



## INTEREST RATE REGIME AND MACROECONOMIC STABILITY IN NIGERIA

Ayano David Ayanniyi

Department of Economic Management, Centre for Management Development (Cmd) Lagos  
March 2010

### ABSTRACT

The total interest on an investment depends on the timescale the interest is calculated on, because interest paid may be compounded. In finance, the effective interest rate is often derived from the yield, a composite measure, which takes into account all payments of interest and capital from the investment. Irrespective of the motives of possessing money, it is customary for countries all over the World to use interest rate and minimum rediscount rate to control the supply of money in the circulation. However, this study examined the impact of interest rate (lending) on Gross National Saving, Inflation, Gross Fixed Capital Formation, Gross Domestic Products, Gross Investment and National Income from 1981 to 2009, in Nigeria. This study explored econometrics model with interest rate as dependent variables while the independent variables include: Gross National Saving, Inflation, Gross Fixed Capital Formation, Gross Domestic Products, Gross Investment and Minimum Rediscount Rate, National Income. This paper used Multiple Regression for its analysis and results show that the specified model is highly significant with R- Square value equal 0.671733 (i. e. coefficient of determination), while the independent variables viz: inflation rate, gross domestic product, capital formation, national saving, national income, investment and minimum rediscount rate of the equation explain 67% of the total variation in interest rate. The table value of F- statistics is 2.45 at  $v_1 = 8$  and  $v_2 = N-K = 20$  (degree of freedom), while the regression analysis shows the estimated value of F-statistics equal 5.846, the foregoing measure the high level of significant of the estimated equation. In addition Durbin Watson statistics value is 2.353, which also measure the high level of significant of the estimated equation.

### 1.0 INTRODUCTION

An interest rate is the price a borrower pays for the use of money they borrow from a lender, for instance a small company might borrow capital from a bank to buy new assets for their business, and the return a lender receives for deferring the use of funds, by lending it to the borrower. Interest rates are fundamental to a Capitalist society. Interest rates are normally expressed as a percentage rate over the period of one year.

Interest rates targets are also a vital tool of monetary policy and are taken into account when dealing with variables like investment, inflation, and unemployment

Financial intermediaries arise because of information asymmetry and transaction costs between agents. The intermediaries serve to ameliorate the problems created by information and transaction frictions. They facilitate mobilization of savings, diversification and pooling of risks, and allocation of resources. However, since the receipts for deposits and loans are not synchronized, intermediaries like banks incur certain costs. They charge a price for the intermediation services offered under uncertainty, and set the interest rate levels for deposits and loans. The difference between the gross costs of borrowing and the net return on lending defines the intermediary costs. The wedge between the lending and deposit rates also proxies efficiency of the intermediation process. For example, under perfect competition the wedge is narrower, composed only of the transaction cost, while in an imperfect market, the wedge is wider, reflecting inefficiency in market operation. (Rose W. Ngugi, 2001)

Narrow money (M1) and broad money (M2) are measures of money supply. Money supply refers to the total value of money in the economy and this consists of currency (notes and coins) and deposits with the banking system. M1 comprises currency-in-circulation with non-bank public and demand deposits. M2 comprises M1, savings and time deposits at the deposit money banks. Savings and time deposits are also called quasi money. Net domestic credit (NDC) is the banking system credit to the economy, consisting of loans and advances given by the CBN as well as deposit money banks to economic agents. NDC comprises credits to government and private sector (CBN Annual Report, 2009).

### 2.0 OBJECTIVES OF STUDY

Macroeconomic aggregates such as output, employment and prices are in turn, affected by the stance of monetary policy via transmission channels: interest rate or money; credit; wealth or portfolio; expectations channel; and exchange rate channels

This paper is to examine the interest rate regimes in Nigeria and its effect on the economic variables such as Gross Domestic Product (GDP), Income, Inflation rate, Investment and Savings. Thus, the result of the interaction of interest rates with the foregoing economic variables will serve as a measure of macroeconomic stability in Nigeria.

### 3.0 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

#### 3.1 Background of Study

Monetary policy is the process by which the government, central bank, or monetary authority of a country controls (i) the supply of money, (ii) availability of money, and (iii) cost of money or rate of interest to attain a set of objectives oriented towards the growth and stability of the economy. Monetary theory provides insight into how to craft optimal monetary policy.

Monetary policy rests on the relationship between the rates of interest in an economy, that is the price at which money can be borrowed, and the total supply of money. Monetary policy uses a variety of tools to control one or both of these, to influence outcomes like economic growth, inflation, exchange rates with other currencies and unemployment. Where currency is under a monopoly of issuance, or where there is a regulated system of issuing currency through banks, which are tied to a central bank, the monetary authority has the ability to alter the money supply and thus influence the interest rate (to achieve policy goals). The beginning of monetary policy as such comes from the late 19th century, where it was used to maintain the gold standard. A policy is referred to as contractionary if it reduces the size of the money supply or raises the interest rate. An expansionary policy increases the size of the money supply, or decreases the interest rate. Furthermore, monetary policies are described as follows: accommodative, if the interest rate set by the central monetary authority is intended to create economic growth; neutral, if it is intended neither to create growth nor combat inflation; or tight if intended to reduce inflation.

It is important for policymakers to make credible announcements, and deprecate interest rate targets, as they are non-important and irrelevant in regarding to monetary policies. If private agents (consumers and firms) believe that policymakers are committed to lowering inflation, they will anticipate future prices to be lower than otherwise (how those expectations are formed is an entirely different matter; compare for instance rational expectations with adaptive expectations). If an employee expects prices to be high in the future, he or she will draw up a wage contract with a high wage to match these prices. Hence, the expectation of lower wages is reflected in wage-setting behavior between employees and employers (lower wages since prices are expected to be lower) and since wages are in fact lower there is no demand pull inflation because employees are receiving a smaller wage and there is no cost push inflation because employers are paying out less in wages.

To achieve this low level of inflation, policymakers must have *credible* announcements; that is, private agents must believe that these announcements will reflect actual future policy. If an announcement about low-level inflation targets is made but not believed by private agents, wage-setting will anticipate high-level inflation and so wages will be higher and inflation will rise. A high wage will increase a consumer's demand (demand pull inflation) and a firm's costs (cost push inflation), so inflation rises. Hence, if a policymaker's announcements regarding monetary policy are not credible, policy will not have the desired effect.

If policymakers believe that private agents anticipate low inflation, they have an incentive to adopt an expansionist monetary policy (where the marginal benefit of increasing economic output outweighs the marginal cost of inflation); however, assuming private agents have rational expectations, they know that policymakers have this incentive. Hence, private agents know that if they anticipate low inflation, an expansionist policy will be adopted that causes a rise in inflation. Consequently, (unless policymakers can make their announcement of low inflation *credible*), private agents expect high inflation. This anticipation is fulfilled through adaptive expectation (wage-setting behavior); so, there is higher inflation (without the benefit of increased output). Hence, unless credible announcements can be made, expansionary monetary policy will fail.

