

Effect of Interest Rate Mechanisms on the Economic Development of Nigeria, 1986 -2016

Richard Osadume, FCIB, Ph.D

Nigeria Maritime University,
Delta State, Nigeria

dr.rcosadume@gmail.com, richdume@yahoo.com

Abstract

This Study examined the Effect of Interest rate mechanism on Economic Development of Nigeria (1986-2016). The objective of this study was to examine the Effects of Discount rates measured by interest rates and monetary policy rates on economic development of Nigeria. The Keynesian liquidity theory, on which this work was anchored believe that interest rate is a function of the demand for and the supply of money; Changes in interest rate will result from changes in supply of money and proportionate change in Economic Development of a country but some available findings from studies appear to disagree with this proposition. The study used secondary data sourced from World Bank, UNDP, Bureau of Statistics and the Central Bank of Nigeria; The research work selected Nigeria as its sample and used the OLS, Co-integration, Granger-causality and Error Correction model data Analysis techniques, to test the Effect of the independent variables (interest rates and Monetary policy rates) on the dependent variable, economic development (proxy by Human Development index) and tested at the 5% level of significance. The findings showed that discount rates represented by interest and monetary policy rates; both had significant effect in the short-run and showed positive and significant effect in the long-run on economic development with significant speed of adjustments. The study concludes that discount rate instruments such as interest and monetary policy rates have significant effect on economic development and recommends amongst others that discount rates should be environment and Business-friendly and predictable in line with prevailing economic dictates and as much as feasible government fiat should be reduced in arriving at monetary rates.

Key word: Interest rate, interest rate mechanism, monetary policy rate, discount rate, monetary policy, macroeconomic policies.

1.0 Introduction

According to CBN (2011), the objectives of monetary policy may vary according to the level of development of the economy involved, but invariably; they include the attainment of price stability, maintenance of external payments equilibrium, as well as promotion of employment and output growth, and sustainable economic development. Irrespective of the type of economy, these objectives are critical for the attainment of internal and external balance and ultimately the promotion of long-run economic growth. Where the stability of the financial system is threatened, these short and long term objectives could be subordinated to the overriding objective of achieving financial stability.

Monetary policy involves the measure through which the central bank manages the supply of money, in order to stabilize prices. Though the primary objective of monetary policy is the attainment of low and stable inflation, the central bank also has the added mandate to promote economic growth and employment. The CBN (2017) argued that in practice, monetary policy plays a counterbalancing role to address price stability concerns and stabilize

the economy. During a period of high inflation, contractionary monetary policy is used to reduce the amount of money in circulation while expansionary monetary policy is used when economic condition is weak. Depending on the level of the financial development of a country, monetary policy is usually implemented through the banking system and the financial market. Implementing monetary policy involves interactions between the monetary authorities and financial intermediaries, using tools of monetary policy including reserve requirements, open market operation, and the policy rate, among others. Various frameworks of monetary policy have been used including monetary targeting, exchange rate targeting, inflation targeting, etc. In recent times, unconventional (non-standard monetary policy has been implemented to address substantial economic meltdown due to adverse global financial conditions (CBN, 2017).

In pursuit of the provisions of the CBN Act 2007, the primary objective of monetary policy has remained the maintenance of monetary and price stability. Generally, the monetary policy of the CBN is anchored on four main pillars (CBN, 2017):

- (i) Inflation as a monetary phenomenon;
- (ii) The public's expectation of future inflation (this is crucial in the setting of current wages and prices). A corollary to this is that there is no long-run trade-off between unemployment and inflation; to anchor expectations;
- (iii) Proactive and rule based monetary policy (for instance, under the Taylor rule, for monetary policy to stabilize prices, the nominal interest rate must be raised by more than the level of inflation); and
- (iv) The need for monetary policy to be undertaken outside the control of the political authorities i.e. independence of the central bank to conduct monetary policy.

Equally, the Monetarist Economist believes that Changes in monetary policy rates should result to direct and proportionate change in Economic Development of a country; economic growth being one of the cardinal objectives of monetary policy, and every nation strives to attain a sustainable level of economic growth which will invariably translate into economic development that will ensure a reduction of unemployment rate, poverty, and poor standard of living which will eventually affect negatively on social welfare/wellbeing of the citizens.

Most researchers have been unable to come to a consensus on what should be the exact effect of monetary policy instruments such as discount rates on economic development of a country and there has been array of debates on such outcome. For instance, Sanchita and Rina (2011), Sanusi (2002), Omoke and Ugwuanyi (2010), Okpara and Nwoha (2010), Adofu, Abula and Audu (2010), all agreed that there is a positive and significant relationship between monetary policy instruments such as discount rates etc and economic growth. While, conversely Olubusoye and Oyaromade (2008), Omofa (1999), Salisu (1993) hold that the relationship is not significant. And more worrisome is the result of the findings of Ditimi (2009) that there is no relationship.

In this study, our objective is to unravel the effect of discount rate mechanisms represented by monetary policy rates and interest rates on economic development of Nigeria. This work is subdivided into five sections, namely: i) Introduction, ii) Review of Related literature, iii) Data and Methodology of Study, iv) Data Presentation and Analysis, v) Conclusion and Recommendations.

