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Banking Sector Credit and Economic Growth in Nigeria: An Empirical Investigation

Aniekan O. Akpansung[1] and Sikiru Jimoh Babalola[2]

The paper examines the relationship between banking sector credit and economic growth in Nigeria over the period 1970-2008. The causal links between the pairs of variables of interest were established using Granger causality test while a Two-Stage Least Squares (TSLS) estimation technique was used for the regression models. The results of Granger causality test show evidence of unidirectional causal relationship from GDP to private sector credit (PSC) and from industrial production index (IND) to GDP. Estimated regression models indicate that private sector credit impacts positively on economic growth over the period of coverage in this study. However, lending (interest) rate impedes economic growth. Over and above, the paper recommends the need for more financial market development that favours more credit to the private sector with minimal interest rate to stimulate economic growth.

Key words: Bank credit, Economic Growth, Two-Stage Least Squares (TSLS)
JEL Classification Code: C01, C32, O16,G17, G21, G28

1.0 Introduction

For the past few decades, theoretical discussions about the importance of financial development and the role that financial intermediation play in economic growth have remained controversial and thus occupied a key position in the literature of development finance. Studies by Gurley and Shaw (1967), Goldsmith (1969), McKinnon (1973), Jayaratne and Strahan (1996), Kashyap and Stein (2000), Beck *et al.*(2000), Beck *et al* (2003), Driscoll (2004), etc, suggest that financial development can foster economic growth by raising saving, improving allocative efficiency of loanable funds, and promoting capital accumulation. They argued that well-developed financial markets are necessary for the overall economic advancement of less developed and the emerging economies. However, in spite of recent findings that financial development and economic growth are clearly related, this relationship has occupied the minds of economists over time; although the channels and even the direction of causality have remained unresolved in both theory and empirics (Fitzgerald, 2006).

Financial intermediation can be a causal factor for economic growth, and vice versa. The positive view of the finance-led growth hypothesis normally focuses on the role played by financial development in mobilizing domestic savings and investment through a more open and more liberalized financial system, and in promoting productivity via creating an efficient financial market. A low rate of expansion of the credit volume is not only a symptom of weak economic growth, but can also be one of its causes (Bundesbank, 2005). Furthermore, a study by Bayoumi & Melander (2008) on the United States macro-financial linkages revealed that, a 2½% reduction in overall credit caused a reduction in the level of GDP by around 1½%. Similarly, King &

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Levine (1993a) established that the banking sector's development in Europe was not only correlated with economic growth but was also a cause of long-term growth.

Prior and after the structural adjustment era, the Central Bank of Nigeria has been seen to be playing a leading and catalytic role by using direct controls not only to control overall credit expansion but also to determine the proportion of bank loans and advances going to "high priority sectors" and "others". This sectoral distribution of bank credit is often meant to stimulate the productive sectors (agriculture, industry and manufacturing) and consequently lead to increased economic growth in the country. Unfortunately, the Financial System Stability Assessment (FSSA) conducted by IMF in 2002 concluded that the Nigerian financial system was vulnerable to a number of risks, such as fiscal indiscipline/dominance, the economy's high dependence on volatile oil prices, and financial abuse. The report further noted that there were serious concerns about the soundness and stability of the Nigerian banking system (IMF, 2002). The Central Bank of Nigeria (2009) also recently noted that the flow of credit to the priority sectors did not meet the prescribed targets and failed to impact positively on investment, output and domestic price level. Certainly, these comments have evoked certain questions bothering the strength, effectiveness, and productivity of bank credit in the Nigerian economy.

Our attempt in this paper is to contribute to the existing empirical literature on financial intermediation, by testing the causality between banking sector credit and economic growth in Nigeria, using the recent data. It is particularly envisaged that the findings of this study will not only help us assess whether the intermediation role of banks stimulates the growth of the Nigerian economy but will also indicate the direction of causality. This is even more pertinent as the recent financial crisis in the world economy has highlighted the vulnerability of financial intermediaries, and more specifically of the banking system's pressure to contract their balance sheets and, ultimately reduce their credits.