Announcements can be made credible in various ways. One is to establish an independent central bank with low inflation targets (but no output targets). Hence, private agents know that inflation will be low because an independent body sets it. Central banks can be given incentives to meet targets (for example, larger budgets, a wage bonus for the head of the bank) to increase their reputation and signal a strong commitment to a policy goal. Reputation is an important element in monetary policy implementation. But the idea of reputation should not be confused with commitment. While a central bank might have a favorable reputation due to good performance in conducting monetary policy, the same central bank might not have chosen any particular form of commitment (such as targeting a certain range for inflation). Reputation plays a crucial role in determining how much would markets believe the announcement of a particular commitment to a policy goal but both concepts should not be assimilated. Also, note that under rational expectations, it is not necessary for the policymaker to have established its reputation through past policy actions; as an example, the reputation of the head of the central bank might be derived entirely from his or her ideology, professional background, public statements, etc. In fact it has been argued that to prevent some pathologies related to the time-inconsistency of monetary policy implementation (in particular excessive inflation), the head of a central bank should have a larger distaste for inflation than the rest of the economy on average. Hence the reputation of a particular central bank is not necessary tied to past performance, but rather to particular institutional arrangements that the markets can use to form inflation expectations. Despite the frequent discussion of credibility as it relates to monetary policy, the exact meaning of credibility is rarely defined. Such lack of clarity can serve to lead policy away from what is believed to be the most beneficial. For example, capability to serve the public interest is one definition of credibility often associated with central banks. The reliability with which a central bank keeps its promises is also a common definition. While everyone most likely agrees a central bank should not lie to the public, wide disagreement exists on how a central bank can best serve the public interest. Therefore, lack of definition can lead people to believe they are supporting one particular policy of credibility when they are really supporting another (Kenneth Rogoff, 1985)

### 3.2 Interest Rate Theories

The Classical theory of interest defines the rate of interest as the element that equates savings and investment. Here investment is nothing but the demand for investible resources and savings is their supply. The rate of interest that is determined by the interaction of investment and savings is the price of the investible resources. Proponents of the classical theory of interest have different ways of looking at the theory and they may be explained as under:

- **Marshall:** According to Marshall the interest rate is the price paid for the use of capital. This rate of interest is determined by the equilibrium formed by the interaction of the aggregate demand for capital; and its forthcoming supply.
- **Taussig:** According to Taussig, the interest rate is determined at the level where the marginal productivity of capital equals the marginal installment of saving.
- **John Maynard Keynes:** According to Keynes the interest rate definitely influences the marginal propensity to save. This savings is also linked to the level of income. Hence it is concluded by Keynes that the rate of interest should be at a point where the demand curve for capital at different interest rates intersects the savings curve at a fixed income level.

### Criticism of the Classical Theory of Interest

- The fact that the demand for capital, the effect of interest on savings out of a fixed income level are all given, there should be a strong correlation between the interest rate and the income level.
- If the interest rate, the demand for capital and the sensitivity of the marginal propensity to save to a change in the interest rate are all given then the income level would be the factor that would equate savings with investment.
- Again according to the classical theory, if the demand curve for capital shifts or both shift, then the new equilibrium rate of interest would be determined at the new point of intersection. This concept is criticised to be totally wrong since the constancy of income does not tally with the notion that the two curves shift independent of each other. The shift of either of the two curves would change the income level and hence the entire assumption of fixed income level breaks down.

### Abstinence Theory of Interest

Abstinence Theory of Interest asserts that the money used for lending purposes is the money not used for consumption - which means, earning interest by abstaining from spending makes the funds possible and available for borrowers.

### Loanable Funds Theory of the Rate of Interest

Developed by Swedish economist Knut Wicksell (1851-1926), loanable funds theory of the rate of interest posits that interest rates are determined by the supply and demand of loanable funds in the capital markets. Loanable funds theory of the rate of interest suggests that investments and savings determine the long-term level of interest rates, whereas short-term rates are determined by financial and monetary conditions in the economy. It was widely accepted before the work of English economist John Maynard Keynes (1883-1946).

### Expectations Theory of Interest Rates

A theory that purports to explain the shape of the yield curve, or the term structure of interest rates. The forces that determine the shape of the yield curve have been widely debated among academic economists for a number of years. The American economist Irving Fisher advanced the expectations theory of interest rates to explain the shape of the curve. According to this theory, longer-term rates are determined by investor expectations of future short-term rates. In mathematical terms, the theory suggests that:

$$(1 + R_2)^2 = (1 + R_1) \times (1 + E(R_1))$$

where

$R_2$  = the rate on two-year securities,

$R_1$  = the rate on one-year securities,

$E(R_1)$  = the rate expected on one-year securities one year from now.

The left side of this equation is the amount per dollar invested that the investor would have after two years if he invested in two-year securities. The right side shows the amount he can expect to have after two years if he invests in one-year obligations. Competition is assumed to make the left side equal to the right side.

The theory is easily generalized to cover any number of maturity classes. And however many maturity classes there may be, the theory always explains the existence of longer-term rates in terms of expected future shorter-term rates.

The expectations theory of interest rates provides the theoretical basis for the use of the yield curve as an analytical tool by economic and financial analysts. For example, an upward-sloping yield curve is explained as an indication that the market expects rising short-term rates in the future. Since rising rates normally occur during economic expansions, an upward-sloping yield curve is a sign that the market expects continued expansion in the level of economic activity.

Financial analysts sometimes use this equation to obtain a market-related forecast of future interest rates. It can be rewritten as follows:

$$E(R_1) = [(1 + R_2)^2 / (1 + R_1)] - 1$$

The equation suggests that the short-term rate expected by the market next period can be obtained from knowledge of rates today.

### 3.3 Theories of Investment and Growth: Acceleration Principle

Acceleration principle is formulated by American economist John Maurice Clark (1884-1963).

Acceleration principle is a theory of investment in modern macroeconomics. It asserts that the level of investment is accelerated only through the rate of increase in output, which is the gross domestic product. Since the acceleration principle links investment to output, it has explanatory value also in understanding the development of business cycles. According to the acceleration principle, each level of output needs a specific amount of capital. Therefore, if output (and the capital required to procure the necessary machinery) is expected to rise, the amount of capital within an economy will also increase. The accelerator equation is:

$I = A \Delta t$ , where:

$I$  is net investment in year  $t$ ,

$A$  is the accelerator coefficient, and

$\Delta t$  is the annual change in income.

### Harrod-Domar Growth Model (20th century)

Named after English economist Roy Harrod (1900-1978) and Polish-born American economist Evsey Domar (1914-1997), Harrod-Domar growth model postulates three kinds of growth:

- (1) warranted growth (the rate of output at which firms feel they have the right level of capital and do not wish to expand or decrease investment);
- (2) natural rate of growth (corresponding to growth in the labor force);
- (3) actual growth (resulting from a change in aggregate output).

However, there are problems between actual and natural growth and warranted and actual growth. The factors that determine actual growth (propensity to save, investment) are autonomous from those factors determining natural growth (birth control, tastes of population, and so on). Disequilibrium arises in a situation in which warranted growth is different to the natural rate of growth; when equal steady growth is accompanied by full employment or a constant rate of unemployment occurs.

### 3.4 Income Theories:

#### Absolute Income Hypothesis (1936)

Absolute Income Hypothesis is proposed by English economist John Maynard Keynes (1883-1946), and has been refined extensively during the 1960s and 1970s, notably by American economist James Tobin (1918-2002).

The theory examines the relationship between income and consumption, and asserts that the consumption level of a household depends on its not relative but absolute level of income. As income rises, the theory asserts, consumption will also rise but not necessarily at the same rate.

In its developed form, absolute income hypothesis is still generally accepted.

#### Relative Income Hypothesis (1949)

Proposed by James Stemble Duesenberry (1918 ) but subsequently overtaken by other studies on the behavior of saving and consumption, relative income hypothesis states that an individual's attitude to consumption and saving is guided more by his income in relation to others than by an abstract standard of living.

'Keeping up with the Joneses' may be a more powerful incentive than the pursuit of wealth for its own sake.

#### Permanent Income Hypothesis (1957)

Developed by American economist Milton Friedman (1912-1992), in its simplest form, permanent income hypothesis states that the choices consumers make regarding their consumption patterns are determined not by current income but by their longer-term income expectations.

Measured income and measured consumption contain a permanent (anticipated and planned) element and a transitory (windfall/unexpected) element. Friedman concluded that the individual will consume a constant proportion of his/her permanent income; and that low income earners have a higher propensity to consume; and high income earners have a higher transitory element to their income and a lower than average propensity to consume.

