Research Journal of Finance and Accounting
ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online)
Vol.8, No.5, 2017

Foreign Portfolio Investment-Economic Growth Nexus in Nigeria: Co Integration and Granger Causality Analyses

AKINBOBOLA T. O IBRAHIM T. Razaq IBRAHIM Odusanya

The study employed Wald causality methodology to uncover the direction of causal relationship between foreign portfolio investment and economic growth in Nigeria between 1986 and 2013. The empirical results suggest that foreign portfolio investment and economic growths are positively cointegrated indicating a stable long run equilibrium relationship. Further, the findings revealed bidirectional causality between foreign portfolio investment and economic growth and the complementary role of domestic savings and interest rate in growth.
Keywords: Causality, Foreign Portfolio Investment, Economic Growth

Introduction

Nigerian economy like any other African country is attractive to foreign investment because of relatively high marginal productivity of capital. This is as a result of the relatively low capital development in the country, which enhances the profitability of investment in the economy. This is so because many opportunities for profitable investment are not being explored in contrary to the developed economies with relatively high income and sophisticated market with high capital labour ratio. In these developed markets, the marginal productivity of capital is relatively low, this discourage further investment into the economy because of little amount of profitable investment opportunities. With globalization, the abundant resources in these developed economies are mobilized to developing economies where these resources have potential of profitable opportunities.

More so, to sustain the growth of Nigeria economy, policy makers are looking forward to attracting these foreign resources into the economy. For this effort to be meaningful, then the attracted foreign portfolio investment should lead to economic growth. Empirical studies by kim and singal (2000) established that increase in the inflow of foreign portfolio investment enhances economic growth. In this case, mobilizing foreign portfolio investment will be an effective instrument at achieving greater economic growth. On the other hand, studies have shown that investors will be interested in the viability of the economy before investing in such economy, in which case, one of the essential factors to attract foreign investor is the growth of the economy among many other factors (Ekeocha, 2008; Duasa and Kassim, 2009 and Narayan, 2013). Therefore, it could then be asserted that the growth of the economy lead to the inflow of foreign portfolio investment. Once there is positive relationship between them, engineering growth to attract foreign investors will have multiplier effect on economic growth of the nation.

However, the direction of causality between foreign portfolio investment and growth is still far from being cleared from empirical perspectives, even though the answer to this question is of critical importance for development policy. Apart from recent efforts, empirical work on the issue of causality between the foreign portfolio investment and growth remain very sparse especially in Nigeria. Few studies available in this direction came out with different conclusion as regard the direction of causality between growth and foreign portfolio investment.

Therefore, the controversy surrounding the direction of causality between foreign portfolio investment and economic growth motivated this study. This study is germane for several reasons, among which is importance of discovering the appropriate direction of causation on policy implications for development strategies in developing countries and Nigeria in particular. The examination of the causal relationship between foreign portfolio investment and economic growth is very important because it provides useful information on which economic variable(s) that the government and relevant authorities need to control in order to attained the desired level of the targeted variable or variables (Sajid and Sarfraz, 2008). For example, if the results of causality test indicate that foreign portfolio investment precedes and causes economic growth, then, government and policy makers can design or employ policies that would promote the mobilization of foreign portfolio investment in order to achieve higher economic growth. On the other hand, if investigation reveals the reverse, then, efforts would be made to remove the obstacles to and accelerate economic growth in order to raise the level of foreign portfolio investment.

Also studies on foreign portfolio investment are recent phenomenon in Nigeria. This is because of unavailability of data on foreign portfolio investment (inflow or outflow) in Nigeria balance of payments account until 1986. Foreign portfolio inflow was N151.6 million in 1986, the effect of the investment policy and the advent of democracy is expected to attract more inflow of portfolio investment. This did not immediately happened, and as at the end of 2013, Nigeria has been a destination of foreign investment, the inflow has improved consistently to about N3.2 trillion in 2013 (CBN, 2014)

Moreover, these increases in foreign portfolio investment have stimulated intense debates about its impact on Nigeria economic growth. While proponents emphasize its positive impacts on growth and financial sector development, critics express concern about its volatile nature whose instability could be unsustainable and adversely affect the financial sector of the economy. In economic theory, portfolio investment either in the form of equity or bond has a direct bearing on economic output through the injection of capital which increases available capital in the domestic economy (Bordo and Meissner, 2007). This will consequently lead to greater investment and reduced financial-sector vulnerability thereby leading to economic growth.