The paper is divided into five sections as follows: Section 1 introduces and sets the background of the study. Section 2 reviews related literature; Section 3 highlights empirical methodology and estimating techniques. Section 4 presents empirical results based on a two-stage least squares regression model for GDP growth and Granger causality tests, while Section 5 concludes the study.

2.0 Literature Review

Empirical evidence on the impact of finance on economic growth has been mixed and remained a debated subject. A theoretical literature exploring the nature of the correlation between the banking sector and economic growth suggests that the financial system could impact positively on real economic performance by affecting the composition of savings (Bencivenga & Smith, 1991), providing information (Greenwood & Jovanovic, 1990), and affecting the scope for credit rationing (Boyd & Smith, 1997). In a study involving data from 13 countries, Demetriades& Hussein (1996) concluded that the issue of causality is country-specific rather than general. Levine (1997) proposed that financial development promotes economic growth through two

‘channels’ of capital accumulation and technological innovation, while King and Levine (1993b) identified innovation as the main channel of transmission between finance and growth.

Dey & Flaherty (2005) used a two-stage regression model to examine the impact of bank credit and stock market liquidity on GDP growth. They found that bank credit and stock market liquidity are not consistent determinants of GDP growth. Banking development is a significant determinant of GDP growth, while turnover is not. Cappiello *et al* (2010) in their study of European Area found that in contrast to recent findings for the US, the supply of credit, both in terms of volumes and in terms of credit standards applied on loans to enterprises, have significant effects on real economic activity. In other words, a change in loan growth has a positive and statistically significant effect on GDP.

In a study carried out Muhsin and Eric (2000) on Turkish economy, it was found that when bank deposit, private sector credit or domestic credit ratios are alternatively used as proxies for financial development; causality runs from economic growth to financial development. Their conclusion was that growth seems to lead financial sector development.

Koivu (2002) analysed the finance-growth nexus using a fixed-effects panel model and unbalanced panel data from 25 transition countries during the period 1993-2000. His results showed that: (1) the interest rate margin was significantly and negatively related to economic growth, (2) a rise in the amount of credit did not seem to accelerate economic growth. Based on the findings, he concluded that the growth in credit has not always been sustainable and in some cases it may have led to a decline in growth rates.

Chang *et al* (2008) used branch panel data to examine bank fund reallocation and economic growth in China and found a positive association between bank deposits and growth. Vazakidis & Adamopoulos (2009) employed a Vector Error Correction Model (VECM) to investigate the relationship between credit market development and economic growth for Italy for the period 1965-2007 taking into account the effect of inflation rate on credit market development. The empirical results indicated that economic growth had a positive effect on credit market development, while inflation rate had a negative effect.

Using a Vector Autoregression (VAR) approach, Shan & Jianhong (2006) examined the impact of financial development on economic growth in China. They found that financial development comes as the second force (after the contribution from labor input) in leading economic growth in China. Their study supports the view in the literature that financial development and economic growth exhibit a two-way causality and hence is against the so-called “finance-led growth” hypothesis.

By employing a panel dataset covering 29 Chinese provinces over the period of 1990-2001, Liang (2007) employed the Generalized Method of Moment (GMM) technique to empirically examine the relationship between banking sector development and economic growth for the case

of China. Empirical results showed that, without an effective and well-developed legal system, banking sector development only partially contributed to China's economic growth.

Mishra *et al* (2009**)** examined the direction of causality that runs between credit market development and the economic growth in India for the period 1980 to 2008. In the VAR framework the application of Granger Causality Test provided the evidence in support of the fact that credit market development spurs economic growth. The empirical investigation indicated a positive effect of economic growth on credit market development of the country.

Mukhopadhyay and Pradhan (2010) recently examined the causal relationship between financial development and economic growth of 7 Asian developing countries (Thailand, Indonesia, Malaysia, the Philippines, China, India and Singapore) during the last 30 years, using multivariate VAR model. The study concluded that no general consensus can be made about the finance-growth relationship in the context of developing countries.