#### Life-Cycle Hypothesis (1957)

Comprising the analysis of individual consumption patterns, life cycle hypothesis was developed by American economist Irving Fisher (1867-1947) and English economist Roy Harrod (1900-1978), before later being extended by Japanese economist Albert Ando (1929-2001) and Italian-born economist Franco Modigliani (1918-2003).

Life-cycle hypothesis assumes that individuals consume a constant percentage of the present value of their life income. This is dictated by preferences and tastes and income.

Ando and Modigliani argued that the average propensity to consume is higher in young and old households, whose members are either borrowing against future income or running down life-savings.

Middle-aged people tend to have higher incomes with lower propensities to consume and higher propensities to save.

### 3.5 Overview Of Monetary Policy In Nigeria (Before and After 1986)

Over the years, the objectives of monetary policy have remained the attainment of internal and external balance of payments. However, emphasis on techniques/instruments to achieve those objectives has changed over the years. There have been two major phases in the pursuit of monetary policy, namely, before and after 1986. The first phase placed emphasis on direct monetary controls, while the second relies on market mechanisms.

#### Monetary Policy Performance 2010

The Monetary Policy Committee (MPC) reviewed domestic economic conditions in 2009 and the challenges faced by the Nigerian economy against the backdrop of developments in the international economic and financial environments in order to chart the course for monetary and financial sector policies for 2010.

On the international economic scene, the Committee noted that developed countries that were most adversely affected by the severe economic and financial crises had started showing signs of recovery. The apparent rebound in global economic activity was being driven mainly by rising manufacturing activity, recovering housing markets and the restoration of consumer confidence. Although central banks around the world have undertaken large interest rate cuts and measures to inject liquidity into their economies, the risks still remain that the current rebound may be sluggish and that the global economy would remain credit-constrained in the near-to-medium-term, as financial institutions continue to maintain their cautious approach to credit extension.

The Committee also noted that commodity prices, including crude oil prices, have resumed an upward trend due largely to the fiscal and monetary stimuli, and the prospect of economic recovery in advanced economies. The rising commodity prices have, however, renewed concerns about the resurgence of inflation in the near-term. The Committee further noted that emerging and developing market economies, on their part, have continued to show strong resilience to the financial crises and recorded positive growth rates despite the harsh international economic and financial environment in 2009.

On the domestic scene, the MPC underscored the need for strengthening on-going reform efforts in the banking sector aimed at engendering desirable medium term economic growth path consistent with price and financial stability. It further underlined the need to fast-track the proposed reforms in some key sectors of the Nigerian economy, and in particular, the power sector, to attract the much-needed private sector/foreign investment. This, the Committee noted,

was necessary because of the benefits in terms of the growth-enhancing and employment-creating potentials that these reforms and opening-up of the sectors would have on the rest of the economy.

### **Monetary Policy Performance 2009**

The MPC is concerned about achieving the multiple objectives of a sound financial system, price and exchange rate stability, as well as ensuring that credit continues to flow to the rest of the economy," the central bank said in a statement. It said it was committed to maintaining the Naira within a band of plus or minus three percent against the dollar until further notice. A lack of clear policy from the regulator has fuelled exchange rate volatility within the year under consideration

The central bank was under pressure to stabilise the Naira and maintain low interest rates, enabling easier short-term borrowing for Nigeria's commercial banks and allowing its businesses to fund expansion plans more easily.

Nigeria significantly eased monetary policy to provide more liquidity to the system, lowering its benchmark interest rate by 50 basis points to 9.75 percent and reducing the cash reserve requirement to 2 percent from 4 percent.

"As part of the response to the global economic crisis, the Bankers Committee reached the following decisions:

"Interest Rates-- It was observed that interest rates have recently risen to levels considered to be intolerable and not supportive of the desired economic recovery. Accordingly, the bankers decided that they would not source deposits at rates above 15 per cent. They would also observe a lending rate, which will be at most 7 per cent above the deposit rate. All other charges would be at most 2 per cent. This implies that lending rates will not exceed 24 per cent at the maximum.

### **Monetary Policy Performance 2008**

In the Central Bank's effort to achieve its mandate of price stability and support the economic policy of the Federal Government, the Monetary Policy Committee (MPC) held five (5) regular meetings and one (1) special meeting at which major domestic and international macroeconomic developments were reviewed, and appropriate monetary policy measures taken and communicated to the public.

Monetary management was challenging in 2008 as a result of the liquidity surfeit in the second quarter, and the tight liquidity condition occasioned by the impact of the global financial crisis on the domestic economy in the last two quarters of the year. The major sources of the excess liquidity included the monetization of part of the excess crude oil receipts and the enhanced statutory allocations to the three tiers of government, arising from enhanced revenue from the favourable price of crude oil in the international market as well as the retirement of matured treasury bills. Consequently, in the second quarter, monetary policy was fairly contractionary encompassing aggressive utilization of the Open Market Operations (OMO), an upward review of the monetary policy rate (MPR), and additional issue of treasury bills for liquidity management. Liquidity in the financial market, particularly in the interbank segment was tight from end-August 2008, owing to the outflow of portfolio investment engendered by the global credit crunch. By end-September, monetary policy was eased to pre-empt the imminent effect of the global credit crunch on the domestic financial market. The measures included reductions of the MPR, CRR and Liquidity Ratio (LR) while discount window operations were expanded to accommodate other instruments in addition to Federal Government securities. In addition, longer tenured repo transactions were allowed against eligible securities. Following the depreciation of the naira exchange rate in the last two months of 2008, deposit money banks' foreign exchange net open position was reduced from 20.0 to 10.0 per cent of shareholders' fund and the CBN actively participated in the daily inter-bank foreign exchange market under the two-way quote in December, to stem the depreciation of the naira (CBN, Annual Report 2008).

### **Monetary Policy Performance in 2007**

The framework for monetary policy management in 2007 remained that of monetary targeting. The Central Bank of Nigeria (CBN) adopted various policy measures aimed at containing the growth of monetary aggregates in order to achieve monetary and price stability. Open Market Operations (OMO) remained the major tool of liquidity management. Other policy measures included increased issuance of treasury securities in the primary market to mop-up excess liquidity; use of deposit and lending facility to encourage inter-bank transactions as well as special sales of foreign exchange, including swap arrangements. NTBs of various tenors (91-, 182- and 364-day were auctioned during the period.

The liquidity management efforts of the CBN yielded the expected results as the single-digit inflation rate was sustained during the year. In addition, the exit reserve money target under the Policy Support Instrument (PSI) was achieved in June 2007. Over the end-December 2006 level, provisional data indicate that broad money supply (M2) grew by 11.03 per cent in June 2007 and further by 21.3 and 25.31 per cent in September and October, 2007 respectively. When annualized, the M2 grew by 28.44 and 30.25 per cent, in September and October, 2007 respectively, compared with 33.3 and 39.6 per cent in the corresponding months of 2006. The growth of M2 was driven by the increase in foreign assets (net) of the banking system as well as the rapid rise in credit to the private sector since the end of the second quarter. With the CBN's drive to contain excess liquidity in the banking system, both M2 and reserve money may be within targets by the end of 2007. At the end of the second quarter, aggregate domestic credit (net) to the economy declined by 56.11 per cent, but increased by 98.99 per cent in October 2007. Also, credit to government (net) declined by 51.9 per cent in September compared to a decline of 56 per cent at the end of the second quarter. But credit to the private sector, which had maintained an upward trend in most of 2007, rose to 34.37 and 62.0 per cent in June and September, respectively.

