Autoregressive Distributed Lag (ARDL) Analysis of Foreign Portfolio Investments Determination in Nigeria

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This study investigates the key macroeconomic variables determining foreign portfolio inflows (FPI) to Nigeria using the autoregressive distributed lag procedure that includes the bounds test of cointegration and error correction mechanism applied against time-series Nigerian data from 1986 through 2019. The results reveal the existence of long-run equilibrium relationship between FPI and exchange rate (EXR), inflation (INF), interest rate (INT), real GDP, and Tax (TXR). Short-run errors are adjusted at a speed of 77.87% per annum, in the long-run. Causality is found to jointly-flow from the explanatory variables to FPI inflows. In all the model estimations - autoregressive, short- and long-runs, exchange rate exerted negative and significant effect on FPIR. Inflation and tax significantly affected FPI inflows to Nigeria. Growth in real GDP and interest rate positively influenced FPIR, but not significantly. The results indicate that the major determinants of FPI inflows are exchange rates, inflation, and tax.

Keywords: foreign portfolio, exchange rate, GDP, tax, interest rate

INTRODUCTION

The most celebrated argument for the encouragement and attraction of foreign investments by developing countries lies with dual-gap theory. The existence of savings-investments and export-import gaps in developing countries create the need to seek external financing to augment domestic capital accumulations. Saving-investments gap arises when a country fails to generate sufficient savings to fill its investment needs, while export-import gap arises when the export proceeds are not enough to cater for the unlimited import demand of nationals. Thus, to finance growth in a typical developing economy, there is the dire need to approach foreign sources. Notable among the available external funding sources are the foreign investments and external borrowing. Foreign investments are categorized into foreign direct

investment (FDI) and foreign portfolio investment (FPI). The duo complements other external sources to assist countries finance shortfalls in their domestic investment bid (Anidiobu & Okolie, 2016; Ezirim, Ezirim & Nwagboso, 2021).

Foreign portfolio investment (FPI) are investments in securities and other financial assets held by investors in another country; simply, the art of holding financial assets such as stocks, bonds, and cash equivalents in a country outside of the investor's home nation. The assets held may be stocks, ADRs, GDRs, bonds, mutual funds, or exchange-traded funds (Chen & Scott, 2021; Investopedia, 2019).

Unlike foreign direct investment (FDI), FPI guarantees only passive ownership interest since investors have no voting right or control over entities invested in. Direct ownership of property or a stake in a company is the preserve of FDIs. Whereas FDIs are long-term and lasting commitments, FPIs, being a hot-money commitments, are short-term in outlook, and as such, are more volatile. Many countries depend on FDI and FPI as key sources of funding output growth and development (Chen & Scott, 2021).

It is easy to recognize the distinguishing nature and character of FDI from FPIs as they occur in Nigeria. For instance, MTN (a leading mobile telephone company in Nigeria) acquired a GSM license at the sum of $285 million in 2001. Etisalat followed closely in 2008. In 2012, Bharti Airtel acquired Zain and brought in much more dollar denominated money; all of which propelled the growth of the telecommunication industry in Nigeria. We can equally see more veritable instances like Shell Oil, Total (now called TotalEnergies) and its merging entities in oil and gas, Toyota in automobile, BBC and CNN in News media, and Shoprite and Spar in the consumer product sector. These are examples of FDI-route to foreign inflows funds to Nigeria. The FPI-route crystallizes in the purchase of stocks or bonds issued in the country's capital market. The profitability of FPIs rests solely on the performance of the assets or issuing companies and the stability of the economy and its sectors (Ogunleye, 2022).

The proportion of FDIs to total foreign investment flow stood at 20%, tumbling to a value below $1 billion in 2016. This reduced even further to 4% in 2019. FPIs accounted for 35% of the aggregate foreign investments during the same 2019 but grew to a proportion of 68% by year end in 2019, reflecting a rise from $1.8 billion in 2016 to $16.4billion in 2019. In terms of importance, it appears in these years, FPI has risen in importance than FDI in Nigeria. This trend is connected with the robust activities and attractive yields on bonds and treasury bills that greeted the financial markets during these periods. For instance, while the yields on these instruments were as low as about 1.8 – 2.0% in the U.S. market, they were as high as 14% in the Nigerian market. The move by the investors to reap the high returns from Nigeria is only incidental and arbitraging. Notwithstanding, the events that greeted the economy such as Covid-19 pandemic and oil price dwindling to almost nothing, did not help both FDI and FPI inflows in year 2020 and beyond (Ogunleye, 2022).

