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## Econometric Analysis of Investment Volatility and the Money in Circulation in Nigeria

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### Abstract

This study examines the inter-relationship between money supply and investment volatility in Nigeria using a restricted VAR model. With estimated VAR object of class “varest”, a restricted VAR was estimated by choosing scheme “ser”. In which circumstance, we re-estimated each equation distinctly with provision of our t-values in absolute value below the threshold value regulated by the function's argument thresh. The core condition that generated was that our variables are co-integrated. From economic view, joint dynamics of our variables that was embodied in the restricted VAR model makes the operational form a depiction of the underlying, structural plus economic relationships. In consequence, our variables contemporaneously impacted each other and error terms became uncorrelated economic shocks which drive the dynamics of our economic variables and hence implicitly implies zero correlation between stochastic disturbances as a preferred property. Empirically, our study reveals that the disturbance to broad money supply causes volatility in aggregate investment. The outcome of the study indicates unpredictable effects of shocks in money supply. The ‘monetary authorities’ should target broad money supply in executing monetary policy in Nigeria and the Federal government should pay heed to investment drives and interest rate management in order to advance the activities of the real sector in Nigeria.

**Keywords:** investment, volatility, money supply, restricted VAR, Nigeria, decomposition.

### 1. Research Background

Investment refers to change in capital stock over a period. Unlike capital, investment depicts a flow concept rather than a stock term. This implies that capital is measured in time variant, while investment is measured over a time lag. Investment is also total expenditure regarding new plants and equipment that is mostly taken with the aim of reducing cost and producing goods to generate future benefits.

Economic science recognizes capital investment which is concerned with tangible goods which translate into projects or set of assets e.g. single assets or fixed assets such as machines, building etc. also, is financial investments which is involve investments in securities including bonds, shares, and financial instruments called documents of claims which economic agents have on others.

Investment plays significant role in enhancing economic growth of a nation. Consequently, measures are taken by government of various economies including Nigeria to encourage investment to boost high productivity, employment level, innovation, standard of living, reduce poverty level and ultimately accelerate economic growth. Ali and Mshelia (2007) opined that investment is a strategic factor steering growth in any country [1].

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Investment is described as indispensable key to boost the level of productivity. A strong relationship between investment and economic advancement has been supported by research studies from development economists across world [3].

Similarly, Muhammad and Mohammed (2004) noted that investment plays an indispensable role for advancement and prosperity of any country. Many countries rely on investment to solve their economic problem such as under-development, unemployment, poverty, etc. Development economics in offering insights into determinant factors of growth affirmed that the importance and role of investment is fundamental as it contributes meaningfully to economic advancement.

On Asian countries experience, it was suggested that an investment rate range from 20 % to 25 % could engender growth rate from seven to eight percent with adequate attention directed to such factors that could affect or may affect investment and its trends. Absolutely, there are so many factors that could influence investment. This means that for a developing economy like Nigeria to achieve her goals of economic emancipation, amidst other economic objectives, there is need to add to the current investment level that will lead to improved economic growth with much focus on such factors that determine investments within and outside the national economy.

As a basic to growth, it is included in development strategies and planned policies of many economies. One of the critical objectives of investment, according to Okereke (2000), is social optimization which includes achieving a target market share, and maintaining minimum level of employment. Nigeria with population spreading over 170 million, vast mineral resources and favorable climate and vegetation features has the largest domestic market in Africa [19].

The domestic market is large and attractive to local and foreign investments as attested to by portfolio investment inflows spanning over N1.0 trillion to Nigeria through the Nigeria's Stock Exchange in 2003. However, investment outcome is not encouraging. It was observed that aggregate investment expenditure, as ratio of GDP rose from 16.9 % (1970) to 29.7 % in 1976 before declining to 7.7 % in 1985. Thereafter, the highest was 11.75 % of GDP in 2000, before declining to 9.3 % in 2006 [6, 7].

Beginning from 1995, investment GDP ratio declined significantly to 5.8 % and increased marginally to 6.99 % in 1997 and remained there about till 2001. In contrast with both slow and fast growing economies, Nigeria's Investment ratio lags behind the required minimum average of about 20 % of GDP annually that could propelled growth rate in fast growing economies. For instance, investment/GDP ratio is about 35 % in Singapore, 38 % in Korea and 41 % each in Malaysia and Thailand. Chile from South America registered 28 % [22].