Following this introduction, the next section reviews the empirical studies on the relationship between foreign portfolio investment and economic growth. Section three considers issues on data and methodology, while section four consists of the empirical findings and discussions. Last section contains conclusion and policy recommendations.

2 Literatures Review

The zeal to understand the systematic relationship between foreign private investments in general and foreign portfolio investment in particular with economic growth had resulted in series of empirical studies with different approaches. However, studies on causality still remain very sparse probably as a result of non availability of data as earlier mentioned; the few available studies came out with different and contradictory conclusions.

Ekeocha (2008) tried to model the long-run determinants of FPI in Nigeria over the period of 1986-2006 converted into quarterly series. It found out that there is a unidirectional causality between net foreign portfolio investment and real gross domestic product, with the causality link flowing from real gross domestic product to net foreign portfolio investment.

Duasa and Kassim (2009) examined the relationship between foreign portfolio investment (FPI) and Malaysia's economic performance. In particular, the study analyses the relationship between FPI and real gross domestic product (GDP) using the widely adopted Granger causality test and the more recent Toda and Yamamoto's (1995) non-causality test to establish the direction of causation between the two variables. Similar method is also applied on the relationship between volatility of FPI and real GDP. Additionally, the study uses an innovation accounting by simulating variance decompositions and impulse response functions for further inferences. Using quarterly data covering the period from 1991 to 2006, the study finds evidence that economic growth causes changes in the FPI and its volatility and not vice versa. The findings suggest that economic performance is the major pull factor in attracting FPI into the country.

Nuri and Huseyin (2012) examines interactions and feedbacks between categories of capital flows and economic growth in Turkey for the 1992:01-2009:08 period based on a new version of the causality test of the frequency domain proposed by Jörg Breitung and Bertrand Candelon (2006). The nature of the interaction/feedback between growth and capital flows varies significantly over frequency bands and subcategories of flows. Over business cycle frequencies, two out of four subcategories of inflows, short-term external borrowings and portfolio investments on government bonds, drive growth whereas the other two components, long-term borrowings and portfolio investments on shares, are driven by growth. Furthermore, for the post-2001 financial crisis period it found significant bidirectional causality between long-term external borrowings and growth whereas portfolio investments, bond flows and short-term external borrowings do not affect growth in the long run.

Narayan (2013) using the pair-wise Granger causality test examined the impact of private foreign capital inflows on economic growth in India on monthly data for the period from 1995:04 to 2011:07 using pair wise Granger causality test. The causality test suggested a short and long run equilibrium relationship between the variables like economic growth and foreign direct investment and economic growth and foreign portfolio investment and vice-versa. The most important observation is that economic growth granger causes FDI and FPI.

Guluzar and Bener (2013) analyzed the relationship between foreign portfolio investments and macroeconomic factors in Turkey for the period between 2006-2012 using VAR, Granger Causality Tests, Impulse Responses and Variance Decomposition. The study found no causal links between foreign portfolio investment and industrial production index and no relationship between them in the shortrun.

Onuorah and Akujuobi (2013) applied ordinary least square method combined with pair wise granger causality test to examine the impact of macroeconomic variables on the performance of FPI IN Nigeria, it found that GDP and Money Supply had inverse relationship with foreign portfolio investment while Interest Rate, Exchange Rate and inflation rate were directly related to foreign portfolio investment. Granger causality results based on F-statistic computed value revealed that there was no causality among all these macroeconomic variables and foreign portfolio investment. Finally, the study found out that there was no longrun relationship existing between GDP, inflation rate, exchange rate, Money Supply, interest rate and foreign portfolio investment.