It is a truism that Nigeria has been one of the developing countries that have attracted and benefited from the inflows of foreign portfolio investments. However, the recorded data shows that the inflows of portfolio investments (FPI) in recent years have been dismal, or even sub-optimal, and generally on a declining trend. For instance, FurtherAfrica (May 2021) reported the declining trend in FPI inflow to Nigeria in 2020 and 2021. FPI dwindled from US$4.31B in first quarter of 2020 to US$385M in the second quarter. It witnessed a small rise to US$407M in the third quarter of 2020, but finally slumped to US$56.15M in the fourth quarter of 2020. It however started recovering in first quarter of 2021, standing at US$974.1M. Notwithstanding, this observed increase in first quarter of 2021 only represented a relative decline of 77.4% of foreign portfolio inflow to Nigeria when compared to first Quarter of 2020. The Covid-19 and associated economic challenges relating to lockdowns, oil price slump and glut, and general economic inactivity have been blamed as being primarily responsible for this trend.

The FPI activities in the Nigerian stock market reflected similar trend. The Independent Newspaper (2022) reports a downward trend in FPIs in Nigerian stock market to the tune of 40.4 per cent in 2021, as the lowest ever in five years; with active foreign investor participation in the market dwindling by 11% of total market transactions (from 33.63% in 2020 to 22.88% in 2021).

Despite the fact that the aggregate FPI transactions in Nigerian stocks plummeted to N434.50 billion in 2021 compared to N729.20 billion in 2020. The gap between FPI inflows and outflows narrowed to a deficit of N24.74 billion (i.e., N204.88 billion as against N229.62 billion respectively) in 2021. Comparatively, the end-of-year inflow-outflow gap in 2020 was N729.20 billion as against N942.55 billion

recorded in 2019, which implied a reduction of 22.64%. This level was a four-year-low and is connected with the equity component of FPIs.

Exchange rate dynamics, inflationary spirals, taxation, high interest rates, and a host of other factors are equally suspected as affecting the inflows of FPIs to the country. The question becomes: which of the macroeconomic variables account mostly for changes in FPI inflows to Nigeria over time? In other word, which of these factors influence FPI decisions the most? Therefore, it becomes the main thrust of this study to unravel the macroeconomic factors that constitute the critical arguments in determining foreign portfolio investment inflows to Nigeria. Some previous studies have identified such factors as exchange rates and inflation, while others attributed them to interest rates and economic performance. Ezirim, and Nwagboso (2021) observed stock market performance as critical determinants of FPI causation in Nigeria. The number of studies that have explored the tax-effect of FPI inflows is not robust enough. Furthermore, it is inconclusive as to which of these variables are the key and sustainable factors explaining FPI inflows. This study seeks to provide some answers, resolve some of the inconclusiveness, and close the gap.

EMPIRICAL BACKGROUND AND REVIEW

The extant literature in this area of study has focused on the impact of foreign investments, such as FPI, on the growth of developing or developed economies. Their motivation is connected with the fact that foreign investment capital inflows is believed to assist in the growth and development of countries economically. On the other hand, the research on the fundamental determinants of FPI in Nigeria is not robust enough and some may argue that it is lacking. For instance, Ezeanyeji & Ifeako (2019) examine the impact of FPI on the growth of the Nigerian economy using the Johansen cointegration and error-correction-modeling procedure applied against annual Nigerian data from 1986 through 2017. They reported that net foreign portfolio investment positively and significantly impacted economic growth of Nigeria.

Baghebo & Apere's (2014) explored the impact of FPI on economic growth, as well as the long-run determinants of FPI in Nigeria. They stated that FPI, market capitalization, and trade-openness have positive long-run relationship with real GDP of Nigeria. Onyeisi, Odo & Anoke (2016) applied VECM against the Nigerian data from 1986 through 2014. They assessed the FPI-stock-market-growth relations and found the existence of long-term significant impact of FPI on stock growth in Nigeria. Okafor, Ezeaku, & Izuchukwu (2015) employed OLS and Granger Causality tests to reported that foreign portfolio investments positively but not-significantly affected exchange rate movements in Nigeria. Acha & Essien (2018) studied the effects of FPI and some macroeconomic variables like exchange rates and market capitalization on Nigeria's economic growth using the OLS technique. They found FPI and market capitalization to have positive effects on real GDP.