The investment level especially domestic have fallen with over 145 % below its 2004 position. Currently, investment level of N4.5 billion appears to low if the nation wants to achieve her national goals and objectives. Apparently, if investments remain at current low level, it will slow down potential growth and reduce long-run levels of per-capita consumption and income, thus militating against the sustainability of economic growth and hope of meaningful poverty alleviation [13].

However, the wobbly behavior of investment and the concomitant stumpy profile in Nigeria is a basis for concern to policy makers in Nigeria. The investment level especially domestic has fallen with over 145% below its 2004 position. Low investments slow down potential growth and reduce long-run per-capita consumption and income, thus hindering the sustainability of economic expansion [5].

Despite policies made by the appropriate organs of government and institutions in Nigeria at different times to solve the problems of low investment, the jeopardy still persists. Investment is generally classified into four main components namely: the private domestic investments, the public domestic investment, the foreign direct investments and portfolio investment.

The stumpy investment is the core hitch facing the Nigerian economy in recent time. Regardless of policies made by the Nigerian government at different times to resolve the problem of low investment, the predicament still endures. Many countries are dependent on investment to unravel their economic problems [22].

Development economics in offering insights into determinant factors of growth affirmed that the importance and role of investment is fundamental as it contributes meaningfully to economic advancement [17]. The domestic market is large and attractive to local and foreign investments as attested to by portfolio investment inflows spanning in excess of one trillion to Nigeria through the Nigeria's Stock Exchange in 2003 [6]. However, investment outcome is not encouraging.

It was observed that aggregate investment expenditure, as ratio of GDP rose from 16.9 % (1970) to 29.7 % in 1976 before declining to 7.7 % in 1985. Thereafter, the highest was 11.75 % of GDP in 1990, before declining to 9.3 % in 1994. Beginning from 1995, investment GDP ratio

declined significantly to 5.8 % and increased marginally to 6.99 % in 1997 and remained there about till 2001.

In comparison with both slow and fast growing economies, Nigeria's investment ratio lags behind the required minimum average of about 20% of GDP annually that could propelled growth rate in prompt growing economies. For instance, for the South East Asian Countries, investment/GDP ratio is about 35 % in Singapore, 38 % in Korea and 41 % each in Malaysia and Thailand. Chile from South America registered 28 % [22].

Comparatively, this explains the low growth performance of the Nigeria's economy which closely followed the growth trend of investment expenditure. The observation is that aggregate income levels between N128.6m to N297.8m in the 1970s fell to as low as N404.1 and N334.7 million in the 1980s [10].

Domestic investment has persistently declined ever since 2004 below the loss ever recorded with as low as N1921.2 million in 2005 to as drastically low as N114, 484.4 in 2008. Currently, investment level of N4.5 billion appears to low if the nation wants to achieve her national goals and objectives.

The study seeks to make certain the consequence on money circulation of investment volatility in Nigeria. Accordingly, the relevant research hypothesis is that there is no inter-relationship between money supply and the trends in investment in Nigeria.

## 2. Empirical Review

The empirical literature on investment is vast, for example empirical evidence support the fact that investment is a strategic factor steering growth in any country [1, 4, 15, 18]. A robust relationship between investment and economic advancement has been supported by research studies from development economists across world [3]. Correspondingly, Elijah (2006), Garcia (2009), noted that investment plays an indispensable role for advancement of nations [11, 12].

In an another study of investment in less developed countries and used their independent variables to include real interest rate, macroeconomic stability, situation reform, external stability and physical infrastructure. Their study comprised panel of forty developing countries. Using co-integration techniques, they found that higher interest rate had negative effect on investment [21].

Empirical test of relationship between money supply and investments in Nigeria by Olekah and Oyaromade (2007) revealed monetary aggregate as one of strong determinants of investment. This study did not consider the role government expenditure plays and other targeted macroeconomic strings in the determination of investment level [18].

Ali and Mshelia (2007) distinguished the fact that investment is a strategic factor that steers growth of an economy. Also, Ali and Mshelia (2007) noted that investment plays an indispensable role for advancement and prosperity of any country [1].

