



Causes of Interest Rate Volatility and its Economic Implications in Nigeria

Wehnam Peter Dabale, Nelson Jagero

To Link this Article: <http://dx.doi.org/10.6007/IJARAFMS/v3-i4/304>

DOI:10.6007/IJARAFMS /v3-i4/304

Received: 13 October 2013, **Revised:** 16 November 2013, **Accepted:** 28 November 2013

Published Online: 12 December 2013

In-Text Citation: (Dabale & Jagero, 2013)

To Cite this Article: Dabale, W. P., & Jagero, N. (2013). Causes of Interest Rate Volatility and its Economic Implications in Nigeria. *International Journal of Academic Research in Accounting Finance and Management Sciences*. 3(4), 35 – 42.

Copyright: © 2013 The Author(s)

Published by Human Resource Management Academic Research Society (www.hrmars.com)

This article is published under the Creative Commons Attribution (CC BY 4.0) license. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this license may be seen at: <http://creativecommons.org/licences/by/4.0/legalcode>

Vol. 3, No. 4, 2013, Pg. 35 - 42

<http://hrmars.com/index.php/pages/detail/IJARAFMS>

JOURNAL HOMEPAGE

Full Terms & Conditions of access and use can be found at
<http://hrmars.com/index.php/pages/detail/publication-ethics>



Causes of Interest Rate Volatility and its Economic Implications in Nigeria

Wehnam Peter Dabale, Nelson Jagero

Africa University, P.O. Box 1320 Mutare, Zimbabwe,

Email: dabalew@africau.edu, jageron@africau.edu

Abstract

The paper explored causes of interest rate volatility and its implications on the socio-economic development of Nigeria for the year 2000 – 2005 periods. Its objective had been the provision of a deeper understanding of the causes of interest rate volatility and whether this has effects on the Nigerian economy. Data for this study were mainly collected from secondary sources and have been log- linearised. An econometric model specification was then built and E-View 5.0 software was used in computing the data regression analysis. Findings of the study were drawn and indicated the relationship between the dependent variable (interest rate) and independent variables (money supply and required reserve ratio). The research study was concluded with a detailed discussion and recommendations based on the findings.

Keywords: Interest Rates Volatility, Money Supply, Reserve Ratio

Introduction

In Nigeria the central Bank of Nigeria (CBN) has significant influence on interest rates and setting up of monetary policies. Todaro and Smith (2006) asserted that monetary and fiscal policies play a major direct and indirect role in governmental efforts designed to expand economic activity in times of unemployment and surplus capacity and to contract that activity in times of excess demand and inflation.

The level of interest rates and the aggregate supply of money in circulation are the two basic instruments of monetary policies which can either be achieved by controlling the growth of the money supply as argued by monetarist theorist or expanding the supply of money in circulation which in turn leads to excess demand thereby causing the interest rates to decline as argued by the Keynesian economists. These are easily achieved in developed countries where there is highly organized, economically interdependent and efficiently functioning money and credit markets.

Maxwell (1988) had argued that many developing countries' markets and financial institutions are highly unorganized, often externally dependent and spatially dependent and fragmented. The central bank has little choice when it is faced with the financing of public sector fiscal deficits. Unfortunately, Nigerian macroeconomic environments are historically stuffed with fiscal dominance such that more and more paper monies are printed in order to finance those deficits.

According to Agu, (2007) since 1965 Nigeria's fiscal disposition has been in favor of deficits which were 99.9% financed through ways and means the central bank's term for printing new currency. The long history of fiscal mismanagement of oil booms in Nigeria severely proscribed the Central Bank of Nigeria's ability to pursue a coherent monetary policy. Without the support of a disciplined and broadly predictable fiscal stance, the central bank was unable to make credible commitments to an inflation target or, indeed, to any other intermediate target such as the monetary supply or the exchange rate.

Consequently, according to the Central Bank of Nigeria's Annual Report and Statement of Accounts for the year ended 31st December, 2007, monetary policy alone did not automatically result in development.

Despite high inflation rates, real interest rate as at 2001 was over 20%. The spread of lending and deposit rates also constitutes a disincentive to effective financial intermediation. Part of the factors identified by the Central Bank as being responsible for this is the oligopolistic nature of the banking industry in Nigeria. More worrisome however is the high premium placed on foreign exchange transactions which is in turn a function of the distorted incentive system and breakdown of traditional control mechanism in the industry. The persistent high interest rate reduces returns on investment in the real sector and perpetuates trading in financial instruments.

