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Monetary policy and domestic private sector investment growth in Nigeria

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Abstract
The study examines the link between monetary policy and private sector investment in Nigeria. The study engaged annual data from 1980-2020 and the variables are private investment, credit reserve ratio, monetary policy rate, minimum lending rate, money supply, open market operation and liquidity ratio. The study engaged Unit Root test for stationarity, Johansen Co-integration and ECM tests to determine the speed of adjustment from the short to its long run equilibrium and examined the trends analysis of the data in the model. Correspondingly, pre-diagnostic and post diagnostic test were carried out to guesstimate the variables. The results indicates that variables are integrated of order 1(1) thereby instituting that the variables are Co-integrated. The ECM (t-1) value of -51per cent displays that it is rightly signed and is capable to correct, adjust and tie the short run dynamics with the long run equilibrium. The post test outcomes divulge that Heteroskedasticity and serial correlation is not a problem in the model. The study similarly ascertains in addition, some level of structural stability in the model using Cumulative Sum (CUSUM) and Cumulative Sum of Square (CUSUMQ) tests. This study concludes that monetary policy spurs private sector investment in the Nigerian economy. The study recommends moderate money supply increase and a reduction in monetary policy rate in the Nigerian economy.

Keywords: monetary policy, private investment, money supply, monetary policy rate, ECM

Introduction

Background to the study

Investment is a vital component of aggregate demand and a vivacious resource for economic growth as it aids expand the production capacity of the economy. In the interim, investment plans are imperative to meet the future demands as well as warranting financial goals (Ogbulu and Torrbira, 2012; Onouorah, Shaib and Ehioya, 2012; Ayeni, 2014; 2014) [28, 30, 7].

By and large, a robust investment potential could guarantee a rapid and maintainable economic development. Investments in banks and financial institutions help to promote the circulation of funds in serving the operation of the economy (Brima and Brima, 2017; Okoroafor, 2020) [10, 29].

The need for private investment within an economy has been identified as a booster for the economy to grow. To large extent, the degree of private investment (PI) is dependent on domestic resource mobilization which in turn rest on the monetary policy environment Tobias and Manbo (2012) [34] and Thuy, Anh and Diem (2020) [33] advanced that countries with high rate of PI have better performing economies. Investment which exists at two levels is essential to ensure development; while the first level may embrace the public sector investment that involves investment in infrastructure; PSI involves investment by private entities within the economy (Bakare, 2011; Atoyebi, Adekunjo, Kadiri and Falana, 2012; Amer, Umer and Muhammad, 2014) [8, 6, 5]. However, PI has been found to contribute more on economic growth than the public investment, in that public investment is seen to be politically motivated most times and lack economic rationality (Bosco and Emerence, 2016; Akeju, 2014; Agwu, 2015; Bosco and Emerence, 2016; George-Anokwuru, 2017) [9, 4, 2, 9, 19]. The affiliation between monetary policy (MP) and PI is a continuing issue in development economics judging from the hundreds of scholarly studies that have been carried out on how the development and structure of PI is been affected by monetary environment through macroeconomic policy (Enang, 2010; Davis and Emerenini, 2015; Ezeibekwe, 2020;) [16, 12, 18]. MP in the Nigerian framework talk about the actions of the CBN to regulate the money supply, so as to achieve the ultimate macroeconomic objectives of government (Adelowokan, Adesoye and Balogun, 2015; Lucky and Uzah, 2016; Kolapo, Oke and Olaniyan, 2018) [1, 25, 3]. Several factors influence the investment expenditure, some of which are within the control of the CBN, while others are outside its control (Amer, Umer and Muhammad, 2014; Ogbulu and Torrbira, 2012; Tobias and Manbo, 2012; Ekpo, 2017) [5, 28, 34]. The specific objective and the focus of MP may change from time to time, contingent on the level of economic development and economic fortunes of the country. The selection of instrument to use to realize what objective would rest on these and other environments. These are the issues that pose as challenges to monetary policy makers. (Obafemi and Ifere, 2015; Ishioro, 2013; Duruechi and Ojiegbe, 2015; Diabate, 2016) [16, 21, 14, 13]. The effectiveness of MP on the promotion of real private investment economy is still an issue under intense debate and in particular, the relative efficacy of its transmission effect on the economy. Conventionally monetary policy is seen as influencing private sector investment via three routes; namely the interest rate channel, the demand for money and the credit channel (Enang, 2010; Obafemi and Ifere, 2015; Esubalew, 2014; Kalu and Onyinye, 2015; Lucky and Uzah, 2016) [16, 27, 22, 25].