2.0 Review of Related Literature

The discount rate instrument is a facility provided by the central bank which enables the DMBs to borrow reserves against collaterals in form of government or other acceptable

securities. The central bank operates this facility in accordance with its role as lender of last resort and transactions are conducted in form of short term (usually overnight) loans. The central bank lends to financially sound DMBs at the policy rate. This rate sets the floor for the interest rate regime in the money market (the nominal anchor rate) and thereby affects the supply of credit, the supply of savings (which affects the supply of reserves and monetary aggregate) and the supply of investment (which affects employment and GDP). The CBN discount window facilities were established strictly in line with the “lender of last resort” role, that the Bank is expected to play. Accordingly, it has continued to provide loans of a short-term nature (overnight) to banks in need of liquidity. The facilities are collateralised by the borrowing institution’s holding of government debt instruments and any other instrument approved by the CBN and subject to a maximum quota. The Minimum Rediscount Rate (MRR) is the nominal anchor, which influences the level and direction of other interest rates in the domestic money market. Its movements are generally intended to signal to market operators the monetary policy stance of the CBN. The discount rate mechanism is divided into monetary policy rate and interest rate mechanism.

i). Monetary Policy Rate (MPR)

The minimum rediscount rate (MRR) was re-christened the Monetary Policy Rate (MPR) in 2006 by the CBN. In this text the term, monetary policy rate (MPR) shall have the same meaning as the minimum rediscount rate (MRR), which has been in use since 1960. MPR is the rate which the central bank charges financial operators for rediscounting first class bills of exchange before the maturity date. Matured bills are discounted outright with discount houses. First class bills include all government securities such as treasury bills and treasury certificates. The second bill to be introduced in 1962 in the Nigeria bills market was the produce bill finance scheme. The produce bill was introduced to enable the marketing boards to obtain funds from the purchase of produce by drawing 90-days bills of exchange on the Nigerian produce marketing company limited (NPMC). A consortium of commercial banks and Acceptance houses discounted the export produce bill after acceptance by NPMC Ltd. CBN supported the bills by offering rediscounting facilities. The discounting facilities were also made available to other first class bills recognised by CBN. They include those bills drawn on commercial banks and acceptances companies by scheduled licensed buying agents and those bills relating to the export of groundnut of the northern region marketing board. The bills of licensed timber exporters were also honoured by the CBN.

The rediscounting of eligible papers before maturity with the CBN by deposit-money banks in dire need of fund, but which are not interested in interbank borrowing will continue to constitute an important feature of CBN function, as the lender of the last resort and a major player in the money market. By reason of lowering of discount rate, CBN influences the market cost of funds. The MPR as a rediscount instrument can be applied to enhance the marketability of the treasury bills, and certificates or any other assets classified by CBN as rediscount able. All short-term rates are linked formally or informally with the MPR. When business are no longer brisk, deposit money banks and other financial institutions holding excess cash invest the excess cash in short-term debt instrument, which earns some interest rather than hold idle cash which earns no interest. In the event of sudden business opportunities, the debt instruments are exchanged for cash before maturity through rediscount facilities provided by the CBN.

Monetary policy rate is normally fixed at a rate fractionally higher than the treasury bills issue rate. Rediscounting before maturity involves some loss, hence the monetary policy rate is regarded as a penalty rate. The MPR was designed basically to promote the treasury

bills markets from where government obtains short-term accommodations to bridge shortfalls in expected revenues. A higher MPR relative to the treasury bills issue rate is meant to discourage the holders of bills from discounting them before maturity. Adequate care is taken in the fixing of the rate in order not to discourage investors from purchasing treasury bills. If the rate is set too high, prospective purchasers of bills will not like to purchase any bill, for fear of sustaining a heavy loss should the bill be rediscounted before maturity. If the CBN wishes to create a tight money supply situation, the MPR is raised. If on the other hand, the monetary policy stance is that of easy money, MPR is lowered to encourage discounting of bills.

When the CBN began operation in July 1959, there was no formal relationship between the lending, deposit and savings rates of commercial banks and the minimum rediscount rate of the bank at the time. It was only in March 1970 that CBN issued a directive to all commercial banks to link interest rate movement with the minimum rediscount rate of the CBN.

ii). **Interest Rate Mechanism**

Okaro (2013) described interest rates as the *raison d'être* of the modern banking and finance. He noted that this is true either if one believes that such a system exists to make the most efficient use of resources or more cynically, to make profit. Interest rates represent the market mechanism by which funds are lent and they govern who can afford to borrow these funds. They also represent the way in which banks and other financial institutions make money as they react to the return on the use of their resources.

In banking, interest rate is said to be the charge for the use or for borrowing money while in economics it is regarded as payment for the service of capital. The classical economists argued that it is only by postponing consumption that capital can be created and to abstain, however is disagreeable and painful, so the lender is paid a reward in the form of interest.

In theoretical terms there are two basic theories about interest rates, the loanable funds theory and the liquidity preference theory. These are not necessarily opposing, rather the second theory is seen as an extension of the first. Rate of return or rate of interest is the price that savers receive for the use of their money, and also what borrowers have to be paid to use it. Okaro (2013) observed that there are several factors that affect the rate of interest to borrowers. These include time, character of the borrower, cost of arranging and running the loan, loan purpose, Amount to be borrow and lenders loss of benefit or alternatives while the following factors affects the rate of interest paid to depositors namely – Time, the institution and the amount deposited.

Onoh (2013) noted that interest rate instrument is more effective in the industrialised economies, where lenders and borrowers react in an elastic manner by any upwards or downwards variations in the rate of interest, even when the variation is as low as 0.25 basis point i.e. a quarter of 1%. If the interest rate is raised, borrowers respond spontaneously by reducing demand for credit and vice-versa. In the developing economies, where the culture and habit of savings are still to be firmly enthroned, and where borrowers are still to feel the pains or understand that they pay penalty costs for borrowed funds, the interest rate is not a very effective monetary policy instrument of credit control. In the developing economy, most borrowers behave indifferently to any rise or fall of the rate of interest provided that the funds are available.

2.1 Monetary Policy and Economic Development

Monetary policy is one of key drivers of economic growth through its impact on economic variables. Economic growth is essential in an economy as it reduces poverty as well as

improving livelihoods. The growing importance of monetary policy has made its effectiveness in influencing economic growth a priority to most governments (Ajisafe and Folorunso, 2002; Khabo, 2002; Dornbusch et al, 1998; Mankiw, 2002; Cittadino et al, 2007).

