
IMPACT OF INTEREST RATE ON MONEY MARKET INSTRUMENTS IN NIGERIA: 1981 TO 2014

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Abstract

This study is on the impact of interest rate on money market instruments in Nigeria. The major objective of the study is to examine the impact of interest rate on investment decisions in Nigeria with particular focus on money market instruments. The study adopted the ex-post facto research design, and time series data for a period of thirty three-years (1981- 2014). Data was sourced from the Central Bank of Nigeria Statistical Bulletin. Four hypotheses were proposed and tested. The Ordinary Least Square regression and correlation were used to test the hypothesis. The interest rate represented by the treasury bill rate and the monetary policy rate was used as the independent variable while the money market instrument represented by the outstanding of commercial paper and treasury bill was used as the dependent variable. The findings revealed that treasury bills outstanding represented by logtbill shows negative and significant relationship to MPR and positive and significant relationship to TBR. That Commercial Papers outstanding represented by logcp shows negative and significant relationship to TBR and positive and significant relationship to MPR. Also, that a strong positive and significant correlation exists between investment in commercial papers and investment in treasury bills in the Nigerian money market. Finally that a strong positive and significant correlation exists between treasury bill rate and monetary policy rate in the Nigerian money market. It is therefore recommended that appropriate regulation of interest rate be made and strict compliance enforced, with the sole objective of driving investment in the money market. Also, that interest rate should be given more priority in the formulation of monetary policy given its relationship with money market instruments. Treasury Bills and Commercial Papers are chosen for this research work because, they are always in high demand by investors because the treasury bills are government securities while the commercial paper are being offered by blue chip companies. Again, the high interest rate is what motivates investors to put their money on these securities.

Keywords: *Investment, Commercial Papers, Monetary Policy Rate, Interest Rate, Treasury Bill.*

INTRODUCTION

Investment is considered to be an important factor in economic growth (Al-Tarawneh, 2004). Investment plays a very important role for the progress of any country. Since countries rely on investment to solve economic problems such as poverty, unemployment amongst others, managers, economists and policy makers have been interested in what determines investment level. Fluctuations in interest rate is determined by many factors, which include taxes, risk of investment, inflationary expectations etc. Prior to the introduction of the Structural Adjustment Programme (SAP) in Nigeria, interest rate was controlled administratively by the monetary authority through the Central Bank of Nigeria. Since the introduction of SAP, interest rate was liberalized and hence controlled by market forces. Commercial banks therefore compete with each other in determining the interest rate. However, in a policy reversal, the government in January 1994 out-rightly introduced some measure of regulation into interest rate management. It was claimed that there were “wide variations and unnecessary high rate” under total deregulation of interest rates. Immediately, deposit rates were once again set at 12% to 15% per annum while a ceiling of 21% per annum was fixed for lending rate. The cap on interest rate introduced in 1993 was retained in 1994 with little modification to allow for flexibility. The cap stayed in place until it was lifted in 1997, to facilitate the pursuit of flexible interest rate regime in which bank deposit and lending rates were largely determined by the forces of demand and supply for funds (Omole & Falokun 1999).

However, the interest rate policy in Nigeria seems not to have significantly increased the level of investment, particularly investment in money market instruments. The high interest rate on investment funds and sometimes demand for excessive collateral securities have not significantly benefited investment in Nigeria generally and money market instruments particularly. This is largely because money market instruments such commercial papers, bankers’ acceptance, treasury bills etc. are mostly short term and are interest sensitive.

The financial repression was largely manifested through indiscriminate distortions of financial prices including interest rates and this has reduced the real rate of growth and the real size of financial system. This has further reduced the availability of funds for investment in Nigeria. With the tendency of slowing down investors’ response to interest rate changes with emphasis on money market instruments which have the potentials to further reduce long-term per capital consumption and income, endangering the sustainability of reform efforts.

Statement of the Research Problem

Money market is a market for short term-funds. It is a market in which money is bought and sold. Unlike the organized Securities and Commodities Exchanges, the money market has no specific location. Trade can be carried out online and executed via what is generally referred to as money market instruments. The major participants in the money

market are Deposit Money Banks, government, Corporations, enterprises, money market mutual funds, CBN etc.

Money market instruments are documents of short term maturities evidencing claims and obligations among economic units, which are used to mobilize funds from the surplus units of the economy to the deficit unit. They are used by intermediary agents especially banks to bridge financial gaps or disequilibrium in an economy. Essentially, they are short-term debt instruments with maturities of one year or less (Ezirim, 2005).

The instruments are used by businesses to raise, funds for economic activities, especially banks to finance temporary reserve loss or invest excess liquid cash. Government through its agencies like CBN plays dominant role in the use of money market instruments to bridge the gap between its receipts and expenditure or attain certain monetary policy objectives.

Mohammad (2014) observed that money market instruments such as treasury bills, Commercial Papers, Bankers acceptance, certificate of deposit are very liquid and considered extraordinarily safe. Most money market instruments are traded in high denominations. This limits the access of individual investors.

There are two conflicting views on the effect of the real interest rate on the level of private investment. A high interest rate level raises the real cost of capital and therefore dampens the private investment level. On the other side, poorly developed financial markets in Less Developed Countries (LDCs) and inadequate access to foreign financing for most private projects, both imply that private investment is constrained largely by domestic savings. (Greene and Villanueva,1990). Thus, Timothy and Robert (1993) noted that these financial instruments enable borrowing and lending for periods of a year or less and also facilitates the transfer of large sums of money quickly at a low cost from one economic unit (business, government bank etc) to another for relatively short periods of time. They are characterized by high degree of safety of principal and are most commonly issued in units of millions of currencies or more. Some of them (market instruments), yielded interest at maturity and are generally exempted from government income taxes, which makes them particularly attractive to investors in high income tax brackets, for instance treasury bills.