Objectives of the Study

The central objectives of this study are to examine the connection between monetary policy and private sector

investment in Nigeria. These specific objectives are to;

1. investigate the impact of credit reserve requirement on PSI in Nigeria,
2. determine the influence of liquidity ratio on PSI in Nigeria,
3. evaluate the impact of monetary policy rate on PSI in Nigeria,
4. estimate the effect of minimum lending rate on PSI in Nigeria
5. examine the outcome of money supply on PSI in Nigeria,
6. appraise the impact of open market operation on PSI in Nigeria.

Theoretical Framework

Neo-classical Theory of investment.

Neoclassical financial theorists have made acrobatic theoretical efforts to defang the principal-agent problem so that the Pareto efficiency properties of markets could escape unscarred from its grasp. Unfortunately, the assumptions required to accomplish this task have no significant foundation in empirical or institutional reality. Stiglitz has accurately characterized the neoclassical principal-agent literature as "the triumph of ideology over theory and fact". Neoclassical investment theory, on the other hand, fails even to acknowledge the existence of the problem. Virtually all neoclassical models of the enterprise investment decision begin with the unsupported assertion that the firm's objective is the pursuit of the owners' objectives: the firm maximizes market value. Three points about the value maximization assumption are worthy of note. First, there is a great deal of empirical and institutional evidence that this assumption is false and virtually no direct empirical evidence that it is true.3 Second, if this highly questionable assumption is rejected, it is not at all clear that a distinct neoclassical approach to the theory of the firm can be identified. In its absence, neoclassical theorists have no generally agreed upon method for choosing an enterprise objective function, for specifying the constraint set, or even for identifying the cost of financial capital.

Keynesian Theory of Investment.

Gordon presents a formal model of what he calls the Keynesian theory of investment. We are less ambitious here, attempting only to sketch out the general characteristics of an investment theory based on the substitute core assumptions discussed in the previous sections. A realistic theory of investment should incorporate the assumption that the firm is a semi-autonomous agent with a preference function of its own. We would expect the firm to pursue growth in size or market share and in profits -its growth objective - and avoid threats to its decision-making autonomy or its financial security - its safety objective. The existence of this safety objective makes the firm itself risk-averse. Growth is attainable only through capital accumulation, but capital accumulation must be financed. Debt finance creates explicit, legally binding cash flow commitments to creditors. But even internal funding and stock flotation create implicit cash flow commitments to shareholders. If commitments to stockholders cannot be met out of the future operating profits generated by invested capital, management may experience a threat to its decision-making autonomy; if commitments to creditors are not met, the firm might go bankrupt.

Empirical Literature Reviewed

This study by Thuy, Anh, and Diem, (2020) [33] sheds new light on the relationship between monetary policy and private investment using Vietnam's provincial data and a system generalized method of moment (GMM) framework. To capture monetary policy's effect, different indicators, *viz*. money supply, domestic credit to the private sector, interest rate and exchange rate are examined. We find that private investment is positively affected by respective monetary policies through broad money, domestic credit and interest rate channels, yet no credible evidence regarding the exchange rate's effect. In which, such a surprising co-movement between real interest rate and private investment was illuminated through analysis of the economy's distinctive characteristics over the two development stages (pre- and post-2012). Another notable finding is that economic development prospects of localities, which attract great attention and cause an intense competition between domestic and foreign investors, appear to be a major barrier to investment decisions of private firms.

