

Relationship between Deposit Money Bank Credit and Economic Growth in Nigeria under a Var G-Causality Environment

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Abstract: *This study evaluated the causal relationship between deposit money bank credit and economic growth in Nigeria over the period 1981-2014. The technique of analysis employed was the Vector autoregressive (VAR) Granger causality test. The proxied variables, real gross domestic product (RGDP), private sector credit (PSC) and broad money supply (M_2) were subjected to preliminary tests while a validity test of serial autocorrelation was also conducted on the residuals of the variables. The results revealed a unidirectional causality running from private sector credit and broad money supply to economic growth as measured by real gross domestic product (RGDP), whereas there was no feedback system from RGDP to either PSC or M_2 . In other words, RGDP was neither Granger causal for PSC nor M_2 . This result confirms the significance of financial development to economic growth. Banking system credit is therefore critical for the growth of the economy. This finding is in tandem with the supply-leading hypothesis, and the policy implication is that the Central Bank of Nigeria (CBN) and the Federal Ministry of Finance should ensure that the financial system is not only healthy but efficient. It is recommended that credit should be channeled, at concessionary costs, to the private sector of the Nigerian economy since their activities is proven to stimulate economic growth.*

Keywords: *Economic Growth, Private Sector credit, Money Supply, Causality,*

I. Introduction

In developing countries banks are expected to play important roles in financing economic projects and related activities as their contribution in ensuring sustainable economic growth. Generally, banks assume an intermediary role between surplus unit who want to let others to use money and the deficit unit who need money. Therefore, banks appear in economy typically as service businesses. Ideally, the key function of banks in an economy is to facilitate operation of credit extension in such efficient manner that will ensure increase in investments and enhance output growth in an economy (Korkmaz, 2015).

One of the greatest debates in finance literature has been on the intermediary roles of the banking system in economic growth and development of developing economies. Notwithstanding the contentions, there appear to be a common understanding that intermediary functions of banks help greatly in stimulating economic growth and development. One of such key roles includes credit creation. Credit lubricates the engine of growth. Banks help in extending loans and advances especially to the private sector of the economy in order to boost economic activities hence enhancing economic growth. Akintola (2004) reflects on the conventional roles of banks include financing of agriculture, manufacturing and syndicating of bank credit to productive sectors of the economy. In the quest to drive growth and create viable economy, central Bank of Nigeria (CBN) has been playing a leading role by using direct control to control overall credit expansion, and also employing same in determining the amount of bank credit to the priority sectors of the economy (Akpansung and Babalola, 2008). Jayaratne and Strahan (1996) maintains that well-developed financial markets are necessary for overall economic advancement of less developed and emerging economies.

The fundamental role of banks and other financial institution in economy is to mobilize savings from income holders and make same available to investors on interest. According to Kelly, McQuinn and Stuart (2013), there is strong positive correlation between the amount of credit provision in an economy and the level of deposits within the financial system. Banks traditionally convert the savings into loanable funds, which are channeled to investors who borrow to meet the financial need of their businesses. Investing the capital in the business will lead to the creation of goods and services (Tahir, et al 2015). Such increases in production often boost economic growth, which is usually measured in terms of the level domestic production in the economy. A common parameter for economic growth is gross domestic product (GDP). Driscoll (2004) posits that financial development can advance economic growth by raising savings, improving allocative efficiency of loanable funds and promoting capital accumulation. Building on the same thought, Jayaratne and Strahan (1996) explain that well-developed financial markets must be in place for overall economic advancement of less developed and emerging economies.

Atseye, Edim and Ezeaku (2015) highlight that while the fact that credit influences growth is largely undisputed, there still remains a gap in understanding the causal relationship between banking industry credit and economic growth in developing economies. Admitting the existence of such gap, Tuuli (2002) states that of course there have been a few empirical discourses on the determinants of growth in transition economies, but the relationship between banking system credit and economic growth has however been neglected. The need to fill this knowledge gap was necessitated this empirical study on the Nigerian case.