As at November 2007, the economy has achieved a commendable level of external reserves of about US\$50.0 billion that is capable of supporting approximately 23 months of current foreign exchange disbursements. This represented an increase of 18.06 per cent when compared with the level of US\$42.42 billion recorded in the corresponding period of 2006.

With the implementation of the new Monetary Policy Rate (MPR) and the adoption of the CBN standing facilities, volatility in inter-bank rates remained subdued with rates hovering within the MPR. The MPR was reviewed thrice

during the year. The first was in June 2007 when it was reviewed downward by 200 basis points, from 10.0 per cent to 8.0 per cent, with the width of the interest rate corridor reduced from +/- 300 to +/- 250 basis points. The second was in October 2007 when the MPR was raised by 100 basis points, from 8.0 to 9.0 per cent, with the interest rate corridor removed, in response to anticipated changes in economic and financial conditions. The MPR was then made to serve as the overnight (repo) rate. The last was in December 2007 when the MPR was increased by 50 basis points, from 9.0 to 9.5 per cent.

### **Monetary Policy Performance in 2006**

In 2006, the New Monetary Policy Framework for monetary policy implementation was introduced. The ultimate goal of the new framework was to achieve a stable value of the domestic currency through stability in short-term interest rates around an Operating Target the CBN Monetary Policy Rate (MPR). The MPR serves as an indicative rate for transactions in the inter-bank money market as well as other interest rates in the money market transactions. The MPR, which replaced the MRR, was set at 10 per cent with spread of 600 basis points around the rate, i.e. 300 basis points above and 300 basis points below. This translates into an upper limit of 13 per cent and a lower limit of 7 per cent. The Whole Sale Dutch Auction System (WDAS) replaced the Dutch Auction System (DAS) in the first quarter of the year under review. In pursuant of further liberalization of the foreign exchange market the bureaux de change was admitted into the WDAS window during the second quarter of 2006. The admittance of the BDC's to the WDAS window led to the unification of the exchange rate between official and parallel market.

The objective of monetary policy in 2006 was sustaining price stability and non inflationary growth, as enunciated in the National Economic Empowerment and Development Strategy (NEEDS).

The target for single digit inflation was, however, achieved as at December 2006 the inflation stood at 8.5 per cent.

The GDP growth rate for 2006 declined to 5.63 per cent compared with what obtained in 2005 when it stood at 6.51 per cent, but the external reserves rose rapidly from US\$28.3 billion to US\$41.9 billion, representing an increase of US\$ 13.6 billion.

At the end of 2006, the overall performance indicated that the broad money supply (M2) target was overshoot as it grew by 30.6 per cent compared with the target of 27.8 per cent. The Reserve money target for December 2006 was missed. The actual Reserve money (RM) at end December stood at N974.9 billion, compared with the target of N 820 Billion.

The non-attainment of RM target at end December was largely due to the rapid growth in currency in circulation.

### **Monetary Policy Before 1986**

The economic environment that guided monetary policy before 1986 was characterized by the dominance of the oil sector, the expanding role of the public sector in the economy and over-dependence on the external sector. In order to maintain price stability and a healthy balance of payments position, monetary management depended on the use of direct monetary instruments such as credit ceilings, selective credit controls, administered interest and exchange rates, as well as the prescription of cash reserve requirements and special deposits. The use of market-based instruments was not feasible at that point because of the underdeveloped nature of the financial markets and the deliberate restraint on interest rates.

The most popular instrument of monetary policy was the issuance of credit rationing guidelines, which primarily set the rates of change for the components and aggregate commercial bank loans and advances to the private sector. The Sectoral allocation of bank credit in CBN guidelines was to stimulate the productive sectors and thereby stem inflationary pressures. The fixing of interest rates at relatively low levels was done mainly to promote investment and growth. Occasionally, special deposits were imposed to reduce the amount of free reserves and credit-creating capacity of the banks. Minimum cash ratios were stipulated for the banks in the mid-1970s on the basis of their total deposit liabilities, but since such cash ratios were usually lower than those voluntarily maintained by the banks, they proved less effective as a restraint on their credit operations.

From the mid-1970s, it became increasingly difficult to achieve the aims of monetary policy. Generally, monetary aggregates, government fiscal deficit, GDP growth rate, inflation rate and the balance of payments position moved in undesirable directions. Compliance by banks with credit guidelines was less than satisfactory. The major source of problems in monetary management was the nature of the monetary control framework, the interest rate regime and the non-harmonization of fiscal and monetary policies. The monetary control framework, which relied heavily on credit ceilings and selective credit controls, increasingly failed to achieve the set monetary targets as their implementation became less effective with time. The rigidly controlled interest rate regime, especially the low levels of the various rates, encouraged monetary expansion without promoting the rapid growth of the money and capital markets. The low interest rates on government debt instruments did not sufficiently attract private sector savers and since the CBN was required by law to absorb the unsubscribed portion of government debt instruments, large amounts of high-powered money were usually injected into the economy. In the oil boom era, the rapid monetization of foreign exchange earnings resulted in large increases in government expenditure, which substantially contributed to monetary instability. In the early 1980s, oil receipts were not adequate to meet increasing levels of demands and since expenditures were not rationalized, government resorted to borrowing from the Central Bank to finance huge deficits. This had adverse implications for monetary management.

### **Monetary Policy Since 1986**

The Structural Adjustment Programme (SAP) was adopted in July, 1986 following the crash in the international oil market and the resultant deteriorating economic conditions in the country. It was designed to achieve fiscal balance and balance of payments viability by altering and restructuring the production and consumption patterns of the economy. These would be achieved by eliminating price distortions, reducing heavy dependence on crude oil exports and consumer goods imports, enhancing the non-oil export base and achieving sustainable growth. Other aims were to rationalize the role of the public sector and accelerate the growth potentials of the private sector. The main strategies of the programme

were the deregulation of external trade and payments arrangements, the adoption of a market-determined exchange rate for the Naira, substantial reduction in complex price and administrative controls and more reliance on market forces as a major determinant of economic activity.

The objectives of monetary policy since 1986 remained the same as in the earlier period, namely: the stimulation of output and employment, and the promotion of domestic and external stability. In line with the general philosophy of economic management under SAP, monetary policy was aimed at inducing the emergence of a market-oriented financial system for effective mobilization of financial savings and efficient resource allocation. The main instrument of the market-based framework is the open market operations. This is complemented by reserve requirements and discount window operations. The adoption of a market-based framework such as OMO in an economy that had been under direct control for long, required substantial improvement in the macroeconomic, legal and regulatory environment.

In order to improve macroeconomic stability, efforts were directed at the management of excess liquidity; thus a number of measures were introduced to reduce liquidity in the system. These included the reduction in the maximum ceiling on credit growth allowed for banks; the recall of the special deposits requirements against outstanding external payment arrears to CBN from banks, abolition of the use of foreign guarantees/currency deposits as collaterals for Naira loans and the withdrawal of public sector deposits from banks to the CBN. Also effective August 1990, the use of stabilization securities for purposes of reducing the bulging size of excess liquidity in banks was re-introduced. Commercial banks' cash reserve requirements were increased in 1989, 1990, 1992, 1996 and 1999.

The rising level of fiscal deficits was identified as a major source of macroeconomic instability. Consequently, government agreed not only to reduce the size of its deficits but also to synchronize fiscal and monetary policies. By way of inducing efficiency and encouraging a good measure of flexibility in banks' credit operations, the regulatory environment has improved. Consequently, the sector-specific credit allocation targets were compressed into four sectors in 1986, and to only two in 1987. From October, 1996, all mandatory credit allocation mechanisms were abolished. The commercial and merchant banks were subjected to equal treatment since their operations were found to produce similar effects on the monetary process. Areas of perceived disadvantages to merchant banks were harmonized in line with the need to create a conducive environment for their operations. The liquidity effect of large deficits financed mainly by the Bank led to an acceleration of monetary and credit aggregate in 1998, relative to stipulated targets and the performance in the preceding year. Outflow of funds through the CBN weekly foreign exchange transaction at the Autonomous Foreign Exchange Market (AFEM) and, to a lesser extent, at Open Market Operation (OMO) exerted some moderating effect.