Given that the volatility of interest rates affects personal, investments and governmental decision making of any nation, Nigeria cannot be an exception as affirmed by Schwartzman (1992) that the movement of interest rates in one direction or another is influenced by a multitude of factors, including economic, inflationary, monetary, fiscal, global, and political factors.

Target growth of M1 (measure of all currency in circulation) and M2 (less liquid measure, consisting M1 plus savings deposits) overshoot by 121% and 554% respectively in 2001 while target reserves overshoot by 792% in 2000.

The Central Bank regularly blamed this on fiscal dominance, but it needed to be empirically proven that even the nature of monetary policy was not in itself a factor in this irregularity.

Objectives

The objective of this research is the provision of a deeper understanding on the causes of interest rates volatility and whether the volatility has effects on the economic development of Nigeria.

- To determine the level of interest rate volatility in Nigeria between 2000 and 2005 and the possible factors influencing it.

Literature Review

Empirical Studies

Anoruo (2002) examined the stability of money demand function in the Structural Adjustment (SAP) period. Also using the Johansen and Juselius co-integration test and other stability test procedures (the CUSUM and CUSUMQ tests), he found that M2 demand function in Nigeria was stable for the period. In his view, this implied that M2 was a viable monetary policy tool and could be used to stimulate economic activity in Nigeria.

Ellis and Lowe (1997) examined the effects of interest rate smoothing on the Taylor rule in Australia. To do so, they introduced a cost for interest rate changes to the Central Bank's loss function. When the cost varied, it was found out that moderate degrees of

smoothing did not often increase the variability of inflation and output in any appreciable degree. They explained this as being as a result of monetary policy transmission lags which increase the impact of previous interest rates on current output. Smoothing in this sense leads to longer cycles in output and inflation.

However, while Ellis and Lowe (1997) model is backward-looking, Clarida et al (1998) present a forward-looking model to assess the smoothing behaviour of the German, United States and Japanese Central Banks. The results showed that the Central Banks apparently raised the anchor rates in reaction to a rise in expected inflation and lowered the rates when output is below a target range.

Ke 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 of 2-, 5-, 7-, 10-year maturity from June 30, 1998 to March 31, 2007 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 found that the movement of interest rate swap spread was negatively related to changes in the slope of yield curve of Treasury Securities which consistent with their hypothesis. They also found out that changes in the IR 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.

Nwaobi (2002) using data from 1960 through 1995 examines the stability of the demand for money in Nigeria. With a model specifying a vector valued autoregressive process (VAR) and the Johansen co-integration framework, he finds that money supply, real GDP, inflation and interest rate are co-integrated. This suggests that the money demand function is stable. In addition, evidence gathered from his non-nested tests suggests that income is the more appropriate scale variable in the estimation of money demand function in Nigeria.

Theoretical Framework

The Classical Theory of Interest

This theory according to Vaish (2000) cannot be ascribed to any one single writer belonging to the classical school. Following Adam Smith, the classical writers being interested in those fundamental forces which determined the long-term interest rate, disregarded those factors of temporary and secondary nature which characterized the short-run disequilibrium situations.

However it is widely accepted that the theory was propounded by Marshall (1920) and Pigou (1932) and this theory is known as the demand and supply theory of saving. The theory states that the rate of interest is determined by the supply and demand of capital. The supply of capital is governed by time preference and the demand for capital is determined by the expected productivity of capital. The time and preference are dependent on savings.

According to Vaish (2000) the demand for capital consists of the demand for productive and consumptive purpose. Capital is demanded by the investors because it is productive. But the productivity of capital is subject to the law of variable proportions (additional units of capital are not productive as their earlier units).

However, the supply of capital according to Jhingan (2001) depends upon savings rather upon the will to save and the power to save of the community. Some people save irrespective of the rate. They would continue to save even if the rate of interest were zero. There are others who save because the current rate of interest induces them to save and reduce when the rates are low. The higher the rate of interest, the larger the community savings and more will be the supply of funds. The supply curve of capital or the savings curve moves upward to the right.

Methodology of Research

Research Design

The purpose of this study, being quantitative and explanatory research is to ascertain causes of interest rates volatility and its economic implication 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.

