



Monetary Policy Impulse on Domestic Private Investment in Nigeria: An ARDL Bound Cointegrating Analysis

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Abstract

The study analyzed monetary policy impulse on domestic private investment in Nigeria for the period of 1981 to 2018. The Augmented Dickey-Fuller test and Autoregressive Distributed Lag model were employed in the analysis of the model. The ADF unit test result reported stationarity of the variables at order 1(1), which satisfied the conditions to adopt the ARDL Bounds testing approach. The ARDL Bounds test revealed cointegration of variables; that is, the presence of a long run relationship between the variables. Consequently, the result showed that monetary policy rate exhibits a negative and significant impulse on domestic private investment in both short and long run dynamic. However, Prime lending rate exhibit a positive and significant impulse on domestic private investment in both periods. More so, minimum reserve ratio and money supply jointly exhibits negative and insignificant impulse on domestic private investment in both short run and long run. The growth of national income (GDP) exhibits a negative and insignificant impulse on domestic private investment in the short run, but in the long run the impulse dynamics was positive and significant which conforms with the a priori expectations. Ramsey reset test revealed that the model was correctly specified since the p-value of f-statistic is more than 0.1. while the normality test revealed that, regression residual was normally distributed at 5% level of significance. The study recommends that a policy that can maintain monetary policy rate at a minimal level that's capable of inducing private investment should be vigorously pursued. This policy can be transmitted through engaging selected micro-financed banks by the central bank of Nigeria for grass root penetration. While on the other hand, minimum rediscount ratio should be downsized to boost the volume of liquidity with the commercial banks, to service the medium and large-scale enterprise.

Key Words: Domestic Private Investment, Monetary Policy Rate, Growth Rate of National Income, minimum Reserve Ratio, Money Supply and Auto-Regressive distributed lag (ARDL)

I. Introduction

Monetary policy is a strategy used by the central bank of Nigeria to regulate the inflation volatility. As the apex bank in Nigeria, saddled with the objectives of ensuring monetary and price stability amongst others. It is founded on the understanding that stable and low inflation will form a monetary policy contribution to ensuring productivity and thriving economy. Moreover, monetary policy can be contractionary or expansionary. Traditionally, when the economy is thriving at a very speed rate with inflation moving higher proportionally, the central bank may take action by raise short term interest rates to stabilize the economy which imply tight monetary policy. Equally, the central bank adopts expansionary monetary measure by cutting interim interest rates to stimulate capital formation and rejuvenate the economy anytime the economy is slow-moving (ML Jhingan, 2005)

Consequently, growth of domestic private investment is a critical stimulus to achieve sustainable economic growth. An economy that must grow sustainably and thrive economically must be able to stimulate its domestic private investment. Essentially, domestic private investment represents the amount of real investment employed in evaluating gross domestic product (GDP) in order to ascertain the economic capacity of a nation. Hence, it provides a pointer for the future productive aptitude of a nation. In a third world economy like Nigeria, domestic private

investment can be regarded as the chief lubricant that enhances economic activities. Nevertheless, domestic investment through capital formation is utmost and prerequisite to ensure a symmetrical speed in economic growth and development of any economy as it offers domestic capital that can be utilized to finance the investment endeavor of the economy.

Incidentally, domestic investment and capital formation in Nigeria has been abysmally low. since 1981 till date, gross capital formation has been dwindling alongside domestic investment. Gross capital formation in 1981 as a percentage of GDP reached its peak of 89.38%, by 1991, it stood at 48.41%, it further declined to 36.63% by 1996, it fell continuously to 34.11% ,17.56% and 19.81% in 2000,2010 and 2018 respectively. More so, domestic investment as a percentage of GDP declined from 12.3% in 1991 to 8.3% in 1992, reduced public investment may have accounted for that, which collapsed during the same period. Hence, domestic investment rose to 12.5% in 1993 and to 16% in 1994. It further declined progressively to 8.9% in 1996. Nevertheless, it stood at a proportional mean of 13% between 2001 and 2010; thus, reaching its peak of 16.2% in 2002 and fell again to 15.2% in 2010 (CBN, 2015). Hence, the monetary policy exhibits a duality impact on domestic private investment; direct and indirect impact. The direct impact is via interest rates, which contracts capital formation. The indirect effect is via expectations based on the direction of the inflation.

