Long Run Relationship between Private Investment and Monetary Policy in Nigeria

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Abstract

The paper investigated the relationship between financial sector development and economic growth in Nigeria for the period 1980-2009. Functional monetary policy measure was used to empirically determine the long run relationship of private investment and economic growth in Nigeria. Appling Vector Auto-Regression Model technique to test the stationary series of variables and the result showed that money supply has a negative but GDP and Others have positive significant impact on private investment in Nigeria in the short run but the variables became statistically significant in the long run. This implies that the monetary policy in Nigeria has positively affected the growth of private investment in the Nigeria economy.

Key Words: Private Investment, Monetary Policy, Co-Integration, Vector Auto-Regression, Granger, Johansen Test.

1. Introduction

The relationship between monetary policy and private investment is a perennial issue in development economics judging from the hundreds of theoretical and empirical scholarly papers that have been written to conceptualize how the development and structure of private investment affect money supply, gross domestic product and others (technological innovation, income growth and employment). Monetary policy in the Nigerian context refers to the actions of the Central Bank of Nigeria to regulate the money supply, so as to achieve the ultimate macroeconomic objectives of government. Several factors influence the money supply, some of which are within the control of the central bank, while others are outside its control. The specific objective and the focus of monetary policy may change from time to time, depending on the level of economic development and economic fortunes of the country. The choice of instrument to use to achieve what objective would depend on these and other circumstances. These are the issues confronting monetary policy makers. (Osiegbu & Onuorah 2010), (Kashyap & Stein 1994), (Hanson 2004).

The studies of (Klein1992), (Bryan 1971), (Ezenduyi 1994), (Nnnana (2003), Levine et al., (2000), Anyawu(2002), (Khan et al. 2005), and (Bright 2004), support a positive relationship between private sector investment development and economic growth through monetary policy in Nigeria. According to (Adamu et'al 2009), empirical studies that are based on cross-sectional and panel data generally support the positive effect of private investment development on economic growth and monetary policy for short run effect but may not satisfactorily address country-specific effects since these countries could be at different stages of financial and economic development. The different stages could be as a result of different institutional characteristics, policies and differences in their implementation (Badun 2009). This has therefore necessitated the need to investigate the finance-growth relationship on a country case.

Ojo (2007) observed that, the Nigerian private investment has evolved over the past 50 years. It has grown structurally and has had improved monetary policy role. The economic growth rate (real GDP growth rate) has also been volatile over the past years. The financial sector which had the Central Bank of

Nigeria (CBN), a handful of commercial banks, insurance companies, a stock market in the1970s, now consist of the CBN, 24 deposit money banks, 5 discount houses, 840 micro finance banks, 5 development finance institutions, 1 stock exchange, 1 commodity exchange, 73 insurance companies, 80 primary mortgage institutions, 102 finance companies, and 1,264 bureaux de change (CBN, 2008). Also, major financial ratios like M2/GDP, ratio of credit to private sector/GDP (CBN Private Investment indicators) and ratio of currency outside banks/M2 have shown some improvement over the years. Despite the growth experienced in the financial sector over the years, the Nigerian financial sector has been described as weak, fragmented, unable to provide domestic credit to the private sector and not in a position to effectively support a strong expansion of the real sector as well as contribute to economic growth.

Going by the limited studies on the private investment trend and growth in relation to GDP, Money Supply (MS) and others in Nigeria and the need to add to existing literature, it is the purpose of this paper to first, establish if there is a robust association between the private investment and monetary policy as stipulated in literature, as well as determine the extent of the private investment impact on monetary policy for Nigeria's economic growth.