Aysam et al. (2004) studied Investment in less developed Countries and used their independent variables to include real interest rate, macroeconomic stability, situation reform, external stability, macroeconomic volatility and physical infrastructure. Their study comprised panel of 40 developing countries. They used co-integration techniques to determine the persistence of a long-term interrelationship between investment and its determinants. They found out that almost all explanatory variables show a significant impact on investment but higher interest rate appears to produce a negative effect on investment.

Using a data from Nigeria, Ayeni (2004) empirically studied external shocks, savings and investment. The econometric result showed that growth of income, increase in public expenditure, openness and exchange rate and savings have positive effect on investment. Rising inflation and high interest (lending) rates equally impede investment in Nigeria [2].

Mouyiwa (2005) examined the linkage between inflation and investment using panel co-integration approach and a variance decomposition. The outcome of the study was a negative association between inflation rates and investment. Still on empirical consideration, De-gregorio (2009) found that in developing countries, investment is determined mainly by monetary aggregates [9, 16].

Empirical study on macroeconomic determinant factors of investment volatility for Nigeria discovered that debt burden, money supply, exchange rate amongst others negatively affect investment. The negative relationships attest to the major reasons why investors do lack confidence in Nigeria investment climate due to loss of confidence and insecurity. Most policies in the recent time centered on ways to improve the investment levels but as to what factors determine the levels

of investments and its influence in the nation's economy seem to be a mirage. This requires further investigation.

Some studies have analyzed the problem of volatile rate and have highlighted domestic factors e.g. inflation, exchange rates and equity growth determining factors of interest rate spread in Nigeria [8, 9, 18, 19]. However, the problem is that many recent studies have shown most economic series are not stationary.

**3. Theory and Model Specification**

Theoretically, the expected positive changes in the macroeconomic adjustments are expected to induce significant resurgence of investment resulting from increases in capital performance and acceleration of investment flows. Incidentally, these promised benefits of macroeconomic adjustments have not materialized in Nigeria. So, it is necessary to appraise very carefully those factors that have influence in terms of expected returns from investment.

Basically, from flexible version of the accelerator theory a link is established between investment output and cost of capital. The theory states that the optimal levels of investments depend on the levels of output including the use of cost of capital which invariably depends on the price of capital goods, the depreciation rate and the real rate of interest. Sajid and Sarfraz (2008) studied causal interrelationship between investment and exchange rate. However, the study was silent on the impact of exchange rate on investments [20].

Theoretically, the expected positive changes in macroeconomic adjustments are expected to induce significant resurgence of investment from investment flows. Consequently, it is necessary to appraise very carefully those factors that have influence in terms of expected returns from investment. The study estimates the basic model:

$$y_t = y_{t-1}G_1 + \dots + y_{t-p}G_p + z_t D + \mu_t \tag{3.1}$$

where  $E(\mu_t) = 0$

$$E(\mu_t \mu_s) = \partial_{ts} \Sigma$$

$$\partial_{ts} = 1 \text{ if } t = s$$

$$\partial_{ts} = 0 \text{ if } t \neq s$$

Given that the stationarity condition holds for autoregressive model, the roots of the deterministic equation becomes:

$$|I - G_1 z - G_2 z^2 - \dots - G_p z^p| = 0$$

Denoting  $N$  the number of observations such that  $n = N - p$  then  $z$  becomes a vector of deterministic components which is predictable for every  $n^* > N$ . In effect, equation (3.1) specified for the full sample of  $n = p + 1, \dots, N$  is:

$$Y_t = Y_{N-1}G_1 + \dots + Y_{N-p}G_p + Z_N D + E_N \tag{3.2}$$

Equation (3.2) in matrix form is specified as:

$$Y_N = FB + E_N \tag{3.3}$$

where,

$$F = [Y_{N-1}, Y_{N-2}, \dots, Y_{N-p}, Z_N]$$

$$B = \begin{bmatrix} G_1 \\ G_2 \\ \cdot \\ \cdot \\ G_p \\ D \end{bmatrix}$$

Using *vec* operator and *Kronecker* products, equation (3.2) becomes:

$$y = (I \otimes F)\beta + \varepsilon \tag{3.4}$$

where,

$$y = \text{vec}(Y_N)$$

$$\beta = \text{vec}(B)$$

$$\varepsilon = \text{vec}(E_N)$$

Letting  $L=lm$  and  $K=m(mp+d)$ , the number of observations needed for estimation is  $L > K$  or  $l > mp+h$ . Given consistent estimates of  $G_1, G_2, \dots, G_p, D$  for all parameter matrices, the  $h$  steps ahead forecasts would be recursively generated using:

