

Causes of Interest Rate Volatility in Nigeria

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Abstract

This paper analyzed the causes of interest rate volatility in Nigeria for the period between January 2000 and December 2005 using an econometric model. The empirical analysis starts by analyzing the series properties of the data which is followed examining the nature of causality amongst the variable using the SPSS version 17 software packages. The results from the study indicated that interest rate exerted significant negative effects on the money supply and the required reserved ratio during the period. 10% decrease in Interest Rate will increase money supply by 4.09% and 10% decrease in interest rate will increase the required reserved ratio by 1.01%. In addition, the study recommended the diversification of the Nigerian economy by investing in other sectors of the economy and the empowerment the Federal Inland Revenue Services in prosecuting tax evaders and improvement on tax collection mechanisms to minimize tax evasion.

Keywords: Regression Analysis, Interest Rate money supply, required reserve ration, Nigeria

1. Introduction

Nigerian economy according to IMF (2013) is a middle income, mixed economy and emerging market, with expanding financial, service, communications, and entertainment sectors. However, the economy, according to the Central Bank of Nigeria's Annual Report and Statement of Accounts for the year ended 31st December 2011 has overdependence on the capital-intensive oil sector, which provided 20% of GDP 95% of foreign exchange earnings, and about 65% of government revenues.

Furthermore, the UNDP (2007) country report stated that the largely subsistence agricultural sector did not keep up with rapid population growth. Nigeria, once a large net exporter of food, now imports some of its food products. In 2006, Nigeria successfully convinced the Paris club to let it buy back the bulk of its debts owed to the Paris Club for a cash payment of roughly \$12 billion (USD).

However, the UNDP (2007) asserted that the country recording high influx of foreign investors with employment rate increasing at 60%, a record inflationary rate of less than 15%, continued international partnerships of Nigeria with Western Countries and appreciating of Nigerian Naira which in turn have all contributed to the positive macro-economic environment. The objectives of this paper are the provisions of a deeper understanding on the causes of interest rates volatility and whether the volatility has effects on the economic development of Nigeria.

2. Literature review

Empirical Studies

The literature on money demand in Nigeria is long and vast. The long string of research, however, shows that money demand in Nigeria has been fairly stable over time. Ajayi (1977) for example examined the period 1960 through 1970 and found that real income and interest rate had significant impact on M2. This, in his view, was an indication that money demand function was stable for the period under the study. His work relied on the OLS methodology. On the other hand, Darrat (1986) explored the demand for money in three OPEC members namely Libya, Nigeria and Saudi Arabia. Applying the Chow, Gupta and Farley and Hinich stability tests he concluded that the money demand function was stable in the three countries.

Kilindo (1982) makes use of a simultaneous econometric model developed by Aghevli and Khan (1978) to analyze the relationship between increases in the supply of money and inflation in Tanzania for 1970- 1979 period. The basic

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hypothesis was that an increase in the rate of inflation, whatever its cause, increases the real value of the fiscal deficits, owing to the fact that money expenditures keep pace with inflation while nominal revenue tend to lag behind. Kilindo shows that the growths of money supply and inflation are linked in a two-way relationship for the case of Tanzania. This link was introduced in the form of reactions of the government fiscal deficit to inflation. He concludes that fiscal deficit financing through money creation increases money supply, and consequently generating further inflation. The limitation of this study however, was that it uses an inadequate data set of 10 observations which is not sufficient for analyzing an econometric model.

Chhibber et al. (1989) develop a detailed econometric model, which takes into account both monetary and structural factors in the course of inflation in Zimbabwe. Their investigation determines that monetary growth, foreign prices, exchange rate and interest rates, unit of labor cost and real income are the determinants of inflation in that country. A similar macroeconomic model of inflation was employed for Ghana by Chhibber and Shaffik (1990a). This study, which covers 1965- 1988, suggests that the growth of money supply is one key variable explaining the Ghanaian inflationary process. Official exchange rates could not exert any significant influence on inflation.

Arize and Lott (1985) also examined money demand in Nigeria. They found that real income and expected inflation were important determinants of money demand, explaining over 80% of variation in real cash balance in Nigeria. They showed that given low per capita income of the country, permanent income and measure income were largely the same. In addition, given the near-exogenous determination of major prices (particularly oil prices), monetary authorities in the country should be more desirous of following the constant growth rate rule as international inflation could be easily transmitted to domestic prices.

A similar argument, made to explain the failure of spreads in developing countries to converge to international levels even after financial liberalization, suggests that high interest rate spreads in developing countries will persist if financial sector reforms “do not significantly alter the structure within which banks operate” (Chirwa and Mlachila, 2004). This structure refers to the market/industry and macroeconomic environment in developing countries. The market specific determinants of commercial bank interest rate spreads highlighted in the literature typically include lack of adequate competition in the banking sector and consequent market power of commercial banks, the degree of development of the banking sector, and explicit and implicit taxation such as profit taxes and reserve requirements. Cross-country studies have also established that banking spreads tend to fall as institutional factors improve.

