AKSU JOURNAL OF MANAGEMENT SCIENCES (AKSUJOMAS) VOL. 9 NO. 1, JUNE, 2024.

EMPIRICAL ANALYSIS OF EFFECT OF MACROECONOMIC AGGREGATES ON FOREIGN PORTFOLIO INVESTMENT IN NIGERIA

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Abstract
The study analyzed the effect of macroeconomic aggregates on foreign portfolio investment (FPI) inflows in Nigeria for the period 1986-2022. GDP growth rate, exchange rate, inflation rate and monetary policy rate were adopted as macroeconomic aggregates. Data was sourced from Central Bank of Nigeria (CBN) Statistical Bulletin (various years). Error correction modeling (ECM) technique was employed to analyze the data. Findings revealed that GDP growth rate had positive and significant effect on foreign portfolio investment (FPI) inflows in Nigeria while exchange rate had negative and significant effect on foreign portfolio investment (FPI) inflows in Nigeria. The study further showed that inflation rate and monetary policy rate had negative and insignificant effect on foreign portfolio investment (FPI) inflows in Nigeria. The study recommended that the Nigerian government should fashion out ways of growing her economy so as to encourage the attractiveness of the country to foreign investors. In this way, foreign portfolio investment (FPI) inflows would be increased.

Keywords: *Exchange rate, foreign portfolio investment, inflation rate, macroeconomic aggregates, monetary policy rate.*

Introduction

Dynamics of macroeconomic aggregates typically affect or determine the structure, composition and/or level of foreign portfolio investment (FPI) in a host country. Recent macroeconomic downturn associated with Global Financial Crisis of 2008, economic recession of 2016 and the COVID-19 crisis caused significant decline in FPI flows (Karimo, 2020). For instance, Nigeria's share of FPI inflows has remained a subject of concern despite the nation being regarded as "giant" of Africa. Its share of FPI has been unstable over the years. It has been argued that the unstable state of FPI inflows into Nigeria can be attributed to policy reversals signaling uncertainty to potential investors, economic crisis and low capacity utilization among others (Obi Onoh & Osuala, 2021). The implication of this is that the fluctuations or unstable nature of foreign portfolio investment (FPI) inflows into Nigeria are largely due to the dynamics of macroeconomic aggregates.

Macroeconomic aggregates are the indicators that determine the economic system. They are mainly concerned with forecasting of national income through analysis of major economic factors that reveal predictable patterns and trends, and their influence on one another (Anochie, Okereafor & Bashir, 2023). Behaviour of the whole economy is reflected in macroeconomic aggregates characterized by boom and recessions, the overall economic output of goods and services, the rate of inflation and unemployment, interest rate, the balance of payment and exchange rate (Nasution, Siregar & Sadalia, 2021). Thus, studying the relationship between macroeconomic aggregates and foreign portfolio investment (FPI) in Nigeria has become important and as such cannot be overemphasized.

Statement of the Problem

The global financial crises in 2008-2009 have drawn the attention of policymakers and researchers to the determinants of foreign portfolio investment (FPI) inflows. Although both international portfolio theory and the neoclassical theory predicts potential benefits of cross border investments, empirical evidence shows that FPI inflows into Nigeria is rapidly increasing in recent years but it is still negatively affected by poor macroeconomic environment as reflected in the rising rate of inflation, exchange rate instability, high interest rate and rising unemployment.

Nigeria is a nation bedeviled by rising inflation rate, exchange rate instability and high (double) interest rate which became worsened with the

outbreak of global financial crisis and COVID-19. Inflation rate in the nation has remained double digit having persisted above 10 percent since 1986. As at third quarter of 2021, inflation rate in Nigeria was 15.63 percent. Similarly, Nigeria's exchange rate has been mostly unstable. In 1986, the official exchange rate in the import/export window stood at ₦1.76/$ and continued fluctuating over the years reaching ₦358.8/$ in 2020. In the same vein, the Central Bank of Nigeria (CBN) has over the years failed to trim down the monetary policy rate as it has persistently remained double-digit. In 1986, monetary policy rate stood at 10 percent and rose to as much as 26 percent in 1993. As at 2020, monetary policy rate in Nigeria stood at 11.5 percent. With the double and high inflation rate, exchange rate and interest rate, it is theoretically expected that foreign portfolio investment would be adversely affected. However, this study aimed to investigate the veracity or otherwise of this theoretical assertion.