Despite the lack of consensus among economists on how monetary policy actually works and on the magnitude of its effect on the economy, there is a remarkable strong agreement that it has some measure of effects on the economy (Nkoro, 2005) Monetary policy as a combination of measures designed to regulate the value, supply and cost of money in an economy, in consonance with the expected level of economic activity (Folawewo and Osinubi, 2006). For most economies, the objectives of monetary policy include price stability, maintenance of balance of payments equilibrium, promotion of employment and output growth, and sustainable development. The pursuit of price stability invariably implies the indirect pursuit of other objectives such as economic growth, which can only take place under conditions of price stability and allocative efficiency of the financial markets. Monetary policy aims at ensuring that money supply is at a level that is consistent with the growth target of real income, such that non-inflationary growth will be ensured. Monetary policy is used as inflation is generally considered as purely a monetary phenomenon. Monetary policy influences economic growth through aggregate spending, changes in money supply and interest rates influence consumer spending as well as investment decisions. Consequently, aggregate demand changes in response to monetary policy adjustments.

2.2 Economic Development Measurement indicators

Human development is considered as one of the core areas of interest in development economics. There are several ways in which we can define human development. It is difficult to find a single coherent definition. However, the best way to explain it can be found in Sen's book 'development as freedom'. It says that human development can be regarded as expansion in people real freedoms that they enjoy. Focusing on human freedoms contrasts sharply with narrower views of development, such as identifying development with the growth of Gross National Product (GNP), with the rise in personal incomes, industrialization, with technological advance, or with social modernization. Sen (1999, p.1) said that, it is surely not a purpose to debilitate the contribution of these variables in accentuating welfare. Rather, it is simply argued that these variables are not sufficient conditions for development. The construction of Human Development Index has been explained fully in Human Development Report (1999, p.159-1960). The value ranges from 0 to 1, where 0 implies no development and 1 mean full development. Normally, no country lies at the extremes and possesses a value between these two numbers. Though, the main structure is the same there has been some change in its construct since 2011, as elaborated in Human Development Report (2010). Contrary to simple income or single development measures like poverty Alleviation, unemployment, etc. HDI is a composite of three different components. Each of them is listed below with all the necessary detail.

i. Standard of Living:

The first component is the standard of living, and the proxy used to calculate it is the natural log of gross national income (GNI) per capita adjusted purchasing power in US dollars. GNI is different from GDP in that it is composed of the sum of all value added by resident producers in the economy plus product taxes plus receipts of primary income from abroad.

Then, the GNI is normalized for each of the country by the formula:

$$\text{Income Index (II)} = \frac{\ln \text{GNI} - \ln(\text{min})}{\ln \text{Max} - \ln(\text{min})}$$

Where $\ln(\text{max})$ and $\ln(\text{min})$ are natural logarithm for maximum and minimum GNI reported for that particular year.

ii. Education:

The education level of each country can be calculated through the education index. Two variables; mean years of schooling and expected year of schooling are given one-half weight each. Adult literacy rate has been replaced by mean years of schooling and expected year of schooling has replaced combined enrolment ratio for primary, secondary and tertiary institutions. The formula for education index is

$$\text{Education Index } EI = (MYS - MYS_{MIN} / MYS_{max} - MYS_{MIN} \times (EYS - EYS_{MIN} / EYS_{MAX} - EYS_{MIN}))^{1/2}$$

Where, MYS is mean years of schooling and EYS is expected years of schooling.

iii. Health and Longevity:

Longevity is measured by life expectancy at birth and normalized by the formula

$$\text{Longevity } (LI) = L - L_{MIN} / L_{MAX} - L_{MIN}$$

Where L is life expectancy at birth for a country and min and max are minimum and maximum values for that particular year.

Finally, the HDI can be calculated by taking the geometric mean for all three measures as: = $EI \times LI \times LI^3$

2.3 Monetary Policy and Interest Rate

Interest and inflation are keys to investment decisions, since they have direct impact on the investment yield. When price rises, the same unit of a currency is able to buy less. A sustained deterioration in the purchasing power of money is called inflation. Investors aim to preserve the value of their money by opting for investments that generate yields higher than the rate of inflation. In most developed economies, banks try to keep the interest rates on savings accounts equal to the inflation rate. However, when inflation rate rises, companies or governments issuing debt instruments would need to lure investors with a higher interest rate (Fernando, Robert and Warren, 2008; Clarida, Gali and Gertler, 1999; Alvarez et al. 2008). Monetary Authorities use the interest rate to control money supply and, consequently, the inflation rate. When interest rates are high, it becomes more expensive to borrow money and savings become attractive. When interest rates are low, banks are able to lend more, resulting in an increased supply of money (Chimobi and Uche, 2010).

A high interest rate influences spending patterns and shifts consumers and businesses from borrowing to saving mode. This influences money supply. A rise in interest rates boosts the return on savings in building societies and banks, while low interest rates encourage investments in shares. Thus, the rate of interest can impact the holding of particular assets. A rise in the interest rate in a particular country fuels the inflow of funds. Investors with funds in other countries now see investment in this country as a more profitable option than before. Inflation has a significant impact on the Time Value of Money (TVM). Changes in the inflation rate (whether anticipated or actual) result in changes in the rates of interest. Banks and companies anticipate the erosion of the value of money due to inflation over the term of the debt instrument they offer. To compensate for this loss, they increased the interest rates. The Central Bank of a country alters interest rates with the broader purpose of stabilizing the national economy. Investors need to keep a close watch on interest and inflation to ensure that the value of their money increases over time (Nwosa and Oseni, 2012, Chuku, 2009; Michael, 2015).

2.4 Keynesian Liquidity Theory

We find the Keynesian Liquidity Theory most valuable in explaining the effect of interest rate mechanism on economic development. According to this theory, the rate of interest is

determined by the demand for and the supply of money. The theory is therefore characterised as the monetary theory of interest, as distinct from the real theory of the classical. The supply of money according to the theory is the total quantity of money in the country for all purposes at any time. Though, the supply of money is a function of the rate of interest to a degree, yet it is considered to be fixed by the monetary authority, that is the supply curve of money is taken as perfectly inelastic (Tily, 2010; Chick, 1983; Chick, 2001; Dow; 1997, Kahn, 1984; Basile et al. 2011; Howson 1993).