3 Data and Methodological Issues

3.1 Stationarity Test

The non-stationary nature of most series data and the need for avoiding the problem of spurious or nonsense regression calls for the examination of their stationary property. In first stage, stationary of series on each variable is examined using both Augmented Dickey-Fuller test and Phillips-Perron (PP) tests. The Dickey-Fuller test involves estimating regression equation and carrying out the hypothesis test. To show the Dickey-Fuller (DF) test, the AR (1) process is shown.

$$Y_t = \alpha + \rho . Y_{t-1} + \varepsilon_t \qquad 1$$

Where α and ρ are parameters and ε_t is a white noise. Y is stationary, if $-1<\rho<1$; if $\rho = 1$, y is non stationary and if the absolute value of ρ is greater than one ($\rho > 1$), the series is explosive. Therefore, the hypothesis of a stationary series involves in whether the absolute value of ρ is strictly less than one ($\rho < 1$). The test is carried out by estimating an equation with Y_{t-1} subtracted from both sides of equations.

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \varepsilon_t \qquad 2$$

Where, $\gamma = \rho - 1$ and the null and alternative hypothesis are

H_0: $\gamma = 0$

H_1: $\gamma > 1$

The t-statistics under the null hypothesis of a unit root does not have the conventional t- distribution. Dickey-Fuller (1979) shows that the distribution is non-standard, and simulated critical values for the selected sample. Later, Mackinnon (1991) generalizes the critical values for any sample size by implementing a much larger set of simulations.

A stochastic process is said to be stationary if its mean, variance and covariance remain constant over time. The value of the covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed. These conditions can be summarized as follows:

i) $E(Y_t)$ = Constant

ii) $Var(Y_t)$ = Constant

iii) $E(Y_t, Y_{t+K})$ = Constant for all t and all $k \neq 0$.

One advantage of ADF is that it corrects for higher order serial correlation by adding lagged difference term on the right hand side. The simple unit root test is valid only if the series is an AR(1) process. One of the important assumptions of DF test is that error terms are uncorrelated, homoscedastic as well as identically and independently distributed.

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \delta 1 \Delta Y_{t-1} + \delta 2 \, \Delta Y_{t-2} + \ldots + \delta p \, \Delta Y_{t-p} + \varepsilon_t \qquad 3$$

This augmented specification is then tested for

H_0: $\gamma = 0$

H_1: $\gamma > 1$

Another unit root testing procedure that is commonly used is Phillips-Perron test (PPT) which was developed in 1988. Philip-Perron test supports the Dickey-Fuller tests in that, it assumes that the errors are statistically independent and have a constant covariance. They, however, used a generalization of the Dickey-Fuller procedure that allows for fairly mild assumptions concerning the distribution of the errors. The procedures are modifications of the Dickey-Fuller t-statistics that take into consideration less restrictive nature of the error process. To illustrate Philip – Perron (PP) approach, consider equation:

$$\Delta y_t = \alpha_0 + \sigma y_{t-1} + \varepsilon_t \qquad 4$$

In the case of ADF test, it corrects for higher order serial correlation by adding lagged differenced terms on the right-hand side of the equation. The PP test, on the other hand, makes a correction of the coefficients in the equation 3.6 in order to account for the correlation. The asymptotic distribution of the PP "t" statistics is the same as that of the ADF "t" statistics, and thus the MacKinnon (1991) critical values are also applicable which is calculated by e-views software. Also, in the same way as with ADF tests, the PP test can be performed by including a constant, constant and trend or neither of the two in the regression. By testing both the unit root hypothesis and the stationarity hypothesis, we can distinguish between series that appear to be stationary, series that appear to have unit root, and series for which the data (or the tests) are not sufficiently informative to be sure whether they are stationary or integrated." Joint testing of both nulls can strengthen inferences made about the stationarity or non-stationarity of a time series especially when the outcomes of the two nulls corroborate each other. This joint testing has been known as "confirmatory analysis."