Objectives of the Study

The main objective of this study was to empirically analyze the effect of macroeconomic aggregates on foreign portfolio investment in Nigeria. The specific objectives are to:

1) Ascertain the effect of GDP growth rate on FPI inflows in Nigeria.
2) Analyze the effect of exchange rate on FPI inflows in Nigeria.
3) Ascertain the effect of inflation rate on FPI inflows in Nigeria.
4) Determine the effect of monetary policy rate on FPI inflows in Nigeria.

Hypotheses

Four hypotheses were tested in the study:

5) **H_{o1}:** GDP growth rate does not have a significant effect on FPI inflows in Nigeria.
6) **H_{o2}:** Exchange rate does not have a significant effect on FPI inflows in Nigeria.
7) **H_{o3}:** Inflation rate does not have a significant effect on FPI inflows in Nigeria.
8) **H_{o4}:** Monetary policy rate does not have a significant effect on FPI inflows in Nigeria.

Scope of the Study

The study spanned 1986-2021 with emphasis being on the Structural Adjustment Programme (SAP) which was a major macroeconomic policy of government introduced in 1986 to open up and liberalize the Nigerian economy.

Review of Related Literature

Conceptual Review

Macroeconomic Aggregates

Macroeconomic aggregates are indicators or main signposts signaling the current trends in the economy. Thus, Keynes identified some main macroeconomics variables that underpin the inflow of foreign portfolio investment (FPI) into an economy as a whole to include gross domestic product, exchange rate, interest rate, inflation rate and money supply. Gross domestic product is considered a macroeconomic aggregate because it measures the aggregate wellbeing of the economy which robs-off on the standard of living of her citizens (Karimo, 2020). In addition, exchange rate was seen as a macroeconomic variable given that it determines the purchasing power of citizens of a country in relation to citizens of other trading partners. For instance, Nigeria naira rate is lower as to compare to dollar of America therefore an American will have a higher purchasing power than Nigerian (Osemene & Arotiba, 2018). Interest rate is the cost of borrowing money, cash, credit, bonds, stocks, mortgage government borrowing. Although rising interest rate signals an expanding economy but when an already high interest rate begins to rise even further and faster, that is a sure sign of the onset of inflation. Inflation is an economy can be the result of an increase in aggregate demand that is unaccompanied by an increase in aggregate supply (Onuorah & Akujiobi, 2013). Such occurs when labour cost and the price of raw materials such as crude oil have risen. Money supply is the injection of money to the financial system and as such considered an important macroeconomic tool for stabilizing the economy.

Foreign Portfolio Investments (FPI)

The concept of foreign portfolio investment (FPI) is a perspective of international capital flows involving transfer of financial assets: such as cash, stock or bonds across international borders in search of profit or high rate of returns (Atobrah, 2015). This type of investments forms significant proportion of the global economy and an important source of funds to

resource-scarce economies. FPI inflow occurs when investors acquire controlling interest in foreign companies by purchasing their securities or notes. Hence, portfolio investments involve financial investments by private individuals, corporations, pension funds, and mutual funds in stocks, bonds and certificates of deposit issued by private companies and the public agencies (Ezeanyeji & Ifeako, 2019).). It is often easier to sell off securities and pull out foreign portfolio investment in a country than FDI, therefore it is said to be a volatile form of capital flows.