A number of empirical studies were also carried out to assess the impact of financial sector development and economic development in Nigeria by a number of authors. Odedokun (1989), for instance, tested the causality between financial variables and economic development. Among other findings, he found a rather weak unidirectional causation from the GDP to the broader money when Sim's procedures were used and contrary estimates for Granger causality. Moreover, Olomola (1995) applied cointegration and Granger causality to Nigerian quarterly-series data for 1962-1992 in order to test if the relationship between financial deepening-growth is either "demand following" or "supply leading". Among other results, his study showed that the Nigerian economy exhibits a mixture of 'supply-leading' and demand-following patterns whereby causation runs from the financial sector of the economy to the real sector and *vice-versa*. His study also supports the case of unidirectional causality from the real sector to the financial sector as in Odedokun (1989). His conclusion among others was that money is causally prior to income, in the sense of Granger, for Nigeria, and that the reverse causation holds.

Generally, the above review of related studies supposes that the causal relation between credit market development and economic growth is still debatable in the literature. Apart from being scanty, the empirical literature is weakened by not covering the period of recent global financial crisis in the Nigerian economy. This paper is an attempt to fill such gaps in the finance-growth nexus literature.

3.0 Research Method

3.1 Model Specification

In Nigeria, the aggregate bank credit is always allocated to both the public sector and private sector of the economy. But studies (e.g. Beck *et al*., 2005; Levine, 2002; Odedokun, 1998; King & Levine, 1993; Boyreau-Debray, 2003; Liang, 2007; Crowley, 2008) have shown that credit to the private sector has more significant effect on economic activities than credit to public sector. In this study, therefore, the change in the growth rate of bank credit to the private sector is taken as an appropriate means of credit to the private sector.

We propose a simultaneous equation model for this study, since bank credit and economic growth are jointly determined. The neglect of reverse causality in either a cross-sectional or time-series modeling framework might introduce simultaneity bias (Koutsoyiannis, 1977; Gujarati & Sangeetha, 2007; Wooldridge, 2006).

(a) **Economic growth equation:**

$$GDP_t = \beta_0 + \beta_1 PSC_{t-i} + \beta_2 LR_{t-i} + \beta_3 IND_{t-i} + \varepsilon_{1t} \quad (1)$$

(b) **Bank credit equation:**

$$PSC_t = \alpha_0 + \alpha_1 GDP_{t-i} + \alpha_2 LR_{t-i} + \alpha_3 PSC_{t-i} + \varepsilon_{2t} \quad (2)$$

where *GDP* is the gross domestic product at current basic prices, PSCis the annual domestic bank credits to private sector as a ratio of the GDP, *LR* is the lending rate of commercial banks, *IND* is the industrial production index, β_0 *and* α_0 are constant or intercept terms, ε_{1t}, ε_{2t} are the disturbance terms and β_1, β_2, β_3, α_1, α_2, α_3 are the estimated coefficients, *t* is the time period, *i* is the number of lags and *t-i* are the time lags. The optimal lag length (i) was chosen based on Akaike Information Criterion (AIC).

In equation (1), the dependent variable is economic growth rate, while the main explanatory variable is change in the growth rate of private sector credit (PSC), measured as the amount of bank credit allocated to the private sector as a share of GDP. This is used to capture the extent of financial intermediation in the economy. Koivu (2002) maintains that this ratio appears a superior option to the pure ratio of broad money to GDP used in some studies, because it excludes credits by development banks and loans to the government and public enterprises. The lagged variables are introduced into the models as control variables to recognize the dynamic nature of economic growth and banking sector credits. They also capture the fixed effects of all the unobservable historical influences. The inclusion of the consumer price index (a proxy for inflationary rate) is to enable us examine the effect of inflation rate on credit market development. A number of studies (e.g., De Melo *et al*, 1996; Havrylyshyn *et al*, 1998; Berg *et al*, 1999) have found significant effects of inflation on economic growth in transition countries. Generally, these additional exogenous variables are meant to strengthen the robustness of our findings.