On the other end, demand for money (addressed as liquidity preference) is the desire to hold cash. The money in cash “lulls disquietude” and the rate of interest which is demanded in exchange for it is a “measure of degree of disquietude”. The rate of interest in Keynes’s word is the premium which has to be offered to induce people to hold their wealth in some form other than hoarded money. The higher the liquidity preference, the higher the interest rate that would be paid to the holders of cash to induce them to part with their liquid assets. The lower the liquidity preference, the lower will be the rate of interest that will be paid to cash holders. According to Keynes, there are three motives behind the desire of the people to hold liquid cash; these are; transactionary, precautionary and speculative motives (Howson and Donald, 1997; Tilly, 2009; Turner, 2011; Smithin, 1996).

Transactionary motive; this relates to the needs to hold cash balances to meet current transactions of personal business exchanges. It is further divided into the income and business motive. The income motive is meant to bridge the interval between the receipt of income and its disbursement, while the business motive is to bridge the gap between the time of incurring business cost and the time of the receipt of the sale proceeds. Hence transactionary demand depends on the level of income, employment and prices, the business turnover, the normal period between the receipt and disbursement of income, amount of salary or income and on the possibility of getting a loan.

Precautionary motive; this relates to provide for contingencies requiring sudden expenditures and for unforeseen opportunities of advantageous purchases. Both individuals and businessmen keep cash in reserves to meet unexpected needs. Individuals hold some cash to provide for illness, accident, unemployment and other unforeseen contingencies. Similarly, businessmen keep cash in reserves to tide over unfavourable conditions or to gain from unexpected deals. Money held for precautionary motive is rather like water kept in reserve in water tank. It depends upon the level of income, business activity, opportunities for unexpected profitable deals, availability of cash, the cost of holding liquid asset in bank reserves, etc.

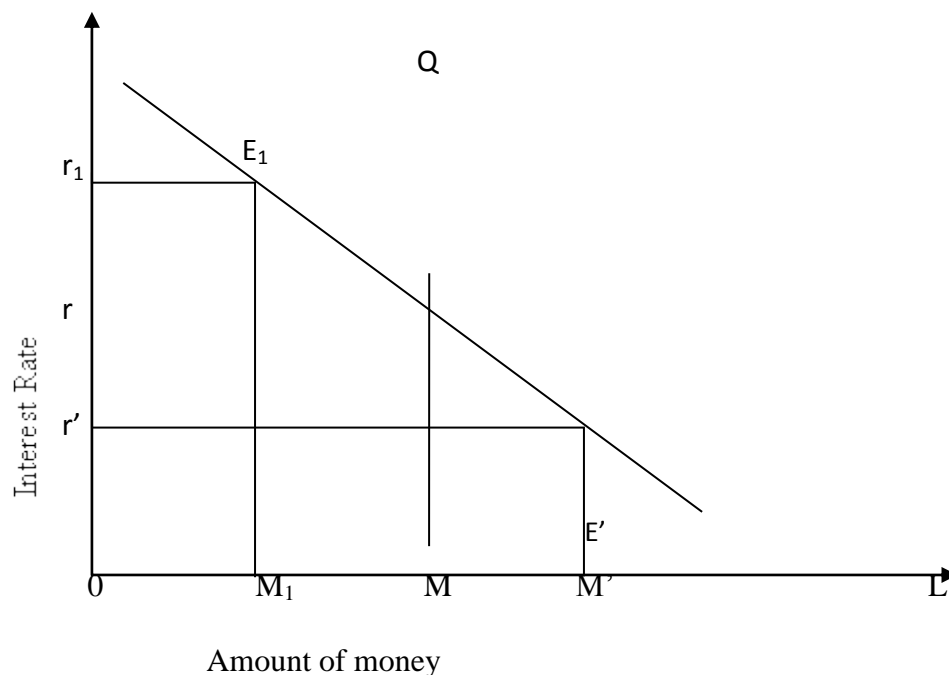
Keynes holds that transactionary and precautionary motives are relatively interest inelastic, but are highly income elastic. The amount of money held under these two motives (M_1) is a function of (L_1) of the level of income (Y) and is expressed as $M = L_1(Y)$.

Speculative motive; money is held for securing profit from knowing better than the market what the future will bring forth. Individuals and businessmen have funds, after keeping enough for transactionary and precautionary purposes, like to gain by investing in bonds. Money held for speculative purposes is a liquid store of value which can be invested at an opportune moment in interest bearing bond or securities. The speculative demand for money is therefore a decreasing function of the rate of interest to the matter of expectation about a safe future rate of interest. The higher the rate of interest the lower the speculative demand for money and vice versa.

Algebraically, Keynes expressed the speculative demand for money as $M_2 = L_2(r)$, where L_2 is the speculative demand for money and r is the rate of interest. Consequently, the total demand for money (M) {which is $M_1 + M_2$ } can be expressed as; $M = L(Y, r)$. So, M_1 is the active or circulating money and M_2 is the idle or passive money. Though M_1 is a function of income and M_2 of the rate of interest yet they cannot be held in water tight compartments. Even M_1 is interest elastic at high interest rates. If there is increased demand for M_1 , it can be met by transferring funds from idle balances to M_2 .

Having, analysed the factors behind the supply and demand for money, Keynes argue that interest rate, like the price of any product or service is determined geometrically at a point where the demand for and the supply of money are equal. In the figure 1 below, it is denoted by E (both intersect at E); it is the point where the equilibrium rate of interest is established (Giangiacomo, 1996). If there is any deviation from this equilibrium, an adjustment will take place via the rate of interest, and the equilibrium level E, is re-established. For example, if the supply of money is increased by the monetary authorities, but the liquidity preference remains the same, the rate of interest will fall to the point of liquidity trap; thereafter further increase in money supply will not affect the rate of interest (Jhingan, 2002).

Figure 2.4: Determination of the rate of interest



However, the theory has been vigorously criticized by Hansen, Robertson *et al*, as a college bursar's theory, at best an inadequate and at worst a misleading account and pre classical, mercantilist, and a man in the street economics. This is because of its deficiencies such as a wrong notion of liquidity trap, assumption that only money held for speculative purposes is fruitful while money held as store of value is barren, as well as the assumption that the demand for money is mainly associated with the liquidity preference for the speculative motive to which the rate of interest is brought directly into touch. In spite of this and many others, the theory is still the closest one can use to relate monetary policy and interest rate (Jhingan, 2002).