II. Literature Review

A number of comprehensive empirical studies on the link between finance and growth exist. Findings of various analysis confirms the view that the nature of relationship, and direction of causality between financial development and economic growth are country specific hence largely differing. Some school of thought believe that given an efficient banking system, financial development accelerates economic growth, whereas some empirical studies arrived at an opposing conclusion maintaining that growth leads financial development. Stolbov (2015) examined causality between credit depth and economic growth among 24 OECD countries using Breitung-Candelon causality tests in the frequency domain. The study ascertained that as economic development progresses, financial development shifts from a supply-leading to demand-following pattern. Mustaq (2016) applied similar technique on Pakistan and found that causality runs from economic growth to bank's lending activities.

On the Nigerian case, Akpansung and Babalola (2008) evaluated the relationship between banking sector credit and economic growth in Nigeria over the period 1970 - 2008. The causal linking between the set of variables of interest were established using Granger causality test. The results showed evidence of unidirectional causal relationship from GDP to private sector credit (PSC) and from industrial production index (IND) to GDP. In contrast, Aurangzeb (2012) confirms bidirectional causal relationship between finance and economic growth in Pakistan.

Abu-Bader and Abu-Qarn (2008) in a paper focused on examining the causal relationship between financial development and economic growth for six Middle East and North Africa countries (Algeria, Egypt, Israel, Morocco, Syria and Tunisia) with a quadripartite vector autoregressive framework. They employed four different measures of financial development and applied the augmented vector autoregression (VAR) methodology to test the Granger causality. The empirical results strongly support the hypothesis that finance lead to growth in five out of the six countries. Only in Israel was weak support found for causality running from economic growth to financial development but no causality in the other direction.

Gazdar and Cherif (2012), in their paper, examined the effects of institutional quality on the finance-growth nexus. An empirical model with linear interaction between financial development and institutional quality was estimated. They observed that while most indicators of financial development have a significant negative effect on economic growth, the indications of the coefficients of interaction variables were significantly positive, which confirmed that institutional quality mitigates the negative effect of financial development on economic growth.

Cevik and Rahmati (2013) carried out a study which aimed at investigating the causal relationship between financial development and economic growth in Libya during the period 1970-2010. The empirical results varied with estimation methodology and model specification, but indicated that there is no long-run relationship between financial intermediation and output growth.

Cappiello, Kadareja, Sørensen and Protopapa (2010) sought to find out if bank loans and credit standards have an effect on output. Using the framework derived by Driscoll (2004), the paper provided empirical evidence to underscore the existence of a bank lending channel of monetary policy transmission in the euro area. In addition, they found that in the euro area, changes in the supply, volumes and standard of credit to enterprises do have significant effects on real economic activity. This further buttresses the need to make the monitoring of credit developments an integral of monetary policy and supports the argument behind giving monetary and credit analysis a key role in the monetary policy strategy.

Christopoulous and Tsionas (2004) investigated the long-run relationship between financial depth and economic growth. They utilized the data in the most efficiently via panel unit root tests and panel co-integration analysis. The long run relationship was projected using fully modified OLS for 10 developing countries, the empirical results strongly support for the hypothesis that there is a single equilibrium relation between financial depth, growth and additional variables, and that the single co-integrating relation implies unidirectional causality from financial depth to growth. Conversely, Güray and Şafaklı (2007) looked into the relationship that exists between financial development and economic growth in Northern Cyprus, covering the period 1986 -2004. The Granger causality test revealed that financial development does not cause economic growth; whereas economic growth Granger causes financial development.

Sanusi, Mo'osin and Kusairi (2012), in their paper, examined the relationship between financial development and economic growth in ASEAN countries by using the static panel approach. In view of the

study, the paper analyzed the evidence on financial depth for ASEAN countries, while disaggregating measures of financial depth covering the financial inequality development. It was found that there is a long-run relationship between financial development and economic growth for ASEAN countries.

Chakraborty (2008) investigated the impact of developments in the financial sector on economic growth in India in the post-reform period. The paper extended the models of Pagano (1993) and Murinde (1996) to formalize the relationship between financial development and economic growth in the structure of an endogenous growth model. The results showed that investment-output ratio has a positive effect on real rate of growth of GDP, irrespective of the stock market development indicator.

Eataz and Malik (2009) analyzed the position of financial sector development in stimulating economic growth. Their study confirmed that domestic credit to private sector is instrumental in increasing output per head, hence promoting economic growth in the long-run. This finding is in line with the findings of Levine (2004) and Franklin and Oura (2004) which revealed that there exist a long run relationship between bank credit and economic growth.