Much has not been done to empirically examine money market instruments and interest rate in Nigeria. It is against this backdrop that this work is set to evaluate the response of investors in money market instruments to changes in interest rate in Nigeria.

Objectives of the Study

The broad objective of this study is to investigate the impact of interest rates on investment decisions in Nigeria with particular focus on money market instruments. While the specific objectives are:

- i. To determine if there exists a significant impact of interest rate on investment in treasury bills in Nigeria

- ii. To examine if there exists a significant impact of interest rate on investment in commercial papers in Nigeria
- iii. To evaluate the degree of linear association between monetary policy rates and Treasury bill rates in Nigeria.

Statement of Hypothesis

The hypotheses for this study are stated as follows;

Ho₁: Interest rate does not have a significant impact on the investment in treasury bills in Nigeria

Ho₂: Interest rate does not have a significant impact on investment in commercial papers in Nigeria

Ho₃: There is no significant correlation between Monetary policy rate and treasury bills rate in Nigeria.

THEORETICAL FRAMEWORK AND REVIEW OF RELATED STUDIES

Several theories explained why interest is paid (Elliot, 1984). The theories of interest can be divided into two; the monetary theories and the non-monetary theories. The monetary theories are those theories of interest that stress the liquidity aspect of money, while the non-monetary theories of interest are those theories which give consideration to savings and productivity aspect of money. However, for the purpose of this study, we shall examine the three theories of interest rate; the classical or loanable funds theory, the liquidity preference theory (The Keynesian approach), the general equilibrium approach (Soyibo and Adekanye, 1992).

The Classical Theory

The classical theory postulated that interest rate is an equilibrium factor between the demand for and the supply of investible funds. The equality between savings and investment is brought about by the mechanism of interest rate. When saving exceeds investment, rate of interest will fall discouraging savings on one hand and encouraging investment on the other hand. This tendency continues operating till equality between savings and investment get established. Similarly, if investment exceeds savings, rate of interest rises to discourage investment and encourage savings till equality is established between savings and investment. Thus, classical system regards rate of interest as the equilibrium force between savings and investment. Classical economists approach to savings – investment equality is based on the assumption of full employment in the economy system (Mwega, Ngola, and Mwangi, 1990).

Keynesian Theory

In the Keynesian system of aggregate, the terms savings and investment refer to the aggregate saving and aggregate investment. Investment means production that is not

currently consumed. It may take the form of machinery, equipment, building or increased investments of consumers' goods. Savings is the amount of the current income, which is not spent upon consumption (Soyibo and Adekanye, 1992). The fundamental thing in this approach is that savings and investment are always and necessary equal. In the word of the Keynesian "provided it is agreed that income is equal to the value of the part of current output which is not consumed and savings is equal to the excess of income over consumption, the equality of savings and investment necessarily follows".

Income = value of output = consumption + investment

Savings = income – consumption.

Savings = investment.

According to Keynesian the determination of interest rate will be found in the money market and these are basically the supply and demand for money. He identified three motives for the desires to hold cash; transaction motive, precautionary motive and speculative motive (McKinnon, 1973). The first two motives are influenced by the level of income, while the speculative motive is influenced by the level of interest rate. Keynes argues that if there were no interest receivable, people would hold their asset in the form of cash. To get people to hold their wealth in any other form, we must be prepared to pay them interest because there is a cost associated with the conversion of the securities into cash.

Empirical Review

Many studies have highlighted the relationship between interest rate and economic growth. For instance, Obamuyi, (2009) investigated the relationship between interest rate and economic growth in Nigeria using time series data covering 1970-2006. He applied co-integration and error correction model to capture both the long run and short run dynamics of variables in the model. The result indicated that real lending rates have significant effect on economic growth. Obanuyi, (2009) studies the relationship between interest rate and economic growth in Nigeria. The study employed co integration and error correction modeling techniques and revealed that lending rate has significant effect on economic growth, the study then postulated that investment friendly interest rate policies necessary for promoting economic growth needs to be formulated and properly implemented. Brzoza-Brzezina and Cuaresma (2008) use a dynamic factor model to investigate the relative importance of domestic and international factors as determinants of short-term real interest rates in 22 countries over the period of 1985-2005. They find that the common world factor accounts for about half of the variance of real rates and that its role was growing up to about the mid-1990s, after which it leveled out and remained relatively constant. Individual country factors are also more important in countries with floating exchange rates. Onwiodiokit's, (2005), study on fiscal deficits, inflation and output growth

in Nigeria, adopted a vector error correction model approach. The result showed monotonically decreasing relationship with prices some lags. The result is at variance with the popular view in the literature that seems to suggest that fiscal deficit is necessarily inflationary. Oosterbaan et al., (2000) estimated the relationship between the annual rate of economic growth and the real rate of interest. 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%.

Later on, De Gregorio and Guidotti, (2009) 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 reduce growth. In India, Malick and Agarwal, (2007) found that none of the three measures of real interest rate seemed to exert any direct influence on growth of real output. This unusual result they ascribed to the possibility that investment, which is an important determinant of growth, is conditioned by several factors other than real interest rate alone. On the other hand,

Mohanty, Chakraborty and Gangadaran (2012) highlighted the presence of inverse relationship between growth and real lending rates in India, with empirical evidence on real lending rates Granger causing both overall GDP and non-agricultural GDP growth. Zhang and Liang, (2007) used a multivariate Generalized Autoregressive Conditionally Heteroscedastic (GARCH) model with Error Corrections Terms (ECM) to investigate the determinants of swap spreads in the U.S. interest rate market. They used monthly data for a total of 106 observations to empirically investigate the importance of the determinants of interest rate swap spread in U.S derivative market. They also found out that changes in the interest rate swap spread would be related positively to changes in the implied Stock market volatility; but they disproved their hypothesis that the changes in the swap spread would be related positively to changes in the default premium in corporate bond market. They however, found that swap spreads in the U.S. market showed negatively strong correlation with default premium with z-statistics of 2.01 or better. They also concluded that changes in the interest rate swap spread would be related negatively to the changes in the business cycle. Rogoffs and Reinhartl, (2004) opined that developing countries are relatively better off in the choice of flexible exchange rate regimes.