2.5 Empirical Reviews

Numerous literature reviewed in the course of this research, could not agree on the likely effect of interest rate changes and other macroeconomic variables on economic development. For instance, Salisu (1993) using OLS to investigate the role of interest rate in the determination of the demand real cash balances, concluded that there existed no significant relationship between the duo, and that any attempt by the policy makers of the Nigerian Economy to influence this kind of money demand through the use of interest rate will not yield any positive result.

Moreover, Nkoro (2005) on a topic “monetary policy and macroeconomic instability in Nigeria (1980 – 2000)” concluded that factors responsible for excess liquidity and inflationary pressure in Nigeria included: instability of the financial sector, which was attributed to bank distress and lack of managerial efficiency, resulting to financial institution failures, non-harmonization of fiscal and monetary policies and increase in government expenditure.

Folawewo and Osinubi (2006) used rational expectation approach to conclude that the effort of Monetary Authority in Nigeria at using its credit and reserves as monetary tools in checking inflation and the rate of exchange has affected the volatility of the two variables over the years. Thus monetary policy, if not well targeted could yield negative results. This is because the speculations of the private agents may frustrate monetary effort (Berg and Pattillo, 1999), just as improper inflation targeting could affect real exchange rate volatility (Amato and Gerlach, 2002) and exchange rate intervention induce inflation (Galati, 2000). Thus monetary policy should be set in such a way that the objective it set to achieve is well defined, in a way that effort at stabilizing exchanging rate will not generate inflation and vice versa.

Additionally, several studies (Idowu, 2010; Uchendu, 2009 and Nkoro, 2005) have established that huge public spending has constrained the efficacy of monetary policy in Nigeria. They buttressed that huge public spending by the three tiers of government, over the years, had hampered monetary management resulting in the missing of monetary targets by wide margins, while inducing serious pressure on the general price level. Moreover, the poor state of economic infrastructure, resulting from past neglect, influence monetary management adversely.

Olubusoye and Oyaromade (2008) analysed the sources of fluctuations in inflation rate in Nigeria using the framework error correction mechanism and found out that the lagged consumer price index (CPI) among other variables propagate the dynamics of inflationary process in Nigeria. The level of output was found to be insignificant but the lagged values of money supply was found to be negative and significant only at 10% level in the parsimonious error correction model.

Omoke and Ugwuanyi (2010), Okpara, (1998) in their long-run study of money, price and output in Nigeria found out no cointegrating vector but however found out that money supply granger causes both output and inflation, suggesting that monetary stability can contribute towards price stability. They also concluded that inflation in Nigeria is a monetary phenomenon.

Okpara and Nwoha (2010) employed a two stage least square method and a reduced form of the growth model was singled out for long run cointegration and casualty test. Their

result revealed that money supply is a positive and significant function of prices and also granger causes prices with no reverse or feedback effect.

Ditimi (2009) adopted a simplified ordinary least squared technique and conducted the unit root and co- integration test in his analysis on monetary policy and macroeconomic stabilization in Nigeria and found out that interest rate has an insignificant influence on price stability.

Adofu, Abula and Audu (2010) analysed the impact of interest rate deregulation on the Nigerian economy using a time series data spanning 1986-2005 and observed that interest rate plays a significant role in enhancing economic activities. The empirical analysis showed that interest rate deregulation has a significant and positive impact on Agricultural productivity in Nigeria.

Eregha (2010) examines variations in interest rate and price stability in Nigeria, using a time series data 1970-2002, employed instrumental variable technique and found out that variation in interest rate played a negative and highly significant role on price decisions in the economy.

Daferighe, and Aje, (2009) using a time series data 1997-2006 employed the OLS method of regression and analysed the impact of the real Gross Domestic Product on stock market prices and found out that increased RGDP has a positive impact on stock market prices.

Sanchita and Rina (2011) Sanusi (2002) concluded in their analytical work on monetary policy using the co- integration test that to achieve macroeconomic stability, inflation, asset price etc, that the classical transmission mechanism of the monetary policy is useful in influencing the price and quantity of the above mentioned macroeconomic indicators.

Serkan (2008), Adam and Tweneboah (2000), used co- integration test, vector Error-Correction Model (VECM) to investigate the role of macroeconomic factors in order to explain the growth rate of interest rate, exchange rate and world equity index and found out that inflation rate is significant for only three of the twelve portfolios examined. They further exerted that there is cointegration between macroeconomic variable and the prices of stock in Ghana indicating long run relationship.

3.0 Data and Methodology

3.1 Source and Nature of Data

The study made use of data mainly from secondary sources, particularly published data from research work of monetary policy department of CBN, the World Bank and the United Nations Development Project (UNDP). Secondary data will be obtained from the statistical bulletin of the Central Bank of Nigeria and will be used for the analysis of the study. We will equally use data from the published works in CBN official websites, Statistical Bulletins, monthly journals, financial reviews as well as Annual Reports and various communiqués of the monetary policy committee meetings. Another source of data for the study will include statistics and published materials by the National Bureau of Statistics (NBS), Nigerian Economic Society, Newspapers, Magazines, Journals, Seminar papers as well as my previous lecture notes and similar studies conducted in this direction. The data obtained was analysed using Econometrics text kit (Software) called E-view –Version 9.

The data used for this study are those relating to:

1. Human Development Index (HDI) - Dependent Variable
2. Monetary Policy rate (MPR), Interest rate (INTR), Inflation rate (INFR) - Independent variables.