Gumus, Duru, & Gungor (2013) applied the VAR, Granger causality tests, impulse response function and variance decomposition procedure to evaluate the relationship between foreign portfolio investments and macroeconomic factors in Turkey from 2006 through 2012. They found foreign portfolio investment affecting Istanbul Stock Exchange Price Index and exchange rates. Equally, industrial production index affected foreign portfolio investment significantly. Shanab (2017) studied the effects of GDP, FPI buying, FPI selling, and inflation on market capitalization of Amman stock exchange from 2005 - 2016. The found a strong relationship between market capitalization and GDP, FPIB, FPIS and no strong relationship between inflation and market capitalization. Atubrah (2015) investigated the portfolio-inflows-economic growth relations in Sub-Saharan Africa countries using the Vector Error Correction Model (VECM) across the 2005-2013 periods. It was discovered that long-run negative relationship ran from portfolio inflows to economic growth. No short-run relationship ran from economic growth to portfolio inflows; but it ran in reverse order, as reported. In the same year, Munstasir (2015) analyzed the linkage between portfolio investment, composite stock index volatility and exchange rate in Indonesia, using the VAR, VECM, cointegration, and causality procedure. The findings are that foreign purchases directly affected the volatility of stock index and exchange rate. Also, exchange rates' changes directly affected volatility the stock market.

The review of the extant studies showed that there is a need for more robust research to examine the determination of FPI causation in typical developing countries like Nigeria, using sophisticated econometric or finametric techniques. This represents a further justification for this study.

METHODOLOGY

This study is designed based on the macro-finametric causal comparative procedure that involves modeling, estimation, and analysis of relations of financial nature and origin. Appropriate resulting hypotheses are also assessed.

The Model

Functionally, foreign portfolio investment inflows are said to depend on such macroeconomic variable as exchange rates (EXR), inflation (INF), interest rates (INT), real economic growth rate (RGDP), and taxes (TXR). Thus, it is specified that

$$FPIR = f(EXR, INF, INT, RGDP, TXR) \quad (1)$$

Explicitly,

$$FPIRt = \psi 0 + \psi 1EXRt + \psi 2INFt + \psi 3INTt + \psi 4RGDPt + \psi 5TXRt + \epsilon t \quad (2)$$

where, $\psi_1 > < 0$, $\psi_2 > 0$, $\psi_3 < 0$, $\psi_4 > 0$, $\psi_5 < 0$; ψ_{is} are parameters, ψ_0 is intercept, and ϵ_t is the error term.

This study hypothesizes that foreign portfolio investment (FPI) inflows are a function of (determined by) a country's contemporaneous values of exchange rates dynamics, inflation spirals, interest rates, the state of the economy (as represented by the growth rate of the real GDP), prevailing employment conditions, taxes, and one-lagged values of the FPI. Specifically, it is argued that FPI relates with its own previous values and the present values of the explanatory variables. The dynamic attribute of lagged values of the dependent variable brings out the autoregressive element. Imputing this autoregressive property, expression (2) can be re-written as

$$FPIRt = \phi 0 + \phi 1EXRt + \phi 2INFt + \phi 3INTt + \phi 4RGDPt + \phi 5TXRt + \phi 6FPIRt\text{-}1 + Ut \quad (3)$$

where, $\phi 1 > < 0$, $\phi 2 > 0$, $\phi 3 < 0$, $\phi 4 > 0$, $\phi 5 < 0$, $\phi 6 > 0$; ϕ is are parameters, $\phi 0$ is intercept, and Ut is the error term.