While Oyejide and Udun, (2010) added that countries at a relatively early stage of financial development and integration are better-off choosing fixed or relatively rigid regimes. Furthermore, David et al., (2010) submitted that for developing and emerging market countries a non-linear relationship exists between growth and regimes choice, with fixed and managed float regimes associated with the highest rate of growth. They further pointed out that regimes choice does not affect the rate of economic growth for the Advanced European countries. They concluded that more flexible regimes are rather associated with slightly higher growth rates over there.

Hasanov, (2010) examined possibility of threshold effect of inflation on economic growth in Azerbaijani economy over the period of 2000-2009. Estimated threshold model indicated that there is a non-linear relationship between economic growth and inflation in the Azerbaijani economy and threshold level of inflation for GDP growth is 13 percent. Below threshold level inflation has statistically significant positive effect on GDP growth, but this positive relationship becomes negative one when inflation exceeds 13 percent. Nisha and Nishat, (2011) found that economic activities can be created by flow of reserves to the most productive investments, as investors usually decide to invest in certain selected companies. Shahmoradi and Baghbanyan, (2011) concentrated on the determining factors of foreign direct investment inflows in developing countries; study was conducted for the period 1990-2007. Obamuyi and Olorunfemi, (2011) examined the implications of financial reform and interest rate behavior on the economic growth in Nigeria. Study results revealed that financial reform and interest rates have significant impact on economic growth in Nigeria; also, results implied that the interest rate behavior is important for economic growth.

Khalid, (2007) used four separate equations to measure the relationship between interest rate deregulation and economic growth in Pakistan between 1981 and 2002. His conclusion was that interest rate liberalization has not impacted positively on economic growth in Pakistan as most of the indicators of the financial liberalization do not show any significant impact on saving, investment or growth. A study by Omar et al., (2007) on the impact of interest rate liberalization on the economy of Bangladesh revealed that long-run economic growth in Bangladesh is largely explained by physical capital and real interest rate. They went on to state that financial liberalization has had significant negative impacts on economic growth implying that financial reforms failed to attract new investment. This they believe is due to the adverse investment climate existing in that country. Oforegbunam, (2012) investigated the effect of interest rate indices on money supply from 1990 to 2007. His study carried out an autoregressive analysis on the variable as well as an assessment of the effects on interest rate indices on money supply. The results among others show that minimum rediscount rate and savings rate have made significant positive impact on money supply. On the other hand, lending rate has made insignificant negative impact on money supply. Based on his findings, he concluded that the inability of the monetary authority to narrow the gap between saving and lending rate remains a key to the problem of instability in money supply, hence concerted effort must be made to strengthen the capacity of regulatory authorities to use market based options to monitor and control periodic volatility in money supply through an effective interest rate regimes. Chete, (2006) also investigated the relationship between real interest rate and economic growth in Nigeria. The result showed that there was a unique long run relationship between interest rate and economic growth. He summed thus: that interest rate is an important determinant of economic growth in Nigeria. However, the deregulation of interest rate in Nigeria may not optimally achieve its goal if those other factors that affect investment negatively are not

sorted out and tackled, he concluded. Adekunla and Akungba, (2009) investigated the relationship between interest rates and economic growth in Nigeria, using time series analysis and annual data from 1970 - 2006. The co-integration and error correction model were used to capture both the long-run and short-run dynamics of the variables in the model. The empirical results indicate that real lending rates have significant effect on economic growth. There also exists a unique long-run relationship between economic growth and its determinants, including interest rate. The results imply that the behavior of interest rate is important for economic growth in view of the relationships between interest rates and inflation and growth. Thus, the formulation and implementation of financial policies that enhance investment-friendly rate of interest is necessary for promoting economic growth in Nigeria. Nicholas, (2010) also examined the dynamic relationship between interest rate reforms; bank based financial development and economic growth in South Africa using co-integration and Error correction models, the study finds a strong support for the positive impacts of interest rate reforms on financial development. The study also discovered that interest rate reforms do not Granger cause investment and economic growth.

We deduced from empirical and theoretical literatures that Money market operations provide the mechanism through which short-term securities and other financial assets with maturity period of less than one year are traded. Money market instruments which are highly liquid assets provide facilities and means for short-term lending and borrowing. Ezirim, (2005) argued that in line with the general observations on financial markets,

Money market may be decomposed into primary markets and secondary markets. The trading of new issues of short-term securities with maturities of one year or less occurs in the primary markets and the trading of existing short-term securities takes place in the secondary markets. Generally, Money market generates the largest proportion of short-term funds for productive economic activities and thus constitutes an awesome segment of every economy of the world. Deudctions from economic theories also have it that a well-developed, smoothly operating Money markets plays crucial roles in contributing to the efficiency and wellness of an economy and thus there is a strong positive relationship between Money market developments and economic growth.