3.2 Model Specification and Validity

This research work adopted the model of Onyeiwu (2012) with slight modifications (for example replacement of gross domestic product (GDP) with Human development index (HDI) and the use of inflation as a moderating variable due to its strong effect on price levels and other macroeconomic variables));

$$GDP = a_0 + a_1Lr + a_2M_2 + a_3Cr + U_i \quad (1) \quad (\text{Onyeiwu, 2012})$$

Where GDP - Gross Domestic Product

Lr - Liquidity ratio

M₂ - Broad Money Supply

Cr - Cash ratio

A₀, a₁, a₂ and a₃ - Parameters

U_i - Error term

Adjusting above model after our work, we have;

Model:

$$HDI = f(DIR) \dots\dots\dots (2)$$

Transforming to multiple linear relationship;

$$HDI = b_0 + b_1MPR + b_2INTR + b_3INFR + u \dots\dots\dots (3)$$

μ = Error term

b_0 = Intercept

b_1 - b_3 = parameters/ coefficients

Where HDI = Human Development Index

MPR = Monetary Policy Rate

INTR = Interest Rate

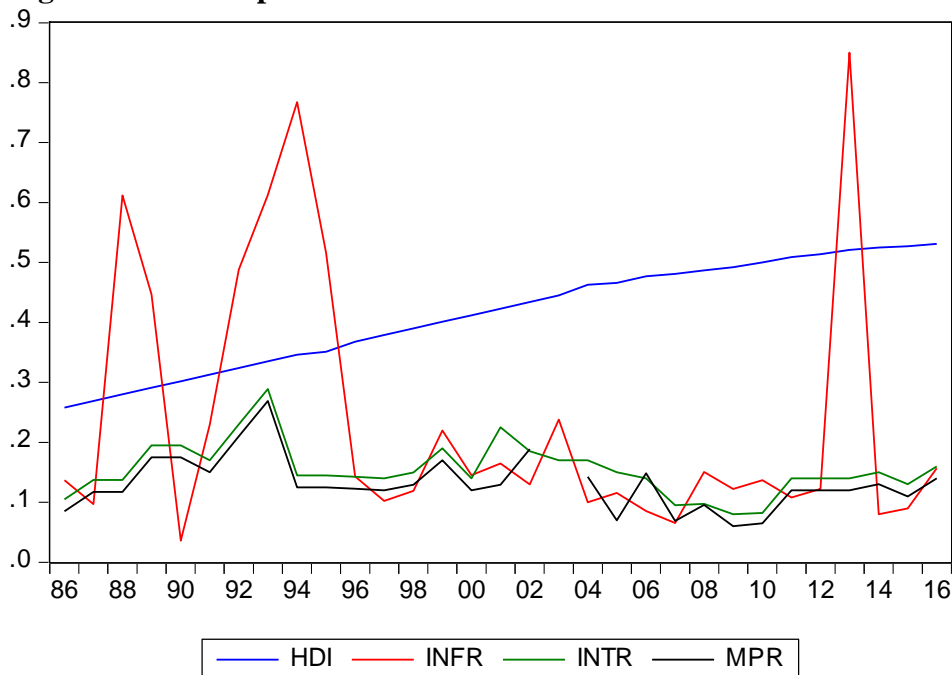
INFR = Inflation Rate (Acting as moderating variable)

Apriori expectation: MPR, INTR, INFR > 0 (positive and significant)

4.0 Data Presentation and Analysis

(See appendix for data details)

Fig. 4.1 Graphical Presentation of Model



Source: Computation by author using E-view 7

Figure 4.1, shows that MPR and INTR have both maintained and exhibited similar oscillating pattern since 1986, reaching its peak between 1992 and 1993 reaching between 21% to 29% within that period in response to macroeconomic pressures. The rates have however, maintained a consistent fall since 1994 while HDI (Dependent variable) on the other hand has maintained a consistent linear growth indicating that the various oscillating independent variables such as MPR, INTR and INFR have had a positive effect on the Economic development of Nigeria measured by HDI. Hence, despite the volatility in the macroeconomic environment, which has occasioned the rise and fall of the monetary policy variables under study, the economic managers have been able to manipulate these elements to effectively ginger developments in the economy.

4.1 Diagnostic Tests

The aim here is to carry out various diagnostic tests to ensure that our data and model used in this research work conforms to the basic assumptions of the classical linear regression. This will ensure that the output of this process is not error prone and is reliable.

4.1.2: Test for Stationarity

The test for stationarity requires that the variables in the series model must be stationery at a given level and p-value must be significant at that level. Stationarity is attained where the test statistics is most negative and greater than the critical value of the chosen level of significance.

Table 4.2 Unit root table

Variables	ADF Test Statistics	Critical Values @5%	P-value	Order of Integration
HDI	-3.6948	-2.9640	0.0094	I(0)
MPR	-3.2611	-2.9719	0.0268	I(0)
INTR	-7.0295	-2.9678	0.0000	I(1)
INFR	-3.8417	-2.9640	0.0066	I(0)

Source: Author's E-view 7 Computation

Table 4.2 shows that the variables – HDI, MPR, INTR and INFR are all stationery at levels except INTR that is stationery at first level. Their respective p-values are all significant confirming stationarity at the 5% level of significance.

4.1.3 Test for Heteroskedasticity (Arch)

The assumption of the classical linear regression that the variance of the errors is constant is known as *Homoscedasticity*. If the variance of the errors is not constant, this would be known as *Heteroskedasticity*. Hence, we test for the presence of heteroskedasticity with the intention of treating same if found. The treatment method adopted here is the Autoregressive conditionally Heteroscedastic test known as ARCH. The Null hypothesis states that there is no Heteroscedasticity if the p-value is greater than the level of significance (Brooks, 2014).

Table 4.3: Heteroskedasticity – Arch Test

Heteroskedasticity Test: ARCH			
F-statistic	0.699348	Prob. F(1,19)	0.4134
Obs*R-squared	0.745523	Prob. Chi-Square(1)	0.3879

Source: Author's E-views computation

The null hypothesis states that there is No heteroskedasticity if p-value is not significant and is greater than the chosen level of significance of 5%. Hence, in this case we accept the Null hypothesis that there is no evidence of heteroskedasticity since p-value is greater than 5% significance level.