Fielding (1994) employs quarterly data of four African countries (Nigeria, Cameroon, Kenya and Cote d’Ivoire) to construct money demand functions. He finds that money demand depends not only on income, inflation and interest rates, but also inversely on the variability of inflation and interest rates. The central policy implication of this finding is that calculations of the seignorage-maximizing rate of inflation which ignores the variability effect of inflation and interest rates will overestimate the optimal rate of inflation given that high inflation tends to be associated with highly variable inflation. The estimated functions were quite heterogeneous though and so while he recommends membership of monetary unions for higher stability, he warns against the four countries being members of the same monetary union.

Theoretical Framework

The Loanable Funds Theory of Interest

This theory which is also known as the neo-classical theory of interest explains the determination of interest in terms of demand and supply of loanable funds or credit. According to this theory as attested by Jhingan, (2001) the rate of interest is the price of credit which is determined by the demand and supply for loanable funds.

According to Vaish (2000) the demand for loanable funds has three sources, which are government, businessmen and consumer who need them for the purposes of investment, hoarding and consumption respectively. The government borrows funds for the provision of public goods; the businessmen borrow for the purchase of capital goods and for starting investment projects. Such borrowings are interest elastic and depend mostly on the expected rate of profits as compared with the rate of interest. The demand of loanable funds on the part of consumers is for the purchase of durable consumer goods like cars, houses etc and this is also interest inelastic.

The supply of loanable funds as affirms by Jhingan (2001) comes from savings, dishoarding and bank credit. Private, individual and corporate savings are the main source of savings. To individuals whose personal savings depend on their income level they are regarded as interest elastic, where if the interest rate is high they save and when the interest rate is low the hoard.

Vaish (2001) also argued that corporate savings are the undistributed profits of a firm, which also depend on the current rate of interest to some extent. If interest rate is high it will act as a deterrent to borrowing and thus will encourage savings.

Hansen (1953), (cited in Jhingan, 2001) asserts that the loanable funds theory like the classical and the Keynesian theories of interest are indeterminate. The supply schedule loanable fund is composing of savings, dishoarding and bank money. But since savings vary with past income and the new money and activated balances with the current income, it follows that the total supply schedule of loanable funds varies with income. Thus the loanable funds theory is indeterminate unless the income level is known.

Rose and Marquis (2009:135) stated “the two forces of supply and demand for loanable funds determine not only the volume of lending and borrowing but also the rate of interest”.

3. Methodology

Research Design

This research will cover quantitative aspects in order to ensure valid empirical findings; the research design will be explanatory to ascertain causes of interest rates volatility in Nigeria.

Sources of Data

The data used in this research were mainly obtained from secondary sources, i.e. text books, seminar papers, government publication, newspapers, journals and the internet.

Estimation Techniques

One purpose of statistical analysis as stated by Dickinson (1977) is to reduce a mass of data into a more compact form that shows general trends and relationships between variables. He maintained that the objective of statistical analysis is to provide a quantitative way of distilling the essential features from the data.

Therefore the SPSS version 17 software packages was used to analyze the collected data; this was possible due to the quantitative nature and time series of the data thus making the use of econometric modeling necessary. The interest rate (dependent variable) of the economy will be regressed against independent variables (money supply and required reserve ratio) at a 5% level of significant therefore a simple linear regression model will be formulated and used in each case.

A log-linear model is one that relates a dependent variable to a single independent variable and therefore an estimate of each model.

4. Results and Discussion

Table 1: Correlations between Interest Rates (ir), Money Supply (ms) and Required Reserve Ratio (rr) in Nigeria (n =60)

		logir	logms	logrr
logir	Pearson Correlation	1		
	Sig. (2-tailed)	0.000		
	N	60		
logms	Pearson Correlation	-0.901**	1	
	Sig. (2-tailed)	0.000	0.000	
	N	60	60	
logrr	Pearson Correlation	-0.539**	0.413**	1
	Sig. (2-tailed)	0.000	0.001	0.000
	N	60	60	60

** Correlation is significant at the 0.01 level (2-tailed)

Interest Rate Vs money Supply

The Correlation between interest rate (ir) and money supply (ms) was -0.901 which was significant at 0.01 levels in a two tailed test. This means that an increase in interest rate will result in decrease in money supply. This is in agreement with the demand and supply for the loanable funds.

On the demand side, foreign credit demands are sensitive to the spread between domestic lending rates and interest rates in foreign markets. If Nigerian interest rates decline relative to foreign rates, foreign borrowers will be inclined to borrow more in Nigeria and less abroad. At the same time, with higher foreign interest rates, Nigerian lending institutions will increase their foreign lending and reduce the availability of loanable funds to domestic borrowers. The net results then, are negative relationship between foreign borrowing band domestic interest rates relative to foreign interest rates.