According to Rigg and Zibell, (2009), Money market plays a key role in bank liquidity management and the transmission of monetary policy; that a developed, active and efficient interbank market enhances the efficiency of Central Banks' monetary policy, transmitting its positive impulse into the economy. As a matter of fact, the finance-growth nexus have offered a much daring appraisal of the causal relationship at the firm-level and industry-level. Since finance is made available to businesses through Money market operations, it exerts a large, positive impact on economic growth. Efficient Money market influences the direct flow of savings and investment in the economy in ways that facilitate capital accumulation for productive purposes thus impacting positively on GDP. Jalloh,

(2013) opined that the existence of Money markets facilitate trading in short-term debt instruments to meet short-term financial needs of large users of funds such as governments, banks and allied institutions.

One of the primary uses of Money market instruments is the control of inflation. Monetary policy focuses on how a country determines the size and rate of growth of its money supply in order to check or control inflation.

Thus, formulating a nation's monetary policy is extremely crucial particularly when it comes to promoting sustainable economic growth in a country. To control inflation, monetary authorities trade Money market instruments which are largely liquid assets or securities in Open Market Operation (OMO) activities. The Central Bank of Nigeria (CBN) buys and sells government security assets which are Money market instruments such as Treasury bills, Treasury certificates; FGN bonds et cetera to regulate the level of the money supply. Depending on its goal, CBN at one time buys securities from banks and pump money into the system to increase productive economic activities and at another time sells security assets to banks which consequently reduce funds for credits and resultantly leads to limiting access to capital. Ultimately, this slows down economic growth with implication for GDP as investments decrease.

Again, we reiterate that Money market operations constitute an integral part of a nation's financial market and indeed the financial system. Accessing Money market for capital through an efficient functioning financial system has the capability to lessen a country's reliance on foreign aid and other forms of external borrowing.

In the study conducted by Sander and Kleimerier (2006), it was found that there exists a greater response to anticipated monetary policy changes measures by interest rate features than to unanticipated changes. Other recent studies have gone beyond estimating the degree and speed of adjustment of market interest rates in relation to changes in monetary policy rates to examining the degree and variability of interest rate pass-through across countries and regions (Weth 2002; De Bondt 2005; Sorensen and Werner 2006; Sander and Kleimeier 2006; Banerjee, et al 2010; Cas. et al 2011). These studies show the degree of interest rate pass-through differ across regions and across countries with common monetary union.

Some studies have found the monetary transmission mechanism to be quick and efficient while other found the effect of monetary policy rate on market rates to be inconclusive. The recent studies carried out by Aziakpono, Wilson and Manuel, (2007) and Aziakpono and Wilson (2010) attest to this fact. While Aziakpono, Wilson and Manuel (2007), found market interest rates to respond quickly to monetary policy rate, the study conducted by Aziakpono and Wilson, (2010) found that commercial Banks lending rates are more rigid in response to positive shocks in monetary policy official rate in South Africa.

In Nigeria, the Central Bank (CBN) Monetary Policy Council (MPC) which derives its legal backing from the various statutes of the bank (CBN Act 1958; Decree No. 3 1997; CBN Act 2007), adopted a new anchor for monetary policy action on December 11, 2006 with the ultimate goal of achieving stability in the domestic currency, prices and ultimate economic stability through interest rates stability around a benchmark called MPR.. At inception, MPR was fixed at 10 per cent with a 600 basis point spread making a lower band of 7% and an upper band of 13% based on the current and expected inflation. Since inception, the MPR has been changed about fourteen times most of which was positive and are usually done in anticipation of a rise in the general price level. Adjustment of MPR by MPC has ranged from a decrease of 20% in the wake of the 2007-2008 global economic crisis to an approximately 30% increase in the period between the third quarter 2011 and the fourth quarter of 2011. Monetary policy rate (MPR) has remained constant between the third quarter of 2011 and the third quarter of 2012. Although at various periods of the change in MPR, market interest rates exhibited changes in different direction without correspondingly tracking changes in MPR. This according to Romer and Romer, (2000) represents a puzzle to policy planners. Given that the relative effectiveness of MPR in tracking other market rates has not been extensively studied in Nigeria, we explore this linkage for Nigeria.

Model Specification

The theoretical model for this work is from Tobin (1981) equation which captures the relationship between investment and profit expectation. The interest in this context is the yield on investment and is represented by the treasury bill rate and monetary policy rate. While the investment is represented by outstanding of commercial paper holding and the treasury bill.

In line with the Classical Linear Regression Model, the models for testing the respective hypothesis are presented below:

Model One (Hypothesis One)

$$\text{LOGTBILL}_t = B_0 + B_1 \text{LOGTBR} + B_2 \text{LOGMPR} + B_3 \text{LOGCP} + B_4 \text{TBILL}(-1)_t + \varepsilon \dots\dots\dots \text{Eq. 1}$$

Where:

B_0 = intercept or the constant

B_1, B_2, B_3, B_4 = Coefficients of the independent variables or the slopes

TBILL = Treasury Bills Outstanding which is the dependent variable

TBR = Treasury bill Rate

MPR = Monetary Policy Rate

CP = Commercial Paper Outstanding

TBILL (-1) = First log of the outstanding treasury bill included to make the model dynamic and overtake autocorrelation.

ϵ = residual or the error term

All the variables are log transformed with the aim of making interpretation of results easy by introducing linearity and elasticity.

Model Two (Hypothesis Two)

$$\text{LOGCP}_t = B_0 + B_1\text{LOGTBR} + B_2\text{LOGMPR} + B_3\text{LOGTBILL} + B_4\text{LOGCP}(-1)_t + \epsilon \dots\dots\dots \text{Eq. 2}$$

Where:

B_0 = intercept or the constant

B_1, B_2, B_3, B_4 = Coefficients of the independent variables or the slopes

TBILL = Treasury Bills Outstanding

TBR = Treasury bill Rate

MPR = Monetary Policy Rate

CP = Commercial Paper Outstanding which is the dependent variable

LOGCP (-1) = First lag of the outstanding commercial paper included to make the model dynamic and overtake autocorrelation.