2. Literature Review

Morgan (1981), identified two causal relationships between private investment and monetary. They are the finance-led growth hypothesis (supply-leading) and the growth-led finance hypothesis (demand leading). The former postulates a positive impact of financial sector development on economic growth, which means that creation of financial institutions and markets increases the supply of financial services and thus leads to economic growth. That is the financial sector transfers resources from the traditional, low-growth sectors to the modern high-growth sectors thereby promoting and stimulatting entrepreneurial response in modern sectors (Patrick 1966). He advocated for a supply leading strategy that ensures the creation of financial institutions and the supply of their assets, liabilities and other services which occurs in advance of demand for them. Supply leading finance would exert a positive influence on capital by improving the composition of the existing stock of capital, allocate efficiently new investments among alternative uses and raise the rate of capital formation by providing incentives for increased saving and investment. It will cause economic development through the transfer of scarce resources from savers to investors according to the highest rates of return on investment.

McKinnon (1973) supports the supply leading argument by suggesting a complementary relationship between accumulations of money balances (financial assets) and physical capital accumulation in developing countries. Adopting an outside money model of demand, McKinnon argued that there are limited opportunities for external finance and that firms are confined to self finance due to under developed financial markets in most developing countries. Thus potential investors must accumulate money balances before undertaking relatively expensive and indivisible projects (Kargbo & Adamu 2009). Shaw (1973) also supporting the supply leading argument and basing his argument on inside money model, proposed that high interest rates are essential in attracting more saving . According to him, supply of more credit enables the financial intermediaries to promote investment and raise output through borrowing and lending.

Lucas (1988) argues that economists tend to over-emphasize the role of financial factors in the process of growth stating that development of the financial markets may well turn out to be an impediment to economic growth when it induces volatility and discourage risk-averse investors from investing (see Singh 1997). Supporting the view of Lucas, some studies do not find evidence of finance led-growth. For example Mohamed (2008) adopts the autoregressive distributed lag approach, investigated the relationship between private investment and economic performance in Sudan over the period 1970-2004. He used the ratio of M3 to GDP and ratio of credit to the private sector to GDP as indicators of financial development. The results indicated a weak relationship between financial development and economic growth. The coefficient of M3/GDP was found to be negative and significant while the ratio of credit to the private sector to GDP was also negative but insignificant. Adeoye (2007), using M_2/ GDP, ratio of bank deposits and ratio of bank credits to GDP as indicators for financial sector development in his study of financial sector development and economic growth in Nigeria discovered that financial markets and institutions were significantly negatively related to growth.

From the various empirical studies, it is observed that while some of the studies have employed a single indicator of Monetary growth, others have used two or more indicators separately to analyze the underlying relationship. However, there is no consensus on the appropriate indicator for private sector development and the direction of the relationship (Kargbo & Adamu 2009).

3.Methodology

Before estimating the model, the dependent and independent variables are separately subjected to some stationary tests using unit root test since the assumptions for the classical regression model require that both variables be stationary and that errors have a zero mean and finite variance. The unit root test is evaluated using the Augmented Dickey-Fuller (ADF) test which can be determined as:

$$\Delta Y_t \ = \ \alpha \ + \ \beta t + \delta Y_{t-1} + \ \gamma \sum_{i=1}^{m} \Delta Y_{t-i} \ + \ \varepsilon_t \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 1$$

Where α represents the drift, t represents deterministic trend and m is a lag length large enough to

ensure that ε_t is a white noise process.

If the variables are stationary and integrated of order one I(2), we test for the possibility of a co-integrating relationship using Eagle and Granger (1987) two stage Var Auto-Regression (VAR).

The study employs the Var Auto-Regression (VAR) because it is an appropriate estimation technique that captures the short and long-run effect of differenced variables. It connects the short run and the long-run behaviour of the dependent and independent variables.

The specification is expressed as function:
 Monetary policy= f(MS, GDP and Others)
The proposed long-run equation in this study is specified below

$$PI_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 MS_t + \ \alpha_3 Others_t + \ \square_t \ \dots\dots\dots\dots\dots 2$$

Hence VAR model used in this study is specified as:

$$\Delta PI_t = \ \beta_1 + \ \beta_2 \sum_{i=1}^{n} \Delta GDPG_{t-i} + \beta_3 \sum_{i=1}^{n} \Delta MS_{t-i} + \beta_4 \sum_{i=1}^{n} Others_{t-i} + \partial_1 VAR(-2) + \ \square U_{t_i}$$

$$..3$$

where PI is private investment, MS is aggregated money supply in the financial sector development indicator, GDP is the Gross Domestic Product and Others comprise the aggregate of (technological innovation, income growth and employment) and $VAR(-2)$ is VAR term and U_t is Error term.

