	-4.455993**
INTR	-2.388746*	-2.791935*	-6.124148**	-6.566741**

Source: Author's Computations, 2015

Note: ***,**,* denote statistical significant at 1%, 5% and 10%, respectively. Lags were automatically selected based on SIC, maximum lag=8.

The result of Augmented Dickey-Fuller (ADF) unit root test presented in Table 1 shows that the variables were not stationary at levels even though RGDPG, MCAP and INTR showed some level of significance at 10% level of significance. The stationarity of these variables suggest that disequilibrium in real gross domestic product growth, market capitalization and interest rate do not persist over time. However, the tests showed a consistent results by rejecting the null (HO: a unit root) hypothesis of a unit root at first difference, against the one-sided alternative whenever the ADF statistic is less than the critical value at a statistically significant levels of 1%, 5%, and 10%. This implies that the variables are actually difference-stationary, attaining stationarity after first differencing of variables. Hence, we accept the hypothesis that the variables possess unit root but are integrated of order one (i.e., I(1)).

Co-integration Test

The concept on which co-integration is based is that, if two or more variables are linked to form an equilibrium or long run relationship between them, even though the series themselves in the short run deviate from equilibrium, they will move together in the long run. This implies that if two time series variables p_t and q_t are both non-stationary at levels but stationary when differenced, i.e. they are of order I(1), then there could be a linear combination of the two time series variables p_t and q_t which is stationary (see, Engle and Granger, 1987). Co-integration tests therefore involve testing for the existence or otherwise of long-term equilibrium between the series in the model. This study employed two statistical tests suggested by Johansen (1988); Johansen and Juselius (1990) to determine the number of co-integration vectors using the maximum likelihood test procedure. First, is the trace test (λ trace) which tests the null hypothesis that the number of distinct co-integrating vector is less than or equal to q against a general unrestricted alternatives q=r, this test is shown in the equation below:

$$\lambda\, trace\,(r) = -T \sum_{i=r+1}^{n} In(1-\lambda t) \qquad (3)$$

Where: T is the number of usable observations, and $\lambda 1$'are the estimated eigenvalue from the matrix. Second, is the maximum eigenvalue test (λ max) which is a test of the null hypothesis that there is r co-integrating vector against the alternative of r+1 co-integrating vector. The maximum eigenvalue is calculated according to the following formula:

$$\lambda \max(r, r+1) = -T\, In(1 - \lambda r + 1) \quad (4)$$

The test results are presented in Tables 2 and 3, respectively.

Table 2

Johansen co-integration test results (trace)

Hypothesized no. of (E(s)	Eigen value	Trace statistic	0.05 critical value	Prob.**
None*	0.9753	152.3767	123.24	0.0000
At most 1*	0.9661	107.5423	96.15	0.0000
At most 2*	0.8860	79.7815	67.81	0.0001
At most 3*	0.6882	56.2082	43.86	0.0013
At most 4	0.5673	24.1474	29.68	0.0620
At most 5	0.4551	9.3057	15.47	0.0939
At most 6	0.0551	0.8416	3.86	0.2576

Source: Researchers' Computations 2015

Trace test indicates 4 co-integrating eqn(s) at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level, ** Mackinnon-Haug-Michelis (1999)'s P-values.

Table 3

Johansen co-integration test result (maximum eigenvalue)

Hypothesized no. of (E(s)	Eigen value	Max-eigen Statistic	0.05 critical value	Prob.**
None*	0.9753	69.4161	45.28	0.0000
At most 1*	0.9661	49.1053	41.37	0.0000
At most 2*	0.8860	38.3235	32.84	0.0021
At most 3*	0.6882	29.0343	26.38	0.0252
At most 4	0.5673	19.2658	20.13	0.0896
At most 5	0.4551	7.1906	14.07	0.1087
At most 6	0.0551	0.6463	3.84	0.2676

Source: Researcher's Computations 2015

Max-eigenvalue test indicates 4 co-integrating equation(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level. ** Mackinnon-Hang-Michelis (1999) P-values.