Using data from 1981 to 2018 and applying the vector error correction model, Ezeibekwe (2020) [18] in his study sought to determine how the changes in the inflation rate affect the ability of monetary policy tools to stabilize the Nigerian economy and stimulate investment. Empirical results suggest that the impact of the interest rates on investment depends on the level of the inflation rate. The size of the effect of interest rates on investment gets weaker as the inflation rate increases suggesting that monetary policy tools, such as the monetary policy rate (MPR), that directly change the interest rates are robust stabilization tools during periods of declining inflation rates but not relevant during periods of rising inflation rates. This is attributable to low bank lending rates. Additionally, the impact of the money supply target on investment does not depend on the level of the inflation rate. This suggests that monetary policy tools, such as open market operations, that directly change the money supply can be relevant stabilization tools during economic booms and recessions. As a result, the Central Bank of Nigeria should work to deepen the scale, capacity, and efficiency of its open market operations by ensuring that most of the people can participate with minimal transaction cost and by making different financial instruments available. Okoroafor (2020) [29] study investigated the impact of monetary indicators on domestic investments and growth of Nigerian economy: 1970-2018, main aim is to ascertain the degree of effects of monetary variables on domestic investment and economic growth. Annual data on the following variables: private domestic investment (PDI), economic growth rate (EGR), narrow money supply (NMS), Commercial bank credit to private Investors (CCP), Commercial bank interest rate (CLR), naira-dollar ratio (NDR) and inflation rate (INR) were extracted from diverse sources. ADF and PP approach as well as ARDL Model were employed for the study. Generally, findings revealed that PDI is influenced positively and significantly at 5% LOS by one period log of PDI and CCP in Nigeria within 1970 and 2018. Also, NMS impacted negatively on domestic investments. It implies that available narrow money supply was utilized majorly by the government sector of the economy with little investment money left for private investors. Results further indicated, that monetary indicators such as NDR, CLR and EGR had no significant

influence on domestic investments in the study period. Other findings showed that PDI, NMS and NDR were significant to explained EGR in this period of study. Lagged EGR variable appeared insignificant. Given the results and analysis made, conclusion is drawn that key monetary variables which explained PDI and EGR are mainly money supply and Commercial bank credit. It is therefore recommended that monetary policy moves that would ensure availability of more money and credit to private investors are vigorously pursued.

Inimino, Abuo and Bosco (2018) [20] examined interest rate and domestic PI in Nigeria from 1980 to 2015.The Augmented Dickey-Fuller test and ARDL model were used as the key analytical tools. The ADF unit test result exposed stationarity of the variables at order zero and one, which satisfied the requirement for the engagement of the ARDL Bounds testing method. The ARDL Bounds test discovered the presence of a long run affiliation among the variables. Furthermore, the result show that MP rate has negative and significant influence on domestic PI both in the short and long run. Maximum lending rate has a positive influence on domestic private investment both in the short and long run and was substantial in the short run. Prime lending rate has negative and inconsequential influence on domestic PI both in the short and long run. Nevertheless, the gross domestic product has a negative and immaterial effect on domestic PI in both the long run and the short run. Based on these outcomes, the study suggested amongst others that: The monetary authorities should guarantee that the appropriate macroeconomic essentials including growth, lending rates, inflation, etc. move in the right direction. This would allow potential and domestic investors to design and weigh costs and benefits of investing in the country. Government must play a dynamic role to make sure peace and stability reigns. If there is uncertainty in the country then it becomes rather challenging to attract investors. Consequently, peace and stability must be assured in order to entice PI. Government should invest in durable infrastructure particularly power, roads, railways and housing to help the numerous sectors of the economy to function very well thereby making the business environment friendly. This will in turn boost the growth and development of the country.

Ajayi and Kolapo (2018) [3] look at the sensitivity of domestic private sector investment to macroeconomic indicators in Nigeria from 1986 to 2015 using domestic PI as the dependent variable and gross domestic product, money supply, exchange rate, interest rate and inflation rate as independent variables. The Ordinary Least Square method, ARDL Modeling method and the Engle Granger causality method for analysis discovered that domestic PI is most sensitive to money supply, gross domestic product as a proxy for economic growth and exchange rate in Nigeria whereas it is less sensitive to inflation and interest rate in the short run. Gross domestic product as a proxy for economic growth and exchange rate affect domestic PI absolutely while money supply has a negative influence in the short run. Domestic PI is most sensitive to money supply and gross domestic product as a proxy for economic growth in the long run and both wield undesirable and optimistic effect on domestic PI one-to-one in the long run whereas inflation and interest rates also wield substantial effect on the same. In the interim, the causality test exposed that domestic PI determines money supply in Nigeria. Henceforth, it is recommended that MP which relate typically to the control of the cost, supply/availability and course of money should be revised occasionally and guarantee that such policies are implemented with little or no lag. Additionally, the devaluation of the exchange rate which will offshoot private domestic PI should be carefully implemented.