Furthermore, King and Levine (1993) on seventy seven countries made up of developed and underdeveloped economies used cross-country growth regression. The aim of the research was to find out whether higher levels of financial development are significantly and robustly correlated with faster economic growth. The result showed that finance not only follows growth; finance seems important to lead economic growth. Moreover, economic growth is no longer believed to happen for exogenous reasons; instead government through appropriate policies particularly with regards to financial market can influence it (Gross, 2001).

III. 3.0 Data And Methodology

We are studying events that have indeed already taken place. This research is therefore particularly an ex post-facto design. The empirical analysis was carried out using annual time series data the period 1981 to 2014. The data series have been directly obtained from the Central Bank of Nigeria statistical Bulletins (various issues). The real GDP growth rate (RGDP) is our proxy for economic growth, and is measured as the rate of growth of gross domestic product at current basic prices. Ratio of private sector credit to GDP (PSC) and ration of broad money supply to GDP (M2) are our regressors. The Augmented Dickey-Fuller was used to test for the stationarity of our variables. The VAR Granger causality approach was employed to ascertain the direction of causality among the variables.

Specification Of Model

Model for this study is a general VAR-model. This model will be used to estimate the direction of causality between real gross domestic product (RGDP), private sector credit (PSC) and gross domestic savings (M2). Our multivariate time series can be explained in a vector autoregressive model (VAR) of order p thus:

$$y_t = w + \delta_1 y_{t-1} + \delta_2 y_{t-2} + \dots + \delta_p y_{t-p} + \mu_t, \quad (1)$$

Where μ_t is an error vector of random variables with zero mean and covariance matrix Σ expressed as,

$$w = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_k \end{bmatrix} \quad \delta_i = \begin{bmatrix} \delta_{11i} & \delta_{21i} & \dots & \delta_{k1i} \\ \delta_{12i} & \delta_{22i} & \dots & \delta_{k2i} \\ \delta_{13i} & \delta_{23i} & \dots & \delta_{k3i} \\ \vdots & \vdots & \ddots & \vdots \\ \delta_{1ki} & \delta_{2ki} & \dots & \delta_{kki} \end{bmatrix}$$

Moreover, our variables (RGDP, PSC, M2,) enter the models endogenously, and we rewrite the covariance matrix as a general VAR(p) model thus,

$$\omega_t = \mu + \sum_{i=1}^p \gamma_i \omega_{t-i} + \varepsilon_t, \quad (2)$$

Where ω_t is a vector of jointly determined variables, μ is a vector of constants, γ_i is a matrix of coefficients to be estimated, and ε_t is a vector of error terms. In order to find the direction of causality, Granger causality test uses past value of a variable X_t in order to forecast second variable Y_t and shows result in a form X_t “Granger cause” Y_t (Stolbov, 2015). In other words, X_t Granger causes Y_t if X_t helps predict Y_t at some time in the future. Usually, we may have that X_t Granger causes Y_t and Y_t Granger causes X_t , in which case we say there exists a feedback system (Sørensen, 2005). We have simply emphasized that Granger causality relationship is not necessarily reciprocal, for instance, δ_{jt} may be Granger causal for γ_{it} , without any implication that γ_{it} Granger causes δ_{jt} .

We now expand equation (2) to incorporate causal links among our variables. The following models were therefore developed,

$$RGDP = \beta_{10} + \sum_{i=1}^n \beta_{11} PSC_{t-1} + \sum_{j=1}^n \beta_{12} M_{2t-j} + \varepsilon_{1it} \tag{2(a)}$$

$$PSC = \beta_{20} + \sum_{i=1}^n \beta_{21} RGDP_{t-1} + \sum_{j=1}^n \beta_{22} M_{2t-j} + \varepsilon_{2it} \tag{2(b)}$$

$$M_2 = \beta_{30} + \sum_{i=1}^n \beta_{21} RGDP_{t-1} + \sum_{j=1}^n \beta_{22} PSC_{t-j} + \varepsilon_{3it} \tag{2(c)}$$

Where

- $\beta_{10} - \beta_{30}$ are constant terms,
- β_{11} , β_{21} and β_{22} are coefficients of variables, inclusive of lag lengths.
- $\varepsilon_1 - \varepsilon_4$ are error terms, an
- i and j are lag lengths.
- RGDP = real Gross Domestic Product (annual %)
- PSC = private sector credit as a percentage of GDP
- M_2 = broad money supply as a percentage of GDP.