The co-integration test results showed that the trace statistic and max-eigen values are more than their critical values at 5 percent significant level in four out of the seven hypotheses, which indicates four co-integrating vectors or four co-integrating equations at the 0.05 level of significant. The existence of co-integrating vectors implies that there would

be no loss of information. Therefore long run relationships exist between FDI and the explanatory variables. The result of the long run estimation is shown in Table 4 below:

Table 4
Long-run relationship Results

Variable	Coefficient	Std. Error	T-statistic	P-value
LNFDI(-1)	-0.51802	0.30421	-1.70284	0.6034
LNRGDPG(-1)	0.76524	0.23290	3.28570	0.0338*
LNEXRV(-1)	-2.12894	0.46704	-4.55837	0.0410*
LNINFLR(-1)	- 0.41317	0.08206	-5.03375	0.0062**
LNMCAP(-1)	1.71765	0.55815	3.07740	0.0247*
LNOPN(-1)	0.16096	0.15741	1.02260	0.0534
LNINTR(-1)	-0.42436	0.46206	- 0.91841	0.2381

Source: Researcher's Computations 2015

** indicates 1% level of significance, * indicates 5% level of significance.

Table 4, reports the long-run estimation results. The coefficient of exchange rate volatility was found to be negative and statistically significant at 5% with t-statistic of -4.55837 and its probability of 0.0410. This implies that 1% increase in exchange rate volatility will reduce foreign direct investment by 26%. This is in line with the findings of (Udoh and Egwaikhide, 2008). The coefficient of inflation rate was also significant but at 1% and carried a negative sign with a coefficient of -0.41317 and t-statistic of -5.03375. By this, 1% increase in inflation rate will lead to 41.32% reduction in foreign direct investment in Nigeria. This is an indication that inflation rate has severe implication on foreign direct investment inflow to Nigeria. The coefficient of interest rate expectedly was negative (-0.42436) but no sufficient evidence was established for its significance as indicated by the t-statistic of -0.91841 and probability value of 0.2381.

However, real gross domestic product growth and market capitalization were correctly signed and statistically significant at 5% with their coefficients of 0.76524 and 1.71765 and t-statistic of 3.28570 and 3.07740 respectively. This is in line with the findings, of (Udoh and Egwaikhide, 2008; Omorokunwa and Ikponmwosa, 2014). Obviously, a well-developed and efficient capital market and a stable RGDPG will attract direct foreign investment to Nigeria. The measure of openness of the economy with a coefficient of 0.16096 and t-statistic of 1.02260 was correctly signed but not statistically significant at 5%.

Short Run Error Correction Model

The long-run model was specified with the residuals from the co-integration regression as parsimonious error correction model (ECM) to capture the short-run dynamics of the behavior of foreign direct investment within the context of short term volatility in exchange rate, market capitalization and other explanatory variables in the model. The results are presented in Table 5 below:

Table 5

Parsimonious Error Correction Model

Variable	Coefficient	Std. Error	T-statistic	P-value
C	0.38746	0.43146	0.89802	0.3763
D(LNFDI(-1))	0.13422	0.20728	0.64751	0.5024
D(LNRGDPG(-1))	0.49009	0.16433	2.98236	0.0231*
D(LNEXRV(-1)	-0.38371	-0.07491	-5.12237	0.0205*
D(LNINFLR(-1))	-0.23015	0.07570	-3.04021	0.0478*
D(LNMCAP(-1))	0.34513	0.06492	5.31635	0.0027**
D(LNOPN(-1))	0.18460	0.28167	0.65539	0.4102
D(LNINTR(-1))	-0.17442	0.18702	-0.93262	0.1691
ECM(-1)	-0.36732	0.07828	-4.69261	0.0038**

R^2 = 0.934268, Adj. R^2 = 0.921908
F-Statistic= 247.6145
Prob. (F-Statistic) = 0.0000
Durbin – Watson Statistic = 2.02872

Source: Researcher's Computations 2015

**indicates significant at 1%, *indicates significant at 5% level of significance. Table 5 reports the short-run dynamics of the error correction mechanism.

The coefficient of exchange rate volatility was found to be negative and statistically significant at 5% with t-statistic of -5.12237 and probability of 0.0205. This implies that 1% increase in exchange rate volatility will reduce foreign direct investment by 38.4% in the short-run. This is in line with the findings of Udoh and Egwaikhide (2008), although Ogunleye (2008) and Omorokunwa and Ikponmwosa (2014) reported that the negative effect was insignificant in the dynamic short run analysis on Nigeria. The coefficient of inflation rate was also significant at 5% and carried a negative sign with a coefficient of -0.23015 and t-statistic of -3.04021. By this, 1% increase in inflation rate will lead to 23% reduction in foreign direct investment in Nigeria. This is an indication that inflation rate has severe implication on foreign direct investment inflow into Nigeria. The coefficient of interest rate expectedly was negative (-0.17442) but no sufficient evidence was established for its significance as indicated by the t-statistic of -0.93262 and probability value of 0.1691. This disagrees with the *a prior* expectation, indicating that FDI will flow to Nigeria irrespective of the level of domestic interest rate. This agrees with the findings of Offiong and Atsu (2014) but in disagreement with Campos and Kinoshita (2003) who reported significant relationship between FDI and domestic interest rate.