Lucky and Uzah (2017) [24] study examined the effects of monetary policy transmission mechanisms on the domestic real investment in Nigeria. Time series data were sourced from Central Bank of Nigeria statistical bulletin from 1981 to 2015. Domestic real investment was modeled as the function of percentage of credit to private sector to gross domestic product, naira exchange rate per US dollar, maximum lending rate, monetary policy rate, prime lending rate, net domestic credit, savings rate and Treasury bill rate. Granger causality test and Johansen co-integration test in the vector error correction model (VECM) setting were employed. Durbin Watson, β Coefficient, R-Square (R^2) and F-Statistics were used to determine the relationship between the dependent and independent variables as formulated in the regression models. The result proved that CPS/GDP, MLR, MPR, NDC and SR have positive relationship with Nigeria real domestic investment while EXR, PLR, and TBR have negative relationship with domestic real investment. The co-integration test proved the present of long run relationship between monetary policy variables and domestic real investment. The ADF test prove that the variables are stationary at first difference, the granger causality test proved both bi-directional, unidirectional and independent relationship running from the independent variables to the dependent variable and from the dependent variable to the independent variables. The error correction model proved that the speed of adjustment is adequate while the parsimonious error correction model proved that MPR and SR have positive relationship while EXR and PLR have negative relationship. From the regression summary, the study concludes that monetary policy transmission mechanism has significant relationship with Nigeria domestic real investment. We recommend that Interest rate management and reactions to domestic real investment must be factored into the management and formulation of monetary policy in Nigeria and institutional and policy barriers to investment should be removed. There is need to elimination barriers to effective transmission of monetary, expansionary monetary policy should be formulated that will reduce interest rate, encourage borrowings and savings. There is also need to revisit some of the policies that conflict with the monetary policy objectives to correspond with the modern financial system innovation that will enhance the free flow of investment into the Nigeria economy.

George-Anokwuru (2017) [19] investigated the link between interest rate and domestic PI in Nigeria. Specifically, the aim of the study was to look at the effect of interest rates and domestic PI investment in Nigeria from 1980 to 2015. Ordinary Least Square regression was employed to examine the link among the variables utilized in the study. The findings revealed that prime lending rate has an undesirable and significant link with domestic PI investment in Nigeria. Nevertheless, real interest rate has a negative but insignificant relationship with domestic PI investment in Nigeria. Combey (2016) examines the main causes of PI in the West African Economic and Monetary Union

(WAEMU). After checking for unit root and co-integration, Error Correction Model is specified, and three estimators are performed: dynamic fixed-effects, mean group, and pooled mean group. Hausman tests demonstrate that the dynamic fixed-effects estimator is more effective and reliable than others. Outcomes submit that, in the short-run PI in the WAEMU zone is determined by the aggregate demand conditions: gross domestic product and output gap, whereas, in the long-run, it is determined by gross domestic product, and political stability. The short-run elasticity of gross domestic product and output gap are statistically substantial. The long-run elasticity of gross domestic product and the semi-elasticity of political stability are statistically substantial. These findings suggest that, to promote private investment in the WAEMU zone, there is a necessity among others for more appropriate design and implementation of aggregate demand management policies, and political framework stability.

Duruechi and Ojiegbe (2015) [14] look at the determinants of PI in the Nigerian economy from 1990-2013. The unstable behaviour of investment in Nigeria has become a source of concern to all who are disturbed about the growth of the country. Similarly, decisions on whether to invest or not are controlled by several factors that must be acknowledged and accorded due thoughtfulness in order to foster investments. OLS model was applied and the Unit root test conducted with the Augmented Dickey Fuller (ADF) Unit root indicating that the variables were stationary at first difference rate 1(1). The presence of long-run link between PI, inflation rate, government expenditure, exchange rate and interest rate were proven with the Johansen Co-integration test. The Pairwaise granger causality displays causality running unidirectionaly from government expenditure to investment. The error correction model (ECM) designated that short run disequilibrium in investments can be rectified at the speed of 67% per annun. This simply confirms that there is a significant link between the selected macroeconomic variables and level of investment in Nigeria. Similarly suggested by the study is the fact that only government expenditure has a significant influence on investment in Nigeria therefore leading the study to conclude that investment in Nigeria is still at a very stumpy level and should be stimulated to influence absolutely on the economy in general. Government should appraise her policies on investments and give more consideration to its determinant i.e. inflation rate, exchange rate, government expenditure and interest rate. The above suggests that they are indispensable ingredients for improving investments in Nigeria.