Based on the foregoing, amidst the devastating economic consequences occasioned by the outbreak of the global corona virus pandemic (COVID-19) on investment position of nations around the world. It leaves nothing to imagine about how the economy of a third world country like Nigeria would thrive without aggressive stimulation of domestic private investment. Most developed economies of the world, like the united states of America (USA) and China depends on stimulating domestic private investments to arrest varied economic uncertainties like is been witnessed at the moment. Paradoxically, the declined crude oil price and the unimaginable economic effects of the corona virus pandemic, the question that boggles the mind is, what should a third world economy like Nigeria do to subvert and sustain economic growth and development. Consequently, in the Keynesian economics palace, aggregate investment stimulates aggregate demand, and as aggregate demand increases, capital formation rises through household savings. Keynes denoted this investment as real investment. Therefore, real investment leads to increase in the level of income and production by increasing the production and purchase of capital goods. Though, capital formation and investment are linked to one another via net investment. Incidentally, monetary policy is considered a lubricant that stimulates capital formation for investment. Paradoxically, the question that draws attention is, what is the impulse response of monetary policy on domestic private investment that can guaranteed sustainable economic growth of a third world country like Nigeria. Thus, the broad aim of this study is to analyze the extent to which monetary policy can stimulate domestic private investment in Nigeria. The research hypothesis is stated as **H₀**: There is no significant relationship between monetary policy and domestic private investment.

II. Literature Review

Conceptual Clarifications

Domestic Private Investment

Gross domestic private investment represents the expenditures on capital goods that is required in the production sector for productivity activities in the domestic economy. This investment is embarked upon by the private enterprise that represent the business sector in an economy during a giving period of time. These expenditures are prone to shocks which makes it tend to be the least stable. In the palace of economics theory, investment simply mean shares, stocks, bonds and securities acquisition from the stock market. This in effect, is not a real investment because it is simply a transfer of ownership of existing assets. The implication of this class of assets is that it does not affect aggregate demand. But in the Keynesian theory, investment refers to real investment which add to capital equipment. Thus, real investment leads to increase in the level of income and production by increasing the production and purchase of capital goods. Monetary policy will help in the promoting capital formation for the acquisition of capital goods like plants, equipment's and semi-finished goods that can be employed in the production process to produce other goods in the domestic economy. The volume of capital formation in an economy is the stock of capital. Thus, capital formation and investment are linked to one another via net investment. While gross investment connotes the total amount expended on the acquisition of new capital assets in a given period, net investment on the other hand, is gross investment less depreciation and replacement

investment, because capital stocks wears out yearly. Hence, if the gross investment becomes parallel to depreciation, net investment becomes zero and capital stock of the economy will witness no accumulation. If the gross investment is lower than depreciation, disinvestment results in the economy and capital formation decreases. Thus, gross investment must surpass depreciation for real capital stock of the economy to increase.

Monetary Policy

Monetary policy attempts to stimulate the rate of aggregate expenditure by fluctuating the level of cash flow or liquid assets at various strata of the economy. In a time of recession, the level of government expenditure is raised by monetary policy through the purchase of short- and long-term securities as well as lowering interest rate to stimulate borrowing. This action by the central bank will raise the amount of liquid assets which causes aggregate demand to rise, investment will increase as well as capital stock or capital formation. Similarly, in a period of high inflation (inflationary pressure) monetary policy would strive to limit aggregate expenditure in order to diminish the amount of liquid assets as well as making borrowing costly by raising rate of interest. The implication of this is less capital formation, as aggregate demand will be affected, thus investment will drop.

Empirical Literature Review

George-Anokwuru (2017) examined the nexus between interest rate and domestic private investment in Nigeria over a period of 1980 to 2015. The study employed ordinary least square regression analysis (OLS). The study outcome disclosed that prime lending rate has a negative and significant association with private domestic investment in Nigeria. This suggesting that if prime lending increased by 1 domestic investment would decrease proportionally by 1. More so, real interest rate has a negative but insignificant association with private domestic investment in Nigeria for the period under study. The study thus recommended that monetary authorities should stimulate policies that are capable of advancing deposits and also make loanable funds available in order to stimulate domestic private investment.

Hitlar (2015) analyzed the impact of interest rate liberalization on investment in Nigeria over a period of 1970 to 2012. He employed the correction model (ECM) in the study. The result confirmed that a long run association exists among the variables. It further revealed that all the variables (interest rate, market capitalization rate, public expenditure and trade openness) have significant influence on investment. More so, the impulse reaction of these variables to shocks in the unrelated variables were verified; by means of Multiple Equation VAR models. In addition, the variance decomposition result showed that Period 2 revealed a standard deviation value of 97.23 in investment resulting from own shock, 2.44 to a reaction from a shock from interest rate, 0.0186 to a reaction from market capitalization rate, 0.205900 to a reaction from public expenditure and 0.101933 to a reaction from trade openness. Also, in period 10, investment reacts positively with a standard deviation of 18.77 arising from own shock and standard deviation values of 8.05, 7.94, 12.43 and 15.59 emanating from a shock from interest rate, market capitalization rate, public expenditure and trade openness respectively. The study recommended that policies to make interest rate attractive to investors as well as improve trade should be encouraged.