The short run effects are captured through the individual coefficients of the differenced terms. That is β_i captures the short run impact while the coefficient of the VAR variable contains information about whether the past values of variables affect the current values of the variables under study. The size and statistical significance of the coefficient of the residual correction term measures the tendency of each variable to return to the equilibrium. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes ∂_1 captures the long-run impact.

4.   Data Description

The data used in this study covered the period 1981 to 2009 and were obtained from various sources.

The Private Investment **(PI)** used as the dependent variable is obtained from the Statistical Bulletin published by the Central Bank of Nigeria (CBN). The aggregated others **(Others)** used in this study is the sum of (technological innovation, income growth and employment) to private sector. The study adopts the use of aggregated financial sector indicator as suggested by The Valencian Institute of Economic Research (Ivie) because of the need to accurately access the country's private sector development, which according to (Lynch 1996) may not be achieved using traditional measures of financial deepening but monetary policy and GDP. Lynch (1996) advocated alternative measures of private sector development to improve its evaluation using technology, innovation, employment income growth)

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Private investment **(PI)** is captured by non-military expenditure. It is productive and complements private capital stock (Udegbunam 2002). The data is obtained from The gross employment generation data is obtained from UNDP (2009). The data is obtained from the CBN statistical bulletin.

5. Empirical Analysis Results and Interpretation

The results of estimating equations 1, 2, 3, 4and 5 are reported in the appendix. The Augmented Dickey-Fuller Unit Root test results for the time series presented in table 1 above reveal that all variables were non stationary at level but stationary at second difference. Having established the stationarity of the series, the next step is to carry out a co-integration test which is a necessary condition for carrying out a short and long run regression analysis using the Vector Auto-regression Model.

5.1 Johansen Co-Integration Test

Using the Johansen and Granger two stage techniques, the co-integration test result in table 2 below reveals that the residuals from the regression result are stationary at 1% level of significance. This means that Money Supply (MS), Gross Domestic Product (GDP), and OTHERS are co-integrated with Private Investment (PI) in Nigeria over 1981 to 2009 periods. In order words there exists a long run stable relationship between the dependent and independent variables. This finding also reveals that any short run deviation in their relationships would return to equilibrium in the long run. It s halso shows that the deterministic trend is normalized at most 3** with co-integrating equations.

5.3 Vector Auto-regression Model Regression Result

Table 3 above reported that the Vector Auto-regression Model (VAR) for Private Investment in Nigeria from 1980 to 2009 using auto-regressive regression techniques, the results clearly showed a well defined coefficient. The coefficient measures the speed at which MS, GDP and OTHERS measure the significant change in the PI.

Furthermore the coefficient of determination (R-squared=0.9833) reveals that about 98% of the systematic variations in Nigeria Private investment is jointly explained by money supply, GDP and Others using the VAR model. The F-test which is used to determine the overall significance of regression models, reveals that there exists a statistically significant linear relationship between the dependent and explanatory variables at 5% levels (F-value 165.41>F-critical value 0.05) in the VAR model.

Specifically, monetary policy which is the MS explanatory variable in this study is negatively related to PI and GDP and Others are positively related to PI in Nigeria as shown. The variable (Monetary policy) was statistically insignificant at 5% level in the short run but became significant in the long run. This finding is consistent with the findings of Adeoye (2007) who found a negative and significant impact of money supply on private investment in Nigeria as well as Mohamed (2008) in his study of Ghana. However, our finding negates the existence of a positive relationship among GDP and others and private investment in accordance with Mckinnon-Shaw hypothesis and the findings of Ukeje and Akpan (2007) and Onwioduokit (2007) in their study of Nigeria. The result therefore implies that the growth experienced in monetary policy have significantly contributed to the private investment in Nigeria over the past 29 years. The reasons for this could be attributed to poor funding of investments, lack of cheap funds for entrepreneurs, lack of confidence in the sector and the failure of the sector to efficiently carry out its intermediate functions. The two period lag in private investment was statistically significant at 5% second other difference. This means that previous expansion in Nigerian private investment did increase current economic growth. The results also revealed that increase in two year past growth in monetary policy increases currently private investment. This, in other words, means that current private investment has long memory of distant past monetary policy activities rather than the immediate.