Lanrewaju, Makinde and Hassan, (2015) look at the influence of MP on private capital formation in Nigeria from 1986-2013. The principal emphasis of this study was to find out whether MP in Nigeria has brought about significant capital for private investment that offshoots economic growth via investment. The OLS Multiple regression method was engaged alongside result obtained exhibited that the GDP growth rate has not been attracting significant PI given the period of study. This implication of this is that that the GDP has been growing at a level not satisfactory to be able to appeal to private investment in the economy. Similarly, the money supply and private investment the exchange rate have been comparatively stable to also cause increase in private investment which has in turn and to an extent promote viable economic growth in the country through. The domestic credit from financial institutions to the private sector has made its own impact to growth of PI in the economy. Recommendations are that the Nigerian economy should be put in the path of viable growth and development mainly through incessant increase in PSI, monetary policy that directs credit to the private sector which in the long run is anticipated to be embarked upon in order to lift private investment.

Model specification

The functional model is;

$$PSI = f(\text{CRR, LQR, MPR, MRR, MSS, OMO}) \quad (1)$$

The econometric form of the model becomes

$$PIV = \lambda_0 + \lambda_1 CRR_t + \lambda_2 LQR_t + \lambda_3 MPR_t + \lambda_4 MRR_t + \lambda_5 MSS_t + \lambda_6 OMO_t + \mu_t \quad (2)$$

The log-linear model can be specified as

$$\ln PIV = \lambda_0 + \lambda_1 \ln \sum_{t=1}^{n} CRR_t + \lambda_2 \ln \sum_{t=1}^{n} LQR_t + \lambda_3 \ln \sum_{t=1}^{n} MPR_t + \lambda_4 \ln \sum_{t=1}^{n} MLR_t + \lambda_5 \ln \sum_{t=1}^{n} MSS_t + \lambda_6 \ln \sum_{t=1}^{n} OMO_t + \mu_t \quad (3)$$

Where

PIV= private investment growth rate, CRR is credit reserve requirement in Nigeria, LQR is liquidity ratio, MPR is monetary policy rate, MLR is minimum lending rate, BMS is broad money supply and OMO is open market operation.

Results and interpretations

Table 1: UNIT ROOT TEST- (ADF)

ADF TEST: LEVEL				ADF TEST: 1ST DFF		
Variables	**Test Stat**	**5 %**	**Order**	**Test Stat**	**5 %**	**Order**
PSI	-3.418690	-3.529758	NS	-6.210027	-3.536601	1(1)
CRR	-2.455958	-3.529750	NS	-6.028607	-3.536601	1(1)
LQR	-5.430121	-3.536601	NS	-7.677159	-3.536601	1(1)
MPR	-3.016381	-3.529758	NS	-6.552705	-3.536601	1(1)
MRR	-3.240540	-3.529758	NS	-7.269094	-3.536601	1(1)
BM_2	-2.203847	-3.529758	NS	-6.667539	-3.536601	1(1)
OMO	-1.632490	-3.529758	NS	-6.332980	-3.536601	1(1)
NS = Not Stationary at 5 % ; stationary a 5%						

From Table 1, the variables are integrated of order 1(1) using the ADF test to determine the time series properties of the model. All variables became stationary at first difference.

Table 2: UNIT ROOT TES- (P-P)

P-P Test: level				P-P Test: 1ST DFF		
Variables	Test Stat	5 %	Order	Test Stat	5 %	Order
PSI	-3.705807	-3.529758	NS	-20.46430	-3.533083	1(1)
CRR	-2.393388	-3.529758	NS	-7.499580	-3.533083	1(1)
LQR	-3.439145	-3.529758	NS	-12.30994	-3.533083	1(1)
MPR	-2.903720	-3.529758	NS	-7.878927	-3.533083	1(1)
MRR	-3.038374	-3.529758	NS	-9.229436	-3.533083	1(1)
BM_2	-2.190380	-3.529758	NS	-6.857823	-3.533083	1(1)
OMO	-1.632490	-3.529758	NS	-8.458396	-3.533083	1(1)
NS= Not stationary. N = Stationary. 5 %						

From Table 2, the variables are integrated of order 1(1) using the P-P test to decide the time series properties of the model. All variables turn out to be stationary at first difference.