Osundina and Osundina (2014) investigated the connection between interest rate and investment decision in Nigeria. The study adopted Multiple Linear Regression model. A modified Mundel – Fleming model was considered and used in the study. Thus, interest rate was the dependent variable and other variables such as; Gross domestic product, investment level, Government spending, debt and exchange rate were independent variables. The result showed that there is no robust empirical evidence that there is a connection between interest rate and investment decision in Nigeria. They recommended that efficient infrastructure and call for Islamic banking, which is interest free should be widely embraced in order to stimulate investment decision.

Ogede (2013) examined interest rates sensitivity and banks investment in Nigeria over a period of 1980 to 2011. The study employed Ordinary least square model (OLS). The empirical results established real lending rates to be significant and negatively sensitive to all the incorporated financial indicators in Nigeria during the period under study. This shows that overall financial policy instituted and regulations have been helpful in stabilizing the sensitivity of interest rate to changes in banks' investment in Nigeria. There also exists presence of negative serial

correlation among the residuals. The results revealed that the behaviour of interest rate is important for banking sector to growth in view of the relationships between interest rates and investment and growth. Thus, the formulation and implementation of financial policies that enhance investment-friendly rate of interest is vital for promoting economic growth in Nigeria.

Inimino EE, Abuo MA & Bosco IE, (2018) examined interest rate and domestic private investment in Nigeria for a period of 1980 to 2015. They employed Augmented Dickey-Fuller test and Autoregressive Distributed lag model in the study. The study outcome revealed that monetary policy rate (i.e interest rate) has negative and significant effect on domestic private investment. Maximum lending rate showed a positive impact on domestic private investment in both short and long run and was only significant in the short run. Prime lending rate on the other hand, revealed negative and insignificant impact on domestic private investment in both short and long run. More so, the gross domestic product indicated negative and insignificant relationship with domestic private investment both in the long run and the short run. They concluded that Government should intervene by investing in infrastructural development such as power, roads, railways and housing to stimulate various sectors of the economy to perform efficiently thereby creating a friendly business environment will stimulate economic growth and development.

Theoretical Literature Review

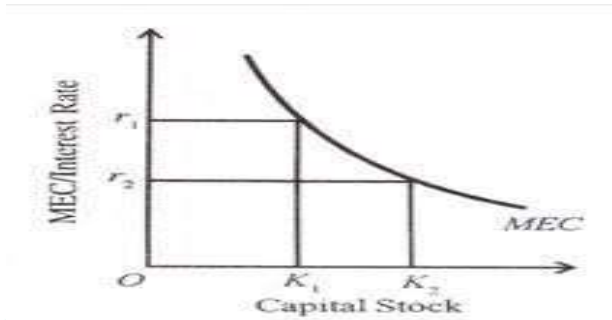
Monetary Policy and Investment Theories

The classical school of thoughts opined that interest rate are determined by the supply and demand for money (capital). They assumed an inverse relationship between supply of capital and the rate of interest. This they called real theory of interest, because the rate of interest does not vary in any way with monetary situations. They also postulated that savings (capital formation) and investment are dependent on the interest rate which represent the price of capital and thus, regarded as the reason that equates savings and investment. Though the classical eventually submitted that investment schedule inclines downward, implying that investment is an increasing or decreasing function of rate of interest. They however believed that an increase in the rate of interest will drive up savings and decreases investment and vice versa. In other words, the real phenomenon according to this theory is rate of interest which determine the supply and demand for capital. Algebraically, $S=f(r)$ while $I=f(r)$ and therefore $S=I$. however, this theory has been criticized due to some short comings identified in the theory. For instance, Gbosi AN (2005) disparaged the classical theory of rate of interest on the ground that the rate of interest is not a determining factor for savings. He asserts that loanable fund theory is an improvement for the classical theory of interest. Hence, the loanable theory demonstrates that the demand and supply of loanable funds is the rate of interest which is the price of credit. That is, demand and supply of credit are principally determined the rate of interest. While the loanable funds represent the total available money by the surplus economic components. Thus, relative to supply of loanable funds, the higher the demand for loanable funds the higher the rate of interest and vice versa (Inimino EE, Abuo MA & Bosco IE, 2018).

Eziri CB (2005) opined that the point where the demand and supply of loanable fund are at parity constitute the equilibrium of interest rate. Additionally, the supply and demand of loanable funds are made up of numerous cradles. While household's savings, business, as well as government savings constitute the supply side for loanable fund. The demand side is denoted by investment in business. This theory is often regarded as the real theory of the rate of interest because it assumes that rate of interest is determined by demand and supply of capital (loanable fund).