3.2 The causality analysis

The most common way to test the causal relationship between two variables is the Granger- Causality proposed by Granger (1969). The test involves estimating the following simple vector autoregressions (VAR):

$$Y_t = \sum_{I=1}^{z} aiY_{t-i} + \sum_{I=1}^{z} bj\, x_{t-j} + E_t \qquad 5$$

And

$$X_t = \sum_{I=1}^{z} c_i Y_{t-i} + \sum_{I=1}^{z} d_j x_{t-j} + E_i \qquad 6$$

Then the null hypothesis that X_t does not granger cause Y_t when
$b_1 = b_2 = \ldots = b_z = 0$.
This can also be tested that Y_t does not Granger cause X_t. When
$c_1 = c_2 = \ldots \ldots = c_z = 0$.
In other words, we can jointly test if the estimated lagged coefficient Σai and Σbj are different from zero with F-statistics. When the jointly test reject the two null hypotheses that Σai and Σbj both are not different from zero, causal relationships between X and Y are confirmed. However, traditional Granger-Causality has been criticized based on its following limitations.

First, a two-variable Granger-Causality test without considering the effect of other variables is subject to possible specification bias. As pointed out by Gujarati (2007), a causality test is sensitive to model specification and the number of lags. It would reveal different results if it was relevant and was not included in the model. Therefore, the empirical evidence of a two-variable Granger-Causality is fragile because of this problem.

Second, time series data are often non-stationary (Maddala, 2001). This situation could exemplify the problem of spurious regression. Gujarati (2007) had also said that when the variables are integrated, the F-test procedure is not valid, as the test statistics do not have a standard distribution. Although researchers can still test the significance of individual coefficients with t-statistic, one may not be able to use F-statistic to jointly test the Granger-Causality.

Toda and Yamamoto (1995) propose an interesting yet simple procedure requiring the estimation of an augmented VAR which guarantees the asymptotic distribution of the Wald statistic (an asymptotic χ2-distribution), since the testing procedure is robust to the integration and cointegration properties of the process.

We use a bivariate VAR (m + dmax) comprised of gross domestic product and foreign portfolio investment, following Yamada (1998);

$$X_t = \omega + \sum_{i=1}^{m} \theta_i X_{t-I} + \sum_{i=m+1}^{m+dmax} \theta_i X_{t-i} + \sum_{i=1}^{m} \delta_i Y_{t-i} + \sum_{i=m+1}^{m+dmax} \delta i Y_{t-i} + v_1 \qquad 7$$

$$Y_t = \psi + \sum_{i=1}^{m} \varphi_i Y_{t-i} + \sum_{i=m+1}^{m+dmax} \varphi_i Y_{t-i} + \sum_{i=1}^{m} \beta_i X_{t-i} + \sum_{i=m+1}^{m+dmax} \beta i X_{t-i} + v_{2t} \qquad 8$$

Where X= gross domestic product and Y= foreign portfolio investment, and ω, θ's, δ's, ψ, φ's and β's are parameters of the model. dmax is the maximum order of integration suspected to occur in the system; $v_{1t} \sim N(0, \Sigma_{v1})$ and $v_{2t} \sim N(0, \Sigma_{v2})$ are the residuals of the model and Σv_1 and Σv_2 the covariance matrices of v_{1t} and v_{2t}, respectively. The null of non-causality from gross domestic product to foreign portfolio investment can be expressed as H0: $\delta_i = 0, \forall\ i=1, 2, \ldots, m$.

Two steps are involved with implementing the procedure. The first step includes the determination of the lag length (m) and the second one is the selection of the maximum order of integration (dmax) for the variables in the system. We use the Augmented Dickey-Fuller (ADF) test as well as Phillip Perron (PP) test for which the null hypothesis is stationarity to determine the maximum order of integration.

3.3 Sources of Data

Secondary annual data are used for this study. Data on foreign portfolio investment and maximum lending rate are obtained from Statistical Bulletin published by the Central Bank of Nigeria (CBN), while data on variables such as GDP growth rate and gross domestic savings from 1986 to 2013 are obtained from World Development Indicators (WDI) data base published by the World Bank.

3.4 Definition and Measurement of Variables

GDP is measured as the growth rate of gross domestic product
FPI is measured as percentage of the ratio of foreign portfolio investment to gross domestic product
DS is measured as percentage of the ratio of domestic savings to gross domestic product
INT is measured as the maximum lending rate in the economy

4 Empirical Findings and Discussions

4.1 Univariate Properties of the Variables

The Table 1 presents the results of the Augmented Dickey Fuller (ADF) and Phillip Perron test at level. It is evident from the results of Augmented Dickey Fuller (ADF) that all the variables were stationary at levels, that is, they were integration of order zero I(0). To choose the appropriate lag length we generate statistics based on the

Schwarz Information Criteria (SIC) automatically computerized from the system. The result based on PP test also indicate that all the variables are integrated of the order zero, i.e. I(0). AR spectral - GLS detrended estimation methods were used, the test result were also based on Schwarz Information Criteria (SIC).