4.1.4 Ramsey Reset Tests

Table 4.4: Ramsey Reset Specification Test

Ramsey RESET Test			
Equation: UNTITLED			
Specification: HDI C CC(5) DD(5) QM(5) MPR(5) INTR(5) CRR(5) LR(5)			
TBR(5) CBTC(5) INFR(3)			
Omitted Variables: Squares of fitted values			
	Value	df	Probability
t-statistic	0.030749	12	0.9760
F-statistic	0.000946	(1, 12)	0.9760
Likelihood ratio	0.001891	1	0.9653

Source: Author's E-views computation

The p-values in table 4.4 for t and F-statistics being greater than the 5% significance level, indicates that the test statistics are not significant at the 5% level. We thus accept the Null hypothesis that the regression model is linear.

4.2.1 Test of Hypothesis Two

H₀₁: There is no significant relationship between discount rate mechanisms captured by both monetary policy rate (MPR) and interest rate (INTR), and economic development of Nigeria.

H₁₁: There is significant relationship between discount rate mechanisms captured by both monetary policy rate (MPR) and interest rate (INTR), and economic development of Nigeria.

4.2.2 OLS Regression Test for Short-run Effect

Table 4.5: Regression Result for Discount Rate Mechanisms

Dependent Variable: HDI				
Method: Least Squares				
Date: 03/27/18 Time: 08:18				
Sample (adjusted): 1987 2015				
Included observations: 28 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019423	0.004906	3.959048	0.0006
INTR(1)	0.080566	0.029010	2.777162	0.0107
MPR(1)	-0.083173	0.029153	-2.852966	0.0090
INFR(1)	-0.002392	0.002699	-0.886239	0.3847
HDI(-1)	0.972570	0.008001	121.5585	0.0000
R-squared	0.998981	Mean dependent var		0.413964
Adjusted R-squared	0.998804	S.D. dependent var		0.084515
S.E. of regression	0.002923	Akaike info criterion		-8.672233
Sum squared resid	0.000196	Schwarz criterion		-8.434340
Log likelihood	126.4113	Hannan-Quinn criter.		-8.599507

F-statistic	5638.779	Durbin-Watson stat	2.413037
Prob(F-statistic)	0.000000		

Source: Author's computer generated Eviews result

In table 4.5, the R^2 and Adjusted R^2 both showed 99.89% and 99.88% respectively. This shows that the chosen regression model best fits the data. Hence, the goodness of fit regression model is 99.89% and implies that chosen explanatory variables explain variations in the dependent variables to the tune of 99.89%. Also, with a high Adjusted R^2 (99.88%) implies that the model can take on more variables conveniently without the R^2 falling beyond 99.88%, which is very commendable. F-statistics of 5638.779 is considered very good being positive and significantly large enough and it shows that there is significant positive relationship between the dependent and explanatory variables. The overall probability (F-statistics) of 0.0000 is rightly signed and very significant and displays a Durbin-Watson of 2.41304, which is considered good as it shows little or no effect of autocorrelation on the chosen data.

Hence, from table 4.5, the INTR(1) at lead 1, has a t-statistic value of 2.7772 and a p-value of 0.0107, was found to have a positive effect on HDI and this effect is statistically significant at 5% level since its p-value is less than 0.05. Similarly, MPR(1) at lead 1, has a t-statistic value of -2.8530 and a p-value of 0.0090, was however, found to have a negative effect on HDI but this effect is statistically significant at the 5% level of significance. Therefore, we reject the null hypothesis to accept the alternative that discount rate mechanisms captured by interest rates and monetary policy rates have significant effect in the short-run on economic development proxied by HDI. However, the INFR(1) at lead 1, has a t-statistic value of -0.8862 and p-value of 0.3847 and this effect is positive and statistically not significant at the 5% level. The INFR is to act as a moderator to the outcome of both the dependent and independent variable. The implication of this result is that a 1% increase in INTR will result to a 8.06% increase in HDI while a 1% rise in MPR will result to a 8.317% increase in HDI and the coefficient of the future levels of INTR and MPR variables have a positive and negative signs respectively at the 5% significance level.

4.2.3 Co-integration test For Long-run effect

Table 4.6: Co-integration result

Date: 03/27/18 Time: 08:47				
Sample (adjusted): 1988 2016				
Included observations: 26 after adjustments				
Trend assumption: Linear deterministic trend				
Series: INTR MPR INFR HDI				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.629955	68.22826	47.85613	0.0002
At most 1 *	0.597307	42.38089	29.79707	0.0011
At most 2 *	0.329469	18.73181	15.49471	0.0157
At most 3 *	0.274409	8.339994	3.841466	0.0039
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's E-views computation

The Johansen Co-integration Test (Trace) reveal the existence of four (4) co-integrating relationship with a p-value of 0.0002, 0.0011, 0.0157 and 0.0039 respectively between INTR, MPR and HDI and the control variable, INFR. We thus confirm that INTR and MPR have a co-integration effect (long-run) on HDI (Human Development Index).

Decision rule: We reject null hypothesis of the co-integration relationship to accept the alternative that there is Co-integration. We thus, conclude that interest rate and monetary policy rate have a long-run effect on Economic development proxied by HDI (Human Development index).

4.2.4 Granger-Causality test

Table 4.7: Granger-Causality Result

Pairwise Granger Causality Tests			
Date: 03/27/18 Time: 09:06			
Sample: 1986 2016			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
MPR does not Granger Cause INTR	26	0.27555	0.7619
INTR does not Granger Cause MPR		3.04931	0.0688
INFR does not Granger Cause INTR	29	0.79249	0.4642
INTR does not Granger Cause INFR		1.90913	0.1701
HDI does not Granger Cause INTR	29	1.63466	0.2160
INTR does not Granger Cause HDI		0.28873	0.7518
INFR does not Granger Cause MPR	26	0.87668	0.4309
MPR does not Granger Cause INFR		4.04120	0.0327
HDI does not Granger Cause MPR	26	1.52524	0.2407
MPR does not Granger Cause HDI		0.66439	0.5251
HDI does not Granger Cause INFR	29	2.35825	0.1161
INFR does not Granger Cause HDI		0.42694	0.6574

Source: Author's E-views computation

The result in table 4.7 shows that MPR does not granger-cause HDI and HDI does not granger-cause MPR as their respective p-values are higher than the chosen level of significance of 5% being 0.5251 and 0.2407 respectively. Similarly, the INTR does not granger-cause HDI and HDI does not granger-cause INTR because their respective p-values are greater than the chosen level of significance of 5% being 0.7518 and 0.2160 respectively. Hence, we conclude that MPR and INTR, both does not granger-cause economic development proxied by HDI and HDI does not granger-cause monetary policy rate as well as interest rate proxied by MPR and INTR respectively.

