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Original Research Article

INTEREST RATE AND INVESTMENT IN MONEY MARKET INSTRUMENTS IN A DEVELOPING ECONOMY: A CASE OF NIGERIA.

Abstract

The relationship between interest rate and investment has been a largely discussed and controvertible one across different economic climes. It is in the light of this that this work was set out to investigate the influence of interest rate on outstanding money market instruments in Nigeria. The study adopted the quasi-experimental and analytical method using secondary data drawn from the Central Bank of Nigeria Statistical Bulletin covering the period 1981 to 2014. Basic Descriptive Statistics were used to expose the data characteristics while linear association was tested using the bivariate correlation Matrices. Basically, the Ordinary Least Squares form of regression was adopted as the principal estimation method. It was found out that interest rate positively and significantly impact on the investment in both public Money Market instrument (Treasury bill) and corporate money market instrument (Commercial Papers) in Nigeria. On the basis of the above, it is expected by way of policy implication, that the government should dutifully manage the interest rate regimes to allow for a purposeful driving of the money market to the advantage of the economy and market players alike.

Keywords: Money Market, Treasury Instrument, Commercial Papers, Monetary Policy Rates, Treasury Bill Rate

1. Introduction

The importance of investment as a macroeconomic element cannot be underplayed. Investment is considered to be an important driver of economic growth (Al-Tarawneh, 2004). The roles of investment stand out in solving economic problems such as poverty, unemployment amongst others. Economists and policy makers alike have been interested in exposingwhat determines investment level.

Fluctuations in interest rate have been blamed on many factors, which include taxes, risk of investment, inflationary expectations etc. In Nigeria, Prior to the introduction of the Structural Adjustment Programme (SAP) interest rate was controlled administratively by the monetary authority through the Central Bank of Nigeria. With 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

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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' accepatance, 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.

Money market is a market for short term-funds. It is a market in which short and medium term funds are bought and sold. With no specific location like the organized Securities and Commodities Exchanges, the money market provides a trading platform for such players as .Deposit Money Banks, government, Corporations, enterprises, money market mutual funds, CBN etc. and such instruments as treasury bills, commercial papers etc.

Ezirim, (2005) holds that money market instruments are largely represented by documents of short term maturities showing claims and obligations among economic units, which are used to intermediate funds from the surplus units of the economy to the deficit unit with maturities of one year or less. Corroborating this frame of argument, 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.

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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).

It is along this line that Majed and Ahmad (2010) investigated the impact of interest rate on investment in Jordan and found that real interest rate has a negative impact on investment. Similarly, Greene and Villanueva (1990) studied the determinants of private investment in less developing countries for 23 countries over the 1975-1987 period, and found that the real deposit interest rate has a negative impact on private investment. Similar studies were done for Pakistan by Hyder and Ahmad (2003), Larsen (2004), for the United States and Aysan et al (2005) for the Middle East and North Africa (MENA) and Wang and Yu (2007) for Taiwan; all had findings showing that the real interest rate investment with different direction and magnitude. Timothy and Robert (1993) stressed the need to give attention to the money market and the factors that intervene with its operations given that the short and medium term financial instruments the market offers, makes borrowing and lending for periods of a year or less possible and also facilitates the accumulation and transfer of large sums of money quickly at a considerable lower cost. This largely underpins the roles that the money market plays and the study of the factors that stimulates and drives its growth brings this study into proper perspective.

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. Aside the introduction, the rest of paper has four parts. The second part has a brief review of literature; part three contains methodology while data presentation and analyses are found in part four with part five housing the conclusions and policy implications.

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2. Brief Review of Empirical Literature

Many scholars in extant literature have drawn different conclusions regarding the relationship between interest rate and investment. It is held that if investment is added as an endogenous variable into a monetary utility function model, the result turned out that investment indeed has a certain impact on interest rates (Qing and Chong, 2004). If discount rate is proxied by stochastic interest rate the result turns out to be that the uncertainty of interest rate will have evident effects on investment (Ingersoll and Ross, 1992). Alvareand and Koskef, (2004) hold that the irreversibility of investment under the changing rates would mean that the change in rate will exhibit positive or negative effect on the overall demand for investment.

This seems to be consistent with the diffusion model of short-term rates which shows that the uncertainty of rate may limit the best investment and enterprise's scale of operation. Alvarez (2010).

As a key departure from the traditional theory, some scholars found a significantly positive correlation between interest rate and investment. Andrea Beccarini, (2007) using datasets covering 1971 to 1980 and empirical evidence from 21 developing economies adopting the GMM estimation method found a positive correlation between interest rate and investment. More so, the volatility rate drove the linear association meaning that the higher the volatility, the more the positive correlation recorded.

However, some scholars believe that interest rates does not impact on investment in either positive or negative way. Prominent among this school of thoughts are Dore, (2013), Baillie and McMahon, (1981).