3.2 Causality Test

Causality test was conducted to explore the transmission mechanism between bank credit and economic growth. Thus, within our bank credit - economic growth context, the Engle and Granger (1987) two step procedure was investigated using the following equations:

$$GDP_t = PSC_t + \aleph \sum PSC_{t-1} + \gamma \sum PSC_{t-2} + \delta \sum PSC_{t-3} + \mu_{1t} \quad (3)$$

$$PSC_t = GDP_t + \tau \sum GDP_{t-1} + \varphi \sum GDP_{t-2} + \omega \sum GDP_{t-3} + \mu_{2t} \quad (4)$$

where, $\aleph$, γ, δ , τ, φ, ω are parametric coefficients; μ_1 and μ_2 are assumed to be 'white noise' or error terms with zero mean and constant variance.

3.3. Data and Estimation Technique

Annual time series data covering 1970 to 2008 were used to estimate the models. The data for this study are GDP at current basic prices, and industrial production index (a proxy for industrial development), bank credit to the private sector, and lending rate of banks. The data were obtained from Central Bank of Nigeria's Statistical Bulletin (various issues), Annual Reports and Statement of Accounts (various issues) as well as National Bureau of Statistics (NBS). Table 1 below reports the summary of the descriptive statistics of the variables.

A two-stage least square estimating technique was used to estimate our simultaneous equation model. The models were estimated using the log values of the variables, with the exception of lending rate. The log transformation made the estimated coefficients to serve as elasticities. The resulting estimated models were assessed based on both economic and statistical/econometric inferences.

Table 1: Summary of Descriptive Statistics

	GDP	IND	LR	PSC
Mean	3356424.	113.9564	16.42487	5.696014
Median	216997.5	120.8000	13.00000	0.232621
Maximum	23892171	158.8000	36.09000	33.50000
Minimum	5281.100	41.30000	6.000000	0.056856
Std. Dev.	6170407.	28.46949	7.350806	7.939521
Skewness	2.114675	-0.770492	0.747344	1.648273
Kurtosis	6.419245	2.806960	2.792740	5.678021
Jarque-Bera	48.06528	3.919333	3.700202	29.31339
Probability	0.000000	0.140905	0.157221	0.000000
Sum	1.31E+08	4444.300	640.5700	222.1445
Sum Sq. Dev.	1.45E+15	30799.46	2053.305	2395.368
Observations	39	39	39	39

Source: Authors' computation.

4.0 Results and Discussion

Table 2 contains the results of Granger Causality tests. The results show evidence of unidirectional causal relationship from GDP to private sector credit (PSC). The results further provide evidence of uni-directional causality running from IND to GDP at 10% level of significance. However, there is no evidence to support the existence of causality between the remaining pairs of variables. Our finding on causal relationship from GDP to private sector credit (PSC) conforms to other studies by Mushin & Eric (2000), Vazakidis & Adamopoulous (2009), Adamopoulous (2010), and Mishra *et al* (2009).

Table 2: Granger Causality Results

Lags: 2 Null Hypothesis:	Obs.	F-Statistic	Probability
IND does not Granger Cause GDP	37	2.78666	0.07662***
GDP does not Granger Cause IND		0.56958	0.57140
LR does not Granger Cause GDP	37	0.98012	0.38625
GDP does not Granger Cause LR		0.61244	0.54826
PSC does not Granger Cause GDP	37	2.23733	0.12318
GDP does not Granger Cause PSC		9.29142	0.00066*
LR does not Granger Cause IND	37	1.13520	0.33396
IND does not Granger Cause LR		1.03881	0.36550
PSC does not Granger Cause IND	37	0.31127	0.73471
IND does not Granger Cause PSC		0.35303	0.70526
PSC does not Granger Cause LR	37	0.93287	0.40386
LR does not Granger Cause PSC		0.64498	0.53136

(*)(***) indicates statistical significance at 0.01 and 0.1.

Table 3 reports the multivariate regression using Two-Stage Least Squares (TSLS) technique. The coefficient of main variable of interest (i.e., Private Sector Credit (PSC)) is found to be positive and statistically significant at 1% with t-statistic of 8.8510 and its corresponding probability value of 0.0000. By this, 1% increase in private sector credit raises the level of GDP by 86%. This, therefore, indicates that private sector credit plays pivotal role in the growth performance of Nigerian economy. The coefficient of lending rate is also correctly signed (i.e., negative) but no sufficient evidence for its significance as indicated by the t-statistic of -0.6442 with corresponding probability value of 0.5238. This result signals the need for moderate lending rate to boost productivity and hence economic growth.