Table 3: Johansen Co-integration test (Trace Statistic)

Hypothesized	Eigenvalue	Trace	0.05	Prob.**
No. of CE(s)		Statistic	Critical Value	
None *	0.822800	226.0563	175.1715	0.0000
At most 1 *	0.758537	165.4897	139.2753	0.0006
At most 2 *	0.709288	115.7533	107.3466	0.0125
At most 3	0.575553	72.51356	79.34145	0.1463
At most 4	0.373367	42.51970	55.24578	0.3961
At most 5	0.320720	26.16090	35.01090	0.3186
At most 6	0.278979	12.62564	18.39771	0.2651
At most 7	0.033086	1.177587	3.841466	0.2778

From Table 3, Johansen co-integration test is used to identify the co-integrating connection between the variables. The null hypothesis of no co-integration is rejected at 0.05 level for three co-integrating equation. The Trace statistic indicate that there is three co-integrating equation among the variables at 0.05 per cent level of significance. Hence, a long run equilibrium relationship is established between these variables and the hypothesized fundamentals for the period under consideration, 1980 – 2019.

Table 4: Johansen Co-integration test (Max-Eigen Statistic)

Hypothesized	Eigenvalue	Max-Eigen	0.05	Prob.**
No. of CE(s)		Statistic	Critical Value	
None *	0.822800	60.56658	55.72819	0.0152
At most 1 *	0.758537	49.73643	49.58633	0.0482
At most 2	0.709288	43.23972	43.41977	0.0523
At most 3	0.575553	29.99387	37.16359	0.2636
At most 4	0.373367	16.35879	30.81507	0.8260
At most 5	0.320720	13.53526	24.25202	0.6297
At most 6	0.278979	11.44805	17.14769	0.2779
At most 7	0.033086	1.177587	3.841466	0.2778

From Table 4, Johansen co-integration test is used to identify the co-integrating connection between the variables. The null hypothesis of no co-integration is rejected at 0.05 level for two co-integrating equation. The Max-Eigen statistic indicate that there is two co-integrating equation among the variables at 0.05 per cent level of significance. Hence, a long run equilibrium relationship is established between these variables and the hypothesized fundamentals for the period under consideration, 1980 – 2019.

Table 5: ECM Parsimonious Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	231.9615	194.7657	1.190977	0.2483
D(CRR(-1))	-149.3697	197.5125	-0.756254	0.4588
D(CRR(-2))	-407.3847	192.5119	-2.116153	0.0478
D(ITR(-1))	-60.82161	88.26994	-0.689041	0.4991
D(LQR(-1))	42.30089	24.47093	1.728618	0.1001
D(MPR)	-54.57473	126.1928	-0.432471	0.6703
D(MPR(-1))	109.8775	101.7190	1.080206	0.2936
D(MRR)	-37.61821	146.7775	-0.256294	0.8005
D(MSS(-1))	-15.80664	18.54812	-0.852197	0.4047
D(MSS(-2))	-10.79761	20.38401	-0.529710	0.6024
D(OMO)	29.01110	32.15710	0.902168	0.3783
D(OMO(-1))	-5.236013	29.63717	-0.176670	0.8616
D(OMO(-2))	47.03121	36.60560	1.284809	0.2143
D(ECM-1)	-0.404.928	378.2891	-3.713900	0.0015
Adj. R^2 = 0.100577 ; DW = 2.343945; F* = 2.253466				

Arising from Table 5, the ECM(-1) is negatively signed and shows that the speed of adjustment from the short run dynamics to its long run equilibrium is -0.404.928 or 40 per cent and is internally consistent at 5 per cent given the t* value of -3.713900. The adjusted R^2 is 10 per cent. The F* value of 2.253466 indicates the whole model is stable over time whereas the Durbin-Watson test statistic value of 2.343945 and disclose absence of positive first order serial correction in the model.

Table 6: The Ols Log-Linear Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.273857	2.927801	-2.142856	0.0404
LOG(CRR)	1.879701	0.437800	4.293518	0.0002
ITR	-0.006051	0.045579	-0.132767	0.8953
LOG(LQR)	-0.660723	0.579378	-1.140400	0.2631
MPR	-0.102732	0.058344	-1.760807	0.0885
(MRR)	-0.305309	0.926719	-0.329451	0.7441
LOG(BM_2)	2.276812	0.521559	4.365400	0.0001
LOG(OMO)	0.521883	0.507767	1.027800	0.3123
R^2 = 0.915223 ; DW = 2.102860; F* = 40.48383;				
AIC = 2.413475; SIC = 2.797374; Prob(F-statistic) = 0.000000				

Parameter Stability Test

The stability of the parameters in the short-run model is examined using the plots of the cumulative sum of squares (CUSUMSQ) and the cumulative sum (CUSUM). Variability of the parameters arises owing to structural variations and the institution of different policy regimes over the sample period. Whereas the CUSUM test is particularly useful for identifying systematic changes in the regression coefficients, the CUSUMSQ test is significant in situations where the departure from the constancy of the regression coefficients is haphazard and unexpected. If any of the straight lines in the graph is crossed, the null hypothesis that the regression equation is properly specified is rejected at the 5% level of significance. Arising from the figure 1 and 2, both was found to falling within 5% critical line, signifying parameter constancy over the sample period in the study.