However, on the supply side, if domestic rates rise relatively to interest rates offered abroad, the supply of foreign funds to domestic markets will tend to rise,. Foreign lenders will find it more attractive to make loans to domestic borrowers. At the same time, domestic borrowers will turn more to foreign markets for loanable funds as domestic interest rates climb relatively to foreign rates.

Interest Rates Vs Required Ratio

The Correlation between interest rate and reserve ratio was -0.539 which was significant at 0.01 levels in a two tailed test. This was also in agreement with the demand and supply for the loanable funds.

On the demand for loanable funds, government demand for loanable is growing factor in the financial markets but does not depend significantly upon interest rates. This is especially true of borrowing by the federal government. Decisions on spending and borrowing are made by the National Assembly in response to social needs and the public welfare, not the rate of interest. Moreover, the federal government has the power both to tax and create money to pay its debts. However, in the supply side, commercial banks and thrift institutions offering payments account have the unique ability to create credit by lending and investing their excess reserves. Credit created by the domestic banking system represent an additional source of loanable funds, which must be added to the amount of savings and the dishoarding of money balances to derive the total supply of loanable funds in the economy.

Money Supply and Reserve Ratio

The Correlation between money supply and reserve ratio was 0.369 which was significant at 0.01 levels in a two tailed test. This was also in agreement with the demand and supply for the loanable funds. Any increase in money supply will also increase the reserve ratio in an economy. This relationship on the supply of money and the reserve ratio are closely controlled by the government through the reserve bank. It is one of the statutory duties of the CBN to provide legal tender to Nigerians and the fiscal policy by the government of the day.

Table 2: Analysis of variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.861	2	0.431	155.464	0.000 ^a
	Residual	0.158	57	0.003		
	Total	1.019	59			

a. Predictors: (Constant), logrr, logms

b. Dependent Variable: logir

We observed that the sum of squares is 0.861; this implied that 86.10% Interest rate is affected by money supply and reserve ratio which affirmed the loanable funds theory of interests. The other 23.9% of interest rates may be affected by other factors such as inflation and government announcements.

The Model

The model for this research will be an equation that specifies a linear relationship amongst the variables. It will give an approximate description of some economic behavior and the relationship among the variables used under the research. The model will be in a log-linear form to cater for fluctuations and smoothen the irregular components.

The log-linear model is applicable here because all the observations in the data set are positive and big numbers. Gujarati (1995) notes that this can be guaranteed by using a transformation like $\log(X+k)$ where k is a positive scalar chosen to ensure positive values.

Therefore, the model for this research is:

$$\text{Log } ir = \beta_0 + \beta_1 \text{Log } ms + \beta_2 \text{Log } rr + \mu$$

Where:

- ir interest rate
- β_0 is a constant
- β_1 and β_2 are the partial coefficients of broad money and reserve ratios respectively
- ms money supply
- rr Required Reserve Ratio
- μ is the error term.

Empirical Results

The results obtained from the regression analysis can be seen in table 3 below and it has also been presented in standard notation.

$$\text{Log } ir = 10.141 - 0.409 \text{log } ms - 0.101 \text{log } rr$$

Table 3: Coefficients of Variance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	10.141	0.417		24.339	0.000
	logms	-0.409	0.029	-0.818	-14.282	0.000
	logrr	-0.101	0.029	-0.201	-3.518	0.001

a. Dependent Variable: logir

The value of β_0 which was a constant is 10.141. This is the value of interest rate with or without money supply or required reserve ration in the economy. This is so because of the statutory duty of CBN in providing legal tender in the economy. The t value in the period under review was 24.339 which are greater than the value of 2; this means that the constant value is significant to our study.

The value β_1 calculated was - 0.409. This value represented a marginal effect of money supply on interest rate in the economy. It means when there is a 10% decrease in the money supplied in the economy; there would be an increase of 4.09% increase on the interest rate in the economy. Our value of t was - 14.282 in the period under review which is greater than the absolute value of 2 indicating that money supply is significant to in our model.

The value of our β_2 calculated was - 0.101. This value represented a marginal effect of required reserved ratio on the interest rate. It means, when there is a 10% decrease in the required reserved ration in the economy; there would be an increase of 1.01% interest rate in the economy. Our value of t was - 3.518 in the period under consideration which is greater than the value of 2 indicating that required reserved ratio is significant in our model.

5. Recommendations

We are recommending that, it would be important for the Nigerian Government to diversify the economy by investing in other sectors of the economy such as agriculture, forestry, or fishing as these sectors only contributed less than 20% of income, of the country.

We are also recommending that the Federal Internal Revenue Service’s (FIRS) be empowered to prosecute tax evaders and they should improve there tax collection mechanisms which minimize tax evasion. In this regard, the government should review the structure of tax administration as well as introduction of computerized system to improve the traditional and existing system.

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