Conversly, others like Mustafa and Ayhan, (2012), Hiroaki and Jun, (2006), Sax, (2006) argue that such macoreconomic variables like the long-term interest rates, short-term exchange rate and investment necessarily interplay and influence each other in either negative or positive ways depending on specific economic characteristics of the environment where they interplay.

In view of the above research and knowledge gaps created by the existence of empirical inconclusiveness, it becomes imperative to use empirical with evidence from a developing economy such as Nigeria, to comparatively use monetary policy rate and Treasury bill rate in measuring the impact of interest rate on investment in money market instruments. More so, to use a combination of public treasury instrument and commercial money market instrument to expose the impact of interest rate on investment in money market in an all-inclusive manner.

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3. Methodology

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)

$$LOGTBILL_t = B_o + B_1LOGTBR + B_2LOGMPR + B_3LOGCP + B_4TBILL(-1)_t + \varepsilon \qquad Eq.\ 1$$

Where:

B_o =intercept or the constant

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

TBILL = Treasury Bill Outstanding which is the dependent variable

TBR = Treasury bill Rate

MPR = Monetary Policy Rate

CP = Commercial Paper Outstanding

TBILL (-1) = First lag 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)

$$LOGCP_t = B_o + B_1LOGTBR + B_2LOGMPR + B_3LOGTBILL + B_4LOGCP(-1)_t + \varepsilon \qquad Eq.\ 2$$

Where:

B_o =intercept or the constant

B_1, B_2, B_3, B_4 = Coefficients of the independent variablesor the slopes

TBILL = Treasury Bill Outstanding

TBR = Treasury bill Rate

MPR = Monetary Policy Rate

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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.

The data for this work is drawn from the statistical bulletin of the Central Bank of Nigeria for the range of years under study. The Treasury bill and commercial papers investment outstanding from 1981 to 2014 are used proxy for money market investment. On the other hand, treasury bill and monetary policy rates for the same period are used as proxy for interest rate. This translates to 34 observations. The choice of the period 1981 to 2014 is informed by the availability of data in a form detailed enough to allow for robust analyses.

In terms of characteristics, the data under study possess two characteristics of interest. Firstly the data used are purely time series. Time series are observations that are ordered in time or numerical values of variables from time to time Osuala(2010), Koutsoyiannis (2001).

The second characteristic of the data set is that it is secondary. Secondary data is data collected by someone other than the user. The preference of secondary data over the primary type in the context of this research stems from the fact that it is quick and relatively inexpensive. It is easier to examine information collected over a long period of time, and identify trends Mochmann(2012).The relationship under study is time bound and could be trend related hence the preference of secondary data. By approach, the study adopts the *ex post facto* research method which is a very common and ideal method in conducting research in business and social sciences. It is mostly used when it is not possible or acceptable to manipulate the characteristics of the variables under study.

4. Data Presentation and Analyses

To 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.

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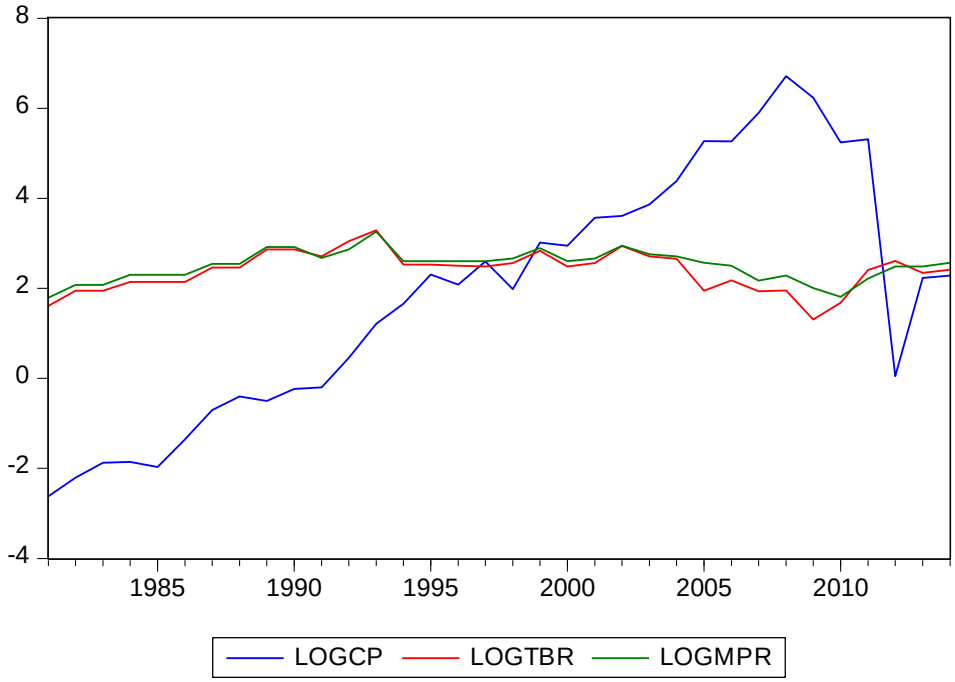

Fig. 4.1: A line graph of Outstanding commercial papers and the interest Variables under study (1981 to 2014)

Source: Author's Plot from Eviews 9.