Theoretical Framework

Neoclassical Theory

The study was anchored on the neoclassical theory. The theory was postulated by Solow (1956) and Swan (1956) and most important to this theory is the identity derived from national income accounting that equates current account to the difference between savings and investments. Since capital account is by definition equal to current account, this identity is understood to indicate that savings and investment decisions are the key variables of analysis of capital flows. In the words of several prominent macroeconomists: "capital flows are traditionally seen as financial counterpart to savings and investment decisions, in line with the narrative of capital flowing "downhill" from capital rich countries with lower rates of return to capital-poor countries with higher returns (Feldstein and Horioka, 1980). From this perspective, the focus is typically on net capital flows, since that is what counts for funding a country's borrowing requirements. Most capital-flows related controversies in international macroeconomics have been more or less explicitly analyzed on this basis.

Empirical Literature

Anochie, Okereafor and Bashir (2023) explored macroeconomic variables and productivity of Nigeria's manufacturing sector in Nigeria for the period 1980-2020. Exchange rate, interest rate and inflation rate were adopted as macroeconomic variables. Ordinary least squares (OLS) technique was employed to analyze the data. The study showed that exchange rate and interest rate had significant effect on productivity of Nigeria while inflation rate had no significant effect on Nigeria's productivity. The study concluded that macroeconomic variables had significant effect on Nigeria's productivity.

Obi, Onoh and Osuala (2021) aimed to check the impact of macroeconomic variables on foreign portfolio investment (FPI) volatility in Nigeria using time series data from January, 2014 to December, 2019 obtained from the Central Bank of Nigeria. The test revealed that previous month's volatility in FPI, inflation rate and all share indexes were significant determinants of FPI volatility in Nigeria.

Nasution, Siregar and Sadalia (2021) examined the essential role of macroeconomic variables in determining portfolio investment inflows in Indonesia from 1989 to 2018. Exchange rate (ER), interest rate (IR), inflation, and economic growth (growth) were adopted as macroeconomic variables. Simultaneous regression analysis was carried out and the findings showed that ER, IR, and growth have a positive effect on demand for portfolio investment in Indonesia while inflation and portfolio investment had significant negative impact on foreign portfolio investment.
Odili and Onyele (2021) evaluated the impact of financial development on FPI in Nigeria from 1986 to 2019. Banking sector development, stock market development and bond market development were constructed with the aid of principal component analysis (PCA). Autoregressive Distributed Lag (ARDL) estimation technique was employed. Findings revealed that BSD, SMD and BMD had significant and positive impact on net FPI flow in the short-run. While in the long-run the index for banking sector development (BSD) had negative and insignificant impact on FPI. Stock market development (SMD) index had positive and insignificant impact on FPI, while, bond market development (BMD) index had positive but significant impact on PFI.

Makoni (2020) examined the effect of real exchange rate and capital openness on foreign portfolio investments, using a panel of nine African countries from 2009 -2016. Fixed effect model was employed for analysis. The results showed that real exchange rates, capital openness and the rate of inflation have a negative relationship with FPI inflows. On the contrary, the lag of FPI, institutional quality, real economic growth rate and stock market development attract inward FPI.

Similarly, Aderemi (2019) analyzed the nexus between exchange rate volatility and foreign capital inflows in Nigeria from 1990-2016. Ordinary least squares (OLS) regression method was used. The findings from the

regression analysis showed that a long run equilibrium relationship existed among the selected variables. Foreign direct investment had a significant inverse relationship with exchange rate in Nigeria. Remittances and exchange rate volatility had a non –significant relationship.

Osemene and Arotiba (2018) investigated effects of exchange rate volatility on foreign portfolio investment in Nigeria from 2007-2016. Their study employed General Autoregressive Conditional Heteroskedasticity GARCH (1, 1) model to test for volatility in both official and BDC rate. A two-stage least square (TSLS) method was used to test the relationship between the volatility and foreign portfolio investment in Nigeria. The results revealed that volatility in the official rate exerted a positive and significant impact of 8.119872 on foreign portfolio investment inflow into Nigeria, while the BDC volatility showed a negative and significant impact of -5.961654 on foreign portfolio investment inflow into Nigeria within the study period.