Table 1 Unit Root Test						
	Augmented Dickey Fuller Test			Phillip Perron Test		
Variables	Lag	Level statistics	Probability	Level statistics	Probability	Lag
GDP	0	-3.26**	0.027	-3.28**	0.029	0
FPI	0	-4.94*	0.0005	-4.94*	0.0005	0
DS	0	-3.74*	0.009	-3.75*	0.009	0
Int	0	-4.22*	0.0029	-4.28*	0.0025	0

1% Critical Value (-3.70)* 5% Critical Value (-2.98) **
Sources: E Views 8 Computation

4.2 Multivariate Analysis

The result of the cointegration test statistics for the four-variables, GDP, FPI, INT, and DS is reported in Table 2 indicates that four cointegrating vector exist. The null hypothesis that there is no cointegrating vector in the systems ($r\leq 0$), ($r\leq 1$), ($r \leq 2$) and ($r \leq 3$) were all rejected. The implication of this is that $r = 4$, which implies that there exist full rank and the system will be estimated by applying OLS to the unrestricted VAR in levels.

Table 2 Unrestricted Cointegration Rank Test (Trace)

H_0:$r\leq k$	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
0	0.546486	51.94263	47.85613	0.0197
1	0.401267	31.38369	29.79707	0.0326
2	0.352704	18.04724	15.49471	0.0202
3	0.228310	6.738491	3.841466	0.0094

Sources: E Views 8 Computation

4.3 Mwald Causality Test Result

The empirical results of Granger Causality test based on Toda and Yamamoto (1995) methodology is estimated through MWALD test and reported in Table 3. The estimates of MWALD test result follow the chi-square distribution with 4 degrees of freedom in accordance with the appropriate lag length (as shown in Appendix A) along with their associated probability. The null hypothesis is that there is no causality between the variables.

Table 3: Wald Causality Test Results
Sources: E Views 8 Computations

Table3 Mwald Granger Causality Test			
Result Null Hypothesis	Chi-sq	Prob.	Granger Causality
GDP→ FPI	36.97168	0.0000	Causality
FPI → GDP	10.70261	0.0301	Causality
FPI→ INT	10.84961	0.0283	Causality
INT → FPI	22.13309	0.0002	Causality
GDP →INT	6.485591	0.1657	No Causality
INT → GDP	9.533347	0.0491	Causality
DS → GDP	4.439280	0.3498	No Causality
GDP → DS	8.495214	0.0750	No Causality
FPI → DS	5.875352	0.2087	No Causality
DS → FPI	21.56882	0.0002	Causality
INT → DS	7.365840	0.1178	No Causality
DS → INT	2.536422	0.6381	No Causality
FPI, DS, INT→GDP	22.46254	0.0327	Causality
GDP, DS, INT → FPI	131.6351	0.0000	Causality

Table 3 reports the χ^2-test statistic obtained, together with the estimate *p*-values and the results for the multivariate and bivariate causality tests. Our results confirm that the probability that the growth rate of GDP does not granger cause foreign portfolio investment in the economy is about 0.03 while the probability that foreign portfolio investment does not granger cause the growth rate of GDP is about 0.00. We therefore reject the null hypothesis that FPI does not Granger Cause GDP and also reject the hypothesis that GDP does not

Granger Cause FPI. We therefore conclude that there is bidirectional causality between foreign portfolio investment and economic growth in Nigeria economy. It further reveals that interest rate and domestic savings granger cause FPI with the same probability of 0.0002 of null hypothesis of no causality. Interest rate also granger causes GDP with probability of 0.05 while domestic savings does not granger cause GDP with probability of 0.35. The multivariate causality shows that FPI, DS, and INT jointly granger cause GDP with probability of 0.03 and also that GDP, DS and INT jointly granger cause FPI with probability of 0.00.
This empirical result however provides evidence supporting the conventional view that higher foreign portfolio investment leads to higher investment and higher economic growth. It however, supports the finding of Duasa and Kassim (2009) and Narayan (2013) which also find causality from GDP to FPI.