The reintroduction of the Dutch Auction system (DAS) of foreign exchange management in July, 2002 engendered relative stability, and stemmed further depletion of reserves during the second half of 2002. However, the financial system was typically marked by rapid expansion in monetary aggregates, particularly during the second half of 2000, influenced by the monetization of enhanced oil receipts. Consequently, monetary growth accelerated significantly, exceeding policy targets by substantial margins. Savings rate and the inter-bank call rates fell generally due to the liquidity surfeit in the banking system though the spread between deposit and lending rates remained wide. CBN Annual Report Report, 2006).

### 3.6 Economic Reforms And Monetary Policy In Nigeria

Direct controls, pervasive government intervention in the financial system resulting in the stifling of competition and resource misallocation, necessitated the introduction of the Structural Adjustment Programme (SAP) in 1986. SAP was a comprehensive economic restructuring programme which emphasized increased reliance on market forces. In line with this orientation, financial sector reforms were initiated to enhance competition, reduce distortion in investment decisions and evolve a sound and more efficient financial system. The reforms, which focused on structural changes, monetary policy, interest rate administration and foreign exchange management, encompass both financial market liberalization and institutional building in the financial sector. The broad objectives of financial sector reform include:

- Removal of controls on interest rates to increase the level of savings and improve allocative efficiency;
- Elimination of non-price rationing of credit to reduce misdirected credit and increase competition;
- Adoption of indirect monetary management in place of the imposition of credit ceiling on individual banks;
- Enhancing of institutional structure and supervision;
- Strengthening the money and capital markets through policy changes and distress resolution measures;
- Improving the linkages between formal and informal financial sectors.

According to Soyibo et-al (2004), Financial sector reforms were expected to ensure that interest rates were positive in real terms and to encourage savings, thereby ensuring that investment funds would be readily available to the real sector for borrowing from the banks. Besides this, the reforms were expected to lead to financial deepening and widening and as a result bring about competition in the financial sector. Customers of banks and NBFIs, alike, would then have a variety of different institutions and products to choose from.

### 3.7 Inflationary Expectations

According to the theory of rational expectations, people form an expectation of what will happen to inflation in the future. They then ensure that they offer or ask a *nominal interest rate* that means they have the appropriate real interest rate on their investment.

This is given by the formula:

$$i_n = i_r + p_e$$

where:

$i_n$  = offered nominal interest rate

$i_r$  = desired real interest rate

$p_e$  = inflationary expectations

### Risk

The level of risk in investments is taken into consideration. This is why very volatile investments like shares and junk bonds have higher returns than safer ones like government bonds.

The extra interest charged on a risky investment is the risk premium. The required risk premium is dependent on the risk preferences of the lender.

If an investment is 50% likely to go bankrupt, a risk-neutral lender will require their returns to double. So for an investment normally returning \$100 they would require \$200 back. A risk-averse lender would require more than \$200 back and a risk-loving lender less than \$200. Evidence suggests that most lenders are in fact risk-averse.

Generally speaking a longer-term investment carries a **maturity risk premium**, because long-term loans are exposed to more risk of default during their duration.

### Liquidity preference

Most investors prefer their money to be in cash than in less fungible investments. Cash is on hand to be spent immediately if the need arises, but some investments require time or effort to transfer into spendable form. This is known as liquidity preference. A 1-year loan, for instance, is very liquid compared to a 10-year loan. A 10-year US Treasury bond, however, is liquid because it can easily be sold on the market.

### 3.8 A market interest-rate model

A basic interest rate-pricing model for an asset

$$i_n = i_r + p_e + rp + lp$$

Assuming perfect information,  $p_e$  is the same for all participants in the market, and this is identical to:

$$i_n = i_n^* + rp + lp$$

where

$i_n$  is the nominal interest rate on a given investment

$i_r$  is the risk-free return to capital

$i_n^*$  = the nominal interest rate on a short-term risk-free liquid bond (such as U.S. Treasury Bills).

$rp$  = a risk premium reflecting the length of the investment and the likelihood the borrower will default

$lp$  = liquidity premium (reflecting the perceived difficulty of converting the asset into money and thus into goods).

### 3.9 Interest Rates In Macroeconomics

#### Output and unemployment

Interest rates are the main determinant of investment on a macroeconomic scale. Broadly speaking, if interest rates increase across the board, then investment decreases, causing a fall in national income.

A government institution, usually a central bank, can lend money to financial institutions to influence their interest rates as the main tool of monetary policy. Usually Central Bank interest rates are lower than commercial interest rates since banks borrow money from the Central Bank then lend the money at a higher rate to generate most of their profit.

By altering interest rates, the government institution is able to affect the interest rates faced by everyone who wants to borrow money for economic investment. Investment can change rapidly in response to changes in interest rates and the total output.

### 3.10 Inflation: Causes, Effect and Measures

Inflation means a persistent rise in the price levels of commodities and services, leading to a fall in the currency's purchasing power. The problem of inflation used to be confined to national boundaries, and was caused by domestic money supply and price rises. In this era of globalization, the effect of economic inflation crosses borders and percolates to both developing and developed nations.

Central bankers believe that mild inflation, in the 1 to 2 per cent range, is the most benign for a country's economy. High inflation, stagflation or deflation are all considered to be serious economic threats.

#### Causes of Economic Inflation

The following factors can lead to inflation:

- Printing too much money. This is called a loose or expansionary monetary policy. If there is a lot of money going around, then supply is plentiful compared to the products you can buy with that money. The law of supply and demand therefore dictates that prices will rise.
- Increases in production costs.
- Tax rises.
- Declines in exchange rates.
- Decreases in the availability of limited resources such as food or oil.
- War or other events causing instability.

Economists generally believe that money supply is the key cause of inflation; in 2008, however, skyrocketing prices of oil, food and steel caused runaway levels of inflation in the world economy that collapsed only because of the global Financial Crisis.

#### Economic Effects of Inflation

One of the economic effects of inflation is the change in the marginal cost of producing money. This involves the appropriate 'price' of money, which, in this case, is the nominal rate of interest. This 'price' indicates the return, which has to be pre-determined to hold back the printing presses, in place of some other assets, which offer the market interest rate.



In addition, if a country has a higher rate of inflation than other countries, its balance of trade is likely to move in an unfavorable direction. This is because there is a decline in its price competitiveness in the global market.

A high rate of inflation can cause the following economic impediments:

- The value of investments are destroyed over time.
- It is economically disastrous for lenders.
- Arbitrary governmental control of the economy to control inflation can restrain economic development of the country.
- Non-uniform inflation can lead to heavy competition in the global market and threaten the existence of small economies.
- High levels of inflation tend to lead to economic stagnation.

### Measures to Control Inflation

The central banks, monetary authorities or finance ministries of most nations have the authority to take economic measures to control rising inflation by regulating the following factors:

- Reducing the central bank interest rates and increasing bank interest rates.
- Regulating fixed exchange rates of the domestic currency.
- Controlling prices and wages.
- Providing cost of living allowance to citizens in order to create demand in the market.

Different schools of thought emphasize different factors as the root cause of inflation. However, there is a consensus on the view that economic inflation is caused either by an increase in the money supply or a decrease in the quantity of goods being supplied, and that the effects of either high inflation or deflation are extremely damaging to the economy.