Data Analysis

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 smoother 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:

$$\text{Log } ir = \beta_0 + \beta_1 \text{Log } ms + \beta_2 \text{Log } rr + \mu \quad (1)$$

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.

Results and Discussion

The Model

The model specification used is in a log-linear form which seeks to show the causal relationship between the dependent variable (interest rate) and the independent variables (broad money and the required reserve ratio). The model uses observations collected between 2000 to 2005 monthly data. All the data were available from the relevant authorities except the interest rate for the year 2000 that was not found.

The model takes into account the disturbance term, μ , also known as the error term whose presence shows that there are some factors that may influence the dependent variable neither captured in the model nor explained by the intercept (β_0), but by the random noise.

R², which is the coefficient of determination, measures the significance of the variable or the strength of the relationship between variables. Therefore if R² is closer to 1, it means the estimated regression line is highly valid. This means that any bulks of the variations in interest rate are explained by the variations in broad money supply and the required reserve ratio. The adjusted value of R² is used as it reveals the true value of the variations as it tends to measure the actual variations and is not affected by the number of variables.

Empirical Results

These are results obtained from the regression analysis of the data used in the model see attached appendix 2 but here they are going to be presented in standard notation.

$$\text{Log ir} = 10.14064 - 0.14064 \text{ Log ms} - 0.101317 \text{ Log rr}$$

$$S(e) = (0.052637)$$

$$T(\text{calc.}) = (-14.28240) (-3.517986)$$

$$R^2 = 0.845080$$

$$\text{Adjusted } R^2 = 0.839644$$

$$\text{DW (stat)} = 0.47554$$

Interpretation Results

$$\beta_0 = +10.14064$$

This is the value of the constant, implying that the level of interest rate in the economy would have this value when the broad money supply and required reserve ratio in the economy are equal to zero. The constant shows that there is a minimum level of money in circulation even when there is no variation in the Broad money and the required reserve ratio. Therefore the positive sign of interest rate (+10.14064) agrees with the a priori expectation that the constant would be positive.

This result can be attributed to the fact that one statutory duties of CBN is to provide the legal tender to Nigerians and the fiscal policy by the government of the day. The monetary policy objective is couched in terms of maintaining price stability and promoting non-inflationary growth which in Nigeria in period under review (2000-2005) is relied on transmission mechanism.

Using the rule of thumb, the t-value (-3.517986) is greater than the absolute value of 2, therefore we reject the null hypothesis and accept the alternate hypothesis; therefore our model is significant in detecting the intercept. This is also confirmed by our R².

$$\beta_1 = -0.14064$$

This is the level of partial coefficient of the money supply in the current period. It shows the marginal effect of broad money on interest rate, therefore a 1% change in the level of broad money supplied in the economy would lead to 14.064% change in the level of interest rate in the economy. The negative sign of the partial coefficient shows that there is a negative relationship between the broad money and interest rate.

This result affirms the position of the Keynesians that though the supply of money is a function of interest rate to a degree, yet it considered to be fixed by the monetary authority, that is supply of money is taken to be perfectly inelastic.

Furthermore when there is increase in broad money in the economy, investors, individuals and corporate organizations as asserted by the liquidity preference theory of interest would have incentive to save money thereby decreasing their willingness to hold on to liquidity. The absolute t-value of - 14.28240 is greater than +/- 2 which shows that the level of money supply in the economy is significant in the model. This is also in line with the value of R2 (0.845080) i.e. closer to 1, implying that the relationship between the interest rate and money supply is significant.

$\beta_2 = - 0.101317$

This is the level of partial coefficient of the required reserve ratio in the current period. It shows the marginal effect of required reserve ratio on interest rate, therefore a 1% change in the level of the required reserve ratio in the economy would lead to - 10.1317% change in the level of interest rate in the economy. The negative sign of the partial coefficient shows that there is a negative relationship between the required reserve and interest rate. This is in line with the a priori expectations.

Since a little increase in the interest rate would lead to a decrease in required reserve ratio, this can be attributed to the fact that individuals and cooperate organization would not have the incentive to borrow thereby decreasing the money creation ability of the banks thereby decreasing the reserve ratio.

The t-value of - 3.517986 is greater than +/- 2 which shows that the level of required reserve in the economy is significant in the model. The significance is explained by the R2 which are close to 1.