Consequently, Keynes approach was completely different from the foregoing. Keynes argued in his theory that the mechanism through which savings and investment are reconciled into equilibrium is income level and not rate of interest income as opined by the classical economists. Precisely, in Keynes postulation, he did not regard interest rate either as price of savings nor for loanable funds, rather Keynes regarded rate of interest as price for the use of money (Inimino EE, Abuo MA & Bosco IE, 2018). Keynes argued that it is a logical error by some economists to regard interest rate determination based on savings and investment. He opined in that interest rate is determined by two dynamics: supply and demand of money. The supply side of Keynesian liquidity preference theory is related to the stock of money been determined by the central bank. While on the other hand, the motive to hold money, perhaps for transaction purpose constitute the demand side. Such that, if a person

desire to hold government securities rather than money, he would earn interest but money holding attracts no interest (Gbosi AN, 2005). In the Keynesian theory of investment, Keynes opined that the decision to invest or not in new stock of capital is a function of perceived rate of return on the new investment. Based on this, if the rate of return on new investment is perceived to be higher than the interest rate that investment of acquiring new capital assets will be decided. Nonetheless, cost of the capital asset, the expected rate of return from it during its lifetime and the market rate of interest forms the deciding factors often taken into account while making any investment decision (Jhingan, 2007). These factors were summarized by Keynes in his concept of the marginal efficiency of capital (MEC). MEC denotes the optimal rate of return anticipated from an extra unit of a capital stock over its cost. Hence, MEC can be defined as the discount rate that links the present cash expenditure with the current value of future cash returns (Gbanador C, 2007).



MEC comprises linking the returns on an investment with the present rate of interest, considered as the alternative forgone of capital. The figure above depicts the MEC of an economy. It slopes from the left to the right, which shows that if the marginal efficiency of capital is higher than or equal to the rate of interest, the firm concerned will profit. Conversely, in this approach, the choice to invest in a given asset is contingent on the domestic Rate of Return resulting from investing in the capital stock and the current rate of interest (Inimino EE, Abuo MA & Bosco IE, 2018). This implies that capital investment is measured by return on investment which is known as Marginal Efficiency of Investment (MEI) which depends on market rate of interest. MEI links the amount invested to variations in the rate of interest, all things been equal. MEI show the nexus between investment and rate of interest. That is, it reveals the volume of investment demanded at diverse rates of interest. Giving this analogy, $I=I_0 + r(i)$ represents the investment function. furthermore, another factor that influences investment is income. Hence, acceleration theory of investment holds that investment in the present production is a function of income and or output. The theory significantly states a direct relationship between investment and income or output which constitute the rate of growth of aggregate demand interest (Inimino EE, Abuo MA & Bosco IE, 2018). Concurring to Ekine NT (2011), the theory simulates that a rise in capital stock may stimulate investment as firms adjusts to arrive at the new optimal stock of capital. The acceleration facilitates on the foundation of fixed capital to output ratio which infer that firms need to alter its investments to produce additional unit of commodities and meet changes in demand. The acceleration equation as adopted from interest (Inimino EE, Abuo MA & Bosco IE, 2018) can be denoted as:

$$I = \alpha(\Delta Y) \dots\dots\dots (1)$$

Based on the supposition of autonomous investment, equ (1) become re-specified as;

$$I = I_0 + \alpha(\Delta Y) \dots\dots\dots (2)$$

Where (I) represent investment, (I₀) denotes autonomous investment, (α) is acceleration coefficient and (ΔY) represent change in income. By evaluating variations in income between period t and t-1, we have

$$\Delta Y = Y_t - Y_{t-1} \dots\dots\dots (3)$$

Substituting equation (3) into (2) we have

$$I_t = I_0 + \alpha (Y_t - Y_{t-1}) \dots\dots\dots (4)$$

Where Y_t represent the current national income and Y_{t-1} connote the past year national income. Based on macroeconomics, investment performs a crucial task in business cycle. More so, Keynesian investment function can be denoted as;

$$I_t = a_0 + a_1 Y_t - a_2 R_t$$

Where I_t denotes investment, Y_t represent the gross domestic product (GDP) and R_t stands for the real interest rate. Accordingly, when the rate of interest is low, investment rises and vice versa. Similarly, an economy (GDP) that is growing very rapidly will exert stress on aggregate demand, and this will in turn stimulate investment in the economy.