However, the coefficient of industrial production index (LIND) has the correct sign, but not statistically significant. The R^2 of 0.9264 indicates that about 93% of total variation in the dependent variable (LOGGDP) is accounted for by the explanatory variables (i.e., LPSC, LR and LIND). This result remains robust even after adjusting for the degrees of freedom (df) as indicated by the value of adjusted R^2, which is 0.9199 (i.e. ≈ 92%). Thus, the regression has a good fit.

The F-statistic, which is a test of explanatory power of the model is 142.61 with the corresponding probability value of 0.0000, is statistically significant at 1%. Therefore, this implies that the three explanatory variables (LPSC, LR and LIND) have joint significant effect on the economic growth of Nigeria using GDP as a proxy. The Durbin-Watson statistic of 0.8897 indicates we cannot completely rule out autocorrelation. In summary, these results are in agreement with similar studies on Nigeria by Odedekun (1987), and Olomola (1995).

Table 3: Regression Results for Model (1)
Method: Two-Stage Least Squares
Dependent Variable: LGDP
Observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.191475	2.473138	0.077422	0.9387
LPSC(-1)	0.863023	0.097506	8.850973	0.0000*
LR(-1)	-0.018484	0.028694	-0.644183	0.5238
LIND(-1)	2.726074	0.540270	5.045764	0.0000*

(*) indicates statistical significance at0.01.
R^2= 0.9264
$\bar{R}^2$= 0.9199
F-statistic = 142.61
Prob (F-statistic) = 0.0000
DW = 0.8897

Similarly, table 4 reports the regression estimates of bank credit equation. Two of the coefficients of the explanatory variables (i.e., $LGDP_{t-1}$ and $LPSC_{t-1}$) have the right sign (i.e., positive) and found to be statistically significant at 1% level with probability values 0.0095 and 0.0006, respectively. These results indicate that past values of the Gross Domestic Product (LGDP) and Private Sector Credit (LPSC) have significant effects on credit to the private sector in Nigeria. The coefficient of multiple determination (R^2 = 0.9260) is significantly high and remained robust at 0.9195 after adjusting for degrees of freedom (df). This implies that at least 92% of the total variation in LPSC is accounted for by the lagged values of LGDP, LR and LPSC.

Moreover, the explanatory variables are jointly significant at 1% level as captured by F-statistic (141.91) with a corresponding probability value of 0.0000. Overall, the results are in consonance with similar studies by Vazakidis & Adamopoulos (2009); Adamopoulos (2010). The policy implication of our findings is that the government should, through the Central Bank, grant more private sector credit with minimal interest rates since these will impact positively on economic growth.

Over and above, the paper recommends the need for more financial market development that favours more credit to the private sector to stimulate economic growth.

Table 4: Regression Results for Model (2)

Method: Two-Stage Least Squares

Dependent Variable: LPSC

Observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.443774	1.508014	-2.946772	0.0058*
LGDP(-1)	0.319828	0.116255	2.751094	0.0095*
LR(-1)	0.031469	0.025009	1.258314	0.2169
LPSC(-1)	0.544217	0.144482	3.766662	0.0006*

(*) indicates statistical significance at 0.01.

R^2= 0.9260

$\bar{R}^2$= 0.9195

F-statistic = 141.91

Prob(F-statistic) = 0.0000

DW = 1.9496

5.0 Conclusion

The paper investigates the relationship between banking sector credit and economic growth in Nigeria over the period 1970-2008. The causal links between the pairs of variables of interest were established using Granger causality test while a Two-Stage Least Squares (TSLS) estimation technique was used for the regression. The results of the analysis indicate that private sector credit impacts positively on economic growth over the period of coverage in this study. However, lending rate impedes growth.

Over and above, the paper recommends the need for more financial market development that favours more credit to the private sector in order to stimulate economic growth.

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