The value of R2 is 0.845080 and adjusted R2 is 0.839644, this means that the change of interest rate is fully explained by the variables in the model i.e. the changes in money supply and required reserve ratio. In other words the model explains the influence of the independent variables on interest rate.

The Durbin-Watson statistics of 0.47554 which is less than 2 is an evidence of positive serial correlation.

Recommendations

- Restrictive Monetary Policies: The effectiveness of monetary policy, its timing and its eventual impacts on the economy are not obvious. That central banks attempt influence the economy through monetary is a given. In any event, insights into monetary policy are very important to the investor. The availability of money and credit are key considerations in the pricing of an investment.

- Sound Fiscal Policies: Reduction in the primary fiscal deficit through which, the government should substantially reduce financing political parties and reduce the jumbo wages and salaries of political office holders. This is so important because many people in Nigeria see politics as a whim for self aggrandizements. On the other hand, it may be prudent to borrow during economic downturns in order to stimulate the economy with the intention of repaying those funds in times of economic growth.

References

Agu, C. (2007). "What Does the Central Bank of Nigeria Target?" An Analysis of Monetary Policy Reaction Function in Nigeria A Draft Final Report Presented at the Biannual Research Workshop of the African Economic Research Consortium, Arusha Tanzania October 2007 African Institute for Applied Economics, 128 Park Avenue, GRA, Enugu.

- Ajayi, S. I. (1977). "Some Empirical Evidence on the Demand for Nigeria in Nigeria," *American Economist*, 21, No.1, 51-54.
- Anoruo, E. (2002). "Stability of the Nigerian M2 Money Demand Function in the SAP Period." *Economics Bulletin*, Vol. 14, No. 3 pp. 1-9.
- Arize, A. C., and Lott, E. J. (1985). "A re-examination of the demand for money in Nigeria" *Atlantic Economic Journal*, Volume 13, Number 1/March, 1985, Springer Netherlands.
- Central Bank of Nigeria. (2007). Annual Report and Statement of Accounts for the year ended 31st December, 2007: CBN, Abuja.
- Clarida, R., Gali, J., and Gertler, M. (1998). "Monetary Policy Rules in Practice: Some International Evidence, *European Economic Review*, 42: 1033 – 1067.
- Friedman, B. M. (2001). Monetary policy, *International Encyclopedia of the social & behavioral Sciences*, pp. 9976-994.
- Gujarati, D. (1995). *Basic Econometrics*. Mc Graw Hill International Edition. Third Edition.
- Hetzel, R. L. (2000). "The Taylor Rule: Is It a Useful Guide to Understanding Monetary Policy?" *Federal Reserve Bank of Richmond Economic Quarterly Volume 86/2 spring 2000*.
- Jhingan, M. L. (2001). "Monetary Economics" 5th Edition, Vrinda publications (P) ltd. Delhi.
- Zhang, K., and Liang, B. (2007). An Empirical Analysis for Determinants of Interest Rate Swap Spread. A Master Thesis for Finance Programme, Economics Department, University of Lund.
- Nnanna, O. J. (2002). "Monetary policy and exchange rate stability in Nigeria" Paper delivered at a one-day seminar in Lagos organized by the Nigerian Economic Society.
- Nwaobi, G. (2002). "A vector error correction and non-nested modeling of money demand function in Nigeria." *Economics Bulletin*, Vol. 3, No. 4 pp. 1-8.
- Phelps, E. S. (1967). "Phillips Curves, Expectations of Inflation and Optimal Employment over Time." *Economica* NS 34, no. 3: 254-81.
- Phillips, A. W. H. (1958). "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957." *Economica* NS 25, no. 2 (1958): 283-99.
- Schwartzman, J. B. (1992). *Forecasting Interest Rates* McGraw-Hill, Inc. USA.
- Todaro, M. P., and Smith, S. C. (2006). *Economic development*, 9th edn. Harlow: Pearson, Addison Wesley.
- Torres, A. (2002). "Monetary policy and interest rates: evidence from Mexico" Banco de México, Banco de México, Av. 5 de Mayo #18 5to piso, Mexico City, C.P. 06059.
- Vaish, M. C. (2000). "Monetary Theory" fifteenth Revised Edition, Vikas Publishing House PVT Ltd, New Delhi.
- Zha, T. (1997), 'Identifying Monetary Policy: A Primer' *Federal Reserve Bank of Atlanta Economic Review* 2nd Quarter 1997.