Additionally, James Tobin (1969) propounded theory of investment model, typically denoted as Tobin's q ratio. According to him, according to him investment choice is a function of the market value ratio of financial assets of firm with respect to their auxiliary cost. Thus, $q = \text{market value of capital assets} / \text{auxiliary cost capital assets}$. Hence, the share of the market value with respect to auxiliary cost of capital stock is identified as Tobin's q . the theory holds that the market value with respect to auxiliary cost of capital assets will tends towards one in the long-run. However, the ratio of the market price with respect to auxiliary cost of capital is regarded as the q -ration. Such that, q denotes the ratio of the market value of a firm present capital stock with respect to their auxiliary cost of physical assets. Consequently, Tobin q offers the connection between how economic surge and depression could affect investment and economic output. Thus, denoting the stance of investment on q , the ratio of market value to auxiliary cost of the capital., with the central bank policy influencing investment by acting on the vector of asset prices that clears the whole range of interrelated asset market (Robert WD, 2014). If we therefore designate the market value of existing assets as MVEA and represent the auxiliary cost as AC, then, articulating this with respect to Tobin- q , we have; $q = \text{MVEA}/\text{AC}$. When the value of Tobin- q is greater than one (i.e $q > 1$), the choice to invest becomes cogent. This implies that when $q > 1$ firm will naturally increase their capital stock because increased production of goods and services yields more return and thus, out weight its cost. On the contrary when q value is lower than one (i.e $q < 1$) it becomes illogical to invest. Thus, in a capitalist economy, stock when q is high a firm would prefer to increase its capital investment and cut it down when q is sliding low. Consequently, the firm gets reconciled to equilibrium when q equals one. Furthermore, because producers require investment capita for production, they would endeavor to raise capital via numerous ways, such as shares and equity trading. Thus, the advantage of Tobins- q function as a measure of returns on investment is that it mirrors both current and expected future return on investment (Inimino EE, Abuo MA & Bosco IE, 2018).

III. Methodology

This study adopted descriptive research method, along with Ex Post Facto Research Design. The study utilized annual time series data. The data were sourced from; Central Bank of Nigeria (CBN) statistical Bulletins, and World Bank Data Base. The variables used for the analysis include domestic private investment, monetary policy rate, prime lending rate minimum rediscount rate, money supply and real gross domestic product (RGDP) classified as the regressand in the model and the explanatory variables: However, the variables were subjected to unit root test using Augmented Dickey-Fuller Test (ADF) to determine whether the variables are stationary or not. More so, the model was subjected to bound test for co-integration to determine the long run relationship between Domestic private investment and monetary policy (monetary policy rate, prime lending, minimum rediscount rate, money supply) in Nigeria, for the period of 1981-2018. Real gross domestic product was added as a control variable. The reason is that valuations provided by ARDL method circumvent autocorrelation and endogeneity hitches, they are unbiased and efficient.

Model Specification

A single equation model was established between the variables in accordance with the Keynesian investment function. This model however, was adopted from Inimino, Abuo & Bosco, (2018) with a slight modification. Hence, its stated below as:

$$I = f(Y, R) \dots\dots\dots (1)$$

which gives:

$$I_t = a_0 + a_1 Y_t - a_2 R_t \dots\dots\dots (2)$$

Where; I represent investment, R represent interest rate and Y represent national income (GDP). Consequently, a slight modification was made on the model to effectively address the broad aim of the study which is to examine the effect of monetary policy on domestic private investment. Therefore, the model for this study can be specified in an implicit or functional form below:

$$DPI = f(MPR, PLR, MRR, MSS, GDP) \dots\dots\dots (3)$$

Where; DPI_t = Growth Rate of Domestic Private Investment,

MPR_t = Monetary Policy Rate (i.e real rate of interest),

PLR_t = Prime Lending Rate,

MRR_t = Minimum Rediscount Rate,

MSS_t = Money supply (% of GDP)

GDP_t = Real Gross Domestic Product,

To achieved the classical assumption of linearity of the variables, the Log of both sides were taken. Meanwhile, in the palace of econometrics analysis, time series data are known to exhibits compelling trend and thus, logarithmic conversion of series effectively linearizes the exponential trend.

$$\ln DPI_t = \beta_0 + \beta_1 \ln MPR_t + \beta_2 \ln PLR_t + \beta_3 \ln MRR_t + \beta_4 \ln MSS_t + \beta_5 \ln GDP_t + \varepsilon_t \dots\dots\dots (4)$$

β_0 is equal to constant term, $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are regression coefficients of independent variables, while on the apriori, we expected $\beta_1, \beta_2, \beta_3$ and $\beta_4 < 0$, while $\beta_5 > 0$.