$$\hat{y}_{N+1} = y_N \hat{G}_1 + y_{N-1} \hat{G}_2 + \dots + y_{N-p+1} \hat{G}_p + z_{N+1} \hat{D}$$

$$\hat{y}_{N+2} = y_{N+1} \hat{G}_1 + y_N \hat{G}_2 + \dots + y_{N-p+2} \hat{G}_p + z_{N+2} \hat{D}$$

$$\begin{matrix} \cdot & & \cdot & & \cdot \\ \cdot & & \cdot & & \cdot \\ \cdot & & \cdot & & \cdot \end{matrix}$$

$$\hat{y}_{N+h} = y_{N+h-1} \hat{G}_1 + y_{N+h-2} \hat{G}_2 + \dots + y_{N-p+h} \hat{G}_p + z_{N+h} \hat{D}$$

The constructed variables could be extended using the relevant lag matrix as follows:

$$S = \begin{bmatrix} 0 & \dots & \dots & 0 \\ 1 & 0 & \dots & \dots & 0 \\ 0 & 1 & 0 & \dots & \dots & 0 \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ 0 & \dots & \dots & 1 & 0 \end{bmatrix}$$

Such that the matrix of predicted values would be given as:

$$\hat{Y}_h = \begin{bmatrix} \hat{y}_{N+1} \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ \hat{y}_{N+h} \end{bmatrix}$$

With  $h > p$ , the matrix of the known data becomes:

$$\bar{F} = \begin{bmatrix} y_N & y_{N-1} & \dots & y_{N-p+1} & z_{N+1} \\ 0 & y_N & y_{N-1} & \dots & y_{N-p+2} & z_{N+2} \\ 0 & 0 & y_N & \dots & y_{N-p+h}^* & z_{N+h}^* \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ 0 & \cdot & \cdot & y_N & z_{N+p} \\ 0 & \cdot & \cdot & 0 & \\ 0 & & & 0 & z_{N+h} \end{bmatrix}$$

For a  $K$ -variable VAR with  $p$  lags,

$$\begin{bmatrix} y_{1t} \\ y_{2t} \\ y_{3t} \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{bmatrix} + \begin{bmatrix} G_{1,1} & G_{1,2} & G_{1,3} \\ G_{2,1} & G_{2,2} & G_{2,3} \\ G_{3,1} & G_{3,2} & G_{3,3} \end{bmatrix} \begin{bmatrix} y_{1t-p} \\ y_{2t-p} \\ y_{3t-p} \end{bmatrix} + \begin{bmatrix} \mu_{1,t} \\ \mu_{2,t} \\ \mu_{3,t} \end{bmatrix}$$

Where  $y_1$  is interest rate,  $y_2$  investment volatility,  $y_3$  broad money supply,  $\mu_t$  is iid normal over time with covariance matrix, the restricted VAR model would be:

$$\Delta y_t = w + \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \mu_t$$

where,

$$\Pi = \sum_{j=1}^{j=p} G_j - I_k, \Gamma_i = -\sum_{j=i+1}^{j=p} G_j$$

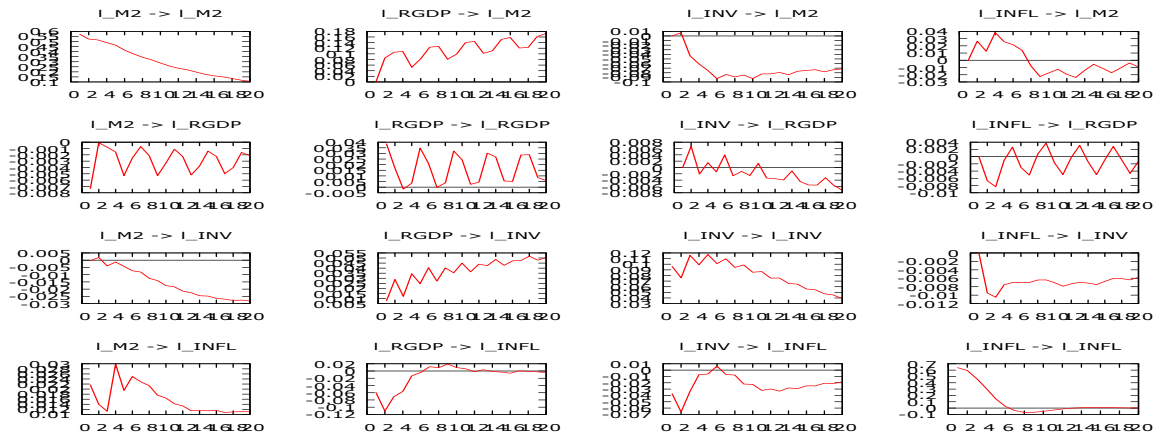
If all variables in  $y_t$  are  $I(1)$ , the matrix  $\Pi$  has rank  $0 \leq r < K$ , where  $r$  is the number of linearly independent co-integrating vectors (Johansen, 2006). Thus, writing the matrix of coefficients on the restricted term  $y_{t-1}$ , we can incorporate a trend in the co-integrating relationship and the restricted VAR equation itself as:

$$\Delta y_t = \phi(\beta' y_{t-1} + e + \rho t) + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \mathfrak{Z} + \ell t + \mu_t$$

The restricted trend is  $\ell = 0$  such that co-integrating equations are trend stationary and trends in levels are linear. The VAR estimation method was explored for analyzing the data. Given that in VAR modelling, all variables have to be of the same order of integration. Accordingly, the unit root test applied is the *ADF* test. Quarterly time series data used in this work were sourced from CBN, 'National Bureau of Statistics' (NBS) and World Bank.

#### 4. Econometric Analysis

The results of 'impulse response functions' (IRFs) are pictured in Figure I which x-ray a visual presentation of the changing effects of momentary shocks to the system and hence multiplier estimates in the dynamic framework.



**Fig. 1.** Impulse Response Charts  
Source: Authors' Work Using GRETL

In the first horizontal panel in Figure I, the impulse-response functions of each of the variables in the VAR to a shock in broad money supply are presented. This will show how each of the variables responds to a one standard error shock to money stock in the analysis. It is evident from the chart that a shock to money stock produces negative impact on investment. This affirms that as money stock increases, the volatility in investment rises.

The shock to money stock causes investment and inflation to fall generally. This is a rather unexpected result of the impact of broad money supply on these variables. The results of the VAR therefore indicate unpredictable responses of the macroeconomic variables to a shock in money

supply. The responses of money stock to shocks in the other variables in the analysis are reported in the first vertical layer of the charts.

It is evident from charts in the figure that following a negative shock to money stock produce upward spiral in investment volatility over the period. The shock to interest rate has almost the same effect on the volatility in investment demand by first increasing them and then causing 'downward spiral picture' which last for the rest of the targeted period.

Restricted VAR Analysis: The results of the vector correction model are shown on Table D. The estimated error correction coefficients all lies between 0 and 1, all negative and significant. The speed of adjustment co-efficient 0.734 implies that about 73.4 percent of volatility in investment is adjusted in subsequent period. This goes to show that the on the basis of changes in money supply and interest rate, restoration of the volatility in investment demand from the position of disequilibrium to the period of equilibrium is rapid. As it were, volatility in investment demand transitory in Nigeria. Hence, long run relationship between investment volatility and money stock is sustainable and is reliable.

**Table 1.** Restricted VAR Results

<i>Variables</i>	<i>Co-intq</i>	<i>Prob. Value</i>
$\Delta l(nr)$	-0.638	0.000
$\Delta l(nv)$	-0.734	0.000
$\Delta l(m_2)$	-0.542	0.000

Source: Author's Estimation Using GRETL

The result of the M2 equation is reported in Table E below. The F-tests of zero restrictions for all VARs indicates that  $H_0$  cannot be rejected. In the results, only the coefficients of the first, second and fourth lags of M2 and interest rate are significant suggesting money supply responds to its previous values with the rate of interest in the financial sector.