### 3.11 Deficit GDP and interest rate

Wachtel and Young (1987) discovered that a 1 percentage increase in the projected deficit-GDP ratio raises interest rates on the order of 6 to 16 basis points. Similarly, study by Cohen and Garnier (1991) indicated a significant positive effect of deficit-GDP ratio on interest rates. A 1 percentage increase in deficit-GDP ratio is projected to raise interest rates on the order of 40 to 55 basis points. Laubach (2003) discovered that fiscal deficit has a significant effect on interest rate. A one percentage increase in the projected deficit-to-GDP ratio is estimated to raise long term interest rates by approximately 25 basis points. Similarly, interest rate rises by about 4 basis points in response to a percentage point in the projected debt-GDP ratio. Similarly, Stephen Miller and Frank Russek (1990) Elmendorf (1993) and Canzoneri et al (2002) and Shapiro (2004) suggested that rising interest rates are associated with federal deficits. Moreover, Gale and Orszag (2003) indicated that a projected rise in the budget deficits-GDP ratio of 1 percentage result in an increase in the long term interest rates by 0.4 to 0.6 percentage points. In the same manner, Qiang Dai and Thomas Phillipon (2004) findings indicated that a 1 percentage point increase in the deficits increases 10 year (interest) rate by 41 basis points. Furthermore, Kimberly (2008) indicated that expected future fiscal deficits increases current long term interest rates. Patnaik (2000 and 2001) reported that, given money supply, fiscal deficits may raise interest rate by increasing the demand for money. He argued further that the link would be effective only if bank credit had supply-constrained. In India, Deepak Lal et al (2001) observed that the financing of large fiscal deficits (sales of bonds) has led to higher real interest rates and crowding out of private investment. Surprisingly, Bhalla (1995) argued that, because of the floor on interest rates, causation does not run from high fiscal deficits to high interest rates in India. The author concluded that, causation runs from high interest rates to high fiscal deficits, and that to reduce deficits, interests should be reduced. As reported by Gosselin and Lalonde (2005), real interest rates rise by 3 basis points for every 1-percentage point increase in the government debt-to-GDP ratio. According to Dellas et al (2005) the effect of deficits on interest rates increases with financial openness.

Ari Aisen and David Hauner (2007) discovered overall highly significant positive impact of budget deficits on interest rates, but the impact depends on interaction term and is only significant when deficits are high, mostly domestically financed or interact with high domestic debt, when financial openness is low, interest rate liberalized or financial depth is low.

## 4.0 METHODOLOGY

This research work employed secondary data from annual report of Central Bank of Nigeria, and CBN Statistical Bulletin on Interest rates for lending, Gross National Saving at cost price, Inflation, Gross Fixed Capital Formation, Gross Domestic Products, Gross Investment Minimum Rediscount Rate and National Income from 1981 to 2008.

### 4.1 Model Specification

This study employ macroeconomic model as follows:

$$IR = a + bInv. + cInfl + dSav + eInc + fGDP + gCF + hMRR + \Phi$$

Int = Interest rate (Lending Rate/ Cost of Capital)

a = autonomous Interest rate

b = coefficient of Investment

Inv = investment

c = coefficient of Inflation

Infl = Inflation

d = coefficient of saving

Sav = National Saving

e = Coefficient of Income

NInc = National Income

f = Coefficient of realGDP

gdp = Real Gross Domestic Product as a measure of output

g = Coefficient of Capital Formation

CF = Capital Formation

h = coefficient of MRR

MRR = Minimum Rediscount Rate

$\Phi$  = Random error /stochastic variable

#### 4.2 Reduction Equation of the Model

$$\text{Intr} = a + b \ln \text{Inv} + c \ln \text{Infl} + d \ln \text{Sav} + e \ln \text{Inc} + f \ln \text{gdp} + g \ln \text{cf} + h \text{mrr} + \Phi$$

Intr = Log of Interest rate (Lending Rate/ Cost of Capital)

a = autonomous Interest rate

b = coefficient of Investment

lnrInv = Log of investment

c = coefficient of Inflation

lnInfl = Log of Inflation

d = coefficient of saving

lnSav = Log of National Saving

e = Coefficient of Income

lnInc = Log of National Income

f = Coefficient of Real GDP

lngdp = Log of Gross Domestic Product as a measure of output

g = Coefficient of Capital Formation

lnrcf = Log of Capital Formation

h = coefficient of MRR

mrr = Minimum Rediscount Rate

$\Phi$  = Random error /stochastic variable

#### 4.3 Theoretical Framework

Generally speaking, a higher real interest rate reduces the broad money supply. Through the quantity theory of money, increases in the money supply lead to inflation.

Interest rates are the main determinant of investment on a macroeconomic scale. Broadly speaking, if interest rates increase across the board, then investment decreases, causing a fall in national income.

Acceleration principle asserted that the level of investment is accelerated only through the rate of increase in output, which is the gross domestic product.

The association between interest rates and economic growth as recognised in the literature on growth can be found in the neoclassical growth framework and the McKinnon-Shaw hypothesis. For instance, McKinnon-Shaw (1973) argued that financial repression – indiscriminate distortions of financial prices including interest rates – reduces real rate of growth. One of the basic arguments of McKinnon-Shaw model is an investment function that responds negatively to the effective real loan rate of interest and positively to the growth rate. McKinnon-Shaw school expects financial liberalisation to exert a positive effect on the rate of economic growth in both the short and medium runs. Albu (2006) used two partial models to investigate the impact of investment on GDP growth rate and the relationship between interest rate and investment in the case of Romanian economy.

The models are specified as:

$$r(\_) = a\_\_ + b$$

$$\_ (I) = c / (d + i)$$

Where; r = GDP growth rate,  $\_$  = investment rate, i = interest rate, p = inflation, a, b, c, and d are parameters to be estimated. He found that the behaviour of the national economic

system and the interest rate - investment – economic growth relationships tend to converge to those demonstrated in a normal market economy. Oosterbaan et al. (2000) estimated the relationship between the annual rate of economic growth (YC) and the real rate of interest (RR) in equations of the basic form:

$$YC = \_0 + \_1(RR + \_2).(RR + \_2)$$

The study shows the effect of a rising real interest rate on growth and claimed that growth is maximized when the real rate of interest lies within the normal range of say, - 5 to +15%. De Gregorio and Guidotti (1995) cited in Oosterbaan et al. (2000) suggest that the relationship between real interest rates and economic growth might resemble an inverted U-curve: Very low (and negative) real interest rates tend to cause financial disintermediation and hence to reduce growth. However, the World Bank reports, cited in Oosterbaan, et al. (2000) show a positive and significant cross-section relationship between average growth and real interest rates over the period 1965 to 1985.

#### STATEMENT OF HYPOTHESES:

##### HYPOTHESIS 1

H<sub>0</sub>: Interest rate has negative relationship with investment

H<sub>1</sub>: Interest has positive relationship with investment

##### HYPOTHESIS 2

H<sub>0</sub>: Interest rate has negative relationship with inflation

H<sub>1</sub>: Interest has positive relationship with inflation

##### HYPOTHESIS 3

H<sub>0</sub>: Interest rate has negative relationship with saving

H<sub>1</sub>: Interest has positive relationship with saving

**HYPOTHESIS 4**

H<sub>0</sub>: Interest rate has negative relationship with income

H<sub>1</sub>: Interest has positive relationship with income

**HYPOTHESIS 5**

H<sub>0</sub>: Interest rate has negative relationship with Gross Domestic Products

H<sub>1</sub>: Interest has positive relationship with Gross Domestic Products

**HYPOTHESIS 6**

H<sub>0</sub>: Interest rate has negative relationship with Capital Formation

H<sub>1</sub>: Interest has positive relationship with Capital Formation

**HYPOTHESIS 7**

H<sub>0</sub>: Interest rate has negative relationship with Minimum Rediscount Rate

H<sub>1</sub>: Interest rate has positive relationship with Minimum Rediscount Rate

**5.0 DATA PRESENTATION AND ANALYSIS**

Table 1 below presents data for this study from 1981 to 2008. This paper employed Multiple Regression Analysis of the economic variables viz: Gross National Saving at cost price, Inflation, Gross Fixed Capital Formation, Gross Domestic Products, Gross Investment and National Income from 1981 to 2008.