ϵ = residual or the error term

All the variables are log transformed with the aim of making interpretation of results easy by introducing linearity and elasticity.

Model for Hypotheses Three and Four

Hypotheses three and four will be tested using correlational analyses and the model is written thus:

Hypothesis Three

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where x = Outstanding commercial Papers

Y = outstanding Treasury bills

Hypothesis Four

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where x = monetary policy rate

Y = Treasury bill rate.

Data Presentation and Analyses of Regression Result

Below contains the money market instruments outstanding and interest related variables for the period under study.

Table 1. Money Market Instruments, Treasury Bill Rates and Monetary Policy Rates at Level Series

Year	CP	TBILL	TBR	MRR
1981	0.073000	5.782000	5.000000	6.000000
1982	0.110400	9.782000	7.000000	8.000000
1983	0.153300	13.47600	7.000000	8.000000
1984	0.156700	15.47600	8.500000	10.00000
1985	0.139300	16.97600	8.500000	10.00000
1986	0.259000	16.97600	8.500000	10.00000
1987	0.496400	25.22600	11.75000	12.75000
1988	0.668900	35.47600	11.75000	12.75000
1989	0.604700	24.12600	17.50000	18.50000
1990	0.790300	25.47600	17.50000	18.50000
1991	0.818500	56.72830	15.00000	14.50000
1992	1.575200	103.3265	21.00000	17.50000
1993	3.371500	103.3265	26.90000	26.00000
1994	5.252500	103.3265	12.50000	13.50000
1995	10.03490	103.3265	12.50000	13.50000
1996	8.023700	103.3265	12.25000	13.50000
1997	13.38870	221.8015	12.00000	13.50000
1998	7.252200	221.8015	12.95083	14.30807
1999	20.47640	361.7584	17.00000	18.00000
2000	19.00250	465.5358	12.00000	13.50000
2001	35.34750	584.5358	12.95083	14.30807
2002	36.97820	733.7635	18.88000	19.00000
2003	47.56900	825.0545	15.02000	15.75000
2004	80.11530	871.5770	14.21000	15.00000
2005	194.5912	854.8280	6.995000	13.00000
2006	193.5116	701.3998	8.800000	12.25000
2007	363.3695	574.9294	6.910000	8.750000
2008	822.7009	471.9295	7.030000	9.812500
2009	509.0791	797.4825	3.700000	7.437500
2010	189.2164	1277.100	5.380000	6.125000
2011	203.0083	1727.914	11.12000	9.187500
2012	1.050359	2122.927	13.60000	12.00000
2013	9.324796	2581.551	10.42000	12.00000
2014	9.822172	2815.524	11.20000	13.00000

Source: Central Bank Statistical Bulletin 2014

where:

CP = Commercial Papers Outstanding

TBILL = Treasury Bill Outstanding

TBR = Treasury Bill Rates

MPR = Monetary Policy Rates

To allow for ease of interpretation, introduction of linearity and elasticity to the variables under study, the log transformed series is used instead of the level series. This is contained in Table 2. below:

Table.2: Money Market Instruments, Treasury Bill Rates and Monetary Policy Rates in log-linearised Form

Year	LOGCP	LOGTBILL	LOGMRR	LOGTBR
1981	2.617296	1.754750	1.791759	1.609438
1982	2.203645	2.280544	2.079442	1.945910
1983	1.875358	2.600910	2.079442	1.945910
1984	1.853422	2.739290	2.302585	2.140066
1985	1.971125	2.831801	2.302585	2.140066
1986	1.350927	2.831801	2.302585	2.140066
1987	0.700373	3.227875	2.545531	2.463853
1988	0.402121	3.568856	2.545531	2.463853
1989	0.503023	3.183290	2.917771	2.862201
1990	0.235343	3.237737	2.917771	2.862201
1991	0.200282	4.038273	2.674149	2.708050
1992	0.454382	4.637894	2.862201	3.044522
1993	1.215358	4.637894	3.258097	3.292126
1994	1.658704	4.637894	2.602690	2.525729
1995	2.306069	4.637894	2.602690	2.525729
1996	2.082400	4.637894	2.602690	2.505526
1997	2.594411	5.401783	2.602690	2.484907
1998	1.981305	5.401783	2.660823	2.561160
1999	3.019273	5.890977	2.890372	2.833213
2000	2.944571	6.143189	2.602690	2.484907
2001	3.565228	6.370818	2.660823	2.561160
2002	3.610329	6.598187	2.944439	2.938103
2003	3.862181	6.715449	2.756840	2.709383
2004	4.383467	6.770304	2.708050	2.653946
2005	5.270901	6.750900	2.564949	1.945196
2006	5.265337	6.553078	2.505526	2.174752
2007	5.895420	6.354247	2.169054	1.932970
2008	6.712593	6.156830	2.283657	1.950187
2009	6.232603	6.681460	2.006535	1.308333
2010	5.242891	7.152347	1.812379	1.682688
2011	5.313247	7.454670	2.217844	2.408745
2012	0.049132	7.660551	2.484907	2.610070
2013	2.232677	7.856146	2.484907	2.343727
2014	2.284642	7.942904	2.564949	2.415914

Source: Author's Computation from Eviews using the Data in Table 1 above where:

LOGCP = Commercial Papers Outstanding in Log Form

LOGTBILL = Treasury bill Outstanding in Log Form

LOGTBR = Treasury bill Rates in Log Form

LOGMPR = Monetary Policy Rates in Log Form

Data Description

To further expose the statistical properties of the variables under study, a line graph plot of outstanding commercial papers and interest related variables is shown in Fig 4.1. The graph suggests a positive linear but volatile relationship among the variables within the period 1981 to 2014.