**Table 2.** Results of Money Supply Equation in the VAR

<i>Variables</i>	<i>Coefficient</i>	<i>t-ratio</i>	<i>p-value</i>	<i>Significance</i>
<i>Const</i>	-8.414	-1.40	0.16	
$\Delta l\_nr\_1$	0.089	0.15	0.88	*
$\Delta l\_nr\_2$	-0.729	-1.00	0.32	**
$\Delta l\_nr\_3$	0.334	0.46	0.65	***
$\Delta l\_nr\_4$	0.262	0.42	0.67	
$\Delta l\_nv\_1$	0.944	9.58	0.00	***
$\Delta l\_nv\_2$	0.033	0.24	0.81	
$\Delta l\_nv\_3$	-0.012	-0.09	0.93	
$\Delta l\_nv\_4$	-0.041	-0.41	0.68	
$\Delta l\_m_2\_1$	2.257	1.98	0.05	**
$\Delta l\_m_2\_2$	-0.189	-0.15	0.88	*
$\Delta l\_m_2\_3$	0.871	0.70	0.48	
$\Delta l\_m_2\_4$	-2.047	-1.70	0.09	*
<i>R squared = 0.979</i>	<i>Adj. R squared = 0.977</i>	<i>F = 302</i>	<i>F-tests of zero restrictions for all VARs = 0.46[0.77]</i>	
<i>Max. Lag = 4</i>				
<i>(***) denotes significance @ 1%</i>	<i>(**) denotes significance @ 5%</i>	<i>(*) denotes significance @ 10%</i>		

Source: Author's Work Using GRETL

From the investment volatility equation shown in Table F, the F-tests of zero restrictions for all VARs suggest that the VAR lag structure of 4 is appropriate in the estimation. All the coefficients of the four lags of money stock are significant, including the second lags of interest rate which is negative with a coefficient of 0.135. The significance of the first, second and third lags of investment volatility at the 1 percent level suggest that the volatility in investment demand is self-enforcing.

**Table 3.** Results of Investment Volatility Equation in the VAR

<i>Variables</i>	<i>Coefficient</i>	<i>t-ratio</i>	<i>p-value</i>	<i>Significance</i>
<i>Const</i>	-0.848	-2.06	0.04	
$\Delta l_{nr\_1}$	0.066	1.66	0.10	
$\Delta l_{nr\_2}$	-0.135	-2.19	0.03	**
$\Delta l_{nr\_3}$	0.055	1.10	0.27	
$\Delta l_{nr\_4}$	-0.024	-0.57	0.57	
$\Delta l_{nv\_1}$	0.006	0.82	0.41	*
$\Delta l_{nv\_2}$	-0.010	-1.09	0.28	*
$\Delta l_{nv\_3}$	0.007	0.71	0.48	*
$\Delta l_{nv\_4}$	-0.002	-0.29	0.77	
$\Delta l_{m_2\_1}$	0.409	5.25	0.00	***
$\Delta l_{m_2\_2}$	-0.292	-3.40	0.00	***
$\Delta l_{m_2\_3}$	0.290	3.42	0.00	***
$\Delta l_{m_2\_4}$	0.672	8.13	0.00	***
<i>R-squared</i> = 0.667	<i>Adj. R-squared</i> = 0.614	<i>F</i> = 12.5	<i>F-tests of zero restrictions for all VARs</i> = 0.46[0.77]	
<i>Maximum Lag. = 4</i>				
<i>(***) denotes significance @ 1%</i>	<i>(**) denotes significance @ 5%</i>	<i>(*) denotes significance @ 10%</i>		

Source: Author's Work Using GRETL

In the investment equation, the first three lags of money supply are significant at the 5 percent level while its fourth lag together with the first and second lags of interest rate are statistically significant at the 1 percent level along with the third lag of interest rate which is significant at the 5 percent level. This is pictured in Table G below. These are therefore the dominant factors that determine investment behavior in Nigeria. In effect, the changes money stock and interest rate are strong factors that explain investment volatility in Nigeria.