To evaluate the Autoregressive Distributed Lag Techniques for long run co-integration causality of the variables, we employed Bound test technique of the ARDL outline. Hence, the ARDL representation of the trade openness and economic growth relationship can be constructed as:

$$\Delta \ln(DPI_{t-1}) = \alpha_0 + \gamma_1 \ln(DPI_{t-1}) + \gamma_2 \ln(MPR_{t-1}) + \gamma_3 \ln(PLR_{t-1}) + \gamma_4 \ln(MRR_{t-1}) + \gamma_5 \ln(MSS_{t-1}) + \gamma_6 \ln(GDP_{t-1}) + \sum \gamma_i \Delta \ln(DPI_{t-i}) + \sum \gamma_j \Delta \ln(MPR_{t-j}) + \sum \gamma_k \Delta \ln(PLR_{t-k}) + \sum \gamma_m \Delta \ln(MRR_{t-m}) + \sum \gamma_n \Delta \ln(MSS_{t-n}) + \sum \gamma_u \Delta \ln(GDP_{t-u}) + \gamma ECM_{t-1} + \varepsilon_t \dots\dots\dots (5)$$

The above procedure was employed because it is relevant irrespective of whether the regressors in the model are of different order of integration or jointly cointegrated. Hence, Δ represents the difference notation, while $\gamma - 6$ are the long run multipliers, α_0 is the intercept and ε_t is the stochastic error term. More so, the following hypothesis were tested in the study $H_0: \alpha_0 = \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$ against the alternative $H_1: \alpha_0 \neq \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 \neq 0$

VI. Presentation and Interpretation of Regression Result

Table no1 unit root test, shows both the ADF unit root tests summary. The result showed that all the variables at levels are non-stationary at 5 percent level of significance. However, the null hypothesis of non-stationary time series i.e. there is a unit root cannot be rejected. Hence, with their first difference $I(1)$, all the variables become stationary at 5% critical value. Given the variables are integrated of order $I(1)$, the condition to employ ARDL model to test for long run relationship is satisfied. Consequently, the stationarity results paved way for cointegration test, which measures the long run relationship among the variables.

Table 1: Unit root test (Augmented Dickey-Fuller Test)

Variables	Level	1 st Difference	P-value	Order of Integration
DPI	-3.420682	-4.659881	0.0006	1(1)
MPR	-2.492018	-6.794034	0.0000	1(1)
PLR	-3.522847	-9.558895	0.0000	1(1)
MRR	-3.301047	-8.678924	0.0000	1(1)
MSS	-1.072075	-5.643062	0.0000	1(1)
GDP	1.098093	-5.249585	0.0001	1(1)

Source: Authors commutated Result, *Eviews 9.0, 2020*

Model Estimation Results

Table no 2 ARDL bound co-integration. Given that the variables were integrated of order $I(1)$, the ARDL bounds test result revealed the existence of long run relationship amongst the variables (DPI, MPR, PLR, MRR, MSS and GDP). The F-statistic of about 27.74 from the result is higher than the upper critical bounds at 10%, 5%, 2.5% and 1% critical values. This provided credence to reject the null hypothesis of no cointegration for the domestic private investment (DPI) model. It can be inferred from the ARDL bounds test result that a long-run relationship exists among the variables in the model. Consequently, this study demonstrates that monetary policy variables have a long run relationship with domestic private investment in Nigeria for the period under review. Owing to the establishment of long-run co-integration association between the variables, the short-run and Long-run dynamic limits for the variables were acquired.

Table 2: ARDL Bounds Test for Co-integration

MODEL		F-statistics = 27.74862
DPI% MPR% PLR% MRR% MSS% GDP%		K = 5
Critical Value	Lower Bound 1(0)	Upper Bound 1(1)
10%	2.75	3.79
5%	3.12	4.25
2.5%	3.49	4.67
1%	3.93	5.23

Source: Authors commutated Result, *Eviews 9.0, 2020*

Result of the Short Run Error Correction Model Using the ARDL Approach

Table 3 illustrates the short-run dynamic error correction model using ARDL approach as related with the long-run association attained from the ECM equation. The result revealed that ECM is negative and statistically significant. This implied the speed of adjustment from short-run equilibrium to long-term equilibrium in the dynamic model. Thus, denoting that any deviation from monetary policy in stimulating domestic private investment in the short-run would adjust quickly back to equilibrium in the long-run. The R^2 value of 0.996130 indicates that 99.6 percent of the variation in domestic private investment growth is explained by monetary policy, while the remaining unaccounted variation of 0.4 percent is captured by the error term. More so, the Durbin Watson (DW) value of 2.353462 which is approximately 2.4, connotes that the model is free from autocorrelation. As envisaged, monetary policy rate (MPR) exhibits a negative and significant impulse on domestic private