The Durbin Watson-statistic value of l.58 shows that there is no evidence to accept the presence of serial correlation in the model. This means that the model is valid and can be used for policy recommendation without re-specification. Summarily, the empirical results from this study reveal that

private investment and monetary policy in Nigeria for the past 29 years have been negatively related in terms of money supply but positively related based on GDP and others.

6. Conclusion

To investigate the private investment and monetary policy on economic growth, the study employing an VAR and Granger Causality technique for time series data from 1981 -2009, used monetary parameters consisting of money supply, GDP and Others. The empirical results show that Private investment has a negative impact on real GDP growth rate in Nigeria. This implies that the Nigerian financial sector growth has not propelled growth in the economy despite the fact that the financial sector has been seen to play an important role in the economic growth of some developing countries. Thus the policy suggestions for a positive impact of the financial sector on economic growth in Nigeria will be the sustenance of present reforms in the financial sector as well as an expansion of its size, depth, and efficiency that will enable a substantial and sustained private sector expansion.

7. Recommendation

The study makes the following recommendations:
1. The government should establish through the National Economic Planning Commision sustainable fiscal policy that enhances money supply that encourage private investment.
2. To uphold and emphasize the significant role of GDP and others monetary policy in the growth of private investment in Nigeria.
3. That GDP and Others measures of monetary have always cause significant increase in the growth of private investment to economic growth in Nigeria.

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Appendix

Augmented Dickey-Fuller Unit Root Test Table 1: Unit Root results

VARIABLES	LEVELS	5% CRITICAL VALUES	REMARK	FIRST DIFFERENCE	5 % CRITICAL VALUES	REMARK	SECOND DIFFERENCE	5 % CRITICAL VALUES	REMARK
PI	2.5065	-2.9907	Non Stationary	-1.7954	-3.0038	Non-Stationary	-5.5895	-3.0199	Stationary
GDP	-0.4660	-2.9750	Non-stationary	-5.4047	-2.9798	Non-Stationary	5.0352	-2.9798	Stationary
MS	3.36133	-3.0532 *	stationary	3.5317	-3.1003	Non-Stationary	-8.4121	-3.1482	Stationary
OTHERS	5.0352	-2.9750	Non-stationary	14.8573	-2.9798	Stationary	11.5137	-2.9850	Stationary
The null hypothesis that the variable is non stationary is rejected when the calculated statistics is greater than the Mackinnon critical values. The alternative hypothesis that is accepted is that the variable is stationary (that is it has no unit root)									

Source: E-Views 4.1 version

Table 2: Johansen Co-integration test

Sample: 1980- 2009
Included observations: 14
 Test assumption: Linear deterministic trend
            in the data
Series: DPI DMS DGDP DOTHERS
Lags interval: No lags

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.996952	167.0820	47.21	54.46	None **
0.981160	85.97645	29.68	35.65	At most 1 **
0.797902	30.37186	15.41	20.04	At most 2 **
0.434711	7.985854	3.76	6.65	At most 3 **

 *(**) denotes rejection of the hypothesis at
      5%(1%) significance level
   L.R. test indicates 4 cointegrating
   equation(s) at 5% significance level

 Unnormalized Cointegrating Coefficients:

DPI	DMS	DGDP	DOTHERS
1.08E-06	2.21E-07	9.79E-06	-1.67E-07
-1.22E-06	2.69E-06	-6.44E-06	-1.11E-06
7.55E-06	9.27E-07	-2.86E-07	-1.49E-07
1.57E-05	-9.45E-07	2.29E-06	-1.83E-07

 Normalized Cointegrating Coefficients: 1
   Cointegrating Equation(s)