Onuoha, Okoro and Okere (2018) estimated the causal and dynamic relationship between macroeconomic variables and FPI in West Africa using System GMM techniques over the period of 1990 to 2016. Using system-GMM, the results provide useful evidence that variables of interest (portfolio equity and bond) do not exert any significant influence on the macroeconomic variables implying the underperformance of FPI. On the side of the short run and long run, portfolio equity and bond are insignificant in influencing real gross domestic product implying the underperformance of FPI.

Nwosa and Adeleke (2017) examined if foreign direct investment (FDI) and foreign portfolio investment (FPI) volatility were determined by the same factors in Nigeria. The study used annual data covering the periods 1986 to 2016 while E-GARCH approach was employed for the data analysis. Based on the analysis, the study observed that trade openness and global GDP significantly explained FDI volatility in Nigeria, while domestic interest rate and stock market capitalization were significantly explained FPI volatility in Nigeria. Other variables were insignificant in influencing volatility in FDI and FPI.

Abdul-Karim, Ramli and Khalid (2016) assessed determinants of foreign portfolio investment (FPI) to Malaysia. The determinants of portfolio

investments considered for the study were foreign and domestic interest rate, real foreign exchange rates, foreign income, domestic income, and the Kuala Lumpur Composite Index (KLCI). The paper used quarterly time series data that spanned from first quarter of 1991 to fourth quarter of 2012 which was analyzed using a panel data technique. Findings revealed that exchange rate, foreign interest rates and domestic stock market development (KLCI) were significant determinants of FPI flows to Malaysia.

With emphasis on Sub-Saharan Africa (SSA), Atobrah (2015) investigated determinants of foreign portfolio inflows (FPI) from 2005 to 2013. Panel regression and Generalized Methods of Moment (GMM) estimation techniques were employed. The study found that current account balance and financial development had inverse relationship with portfolio flows. The results also suggested that domestic market size, previous year's portfolio inflows and growth rate of industrialized economies had positively affected portfolio flows to SSA countries.

Methodology

Research Design

The *ex-post facto* research design was used in the study in order to foist a link between the dependent and independent variables. The beauty of the *ex-post facto* research design is the ability of the research to establish this relationship using existing data which cannot be manipulated by the researcher. Data on GDP growth rate, exchange rate, inflation rate, monetary policy rate and FPI are already in existence and they are devoid of being manipulated by the researcher.

Method and Sources of Data Collected

The data collated and used for this study were secondary in nature. The data were sourced from the Central Bank of Nigeria Statistical Bulletin (various years).

Model Specification

Adopting the model specified by Oudat et al (2020) with modification, the model for the study was specified as:

FPI = f (GDPGR, EXCR, INFR, MPR) ……. 3.1

Transforming equation 3.1 into its econometric form, the model becomes:

$FPI = \beta_0 + \beta_1 GDPGR + \beta_2 EXCR + \beta_3 INFR + \beta_4 MPR + \mu$ …….. 3.2

The error correction model of the study was specified as:

$\Delta FPI_t = \beta_0 + \beta_1 \Delta FPI_{t-1} + \beta_1 \Delta GDPGR_{t-1} + \beta_2 \Delta EXCR_{t-1} + \beta_3 \Delta INFR_{t-1} + \beta_4 \Delta MPR_{t-1} + \theta ECM_{t-1} + \mu_t$……..…3.3

Where:

FPI = foreign portfolio investment

GDPGR = gross domestic product growth rate

EXCR = Exchange rate

INFR = inflation rate

MPR = monetary policy rate

β_0 = constant

$\beta_1 - \beta_4$ = coefficients of explanatory variables

μ = error term

θ = Speed of adjustment

Data Analysis

Unit Root Test

Table 1: Augmented Dickey-Fuller (ADF) unit root test result

Variable	ADF Values		0.05 Critical Values		Decision
	Levels	1st Difference	Levels	1st Difference	
Δ(LOGFPI)	-3.554741	-	-2.986225	-	I(0)
Δ(GDPGR)	-3.209352	-	-2.945842	-	I(0)
Δ(EXR)	-2.289318	-4.095029	-2.945842	-2.948404	I(1)
Δ(INFR)	-2.892096	-5.684571	-2.945842	-2.948404	I(1)
Δ(MPR)	3.749374	-	-2.945842	-	I(0)