However, real gross domestic product growth and market capitalization were positively signed and statistically significant at 5% and 1% respectively with their coefficients of 0.49009 and 0.34513 and t-statistic of 2.98236 and 5.31635 respectively. This is in line with the findings of Offiong and Atsu (2014), who reported the existence of positive and significant relationship between the flow of FDI and real GDP growth. Apparently, a stable real GDP growth and a liquid capital market given a conductive business environment will definitely attract direct foreign investment to Nigeria. The measure of openness of the economy with a coefficient of 0.18460 and t-statistic of 0.65539 was correctly signed but not statistically significant at 5%. This also agrees with the findings of Offiong and Atsu (2014) but not

supported by the findings of Ibrahim and Onikos-Allyui (2008) that revealed the existence of significant relationship between FDI and openness of the economy.

The error correction term (ECM) coefficient of -036732 which is otherwise referred to as the speed of adjustment was correctly signed and statistically significant at 1%, considering its probability value of 0.0038. The value indicates that about 36.7% of the short run disequilibrium and inconsistencies are being corrected and adjusted into the long-run equilibrium path. This shows that any short run deviation of FDI from equilibrium in the previous period can be restored back into the long run path. The equation of the ECM is therefore specified in line with the parsimonious model as follows:

$$FDI_t = 0.38746 + 0.13422\ FDI_{t-1} + 0.49009\ RGDPG_t - 1 - 0.38371\ EXRV_t - 1 - 0.23015\ INFLR_{t-1} ++ 0.34513\ MCAP_{t-1} + 0.184600\ PN_{t-1} - 0.17442\ INTR_{t-1} - 0.36732\ ECM_{t-1} \quad (5)$$

The R^2 of 0.93426 indicates that about 93% of total variation in the dependent variable (FDI) is accounted for by the explanatory variables (RGDPG, EXRV, INFLR, MCAP, OPN and INTR). This result remains robust even after adjusting for the degrees of freedom (d.f.) as indicated by the value of the adjusted R^2, which is 0.921908 (92%). The regression therefore has a good fit. The F-statistic, which is a measure of the overall significance of the model, is 247.6145 with the corresponding probability value of 0.0000, statistically significant at 1%. The implication of this is that the explanatory variables have joint significant effect on the inflow of foreign direct investment to Nigeria. The Durbin-Watson statistic of 2.02872 indicates no evidence of serial autocorrelation in the residuals of the estimates.

Conclusion and Recommendations

This study investigated the impact of exchange rate volatility and market capitalization of the Nigeria's capital market on the inflow of foreign direct investment to Nigeria using time series data from 1980 to 2013. It employed the ordinary least square technique and error correction model in its estimations. The result revealed that exchange rate volatility has negative and significant effect on the inflow of foreign direct investment to Nigeria both in the long run and in the short run. The coefficient of inflation rate was also significant at 5% and carried a negative sign. The coefficient of interest rate expectedly was negative but no sufficient evidence was established for its significance indicating that FDI will flow to Nigeria irrespective of the level of the domestic interest rate. However, real gross domestic product growth and market capitalization were positively signed and statistically significant. Apparently, a stable real GDP growth and a well-developed capital market will definitely attract direct foreign investment to Nigeria. The measure of openness of the economy was correctly signed but not statistically significant at 5%. The error correct mechanism revealed that about 36.7% of the short run disequilibrium and inconsistencies are being corrected and adjusted into the long run equilibrium path within the period.

This study recommends that to restore investors' confidence and encourage growth in the private sector, stable exchange rate should be vigorously pursued through sound exchange rate management system and policies that will lead to increase in domestic production of export commodities. This will increase the country's foreign exchange earnings and reduce volatility in exchange rate. There is need to stop the concept of dollarization of the economy whereby most investment projects are quantified, appraised and paid for in dollar in a country where naira is the legal tender. This will reduce the stress on foreign earnings which is a major factor, causing exchange rate volatility in Nigeria. Deepening of the

capital market is essential to provide the needed liquidity for the capital market to effectively function and provide funds for investors. It also recommends development policies that are aimed at embarking on greater private (domestic and foreign) participation in the economy to increase the level of openness. Nigeria needs to reduce restrictions and barriers that limit access to the securities markets for foreign investors. Sound foreign reserve management practices are imperative for Nigeria as measures of maintaining the value of the naira and to reduce exchange rate volatility as well as international capital shocks.

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