4.2.5 Error Correction Term for the Model

Table 4.8: Residual Unit Root test for the model

Var	ADF stat	Critic.value@5%	P-value	Order of Integ
ECT2	-4.6860	-3.0300	0.0017	I(0)

Source: Author's E-views computation

Table 4.9: Error Correction Model

$$d(\text{hdi}) = c + d(\text{mpr}(-2)) + d(\text{intr}(-2)) + d(\text{infr}(-4)) + d(\text{hdi}(-1)) + \text{ect2}(-1)$$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000486	0.001923	-0.252707	0.8035
D(INTR(-2))	-0.091222	0.021328	-4.277112	0.0005
D(MPR(-2))	0.048662	0.018000	2.703460	0.0151
D(INFR(-4))	-0.003190	0.003008	-1.060638	0.3037
D(HDI(-1))	1.031492	0.210177	4.907722	0.0001
ECT2(-1)	-0.731059	0.269082	-2.716859	0.0146

Source: Author's E-views computation

This section presents the result of the ECM for. The model of the ECM is on the table 4.9 and the estimates of the short-run and long-run movements, as well as the error correction term, which proxies speed of adjustment, are provided in the table 4.9. The table shows useful long-run information. The equilibrium adjustment coefficient 73.11% enters with a correct sign “negative”. This suggests that interest and monetary policy rates and economic development proxied by Human Development index (HDI) converges to long-run equilibrium; it can also be observed that ECT2(-1) coefficient tends to one, indicating that the speed of adjustment to equilibrium is fast. It shows that 73.11% of the deviation from the equilibrium path is corrected on a yearly basis. The ECM result therefore confirm the long-run relationship between both monetary policy (MPR) and interest rate (INTR) and economic development (HDI) from the residual unit root test and the co-integration tests respectively.

4.3 Discussion of Findings

The result of the ordinary regression analysis showed that interest rate and monetary policy rate have a positive and negative but significant effect respectively on economic development of Nigeria. The study showed that future levels of interest rate and monetary policy rate (t-statistic, 2.7772 and -2.8530 respectively) and significant effect (p-value of 0.0107 and 0.0090 respectively) on economic development (HDI) at the 5% level of significance. The coefficients of the future levels of interest rate (INTR, 1) monetary policy rate (MPR, 1) have positive sign (0.0806) and negative sign (-0.08317) at the chosen level of significance. This implies that a 1% increase in future levels of INTR will result to 8.06% rise in economic development while 1% increase in future levels of MPR will result to 8.317% decline in economic development.

The result of this study is corroborated by the findings of Onyeiwu (2012) and Eregha (2010), whose studies found positive and negative significant effects of monetary policy instrument on economic growth respectively. The granger-causality test however did not reveal any relationship effect between HDI and INTR and MPR. The Keynesian liquidity theory strongly supports these findings as it propounds that the effect of increase in monetary policy instruments must be direct and proportionate. Also, in the Cointegration test, the effect again is positive and highly significant and is in line with findings of Chimaobi and Uche (2010) of a positive and significant cointegration effect. However, the error correction term stands at a speed of adjustment of 73.10% to long-run convergence with a negative sign that is highly significant.

5.0 Conclusion

From the result of this study, we conclude that discount rate mechanism represented by interest rate and monetary policy rate both had significant effect in the short-run period on

economic development, and positive and significant effect on economic development of Nigeria in the long-run period.

5.1 Recommendations

Based on the findings of this study, we recommend as follows:

1. Monetary policy rates as well as interest rates should be environment and Business-friendly and predictable in line with prevailing economic dictates and conditions.
2. Relevant stakeholders should be consulted in arriving at appropriate monetary policy and interest rates.
3. We advise that as much as feasible government fiat should be reduced in arriving at monetary rates.

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APPENDIX

Table 4.1 Data for Selected Variables

Year	MPR	INTR	INFR	HDI
1986	0.0850	0.1050	0.1367	0.258
1987	0.1175	0.1375	0.0969	0.269
1988	0.1175	0.1375	0.6121	0.280
1989	0.1750	0.1950	0.4467	0.291
1990	0.1750	0.1950	0.0361	0.302
1991	0.1500	0.1700	0.2296	0.313
1992	0.2100	0.2300	0.4880	0.324
1993	0.2690	0.2890	0.6126	0.335
1994	0.1250	0.1450	0.7676	0.346
1995	0.1250	0.1450	0.5159	0.351
1996	0.1225	0.1425	0.1431	0.368
1997	0.1200	0.1400	0.1021	0.379
1998	0.1295	0.1495	0.1191	0.390
1999	0.1700	0.1900	0.2200	0.401
2000	0.1200	0.1400	0.1453	0.412
2001	0.1295	0.2250	0.1649	0.423
2002	0.1888	0.1850	0.1297	0.434
2003	0.1502	0.1700	0.2381	0.445
2004	0.1425	0.1700	0.1001	0.463
2005	0.0700	0.1500	0.1157	0.466
2006	0.1485	0.1400	0.0855	0.477
2007	0.0691	0.0950	0.0656	0.481
2008	0.0955	0.0975	0.1506	0.487
2009	0.060	0.0800	0.1220	0.492
2010	0.0650	0.0825	0.1370	0.500
2011	0.120	0.1400	0.1080	0.509
2012	0.120	0.1400	0.1220	0.514
2013	0.120	0.1400	0.8500	0.521
2014	0.130	0.1500	0.0800	0.525
2015	0.110	0.1300	0.0900	0.527
2016	0.140	0.1600	0.1570	0.531

Source: CBN, NBS and UNDP (2017)