IV. Results And Analysis

i. Unit root test.

Table 4.1 Augmented Dickey-Fuller Unit Root Test

Variable	ADF-Test Statistic	Critical Value at 1%	Critical Value at 5%	Order of Integration
RGDP	-6.030990	-3.670170	-2.963972	1(1)
PSC	-5.868301	-3.661661	-2.960411	1(1)
M_2	-5.301951	-3.653730	-2.957110	1(1)

Source: Eviews Results.

Results in table 4.1 above indicated that all the variables are stationary. Stationarity for RGDP, PSC and M_2 were attained all at order one. In order words, they are integrated of same order. Table 4.2 below reflects our lag selection criteria in which each of the criterion especially AIC and SC indicated maximum lag choice of 2. Therefore, having attained stationarity, our lag selection for the causality test are lags1 and 2 which will be jointly deterministic for each variable as defined by ω_t in Equation (2).

4.2 Lag Selection Criterial

VAR Lag Order Selection Criteria						
Endogenous variables: RGDP PSC M_2						
Exogenous variables: C						
Sample: 1981 2014						
Included observations: 32						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-281.8194	NA	10803.72	17.80122	17.93863	17.84676
1	-248.5181	58.27737*	2374.858*	16.28238*	16.83203*	16.46457*
2	-246.1336	3.725828	3654.717	16.69585	17.65774	17.01469
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

4.3 Test For Serial-Autocorrelation

VAR Residual Serial Correlation LM Tests		
Null Hypothesis: no serial correlation at lag order h		
Sample: 1981 2014		
Included observations: 32		
Lags	LM-Stat	Prob
1	7.028145	0.6342

2	6.713582	0.6669
3	1.844525	0.9937
4	12.27134	0.1984
5	3.872359	0.9196
6	3.618883	0.9347
Probs from chi-square with 9 df.		

Residuals for each of our variable were subjected to a validity test and the results as shown in table 4.2 reveals that there are no traits of serial autocorrelation in our model. This is desirable as we proceed with VAR Granger causality test.

4.4 Var Granger Causality

VAR Granger Causality/Block Exogeneity Wald Tests			
Sample: 1981 2014			
Included observations: 32			
Dependent variable: RGDP			
Excluded	Chi-sq	df	Prob.
PSC	43.287214	2	0.0000
M ₂	25.269450	2	0.0000
All	68.556664	4	0.0000
Dependent variable: PSC			
Excluded	Chi-sq	df	Prob.
RGDP	0.321641	2	0.8514
M ₂	0.822006	2	0.6630
All	1.492966	4	0.8279
Dependent variable: M ₂			
Excluded	Chi-sq	df	Prob.
RGDP	0.988000	2	0.6102
PSC	2.261594	2	0.3228
All	3.304294	4	0.5083

Source: Eviews Results

Table 4.4 above presents the VAR Granger causality test results. The results in the first panel revealed a uni-directional causality running from private sector credit (PSC) and broad money suppl (M₂) to economic growth as measured by real gross domestic product (RGDP). The second and third panel showed that there was no feedback system from RGDP to PSC and M₂ respectively, which means that RGDP was neither Granger causal for PSC nor M₂.

V. Conclusion And Implication

This study evaluated the causal relationship between deposit money bank credit and economic growth in Nigeria under the Vector autoregressive (VAR) Granger causality environment. The proxied variables, RGDP, PSC and M₂, were subjected to preliminary tests while a validity test of serial autocorrelation was also conducted on the residuals of the variables to enhance the reliability of the results. The VAR Granger causality test results indicate that causality runs from private sector credit (PSC) and broad money supply (M₂) to real gross domestic product (RGDP), whereas RGDP is not Granger causal for PSC and M₂. Therefore, in the absence of any feedback system, it is confirmed that there is uni-directional causality running only from PSC and M₂ to RGDP in the Nigerian case. The results emphasizes the significance of financial development to economic growth. Banking system credit is therefore critical for economic growth. This result is in tandem with supply-leading hypothesis, and the implication is that the monetary authority and the federal ministry of finance should ensure that the financial system is not only healthy but efficient. It is very important that credit should be channeled at concessionary costs to the private sector since their activities stimulate economic growth.

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