The ECM for co-integrated data would take the form:

$$\Delta FPIRt = \beta 0 + \Sigma \beta i \Delta yt\text{-}i + \Sigma \gamma j \Delta EXRt\text{-}j + \Sigma \delta k \Delta INFt\text{-}k + \Sigma \delta k \Delta INTt\text{-}l + \Sigma \delta k \Delta RGDPt\text{-}m + \Sigma \delta k \Delta TXRt\text{-}n + \varphi zt\text{-}1 + et; \quad (4)$$

where

$$z_{t-1} = (FPIR_{t-1} - a_0 - a_1EXR_{t-1} - a_2INF_{t-1}) - a_2INT_{t-1} - a_2RGDP_{t-1} - a_2TXR_{t-1}) \quad (5)$$

and where, z, the "error-correction term", which corresponds to the OLS residuals series from the long-run cointegrating regression, that reads:

$$FPIRt = \alpha 0 + \alpha 1EXRt + \alpha 2INFt + \alpha 2INTt + \alpha 2RGDPt + \alpha 2TXRt + vt; \quad (6)$$

Expression (6) above is estimably reliable when a Bounds test and ECM verify the existence of cointegration between the variables (Adeleye, B.N., 2018; Giles, D., 2013).

ESTIMATION TECHNIQUES AND PROCEDURE

The starting point of the estimation in the study is the computation and analysis of the descriptive statistics of variables, namely measures of central tendency, dispersion, and symmetry. It proceeded to assess for stationarity using the Augmented Dickey-Fuller method. The default probability is 0.10 or 10% alpha level of significance. The results of the ADF tests enabled decision on the appropriate technique to employ to determine relationships in the long- and short-runs. Based on the results, the study utilized the autoregressive distributed lag (ARDL) approach to examine the relationships between foreign portfolio inflows and their determinants. The maximum dependent lags were determined automatically by the software, while the model selection method followed the Akaike information criterion (AIC).

The dynamic regressor with automatically selected lag of 0 included EXR, INF, INT, and RGDP, while the fixed regressors included TXR, constant, and trends. The consistent standard errors and covariance were determined using the White heteroskedasticity test. To determine the short-run and long-run relationships, the analysis extended to ARDL cointegrating and long-run estimations. as well as the ARDL Cointegration between the variables is examined using the bounds test within the ARDL modelling framework. The estimated critical values for F- and t-statistics that are derived from Pesaran et al (2001), where the calculated F-statistics are compared with two sets of critical values, one assuming that all variables are I (0) and the other assuming they are all I (1) (Adeleye, B.N., 2018; Giles, D., 2013).