**PRESENTATION OF DATA:****Table 1: Variables Considered for Regression Analysis**

YEAR	irt	mrr	gns	infr	gfcf	gdp	gi	ninc
1981	10	6	6769.9	20.9	12215	205685.3	45,962.01	154,436.57
1982	11.75	8	7514.4	7.7	10922	199685.3	35,916.66	135,216.61
1983	11.5	8	9443.9	23.2	8135	185598.1	29,246.50	123,333.68
1984	13	10	10988.1	39.6	5417	183563	19,868.00	128,257.11
1985	11.75	10	12521.8	5.5	5573	201036.3	18,317.33	135,780.60
1986	12	10	13934.1	5.4	7323	205971.4	14,112.96	100,494.13
1987	19.2	12.75	18676.3	10.2	10661.1	204806.5	17,396.00	97,764.47
1988	17.6	12.75	23249	38.3	12383.7	219875.6	19,428.05	104,004.41
1989	24.6	18.5	23801.3	40.9	18414.1	236729.6	22,647.23	117,912.60
1990	27.7	18.5	29651.2	7.5	30626.8	267550	22,273.10	131,898.52
1991	20.8	14.5	37738.2	13	35423.9	265379.1	33,769.15	132,860.79
1992	31.2	17.5	55116.8	44.5	58640.3	271365.5	41,988.38	131,443.74
1993	336.09	26	85027.9	57.2	80948.1	274833.3	53,102.37	132,690.12
1994	21	13.5	108460.5	57	85021.9	275450.6	52,198.00	134,020.24
1995	20.79	13.5	108490.3	72.8	114476.3	281407.4	45,405.00	137,984.59
1996	20.86	13.5	134,503.20	29.3	172105.7	293745.4	40,455.00	163,881.89
1997	23.32	13.5	177648.7	8.5	205553.2	302022.5	41,969.11	152,742.53
1998	21.34	14.31	200065.1	10	192984.4	310890.1	44,071.84	137,536.36
1999	27.19	18	277667.5	6.6	175735.8	312183.5	44,072.94	153,563.91
2000	21.55	13.5	385045.4	6.9	268894.5	329178.7	55,004.34	191,708.15
2001	21.34	14.31	488045.4	18.9	371897.9	356994.3	65,420.23	188,487.43
2002	30.19	19	592094	12.9	438114.9	433203.5	101,195.43	189,806.85
2003	22.88	15.75	655739.7	14	429230	477533	93,570.42	214,034.68
2004	20.82	15	797517.2	15	470413.0333	527576	103,377.44	244,465.80
2005	19.49	13	1316957.4	17.9	499079.0833	561931.4	129,976.61	287,615.78
2006	18.7	12.25	1739636	8.2	527745.1333	595821.6	145,381.02	322,286.52
2007	18.75	9	2693554.3	5.4	556411.1833	634251.1	163,584.11	359,077.07
2008	21.18	10	4118172.8	14.6	585077.2333	674889	181,787.21	395,867.62

Sources: Collated from CBN Statistical Bulletin and CBN Annual Reports.

Table 2: Multiple Regression Results

Dependent Variable: IRT

Method: Least Squares

Date: 04/08/10 Time: 11:26

Sample: 1981 2008

Included observations: 28

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFR	0.015248	0.519781	0.029335	0.9769
LNCF	-9.39E-05	0.000173	-0.542091	0.5937
LNGDP	-0.000944	0.000389	-2.425841	0.0249
LNGI	0.002259	0.001034	2.184026	0.0410
LNGNS	-8.79E-06	2.75E-05	-0.319690	0.7525
LNINC	0.000761	0.000652	1.167541	0.2567
MRR	14.14707	2.684017	5.270858	0.0000
C	-94.54904	84.73861	-1.115773	0.2777
R-squared	0.671733	Mean dependent var		31.30679
Adjusted R-squared	0.556840	S.D. dependent var		59.98653
S.E. of regression	39.93320	Akaike info criterion		10.44725
Sum squared resid	31893.21	Schwarz criterion		10.82788
Log likelihood	-138.2615	F-statistic		5.846578
Durbin-Watson stat	2.353023	Prob(F-statistic)		0.000852

## 6.0 INTERPRETATION OF RESULTS

The standard error of inflation rate is greater than half of the coefficient of inflation rate (i.e.  $s(c) > c/2$ ), thus the foregoing result shows that this estimate is statistically insignificant and this means we accept null hypothesis ( $H_0$ ) and reject alternative hypothesis ( $H_1$ ). Also the standard error of gross domestic product is greater than half the of the coefficient of gross domestic product (i.e.  $s(f) > f/2$ ), thus the foregoing result shows that this estimate is statistically insignificant and this means we accept null hypothesis ( $H_0$ ) and reject alternative hypothesis ( $H_1$ ). The standard error of capital formation is greater than half of the coefficient of capital formation (i.e.  $s(g) > g/2$ ), thus the foregoing result shows that this estimate is statistically insignificant and this means we accept null hypothesis ( $H_0$ ) and reject alternative hypothesis ( $H_1$ ). The standard error of gross investment is less than half of the coefficient of gross investment (i.e.  $s(b) < b/2$ ), thus the foregoing result shows that this estimate is statistically significant and this means we reject null hypothesis ( $H_0$ ) and accept alternative hypothesis ( $H_1$ ). While the standard error of gross national saving is greater than half of the coefficient gross national saving (i.e.  $s(d) > d/2$ ), thus the foregoing result shows that this estimate is statistically insignificant and this means we accept null hypothesis ( $H_0$ ) and reject alternative hypothesis ( $H_1$ ). However, standard error of minimum rediscount rate is less than half of the coefficient of minimum rediscount rate (i.e.  $s(h) < h/2$ ), thus the foregoing result shows that this estimate is statistically significant and this means we reject null hypothesis ( $H_0$ ) and accept alternative hypothesis ( $H_1$ ).

The standard error of national income is greater than half of the coefficient of national income (i.e.  $s(e) > e/2$ ), thus the foregoing result shows that this estimate is statistically insignificant and this means we accept null hypothesis ( $H_0$ ) and reject alternative hypothesis ( $H_1$ ).

Using the statistical t-test for the estimates at degree of freedom  $N-K = 28-8 = 20$ , we find the table value of  $t^*$  at 5 % level of significant to be 2.086. Thus, the estimated values of  $t^*$  for inflation rate, gross domestic product, capital formation, national saving, and national income fall within the acceptance region (i.e.  $-t_{0.025} < t^* < +t_{0.025}$ ), which means that null hypotheses of the foregoing mentioned variables will be accepted while the alternative hypotheses of the same variables will be rejected. While the investment and minimum rediscount rate fall within the critical region, thus the statement explained the rejection of null hypothesis ( $H_0$ ) and acceptance of alternative hypothesis ( $H_1$ ) for both investment and minimum rediscount rate.

The R- Square value from the above regression table is 0.671733 (i. e. coefficient of determination), which measures the positive correlation coefficient of variables in the equation. Thus, all the independent variables viz: inflation rate, gross domestic product, capital formation, national saving,, national income, investment and minimum rediscount rate of the equation explain 67% of the total variation in interest rate.

The table value of F- statistics is 2.45 at  $v_1 = 8$  and  $v_2 = N-K = 20$  (degree of freedom), while the regression analysis shows the estimated value of F-statistics equal 5.846, the foregoing measure the high level of significant of the estimated

equation. In addition Durbin Watson statistics value is 2.353, which also measure the high level of significant of the estimated equation.