DPI	DMS	DGDP	DOTHERS	C
1.000000	0.203711	9.031422	-0.154474	-108101.9
	(0.06981)	(2.12105)	(0.03798)	
Log likelihood	-679.2368			

 Normalized Cointegrating Coefficients: 2
   Cointegrating Equation(s)

DPI	DMS	DGDP	DOTHERS	C
1.000000	0.000000	8.715209	-0.064506	-98942.65
		(1.90294)	(0.01088)	
0.000000	1.000000	1.552262	-0.441645	-44961.84
		(2.05996)	(0.01178)	
Log likelihood	-651.4345			

 Normalized Cointegrating Coefficients: 3
   Cointegrating Equation(s)

DPI	DMS	DGDP	DOTHERS	C
1.000000	0.000000	0.000000	0.031990	-23857.98
			(0.01852)	
0.000000	1.000000	0.000000	-0.424459	-31588.55
			(0.01440)	
0.000000	0.000000	1.000000	-0.011072	-8615.361

(0.00263)

| | Log likelihood | -640.2415 | | | |

Source: E-Views 4.1 version

5.2 Table 3: Short run and long run regression results
VAR Estimation

Sample(adjusted): 1984-2009
Included observations: 20
Excluded observations: 6 after
adjusting endpoints
Standard errors & t-statistics in
parentheses

	PI
PI(-1)	0.889601
	(0.25546)
	(3.48236)
PI(-2)	0.082832
	(0.26398)
	(0.31377)
C	-31676.68
	(38636.0)
	(-0.81988)
MS	-0.011231
	(0.03765)
	(-0.29830)
GDP	0.470590
	(0.47429)
	(0.99220)
OTHERS	0.006312
	(0.01835)
	(0.34398)
R-squared	0.983355
Adj. R-squared	0.977410
Sum sq. Resids	4.85E+09
S.E. equation	18612.38
F-statistic	165.4163
Log likelihood	-221.4437
Akaike AIC	22.74437
Schwarz SC	23.04309
Mean dependent	120799.1
S.D. dependent	123835.2

Source: E-Views 4.1 version

The value of R-squared is 0.9833 implying that the independent variables can explain dependent variable at 98.3% with 1.7% unexplainable which could be accounted for random error and other social crisis. This adjudged the analysis is highly accurate. There is parameter significant in the estimated regression.

Table 4: Estimation: Model

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LS 1 2 PI @ C MS GDP OTHERS

VAR Model:

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PI = C(1,1)*PI(-1) + C(1,2)*PI(-2) + C(1,3) + C(1,4)*MS + C(1,5)*GDP + C(1,6)*OTHERS

VAR Model - Substituted Coefficients:

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PI = 0.8896012086*PI(-1) + 0.08283152683*PI(-2) - 31676.68273 - 0.01123137972*MS +
0.4705902842*GDP + 0.006312186424*OTHERS

Source: E-Views 4.1 version

Table5: Granger Causality Test
 Pairwise Granger Causality Tests

 Sample: 1980-2009
 Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
MS does not Granger Cause PI	10	0.12289	0.88695
PI does not Granger Cause MS		0.12215	0.88758
GDP does not Granger Cause PI	22	1.11242	0.35155
PI does not Granger Cause GDP		3.12083	0.07007
OTHERS does not Granger Cause PI	22	2.92914	0.08071
PI does not Granger Cause OTHERS		0.09363	0.91108
GDP does not Granger Cause MS	14	9.06866	0.00697
MS does not Granger Cause GDP		0.46651	0.64154
OTHERS does not Granger Cause MS	14	15.8938	0.00111
MS does not Granger Cause OTHERS		4.92981	0.03583
OTHERS does not Granger Cause GDP	26	0.63586	0.53937
GDP does not Granger Cause OTHERS		1.06041	0.36414

The result of table 5 reveals the causality of monetary policy on the private investment in Nigeria. The
Granger causality tests at 5% indicated that MS does not cause PI but GDP and OTHERS does Granger
cause PI in Nigeria as they indicated significant.

Endogeneous Graph