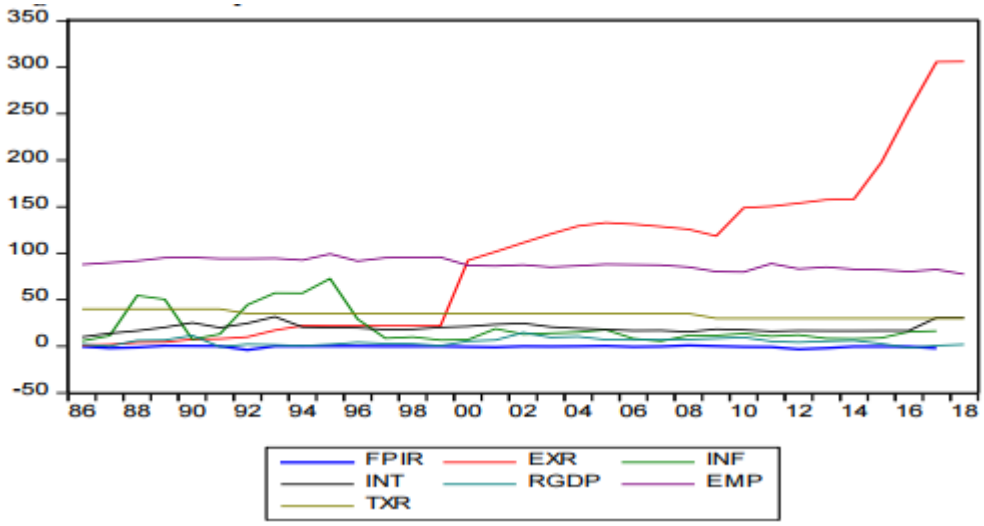
DATA AND DESCRIPTIVE STATISTICS

The data set for this study relates to annual time-series Nigerian data in respect of each of the variables from 1986 through 2019, a period described as post-structural adjustment program (post-SAP) in Nigeria. The data were sourced from the Statistical Bulletin of the Central Bank of Nigeria. The values of the variables were all converted to ratios and or rates of change. The descriptive statistics of the variables as summarized on Table 1. FPIR, EXR, INF, INT, RGDP, EMP, and TXR averaged -0.554, 97,28, 20.16, 19.78, and 34.39 during the period under study. *Inter alia*, their variability as represented by the standard deviation shows that EXR ($\sigma = 87.3$) displayed the highest variance away from the mean, followed by INF ($\sigma = 18.587.3$). The others varied minimally away from their means. Figure 1 depicts the Line Graph showing the trends in the variables over time. It is easy to see that EXR and inflation fluctuated more violently that all other variables. FPIR and EMP skewed negatively to the left, while all other variables skewed positively to the right. Three variables namely FPIR, INF, and INT were highly peaked with kurtosis of 5.2, 4.05, and 3.85 respectively, which are greater than the threshold value for normal distribution of 3. The rest, EXR, RGDP, EMP, and TXR were flatter than peaked. The observed Jaque-Bera statistic with its associated probability indicates that FPIR and INF are not normally distributed, while the others are normally distributed at 5% level of significance.

TABLE 1
DESCRIPTIVE STATISTICS OF THE VARIABLES

Statistic	FPIR	EXR	INF	INT	RGDP	TXR
Mean	-0.554413	97.27818	20.16343	19.79758	4.846745	34.39394
Std. Dev.	1.084202	87.32947	18.53114	4.773375	3.818625	3.481553
Skewness	-1.589323	0.742017	1.563274	0.926577	0.454398	0.159859
Kurtosis	5.153922	2.932708	4.049997	3.849606	2.719757	2.117981
Jarq-Bera	19.65757	3.034470	14.50373	5.714516	1.243615	1.210243
Probability	0.000054	0.219317	0.000709	0.057426	0.536973	0.546008

FIGURE 1
LINE GRAPH OF VARIABLES



ESTIMATION RESULTS AND ANALYSIS

The study commences the analysis implicated in this study with checking the stationarity status of the variables so as to know which analytical technique will best serve the purpose of the study. The Augmented Dicky-Fuller unit root test was utilized, and the results are summarized on Table 2. As can be seen in Table 2, four variables are stationary at level data, namely FPIR, INF, INT, and RGDP, being I(0) variables. Two variables, EXR and TXR attained stationarity at first-difference, and thus, I(1) variables. When such condition of different order of integration among variables prevails, one implicated technique to apply is the ARDL technique. This study recognizes that rule and employed the ARDL tool for its analysis.

TABLE 2
AUGMENTED DICKEY-FULLER STATIONARITY TESTS' RESULTS

Variable	T.Statistic	Probability	Integration Order	Remarks
FPIR	-4.399883	0.0015	I(0)	Stationary at level
EXR	-4.023091*	0.0041	I(1)	Stationary at 1st Diff
INF	-4.392034	0.0022	I(0)	Stationary at level
INT	-2.678602	0.0888	I(0)	Stationary at level
RGDP	-3.016365	0.0440	I(0)	Stationary at level
TXR	-5.770294*	0.0000	I(1)	Stationary at 1st Diff

*See Appendix 1 for their level t-statistics' and probability values

ARDL ANALYSIS OF DETERMINANTS OF FPIR

Employing automatic model and lag selection, the ARDL (1,0,0,0,0,0) model was utilized for the analysis, the results of which are summarized on Table 3. From the Table, the autoregressive variable, FPIR (-1) posted a coefficient of 0.22 which was not significant at 5% level. By implication, previous inflows of foreign portfolio investment do not significantly influence current inflows of FPI in Nigeria. Exchange rate significantly but negatively affects FPI inflows (beta = -0.025; prob = 0.0002). Increases in exchange rate (to the disadvantage of the domestic currency, the Naira) causes reduction in inflows, *ceteris paribus*. This

indicates that the foreign investors would prefer less-fluctuating exchange rate regime than the highly variable system that prevails in Nigeria.

Inflation positively and significantly influences FPI inflows to Nigeria (beta = 0.027; prob = 0.0004). Rising prices are a motivation for foreign portfolio investment inflows. As prices continue to rise, the firms into which the foreign portfolio investors channeled their investments reserves the potentials to generate more earnings and hence becomes more profitable. The investors reap higher income from higher dividends. This is captured in the reasoning that investors or producers would prefer rising prices than stagnating or declining prices, since the former guarantees more returns.