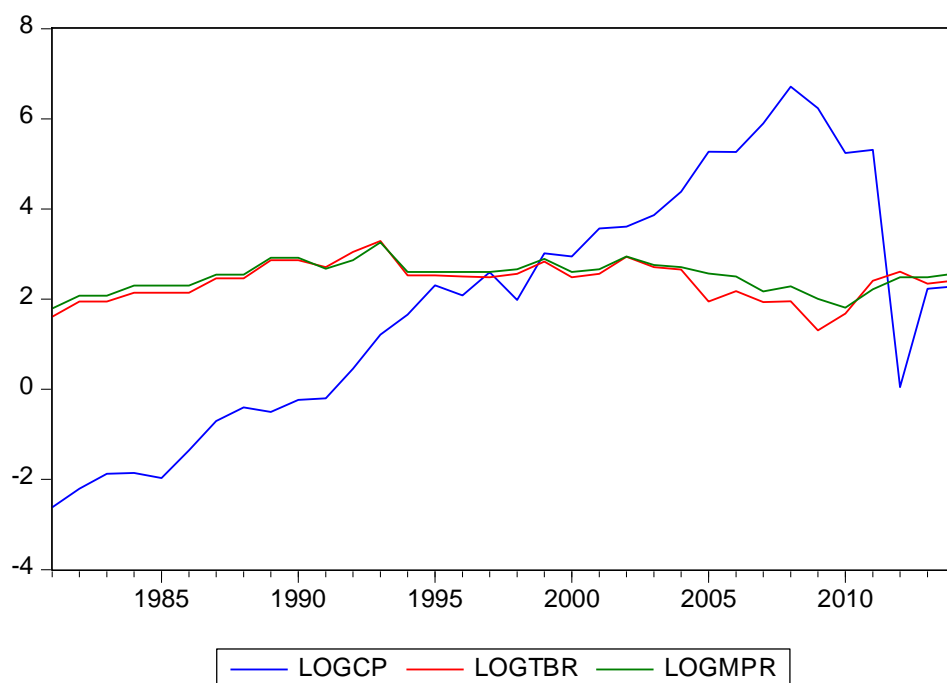


Fig. 1: A line graph of Outstanding commercial papers and the interest Variables under study (1981 to 2014)

Source: Author's Plot from Eviews 9.

Fig. 2 below is a bar chart plot of the relationship between outstanding Treasury bill and the interest related variables under study. An oscillating pattern of growth is shown by the interest related variables as well as the outstanding treasury bill over the period 1981 to 2014.

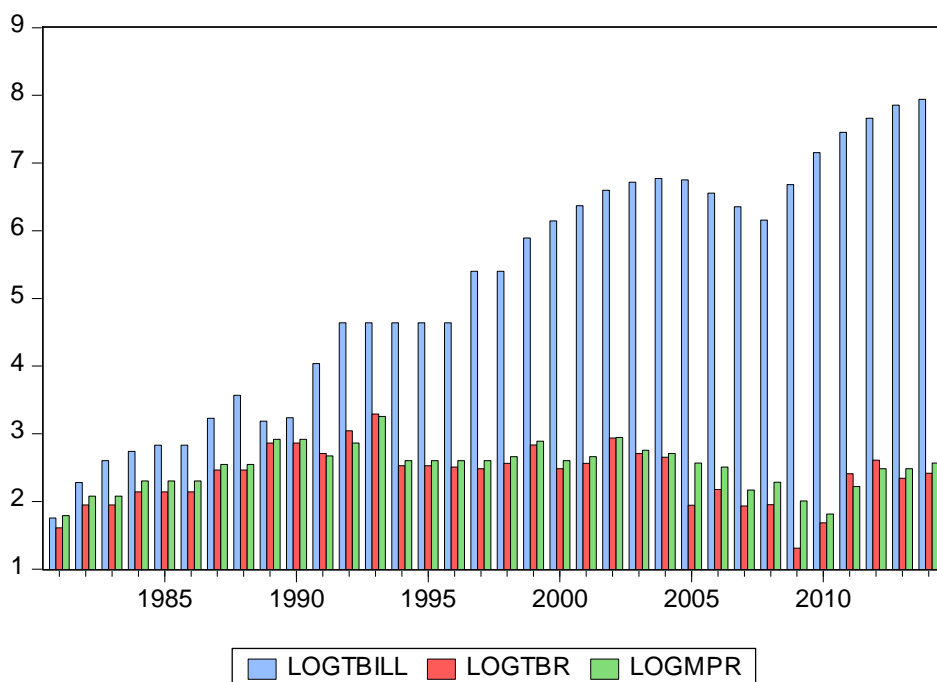


Fig. 2: A Bar Plot of Outstanding Treasury Bill and the interest Variables under study (1981 to 2014)

Source: Author’s Plot from Eviews.

Moreso, Table .3 below contains the basic aggregative averages of the datasets. This is in addition to some measures of spread and variation.