Fig 4.2 below is a bar 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.

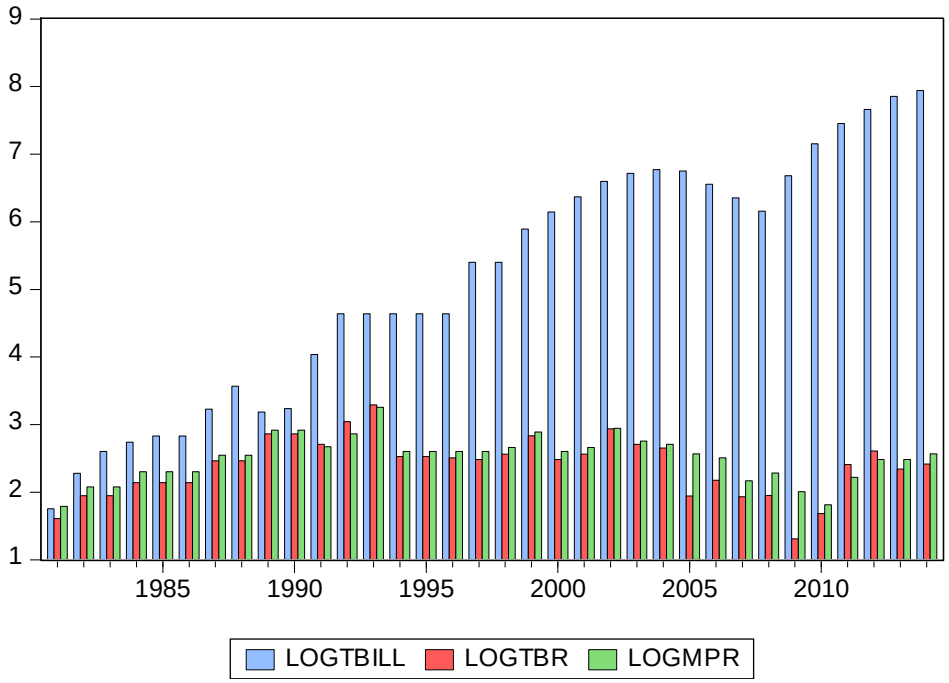

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Fig. 4.2: A Bar Plot of Outstanding Treasury Bill and the interest Variables under study (1981 to 2014)
Source: Author's Plot from Eviews 9.

More so, Table 4.3 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 is shown.

4.1 Test of Interest Rate and Treasury bill

Ho_1: Interest rate does not positively and significantly impact on investment in treasury bills.

Ha_1: Interest rate positively and significantly impact on investment in treasury bills.

Estimation method/Test Statistics

Ordinary Least Squares form of Regression

The test of this hypothesis is done using the OLS result following the model specified as equation 3.1 which is represented thus and the estimated form as contained in table 4.4

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Table 4.4: The OLS Results for Hypothesis One

Dependent Variable: LOGTBILL

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	94%			
Adjusted R-squared	93%			
F-statistic	109.2142			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.7			

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 1.66shows 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 impact on the investment in treasury bills in the Nigerian Money Market.

4.3.2 Test of Interest Rate and Commercial Papers

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Ho_2: Interest rate does not have positive and significant impact on investment in commercial papers

Ha_2: Interest rate has positive and significant impact on investment in commercial papers

The test of this hypothesis is done using the OLS result following the model specified as equation 3.2 which is represented thus and the estimated form as contained in table 4.4.

Table 4.5: The OLS Results for Hypothesis Two

Dependent Variable: LOGCP

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	87%
Adjusted R-squared	85%
F-statistic	47.15942
Prob(F-statistic)	0.000000
Durbin-Watson stat	2.3

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 R^2 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 regressors 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.

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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.

5. Summary and 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. It was against the foregoing that the study chose a broad objective of examining the theoretical and empirical relationship between interest rate and investment in money market instruments with evidence from the Nigerian economic environment. To achieve this main objective, the study sought to specifically: (i) measure the impact of interest rate on investment in treasury bills, (ii) measure the impact of interest rate on investment in commercial papers in Nigeria (iii) measure the degree of linear association between investment in commercial papers and investment in treasury bills, and (iv) measure the degree of linear association between monetary policy rates and Treasury bill rates. 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. In line with the specific objectives of this study and the findings made, we recommend as follows:

1. That government should appropriately regulate interest rate with the ultimate aim of using it to drive investment in money market instruments.
2. That interest 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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