Interest rate is found to be positively-but-not-significantly-related to FPI in Nigeria (beta = 0.055; prob = 0.1982). A priori, it was expected that interest rate would have related negatively with FPI, since in theory, lower interest rates promote and boosts investment and production. An explanation of this situation may not be unconnected with the point that foreign portfolio investors are not necessarily supposed to be borrowing from the domestic capital market in order to produce or invest in the country. They actually should have brought, and continue to bring, in external funds into the capital market to augment domestic capital accumulation and investment. Nevertheless, interest rate is not found significant since it appears they investors do not give it pride of place in their investment decision.

The state of the economy, represented by the growth rate of the real GDP, is not significant at the conventional level; however, it moves in the same direction with FPI inflows (beta = 0.027; prob = 0.3378). This result is consistent with the expectation that the state of the economy is not the major reason for foreign portfolio investment. Conceivably, they are more interested in the growth and buoyancy of the particular sectors of investment interest, rather. Those interested in the oil and gas sector may be primarily concerned with the growth and development of that sector and not so much concerned with the general economy, more or less. It is worth noting that there is a positive and significant trend effect on FPI inflows, such that such forces as time and seasonality influence the magnitude of inflows of foreign capital to the Nigerian economy. Thus, even when the state of the economy did not influence FPI inflows, trends in the economy indirectly captured the effects, more or less.

Tax is reported to relate with FPIR significantly and positively (beta = 0.54; prob = 0.0048). This is against a priori reasoning, since, in theory, tax reduces the apportionable returns to investors, whether in terms of corporate income tax, capital gains tax or withholding tax on dividends or interest received. Using corporate income tax as proxy in this study, it is plausible that the last-income-recipient axiom which postulates that investors will always prefer a situation where a company generates as much earnings as possible such that the eventual returns to the shareholders (the last-income-recipients) are maximized, even after tax-deductions are made. Thus, investors are happy investing in corporations that promise high after-tax returns, which may explain why tax is not a deterrent to portfolio investments.

TABLE 3
SELECTED ARDL (1,0,0,0,0,0) RESULTS

Dependent Variable: FPIR

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FPIR (-1)	0.221257	0.177725	1.244944	0.2252
EXR	-0.025081	0.005649	-4.439874	0.0002
INF	0.027195	0.006594	4.124437	0.0004
INT	0.055014	0.041576	1.323229	0.1982
RGDP	0.027044	0.027651	0.978035	0.3378
TXR	0.549826	0.176739	3.110950	0.0048
C	-25.21765	7.343621	-3.433953	0.0022

@TREND	0.403314	0.096766	4.167919	0.0003
R-squared	0.419342	F-statistic		2.476055
Adjusted R-squared	0.249983	Prob(F-statistic)		0.046010
Durbin-Watson stat	2.020912			

*Note: p-values and any subsequent tests do not account for model selection.

SHORT-RUN AND LONG-RUN DETERMINATION OF FPIR

The short- and long-run implications and effects of the determinant of FPIR are depicted on Panels A and B of Table 4, that describes the cointegrating short-run and long-run estimates of the variables. An unmistakable observation that this study enables is that what happens to the relationships of the variable in the short-run appear to subsist in the long-run, talking of the direction and magnitudes of FPI and its determinants. For instance, all the variables that are positively and significantly related to FPI such as inflation and tax are equally positive and significant in the long-run. Exchange rate that was negative and significant in the short-run remained so in the long-run. Interest rate and real GDP growth rate that are positive but not significant in the short-run maintained the same nature of relationships with FPI in the long-run. These are depicted in both Panels A and B in Table 4.

Another interesting observation relates to the result of the error correction parameter (beta = -0.7787; prob = 0.0002). It is both significant and negative which satisfies three necessary conditions. The first is that short-run errors are easily adjusted or corrected in the long-run. The rate or speed of adjustment of such errors is 77.87% per annum. Second, there exist long-run causality that flows from the explanatory variables to the explained variable, FPIR. This enabled the study to interpret observed relationships between the variables as causal; and this extends to the short-run, since what happens in the short-run also happens in the long-run.