Table 4.3: Basic Descriptive Statistics of the Dataset

	LOGCP	LOGMRR	LOGTBR	LOGTBILL
Mean	1.890124	2.509087	2.387488	5.157065
Median	2.157538	2.564949	2.474380	5.401783
Maximum	6.712593	3.258097	3.292126	7.942904
Minimum	-2.617296	1.791759	1.308333	1.754750
Std. Dev.	2.732536	0.329541	0.431869	1.821569
Skewness	0.030526	-0.272410	-0.366384	-0.218778
Kurtosis	1.868190	2.942817	2.959248	1.769766
Sum	64.26421	85.30895	81.17461	175.3402
Sum Sq. Dev.	246.4028	3.583711	6.154847	109.4978
Observations	34	34	34	34

Source: Author’s Computation from Eviews

The descriptive statistics in Table 4.3 above shows the basic aggregative averages like mean and median for all the observations. The spread and variations in the series are also indicated using the standard deviation which is the deviation between the minimum and the maximum. Significantly kurtosis which shows the degree of peakedness is also shown together with skewness which is a reflection of the degree of or departure from

symmetry of the given series. The sum of squares as well as the number of observations are shown.

Test of Hypotheses

Hypothesis One

H_{01} : Interest rate has no significant impacts on the investment in treasury bills in Nigeria.

Table .4: The OLS Results for Hypothesis One

Dependent Variable: LOGTBILL

Method: Least Squares

Date: 06/25/17 Time: 22:31

Sample (adjusted): 1982 2014

Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.729233	0.775185	3.520751	0.0015
LOGTBR	1.196974	0.544390	2.198744	0.0363
LOGMPR	-0.767758	0.716239	-1.071930	0.2929
LOGCP	0.415641	0.036974	11.24153	0.0000
TBILL(-1)	0.001523	0.000142	10.72609	0.0000
R-squared	0.939766	Mean dependent var	5.260166	
Adjusted R-squared	0.931162	S.D. dependent var	1.746168	
S.E. of regression	0.458143	Akaike info criterion	1.415458	
Sum squared resid	5.877067	Schwarz criterion	1.642201	
Log likelihood	-18.35505	Hannan-Quinn criter.	1.491750	
F-statistic	109.2142	Durbin-Watson stat	1.658471	
Prob(F-statistic)	0.000000			

Source: Author's Computation from Eviews

From the table 4.4 above, LOGMPR, LOGTBR, LOGCP and LOGTBILL (-1), were used as explanatory variables. Treasury Bills outstanding represented by LOGTBILL shows negative and significant response to MPR and positive and significant response to TBR. This is indicated by correspondingly signed coefficient and p-values that are respectively less than of 0.05. It shows that as TBR increases, TBILL increases and falls as MPR rises. The R^2 which is a show of the goodness of fit of the model is 94% which means that 94% of variation in TBILL was explained by the regressors and about 6% of the relationship is explained by factors not captured by the model

The F-statistics of 109.2, P-value = 0.000 at a critical value of 0.05 shows that the overall regression is significant and can be used for meaningful analyses. The Durbin Watson statistics (DW) value of 1.66 shows that there is no evidence of a first order serial autocorrelation AR(1). By rule of thumb, if the DW statistics is approximately equal to 2, it is evidence against the existence of a first order serial correlation.

Given that the proxy for interest rate (LOGTBR) has a positive coefficient and a significant t-statistics with its associated probability value, we reject the null hypothesis and conclude that interest rate positively and significantly impacts on the investment in treasury bills in the Nigerian Money Market.

Test of Hypothesis Two

Ho₂: Interest rate does not a significant impact on investment in commercial papers in Nigeria.

Table .5: The OLS Results for Hypothesis Two

Dependent Variable: LOGCP
 Method: Least Squares
 Date: 06/25/17 Time: 23:11
 Sample (adjusted): 1982 2014
 Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.977143	1.802084	-1.652056	0.1097
LOGTBR	-2.821185	1.157306	-2.437717	0.0214
LOGMPR	3.623518	1.505089	2.407510	0.0229
LOGTBILL	0.249303	0.199398	1.250276	0.2215
LOGCP(-1)	0.704973	0.130777	5.390664	0.0000
R-squared	0.870752	Mean dependent var	2.026712	
Adjusted R-squared	0.852288	S.D. dependent var	2.654420	
S.E. of regression	1.020182	Akaike info criterion	3.016566	
Sum squared resid	29.14159	Schwarz criterion	3.243310	
Log likelihood	-44.77334	Hannan-Quinn criter.	3.092859	
F-statistic	47.15942	Durbin-Watson stat	2.260418	
Prob(F-statistic)	0.000000			

Source: Author’s Computation from Eviews

From the table 4.5 above, LOGMPR, LOGTBR, LOGTBILL and LOGCP (-1), were used as explanatory variables. Commercial Papers outstanding represented by LOGCP shows negative and significant response to TBR and positive and significant response to MPR. This is indicated by correspondingly signed coefficient and p-values that are respectively less than of 0.05. It shows that as TBR increases, CP decreases and rises as MPR rises. The R² which is a show of the goodness of fit of the model is 87% which means that 87% of variation in CP was explained by the repressors’ and about 13% of the relationship is explained by factors not captured by the model. The F-statistics of 47.15, P-value = 0.000 at a critical value of 0.05 shows that the overall regression is significant and can be used for meaningful analyses. The Durbin Watson statistics (DW) value of 2.26 shows that there is no evidence of a first order serial autocorrelation AR(1). By rule of thumb, if the DW statistics is

approximately equal to 2, it is evidence against the existence of a first order serial correlation.

Given that the proxy for interest rate (LOGMPR) has a positive coefficient and a significant t-statistics with its associated probability value, we reject the null hypothesis and conclude that interest rate positively and significantly impact on the investment in commercial papers in the Nigerian Money Market.

Test of Hypothesis Three

H₀₃: There is no significant correlation between investment in commercial papers and investment in treasury bills in Nigeria.