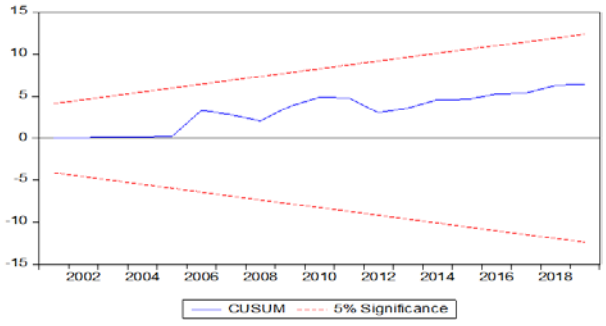

Fig 1

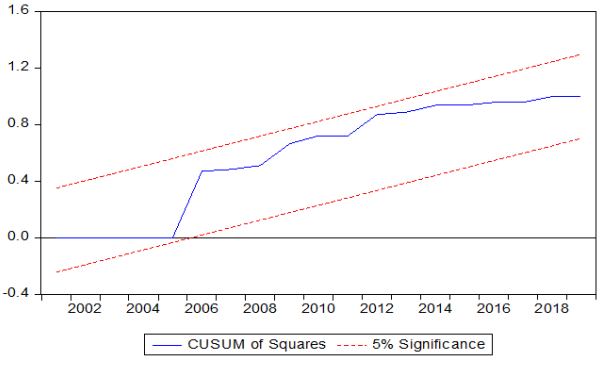

Fig 2

Table 7: Summary of Post Diagnostic Tests for the ECM Model

Test	F*	Prob
Jarque bera normality		**0.359263**
Breusch-Godfrey (BG)	3.755517	0.0849
Heteroskedasticity (ARCH)	0.581671	0.8546

Sources: Authors Computation (E- View 9.0)

Arising from Table 7, this Breusch-Godfrey Serial Correlation LM test is used as higher order test for null hypothesis of no Serial Correlation against the conditional alternative hypothesis of serial correlation in the presence of parsimonious ECM at 5 per cent level. The Breusch-Godfrey Serial Correlation LM test shows that serial correlation is not a problem in the model because the ensuing probability value (3.755517) of the Chi-Square statistic exceeds 0.05. The B-G tests have stronger statistical power and revealed the non-appearance of serial correlation. The Autoregressive conditional Heteroskedasticity Test **(**Breusch-Pagan-Godfrey) is accepted to consider whether or not the variance of the residuals parsimonious ECM is homoscedastic. The probability value (0.581671) in the Autoregressive conditional Heteroskedasticity **(**Breusch-Pagan-Godfrey) test result specifies that Heteroskedasticity is not a problem in the parsimonious ECM suggesting that the results of the variance of the residual is not homoscedastic over the sampled period. The outcome of the diagnostic tests as discovered above is acceptable. Under the null hypothesis that the residuals are normally distributed, the JB test for residual normality assumption is not disrupted.

Conclusion

The study on monetary policy and Private sector investment in Nigeria from 1980 to 2019 is very imperative because in any economy, the principal role of monetary policy is to ensure that monetary policy aggregate stability exists within the financial environment. The study established he presence a long and short run link in the study. Monetary policy tools were seen to be very efficacious in boosting investment in Nigeria within the reviewed period.

Recommendations

1. Expansionary monetary policy should be formulated that will reduce interest rate, encourage borrowings and savings hence private investment.
2. One common method of the regulatory authorities to encourage investment by borrowing from the financial system in the country.
3. Government must show an active role to ensure peace and stability in Nigeria. This is because instability in the country makes it hard to attract investors. Peace and stability must be a sine qua non to attract private sector investment.
4. Government should invest in durable infrastructure, principally on power, roads, railways and housing to help the countless sectors of the economy to function thereby making the investment climate a friendly and in turn improve the growth and development of the country.

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