investment (DPI) in the short run. This signifies that, a 1 percent increase in monetary policy rate will decrease domestic private investment by 0.631441%. Furthermore, this finding corresponds to the results outcome of Ogede (2013) and George-Anokwuru (2017) that real interest rate (i.e., monetary policy rate) is negatively sensitive and statistically significant to private domestic investment. The result outcome of prime lending rate (PLR) did not conform with the apriori expectations. Thus, the result showed a positive and statistically significant impulse association. Implying that a 1 percent increase in prime lending rate will increase domestic private investment. Also, this outcome conforms with the finding of Inimino, Abuo & Bosco, (2018) that prime lending rate is positively related to private domestic investment in the short run. This results further indicates that interest rate and prime lending rate jointly have the capacity to quickly return to equilibrium with domestic private investment in the long run. Incidentally, minimum rediscount ratio (MRR), money supply (MSS) and gross domestic product (GDP) jointly have negative impulse on domestic private investment. Additionally, they are not statistically significant. Consequently, with regard to gross domestic product, the observed negative and insignificant impulse association during the period under review apparently, was not momentary enough to wield concerted pressure on aggregate demand, which through multiplier effect would stimulate domestic private investment. Thus, economics theories opined that investment is a function of national income growth and since it is premised on aggregate demand, a low growth rate will essentially cause investment demand to diminish. Additionally, a percentage increase in minimum reserve ratio and money supply will decrease domestic private investment.

Table 3: ARDL Short-Run Analysis (3,4,4,0,0,3)

Regressors	Coefficient	t-statistic	P-value
MPR	-0.631441	-2846704	0.0137
PLR	0.276924	2.064742	0.0595
MRR	-0.000594	-0.004324	0.9966
MSS	-0.362785	-1.602580	0.1330
GDP	-0.002217	-0.202568	0.8426
ECM(-1)	-1.649211	-12.280553	0.0000
R-squared= 0.996130	F-statistic =167.3200 Pro F-statistic= 0.000000	Akaike info criterion= 3.690552 Schwars Creterion= 4.633304	Durbin Watson= 2.353462

Source: Authors commutated Result, Eviews 9.0, 2020

Estimated ARDL Long Run Analysis

The results in table 4 above shows that the impulse response between monetary policy rate and domestic private investment in the long run is negative and significant. Prime lending rate also exhibit a positive and significant impulse with domestic private investment in the long run, this however, does not conform with the apriori expectations. While minimum reserve ratio and money supply jointly denoted a negative and insignificant impulse with domestic private investment, this however conform to the apriori expectations. Furthermore, growth of national income exhibits significant and positive impulse with domestic investment. This implies that in the long run, growth of national income (GDP) will exert concerted pressure on aggregate demand as this would through multiplier effect stimulate domestic private investment.

Table 4: ARDL Long Run Coefficients. Dependent Variable: DPI ARDL (3,4,4,0,0,3)

Regressor	Coefficient	t-statistic	P-value
MPR	-1.477532	-6.590318	0.0000
PLR	1.752779	6.606703	0.0000
MRR	-0.000360	-0.004324	0.9966
MSS	-0.219975	-1.603397	0.1329
GDP	0.320550	10.371317	0.0000

Source: Authors commutated Result, Eviews 9.0, 2020

Diagnostic Test

In table 5, Ramsey reset test outcome revealed the test regression. The t-statistic and f-statistic for testing the hypothesis that the coefficients on the powers of fitted values from the regression are jointly zero, conversely, that is the model was correctly specified. Hence, the null hypothesis cannot be rejected since the p-value is more than 0.1.

Table 5: Ramsey Reset test

	Value	Df	Probability
t-statistic	0.069496	12	0.9457
f-statistic		(1, 12)	0.9457

Source: Authors commutated Result, Eviews 9.0, 2020

SERIAL CORRELATION

In table 6, Breusch-Godfrey LM test was carried out in this study to check the presence of serial correlation in the estimated model. The null hypothesis is states: "No Serial Correlation at Lag Order h." Consequently, the null hypothesis will be assented to if the p-value is more than 10 percent and rejected if the p-value is less than 10 percent. Accordingly, from the result presented above, the p-values of the f-statistic and chi-square is greater than 10 percent, hence, the null hypothesis of no serial correlation is accepted, which lends credence to the estimates of the model and thus, study outcome can be relied upon for policy recommendation.

Table6:Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.646489	Prob. F(2,11)	0.5427
Obs*R-squared	3.576129	Prob. Chi-Square(2)	0.1673

Source: Authors commutated Result, Eviews 9.0, 2020

HETEROSKEDASTICITY

To satisfy regression assumptions and the credibility of the results, the residuals should exhibit a constant variance. The null hypothesis is that the error variances are equal, while the alternative hypothesis is that the error variances are not equal. Thus, since the p value of the chi square is more than 0.1, the null hypothesis is accepted.