Table .6 Correlational Analyses Result

Correlation t-Statistic Probability	LOGCP	LOGMRR	LOGTBR	LOGTBILL
LOGMRR	0.012467 0.070529 0.9442	1.000000 ----- -----		
LOGTBR	-0.137061 -0.782719 0.4395	0.926400 13.91753 0.0000	1.000000 ----- -----	
LOGTBILL	0.821631 8.153820 0.0000	0.112033 0.637768 0.5282	0.048608 0.275297 0.7849	1.000000 ----- -----

Source: Author's Computation for Eviews 9

Table 4.6 contains the correlation analyses results for all the variables carried out in bivariate form. The variables are paired and their correlation coefficient, t-statistics and p-values of t-statistics respectively shown. It is on the basis of the above parameters that hypotheses three and four are tested.

Given that the correlation coefficient of LOGCP and LOGTBILL is strong and positively signed (0.821631 approx. 82%) and the t-statistics is significant as shown by the associated p-value (8.15, 0.0000), we reject the null hypothesis and conclude that a strong positive and significant correlation exist between investment in commercial papers and investment in treasury bills in the Nigerian Money Market.

Test of Hypothesis Four

H₀₄: Monetary policy rate does not have a significantly correlation with treasury bill rate in Nigeria.

The result for the correlational analyses as contained in table 4.6 is used in testing both hypothesis three as shown above as well hypothesis four below.

Given that the correlation coefficient of LOGMPR and LOGTBR is strong and positively signed (0.926400 approx. 93%) and the t-statistics is significant as shown by the associated p-value (13.91753, 0.0000), we reject the null hypothesis and conclude that a strong positive and significant correlation exist between treasury bill rate and monetary policy rate in the Nigerian Money Market.

Interpretation of Findings

This study examined the impact of interest rate on money market instruments in Nigeria from 1981 to 2014 with the view to establishing whether a nexus exists between them using empirical evidence from Nigeria. Following a detailed theoretical review and empirical analyses, findings were made in line with the research objectives earlier set and tested hypotheses. These findings are discussed together with the objectives earlier set.

Objective One: To determine if there exists any significant impact of interest rate on investment in treasury bills in Nigeria.

Treasury Bills outstanding represented by LOGTBILL shows negative and significant response to MPR and positive and significant response to TBR. This is indicated by correspondingly signed coefficient and p-values that are respectively less than of 0.05. It shows that as TBR increases, TBILL increases and falls as MPR rises. In relating the finding to the set objective, we have discovered in specific terms that interest rate positively impacts on treasury bill investment.

Objective Two: To examine if there exists any significant impact of interest rate on investment in commercial papers in Nigeria.

Commercial Papers outstanding represented by LOGCP shows negative and significant response to TBR and positive and significant response to MPR. This is indicated by correspondingly signed coefficient and p-values that are respectively less than of 0.05. It shows that as TBR increases, CP decreases and rises as MPR rises. Monetary Policy Rate was used as a proxy for interest rate in the second objective because of its broader implication in the light of commercial papers being corporate instead of a public money market instrument. With emphasis on the second objective, a positive and significant impact is found on commercial papers investment as exerted by interest rate proxied by MPR.

Objective Three: To ascertain the degree of linear relationship between investment in commercial papers and investment in treasury bills in Nigeria.

This is set out to determine the degree and direction of correlation between investment in commercial papers and investment in treasury bills in the Nigerian money market. We found that the correlation coefficient of LOGCP and LOGTBILL is strong and positively signed (0.821631 approx. 82%) and the t-statistics is significant as shown by the

associated p-value (8.15, 0.0000). This is a proof that a strong positive and significant correlation exists between investment in commercial papers and investment in treasury bills in the Nigerian Money Market.

Objective Four: To examine the degree of linear relationship between monetary policy rates and Treasury bill rates in the Nigerian Money Market.

The grand focus is to determine the degree and direction of correlation between monetary policy rates and treasury bill rates in the Nigerian money market. It was discovered that the correlation coefficient of LOGMPR and LOGTBR is strong and positively signed (0.926400 approx. 93%) and the t-statistics is significant as shown by the associated p-value (13.91753, 0.0000). This makes us conclude that a strong positive and significant correlation exist between treasury bill rate and monetary policy rate in the Nigerian Money Market. This implies that the two interest rate elements can be said to interplay in determining the direction of investment in money market instrument.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The findings from the study can be summarized as follows:

- That Treasury Bills outstanding represented by LOGTBILL shows negative and significant response to MPR and positive and significant response to TBR.
- That Commercial Papers outstanding represented by LOGCP shows negative and significant response to TBR and positive and significant response to MPR.
- That a strong positive and significant correlation exists between investment in commercial papers and investment in treasury bills in the Nigerian Money Market.
- That a strong positive and significant correlation exists between treasury bill rate and monetary policy rate in the Nigerian Money Market.

Conclusions

This study viewed the relationship between investment in money market instruments and interest rate with particular emphasis on the Nigerian economic environment. Literatures were reviewed with focus on concepts, theories and empirical works and gaps in literature established which acted as a justification for this work. Empirical analyses focused on key interest variables like the monetary policy rates and treasury bill rates with commercial papers and treasury bills representing investing in money market instruments while measuring this relationship. The results emanating from the study proved that interest rates are key determinants to the volume of investment in money market instruments. This means that investment in money market instruments responds to the dynamics of interest rate in Nigeria; with particular emphasis on the economic time and space that was studied.

Recommendations

In line with the specific objectives of this study and the findings made, we recommend as follows:

1. Federal government should appropriately regulate interest rate with the ultimate aim of using it to drive investment in money market instruments.
2. Interest rate should be seen as an anchor for monetary policy formulation and implementation. This is largely necessary given the nexus between it and the money market instruments which also serve as monetary policy instruments.
3. There should also be creation of awareness for the public to appreciate and invest in money market instruments given their monetary policy related functions.

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