**Table 4.** Results of the Interest Rate Equation in the VAR

<i>Variables</i>	<i>Coefficient</i>	<i>t-ratio</i>	<i>p-value</i>	<i>Significance</i>
<i>Const</i>	-1.750	-1.73	0.09	*
$\Delta l_{nr\_1}$	0.782	8.04	0.00	*
$\Delta l_{nr\_2}$	0.543	4.43	0.00	*
$\Delta l_{nr\_3}$	-0.265	-2.16	0.03	**
$\Delta l_{nr\_4}$	-0.103	-0.99	0.32	
$\Delta l_{nv\_1}$	0.012	0.70	0.48	*
$\Delta l_{nv\_2}$	-0.029	-1.24	0.22	***
$\Delta l_{nv\_3}$	0.026	1.12	0.26	
$\Delta l_{nv\_4}$	-0.013	-0.76	0.45	
$\Delta l_{m_2\_1}$	0.567	2.95	0.00	**



$\Delta l_{m_2_2}$	-0.674	-3.18	0.00	**
$\Delta l_{m_2_3}$	0.675	3.24	0.00	**
$\Delta l_{m_2_4}$	-0.389	-1.91	0.06	*
$R\text{-sqd} = 0.667$	$Adj. R\text{-sqd} = 0.614$	$F = 12.5$	$F\text{-tests of zero restrictions for all VARs} = 0.46[0.77]$	
<i>Maximum Lag. = 4</i>				
(***) denotes significance @ 1%	(**) denotes significance @ 5%	(*) denotes significance @ 10%		

Source: Author's Work Using GRETL

### 5. Policy Implication of Results

The implications of the results are discernible as follows. The insignificance of interest rate is a pointer to the fact that the banking sector activities through loans have not played appropriate role in channeling credit to the real (investment) sector in the Nigerian economy over time.

Investment volatility coefficient has a positive and significant impact on money stock in Nigeria. This implies that even though short run changes in broad money supply may be mostly exogenous as demonstrated in the failure of the coefficients in the model; the level of economic activities has strong positive impact on money stock in Nigeria.

The disturbance to broad money supply seems to cause investment to fall generally. This is a rather unexpected result of the influence of money stock on these variables. The results of the VAR therefore indicate unpredictable responses of the 'macroeconomic variables' to a shock in money supply.

### 6. Conclusion

This study examines the inter-relationship between money supply, investment, inflation, interest rate and economic performance in Nigeria using VAR Analysis. The study reveals that the shock to broad money supply seems to cause volatility in investment behavior in Nigeria. This is a rather unexpected result of the influence of broad money supply on these variables.

The outcomes of the VAR analysis therefore indicate unpredictable responses of the macroeconomic variables to a shock in money supply. High interest rate adversely affects investment, thus, strongly supporting the notion that banking sector activities through loans have not played appropriate role in channeling credits to the real (investment) sector in Nigeria over time. The monetary authorities should target broad money supply in executing monetary policy in Nigeria. Government should pay attention to investment drives, interest rate management to improve the activities of real sector in Nigeria. Also, the Nigerian government should intensify investment effort on road transportation projects, telecommunication projects and electricity generation and possibly enter into partnership with private individuals and firms in implementing of these projects.

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УДК 33

### **Эконометрический анализ волатильности инвестиций и денежное обращение в Нигерии**

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**Аннотация.** В настоящем исследовании рассматривается взаимосвязь между денежной массой и волатильностью инвестиций в Нигерии с использованием ограниченной модели VAR. Предполагаемый VAR объект класса “varest”, ограниченный VAR, оценивался путем выбора схемы “ser”. В этом случае мы четко переоцениваем каждое уравнение с предоставлением наших t-значений в абсолютном значении ниже порогового значения,

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регулируемого аргументом функции thresh. Основным сгенерированным условием было то, что наши переменные являются совместно интегрированными. С экономической точки зрения совместная динамика наших переменных, воплощенная в ограниченной модели VAR, делает операционную форму изображением базовых, структурных и экономических отношений. Вследствие этого наши переменные одновременно воздействовали друг на друга, а термины погрешности стали несвязанными экономическими потрясениями, которые приводят к динамике в рядах наших экономических переменных и, следовательно, неявно подразумевают нулевую корреляцию между стохастическими нарушениями как предпочтительным свойством. Эмпирически, наше исследование показывает, что изменение денежного предложения (денежной массы) вызывает волатильность совокупных инвестиций. Результаты исследования свидетельствуют о непредсказуемых последствиях в денежной массе. "Монетарные власти" должны ориентироваться на широкую денежную массу при осуществлении монетарно-кредитной политики в Нигерии, а федеральное правительство должно прислушиваться к тенденциям инвестиционных движений и управления процентными ставками для того, чтобы продвигать деятельность реального сектора в Нигерии.

**Ключевые слова:** инвестиции, волатильность, денежная масса, ограниченный VAR, Нигерия, распад.