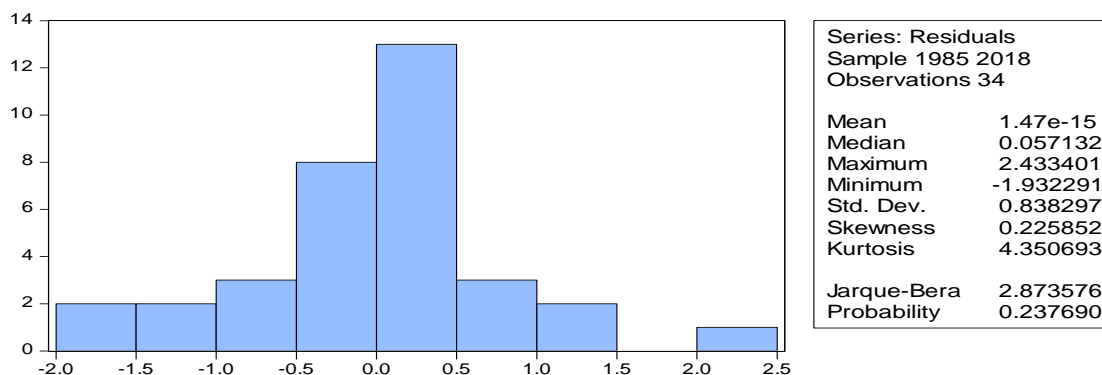
Table 7: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.674002	Prob. F(20,13)	0.7926
Obs*R-squared	17.30818	Prob. Chi-Square(20)	0.6329
Scaled explained SS	4.239209	Prob. Chi-Square(20)	0.9999

Source: Authors commutated Result, Eviews 9.0, 2020

NORMALITY TEST

Normality test revealed that, regression residual was normally distributed since JB –statistics of 2.87 and the corresponding P-value of 0.23 is greater than the 5% (0.05) level of significance.



Source: Authors commutated Result, Eviews 9.0, 2020

V. Conclusion and Recommendation

This study analyzed monetary policy impulse on domestic private investment stimulation in Nigeria between 1981 to 2018. This study is very critical at this time because monetary policy plays a significant role in ensuring growth and sustainable productivity of the private sectors and ultimately a thriving economy. Incidentally, monetary policy has the capacity to affect aggregate demand on one hand, and the level of domestic private investment on the other hand. Consequently, to achieve the broad aim of the study, annual time series data were sourced from CBN Statistical Bulletin, and the variables utilized include, monetary policy rate (MPR), prime lending rate (PLR), minimum rediscount ratio (MRR), money supply (MSS), and growth of national income (GDP) on growth rate of domestic private investment (DPI). Hence, to capture both the short run and long run dynamics between regressor and explained variables, Autoregressive Distributed Lag (ARDL) method of econometrics was adopted. The regression outcome showed that 99% of variation in the growth rate of domestic private investment is explained by the proponent of monetary policy tools utilized in this study. Hence, the result showed that monetary policy rate exhibits an inverse and significant impulse in stimulating domestic private investment in both short run and long run. Prime lending rate exhibit a positive and significant impulse on domestic private investment in both short run and long run. More so, minimum rediscount ratio and money supply jointly exhibit an inverse and insignificant impulse in stimulating domestic private investment in both short run and long run. Furth more, growth of national income exhibits an inverse and insignificant impulse in stimulating domestic private investment in the short, while in the long run, the impulse dynamics was positive and significant. Suggesting that in the long run, growth of national income can positively stimulate domestic private investment. This suggests that the alternative hypothesis is accepted while the null hypothesis is rejected. Incidentally, there is a long run association amongst DPI, MRP, PLR, MRR, MSS, and GDP for the period under study. Based on the findings, the study recommends that a policy that can maintain monetary policy rate at a minimal level that's capable of stimulating domestic private investment should be pursued vigorously by the monetary authority. Such policy can be transmitted through engaging selected micro-financed banks by the monetary authority to enhance grass root penetration. While on the other hand, minimum rediscount ratio should be downsized to boost the volume of liquidity with the commercial banks, so they can better service the medium and large-scale enterprise in the urban and semi-urban centers. Moreover, monetary authorities should also ensure that money supply moves in the right direction. Thus, this action would stimulate potential domestic investors, and consequently, the multiplier effect would result to increase in national income (GDP) through increased productivity that can in-turn stimulate domestic private investment positively in the short run. Accordingly, as domestic private investment is thriving, economic growth and development will be optimally achieved in Nigeria.

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