Δ = Change notation

LOG = Logarithm

Source: Researcher's computation (2023) from E-views 10 software package

From the unit root result in table 1, it is evident that foreign portfolio investment, gross domestic product (GDP) growth rate and monetary policy rate were stationary at level while exchange rate and inflation rate were

stationary after first differencing. Thus, there was mixed order of integration consisting of I(0) and I(1).

Autoregressive distributed lag (ARDL) cointegration test

Table 2: ARDL Bounds test

Test Statistic	Value	Critical Value	I(0)	I(1)
F-Statistic	9.376885	10%	2.2	3.9
K	4	5%	2.56	3.49*
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Researcher's computation (2023) from E-views 10 software package

From table 3, there is evident that the ARDL bounds test F-statistic (9.376885) exceeded the lower and upper bounds critical values (2.56) and (3.49) at five percent level of significance. Thus, there exists a long run equilibrium relationship among the variables.

Error Correction Mechanism (ECM) Regression

Table 3: Error correction mechanism (ECM) result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGFPI(-1))	0.039333	0.014401	0.254748	0.8022
D(GDPGR(-1))	0.034803	0.014710	2.365942	0.0292
D(EXCHR(-1))	-0.011394	0.004332	-2.630194	0.0218
D(INFR(-1))	-0.023391	0.015125	-1.546534	0.1415
D(MPR(-1))	-0.019846	0.033976	-0.584119	0.5673
ECM(-1)	0.222619	0.195000	2.120182	0.0361
C	0.138470	0.116739	1.186146	0.2529
R-squared	0.764499			
Adjusted R-squared	0.611314			
F-statistic	9.958978			

Prob. (F-statistic)	0.000532
Durbin-Watson stat	1.911098

Source: E-Views 10.0 Output (2023)

From the regression results, the estimated coefficient of GDPGR indicated that an increase in GDP growth rate caused about 3.48 percent increase in foreign portfolio inflow (FPI) inflows to Nigeria in the short run. EXCHR turned out with a negative coefficient of -0.011394, indicating that an increase in exchange rate led to approximately 1.14 percent decline in FPI in Nigeria. With an estimated coefficient of -0.023391, it was established that FPI decreased by approximately 2.34 percent due to an increase in inflation rate. Also, the coefficient of MPR was -0.019846, showing that FPI declined by approximately 1.98 percent due to an increase in the monetary policy rate.

The coefficient of determination (Adjusted R-squared) of 0.611314 showed that 61 percent of variations in foreign portfolio investment are due to changes in GDP growth rate, exchange rate, inflation rate and monetary policy rate. Thus, the remaining 29 percent of variations in FPI are due to other factors not included in the model. The model adopted for the study was reliable and significant given that the probability F-statistics (0.000532) was less than the test significant level (0.05). Durbin-Watson statistic of 1.911098 meant that there is no autocorrelation correlation in the model given that the Durbin-Watson statistic lied within the acceptance region as $2 \leq 1.911098 < 4$.

Interestingly, the coefficient of the error correction term appeared with the negative sign and was significant at five percent level. The coefficient of -0.222619 showed that the speed of adjustment of short run foreign portfolio investment (FPI) inflow in Nigeria to long run equilibrium was about 22 percent. This is a slow speed of adjustment.

Discussion of Results

Specifically, it was found that GDP growth rate had a positive and significant effect on FPI inflows in Nigeria. This shows that higher economic growth pulls foreign capital into Nigeria as predicted by the Lucas paradox. This appeared to be the situation in Nigeria as FPI increased significantly alongside increase in GDP growth rate. This finding was in line with Nasution *et al*. (2021) and Onuoha *et al*. (2018) that economic

growth attracts foreign capital flows in the form of FPI to developing countries.