TABLE 4
ARDL COINTEGRATING SHORT-RUN AND LONG RUN ESTIMATES

Dependent Variable: FPIR
Selected Model: ARDL(1, 0, 0, 0, 0)

Panel A: Cointegrating Form and Short run estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR)	-0.025081	0.005649	-4.439874	0.0002
D(INF)	0.027195	0.006594	4.124437	0.0004
D(INT)	0.055014	0.041576	1.323229	0.1982
D(RGDP)	0.027044	0.027651	0.978035	0.3378
D(TXR)	0.549826	0.176739	3.110950	0.0048
D(@TREND())	0.403314	0.096766	4.167919	0.0003
CointEq(-1)	-0.778743	0.177725	-4.381735	0.0002

Cointeq = FPIR - (-0.0322*EXR + 0.0349*INF + 0.0706*INT + 0.0347*RGDP
+ 0.7060*TXR -32.3825 + 0.5179*@TREND)

Panel B: Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.032207	0.007104	-4.533846	0.0001
INF	0.034922	0.012255	2.849724	0.0088
INT	0.070645	0.055786	1.266350	0.2175
RGDP	0.034727	0.037219	0.933057	0.3601
TXR	0.706043	0.220567	3.201044	0.0038
C	-32.38252	9.302190	-3.481171	0.0019
@TREND	0.517904	0.118728	4.362096	0.0002

TABLE 5
ARDL BOUNDS TEST

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	9.626980	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72

Thirdly, it is not in contest that there exist equilibrium long-run causal relationships between FPIR and its determinants. This point is confirmed by the result of the Bounds test of cointegration that is reported in Table 5. As can be seen in Table 5, the observed F-statistic of 9.63 lies outside the lower and upper bounds at all the conventional alpha levels. This implies the rejection of the null hypothesis of "no long-run relationships existing between the variables". Invariably, both the necessary and sufficient conditions for the existent of long-run equilibrium relationships between FPIR and its determinants (EXR, INF, INT, RGDP, TXR) are fully satisfied.

CONCLUSION

The analysis reveals that long-run equilibrium relationships exist between foreign portfolio investment (FPI) inflow and exchange rate (EXR), inflation (INF), interest rate (INT), real GDP growth, and tax. Short-run errors are adjusted at a speed of 77.87% per annum, in the long-run. The causality implications underscore that causality flows jointly from the explanatory variables to FPI inflows. In all the model estimations - autoregressive, short- and long-runs, exchange rate exerted negative and significant on FPIR. Inflation and tax significantly and positively caused FPI inflows to Nigeria. Growth in real GDP and interest rates positively influenced FPIR, but not significantly. This alludes to the fact that the major determinants of FPI inflows are exchange rates, inflation, and taxes. The general state of economic growth and interest rates are not key determinants of FPI inflows to Nigeria, based on the evidence from this study. Previous inflows of portfolio investments are not major arguments in current portfolio inflows.

If attracting foreign portfolio investment inflows to Nigeria becomes cardinal to policymakers and strategic managers of the country's economy, then, it is proper for the country not to be encouraging incessant devaluation and depreciation of the domestic currency against foreign currencies. This is in view of the fact that ever-rising and higher exchange rates cause foreign portfolio investors to pull away their investments from highly volatile financial market. They prefer stabilizing the rates, instead, to guarantee them against loss. Also, inflation is seen to positively influence FPI inflows, which indicates that the investors prefer rising prices against falling prices. This calls for policies that would ensure creeping and slowly rising prices than otherwise. Tax rates can be sustained at current levels since they do not deter but encourage foreign portfolio investors. It is actually a fact that taxes are not currently exorbitant in Nigeria.

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APPENDIX 1: STATIONARITY TEST RESULTS

Null Hypothesis: FPIR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.399883	0.0015
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

Null Hypothesis: EXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.489516	0.9989
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

Null Hypothesis: D(EXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.023091	0.0041
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.392034	0.0022
Test critical values:	1% level	-3.737853	
	5% level	-2.991878	
	10% level	-2.635542	

Null Hypothesis: INT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.678602	0.0888
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

Null Hypothesis: RGDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.016365	0.0440
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

Null Hypothesis: TXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.271005	0.6306
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

Null Hypothesis: D(TXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.770294	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

Null Hypothesis: EMP has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.589110	0.8591
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

Null Hypothesis: D(EMP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.002553	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.