## 7.0 SUMMARY OF FINDINGS

The following are the summary of findings of this research work:

- that interest rate has positive relationship with investment,
- that interest rate has negative relationship with inflation
- that interest rate has negative relationship with saving
- that interest rate has negative relationship with income
- that interest rate has negative relationship with Gross Domestic Products
- that interest rate has negative relationship with Capital Formation
- that interest rate has positive relationship with Minimum Rediscount Rate
- that the estimated equation is significant with the value of F-statistics equal 5.846
- that all the variables in the equation are positively correlated with  $r = 0.81$ .

## 8.0 DISCUSSIONS AND CONCLUSION

Theoretically, interest rates are the main determinant of investment on a macroeconomic scale, thus the higher the interest rate, the lower the investment. However, contrary to the theoretical background the result of this research work shows a positive relationship between interest rate and investment. Investment can change rapidly in response to changes in interest rates and the total output. Also it has been established theoretically that if interest rates increase across the board, then investment decreases, causing a fall in national income. Thus, this research work shows that interest rate has a negative relationship with income, which complied with the theory. The higher the interest rate the lower the income. Also, government used a higher real interest rate to reduce broad money supply, thus reduces the income level.

The quantity theory of money, indicate that increases in the money supply lead to inflation, thus the result of this research work shows that there exists a negative relationship between interest rate and inflation rate, which shows that a reduction in interest rate can lead to increase in investment which may lead to increase in the money supply. .

Acceleration principle asserted that the level of investment is accelerated only through the rate of increase in output, which is the gross domestic product. However, the foregoing comply with the result of this research work which reflects that there exists a negative relationship between interest rate and gross domestic products or output if the interest rate is reduced for the purpose of increasing investment level.

According to classical theory, the rate of interest that is determined by the interaction of investment and savings is the price of the investible resources. The result of this research work shows a negative relationship between interest rate and national saving, but established a good interaction between investment and savings which stipulated that interest rate being measured in this research work is also the price of an investible resources.

The negative or inverse relationship between interest rate and gross domestic product complied with the findings of De Gregorio and Guidotti (1995) cited in Oosterbaan et al. (2000), which stated that the relationship between real interest rates and economic growth might resemble an inverted U-curve: Very low (and negative) real interest rates tend to cause financial dis-intermediation and hence to reduce growth.

Theoretically, interest rate has positive relationship with minimum rediscount rates (MRR), the higher the minimum rediscount rate from Central Bank, the higher the interest rate charged by the commercial banks, this is also hold in this research work with the existence of positive relationship between interest rate and minimum rediscount rate.

## 9.0 POLICY RECOMMENDATION

The following policy recommendations are suggested for efficient and sustainable macroeconomic stability in Nigeria:

- that Nigeria government should encourage disciplined financial sector;
- that Central Bank of Nigeria should use the monetary policy to manage the macroeconomic variables;
- that bank lending interest rate should be regulated to enhance investment opportunities;
- that Central Bank of Nigeria should support the capital base of banks for the purpose of investment and development of real sector of the economy;
- that Nigeria government should change from mono-product economy to multi-product economy, this will enhance job creation for the unemployed citizens;
- that government should work toward price stability and installing single digit inflation rate in the country;
- that government should reduce the minimum rediscount rate in order to enhance investment through low interest rates;
- that government should ensure adequate insurance for banks in order to create confidence for the depositors for the purpose of increase saving and capital formation;
- that government should enhance proper financial institutional structure and supervision;
- that government should strengthening the money and capital markets through policy changes and distress resolution measures; and
- that government should improve the linkages between formal and informal financial sectors.

## REFERENCES

A Ando and F Modigliani, 'Tests of the Life Cycle Hypothesis of Saving: Comments and Suggestions', Oxford Institute of Statistics Bulletin, vol. xix (May, 1957), 99-124

Albu L (2006). 'Trends in the Interest Rate – Investment – GDP Growth Relationship', Romanian J. Econ. Forecast No. 3.

- Anyanwu, J. C. Do Fiscal Deficits Produce High Interest Rates?: The Case of Nigeria, Ghana and the Gambia, CBN Economic and Financial Review, Vol. 36, No. 1, 1998
- Aisen, A. and Hauner, D. Budget Deficits and Interest Rates: A Fresh Perspective, IMF Discussion Series, November 2007
- Bhalla, S. This Time, It Is Already Different: A Personal Perspective, Deutsche Bank, December 7, 1995.
- CBN Statistical Bulletins. (2008)
- CBN Annual Report, (2009).
- CBN, Annual Report (2008).
- Canzoneri, M. B., Cumby, R. E. and Diba, B. Should the European Central Bank and the Federal Reserve be Concerned About Fiscal Policy? Paper Presented at a Symposium held on “Re-Thinking Stabilization Policy”, Federal Reserve Bank of Kansas City, August 2002
- Cohen, D. and Garnier, O. The Impact of Forecasts of Budget Deficits on Interest Rates in the United States and other G-7 Countries, Federal Reserve Board, 1991
- Dellas, H., Nuesser, K. and Walti, M. Fiscal Policy in Open Economies, Working Paper, Department of Economics, University of Bern Switzerland, 2005
- Elmendorf, D. W. Actual Budget Deficit Expectations and Interest Rates, Harvard Institute of Economic Research, May 1993
- Gale, W. G. and Peter, O. Economic Effects of Sustained Budget Deficits, National Tax Journal Vol. 56 No. 3, 2003, pp. 463-485
- Gosselin, M. A. and Lalonde, R. MUSE: The Bank of Canada’s New Projection Model of United States Economy, Bank of Canada Technical Report, No. 6, 2005
- Kenneth Rogoff, 1985. "The Optimal Commitment to an Intermediate Monetary Target" Quarterly Journal of Economics #100, pp. 1169–1189
- Laubach, T. New Evidence on the Interest Rate Effects of Budget Deficits and Debt, Board of Governors of the Federal Reserve System, May 2003
- McKinnon- Shaw (1973)
- Patnaik, P. On Some Common Macroeconomic Fallacies, Economic and Political Weekly, Vol. 35 No. 15, April 2000, pp. 1220-1222
- Oosterbaan MS, Der Windt NV, Steveninck TRV, Oosterbaan MS (2000). ‘Determinants of Growth’ (Ed). Available at <http://books.google.co.uk/books>.
- Qiang Dai and Thomas Phillipon (2004)
- R F Harrod, Towards a Dynamic Economics (London, 1948);
- Rose W. Ngugi, Interest Rate Spread in Kenya. African Economic Research Consortium, Nairobi Paper 106 (May 2001)
- Shaw E (1973). Financial Deepening in Economic Development. New York: Oxf. Univ. Press.
- Shapiro, D. M. Federal Government Debt and Interest Rates, in “Discussion of Engen and Hubbard”, NBER Macroeconomics Annual Conference, June 2004
- Sidney Homer, Richard Eugene Sylla, Richard Sylla (1996). *A History of Interest Rates*. Rutgers University Press. pp. 509. ISBN 0813522889.
- Soyibo A, Olayiwola K (2000). ‘Interest rate Policy and the Promotion of Savings Investment and Resource Mobilisation in Nigeria’, Research Report 24, Development Policy Centre, Ibadan.
- Miller, S. M. and Russek, F.S. The Temporal Causality between Fiscal Deficits and Interest Rates, Paper Presented at the Western Economic Association, International 65th Annual Conference, San Diego, June 1990
- Wachtel, P. and Young, J. Deficit Announcements and Interest Rates, American Economic Review 77, 1987, pp. 1007-1012
- World Bank Policy Research Bulletin, Vol. 4 No. 3, May-July 1993