Also, the effect of exchange rate on FPI inflows was found to be negative and statistically significant. This implies that Nigeria's FPI inflows have been decreasing alongside rising exchange rate of naira - dollar. This means that the amount of FPI inflows has been declining significantly due to the adverse effect of exchange rate. This could mean that foreign portfolio investors in Nigeria are moving to other countries to establish their business. These findings agreed with those of Osemene and Arotiba (2018); Rashid and Khalid (2017); Waqas et al. (2015); Makoni (2014) that due to exchange rate instability, FPI flows to developing countries had decreased significantly.

The negative and statistically insignificance of inflation shows that annual increase in the general price level exerted negative effect on FPI inflows to Nigeria. The negative effect of inflation is also attributed to the loss of purchasing power that is often seen during high inflationary pressure. However, the finding of this study aligns with the studies of Mugableh and Oudat (2018); Belke and Volz (2018); Nwosa and Adeleke (2017); Atobrah (2015) that rising inflation rate exerts marginal effect on FPI flows.

It was also established that the monetary policy rate (MPR) exerts negative and insignificant effect on FPI inflows to Nigeria. This implies that the Nigerian monetary policy lowers the amount of FPI flowing. The negative and insignificant impact of monetary policy rate could be due to huge policy lapses often experienced in Nigeria. This finding was supported by Dahlhaus and Vasishtha (2014); Onuorah and Akujiobi (2013) that poor monetary policy reduces FPI inflows in developing countries.

Conclusion

The study aimed at determining the effect of macroeconomic aggregates on foreign portfolio investment (FPI) inflows to Nigeria for the period of 1986-2022. The study found that economic growth and exchange rate were highly potent in determining the flow of FPI into Nigeria. It also found that the inflation rate and monetary policy rate have insignificant effect on foreign portfolio investment inflow in the short run. The implication of the findings is that, although, various macroeconomic aggregates had affected FPI flows

in diverse ways there is need to strengthen the macroeconomic environment of Nigeria. It was concluded that economic growth and exchange rate and are the main determinants of foreign portfolio investments in Nigeria.

Recommendations

3) Ease of doing business in Nigeria should be further enhanced so as to increase the nation's economic growth and facilitate FPI inflows.
4) Exchange rate management should be credible such that market actors' (including foreigners) and stakeholders' confidence is restored. In this way, foreign portfolio investment would be enhanced.
5) The Central Bank of Nigeria (CBN) should fashion out ways of reducing the monetary policy rate so as to reduce the cost of borrowing and other transaction costs. In this way, foreign portfolio investment (FPI) inflow would be increased.
6) The government should ensure that inflation does not exceed the current or recent threshold of inflation rate (double digits) so that it would not negatively influence FPI inflows into the country.

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Appendix

Regression Result

Dependent Variable: D(LOGFPI)
Method: Least Squares
Date: 12/18/23 Time: 20:17
Sample (adjusted): 1988 2022
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.138470	0.116739	1.186146	0.2529
D(LOGFPI(-1))	0.039333	0.014401	0.254748	0.8022
D(GDPGR(-1))	0.034803	0.014710	2.365942	0.0292
D(EXCR(-1))	-0.011394	0.004332	-2.630194	0.0218
D(INFR(-1))	-0.023391	0.015125	-1.546534	0.1415
D(MPR(-1))	-0.019846	0.033976	-0.584119	0.5673
ECM(-1)	-0.222619	0.195000	-2.120182	0.0361

R-squared	0.764499	Mean dependent var	0.083894
Adjusted R-squared	0.611314	S.D. dependent var	0.382258
S.E. of regression	0.384414	Akaike info criterion	1.171597
Sum squared resid	2.364385	Schwarz criterion	1.517182
Log likelihood	-6.473361	Hannan-Quinn criter.	1.258510
F-statistic	9.958978	Durbin-Watson stat	1.911098
Prob(F-statistic)	0.000532		