5 Conclusion and Policy Implications

The paper presented careful tests of causality between foreign portfolio investment and economic growth in both bivariate and multivariate systems using the Toda and Yamamoto methodology. The empirical results suggest that foreign portfolio investment and economic growths are positively cointegrated indicating a stable long run equilibrium relationship. Further, the findings revealed bidirectional causality between foreign portfolio investment and economic growth. It also established the complementary role of domestic savings and interest rate to the growth of the economy. The Nigerian government therefore, needs to formulate policies that; would enhance saving, stabilize interest rate to improve the confidence of the foreign investors in the economy, as this might lead to sustainable economic growth in Nigeria.

Government should ensure that more foreign investment flows into the economy. This will entail creating appropriate enabling environment to attract more FPI. There is a need for major institutional-legal changes such as the relaxation or elimination of restrictions on profit and capital remittances. In addition, government must open up the formerly classified “priority sectors” to foreign investors. On the other way round, government should employ all necessary fiscal and monetary policy to ensure stable economic growth and provide enabling environment for the growth of the economy through the provision of social amenities and infrastructural facilities.

Reference

Dolado, J. and Lutkepohl, H (1996) Making Wald Tests work for Cointegrated VAR Systems. Econometric Review, 15, 369-386.

Ekeocha, P .C (2008) ‘Modelling the Long Run Determinants of Foreign Portfolio Investment in an Emerging Market: Evidence from Nigeria’, International Conference on Applied Economics

Granger, C. W. J. (1969) Investigating causal relations by econometric models and cross spectral methods, Econometrica, 37, 424- 38

Guluzar Kurt Gumus,and Bener Gungor (2013) The Relationship between Foreign Portfolio Investment and Macroeconomic Variables, European Scientific Journal vol.9, No.34

Jarita Duasa And Salina H. Kassim (2009) Foreign Portfolio Investment and Economic Growth in Malaysia, The Pakistan Development Review, 48: 2 pp. 109–123

Kim, J., and Singal, V (2000), “Stock Market Openings: Experience of Emerging Economies”, Journal of Business, 73, 25-66.

Maddala, G.S (2001) Introduction to Econometrics, 3rd Edition, Wiley and Sons, Inc

Narayan (2013) ‘Causal Relationship between Foreign Capital Inflows and Economic Growth: Empirical Evidence from India’ International Journal of Economics, Finance and Management, volume 2 no 1

Nuri Yildirim and Huseyin Tastan (2012) Capital Flows and Economic Growth across Spectral Frequencies: Evidence from Turkey Panoeconomicus, vol4, pp. 441-462

Obadan M.I. (2004): Foreign Capital flow and External Debt perspectives on Nigeria and the
LDCS Groups, Ibadan University Prints, Nigeria.

Onuorah, Anastasia Chi-Chi and Akujuobi, Linus Eze (2013) Impact of Macroeconomic Indicators on the Performance of Foreign Portfolio Investment in Nigeria European Journal of Business and Management Vol.5, No.2,

Sajid, G. M. and M. Sarfraz (2008) “Savings and Economic Growth in Pakistan: An Issue of Causality,” Pakistan Economic and Social Review Vol. 46, No. 1, pp. 17-36.

Toda, H.Y. and Yamamoto (1995) Statistical inference in Vector Autoregressions with possibly integrated processes. Journal of Econometrics, 66, 225-250.

Appendix A
VAR Lag Order Selection Criteria
Endogenous variables: GDP FPI DS INT
Exogenous variables: C
Sample: 1986 2013
Included observations: 24

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-245.7674	NA	12869.70	20.81395	21.01029	20.86604
1	-230.8875	23.55981	14480.26	20.90729	21.88900	21.16774
2	-219.8202	13.83405	24851.50	21.31835	23.08543	21.78716
3	-188.7150	28.51309	10166.32	20.05959	22.61204	20.73675
4	-137.1030	30.10701*	1266.980*	17.09192*	20.42974*	17.97744*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion