Determinants of Bank Lending in Nigeria

OYEBOWALE, Adeola <http://orcid.org/0000-0002-0555-8519>

Available from Sheffield Hallam University Research Archive (SHURA) at:
http://shura.shu.ac.uk/25375/

This document is the author deposited version. You are advised to consult the publisher's version if you wish to cite from it.

Published version


Copyright and re-use policy

See http://shura.shu.ac.uk/information.html
Determinants of Bank Lending in Nigeria

Adeola Yahya Oyebowale$^{1,2}$

$^1$ Sheffield Business School, Sheffield Hallam University, UK
$^2$ Faculty of Business and Law, Anglia Ruskin University, UK

Correspondence: Adeola Yahya Oyebowale, Sheffield Business School, Sheffield Hallam University, Howard Street, Sheffield, S1 1WB. Tel: +447432489111. E-mail: a.oyebowale@shu.ac.uk

Abstract

The willingness of commercial banks to provide credit is determined by different factors. In the light of this, this paper provides further empirical evidence on determinants of bank lending in the Nigerian context. As such, the parsimonious empirical model of this study investigates the influence of growth in loan-to-deposit ratio, growth in inflation, growth in broad money and growth in bank capital on growth in commercial bank lending in Nigeria for the longitudinal period 1961 to 2016. This study finds a long-run unidirectional causality running from growth in bank lending to growth in loan-to-deposit ratio in Nigeria. Also, short-run bidirectional causality exists between growth in loan-to-deposit ratio and growth in bank lending in Nigeria, and a short-run unidirectional causality running from growth in broad money to growth in bank lending. Thus, the results indicate that growth in inflation and growth in loan-to-deposit ratio are long-run determinants of bank lending in Nigeria. Concurrently, this paper argues that growth in broad money and growth in bank capital are not long-run determinants of bank lending in Nigeria.

Keywords: bank lending, bank capital, broad money

1. Introduction

In every economy, existence of the financial sector is designed to drive economic growth. However, causality empirical results on this topic from different countries are inconclusive with unresolved arguments. For instance, existing studies such as Odedokun (1996), Mahran (2012), Marashdeh & Al-Malkawi (2014), Kumar (2014), Fethi & Katircioglu (2015), Deysahppriya (2016), Bist (2018) and Taivan (2018), among others find evidence to support finance-led growth view or supply-leading hypothesis. On the other hand, studies such as Hassan, Sanchez & Yu (2011), Ndlovu (2013), Pan & Mishra (2018), Nasir, Majeed & Aleem (2018), among others support growth-led finance or demand-leading hypothesis. In a dual causality context, the studies of Calderon & Liu (2003), Ndako (2010), Oghonna et al. (2013), Adeeye et al. (2015), Kyophilavong, Uddin & Shahbaz (2016), Taivan (2018), Abosedra & Sita (2018), and Oyebowale & Karley (2018) among others find evidence to support bidirectional or feedback hypothesis. Furthermore, the studies of Akbas (2015), Nyasha & Odhiambo (2015), Adeniyi et al. (2015) and Pradhan (2018) among others argue that finance does not impact economic growth or neutrality hypothesis. Thus, the significance of financial sector on economic growth remains a topic for continuous research.

Historically, the significance of the financial system in enhancing economic growth has specifically focused on the relevance of the banking in earlier studies of Bagehot (1873) and Schumpeter (1911). These aforementioned seminal studies emphasize the essential role of the banking system in stimulating economic growth through their special function of discovering and funding productive investments. Conversely, the view of Robinson (1952) accentuates that banks perform a passive role in stimulating economic growth. Affirming this assertion, Lucas (1988) argues that the role of financial system in the process of economic growth in ‘badly over-stressed’. Nevertheless, the efficiency of the banking system in an economy is a main determinant of macroeconomic performance and stability (Alexiou, Vogiazas & Nellis, 2018; Fu, Lin & Molyneux, 2018). This has been evident during the 2007/2008 financial crisis and other great depressions in different developed and developing countries.

In line with the ongoing, the influence of the banking system in an economy focuses on two main channels: credit allocation (Schumpeter, 1934) and capital accumulation (Hicks, 1969). On credit allocation, the view of Schumpeter (1934) postulates that an improved financial intermediation and innovation in an economy drives economic growth, which helps to boost investment and productivity. As regards capital accumulation role of banking, Hicks (1969) affirms that the financial intermediation function of banks helps to diversity risks and reduces transaction costs in mobilisation of savings. Thus, Oyebowale & Karley (2018) argues that risk diversification is encouraged for both saving and investing economic units to facilitate financial intermediation process.
Clearly, the credit allocation role of commercial banks from savings surplus units to savings deficit units explains the bank lending channel of monetary policy transmission through supply of bank loan. As such, the transmission mechanisms of monetary policy to the real economy remains a key topic which has increased the attention of scholars in macroeconomics (Ramey, 1993) as the transmission mechanisms serve as tools for monetary authorities to influence activities in the real economy (Apergis, Miller & Alevizopoulou, 2012). The prominent literature of Mishkin (1996) provides a comprehensive discussion about the channels through which monetary policy transmits into the real economy. As such, the main channels are traditional interest rate channel (money channel view) and credit channel (credit channel view).

The money view focuses on the influence of interest rates on aggregate demand. According to Nilsen (2002), the money channel view posits that when central banks reduce reserves, banks reduce their demand deposits due to higher costs of funds. Consequently, in situations when prices become sticky, the reduction in real balances of banks increases real interest rates to curtail interest-responsive spending and economic activity (Nilsen, 2002). In a different token, the credit channel view emanates due to problems of information asymmetry in the credit markets through the bank lending channel and the balance-sheet channel. On the one hand, the bank lending channel focuses on the supply of loans by banks and that there are no other perfect substitute sources of funds (Mishkin, 1996). On the other hand, the balance-sheet channel focuses on how the net worth of business firms creates adverse selection and moral hazards problem in lending to firms (Mishkin, 1996).

2. Literature Review

2.1. The Bank Lending Channel

Monetary authorities use interest rate channel and the bank lending channel as a sub-channel of the credit view to implement monetary policy within an economy. For instance, an expansionary monetary policy through the interest channel will reduce interest rate in order to lower cost of capital; this will further lead to an increase in investment spending, increase in aggregate demand and output concurrently. On the other side of the token, an expansionary monetary policy through the bank lending channel will increase bank deposits and reserves, causing an increase in availability of bank loans to boost investment and consumer spending. Going by the main focus of this research, understanding the bank lending channel is significantly vital in designing and implementing a suitable monetary policy framework (Zulkhibri, 2013).

An earlier proponent of bank lending channel is the seminal work of Bernanke & Blinder (1988) which builds on the studies of Tobin (1969) and Brunner & Meltzer (1972). As such, the money view focuses on two-asset world of money and bonds, where bank loans are merged with other debt instruments in a bond market as perfect substitutes. In this regard, the study of Bernanke & Blinder (1988) ignores the perfect substitutability assumption of the money view and develops a three-asset in recognition of bank loans as a separate asset: money, bonds and intermediated loans. Another proponent of bank lending is Kashyap & Stein (1994) which affirms that in a three-asset world, monetary policy works through the independent impact of intermediated loans supply and rate of interest in bond market. As such, the model of Bernanke & Blinder (1988) highlights that three essential conditions must prevail in order to ensure existence of distinct bank lending channel of monetary policy transmission: open-market bonds and intermediated loans must not be perfect substitutes; monetary authorities should be able to influence supply of intermediated loans by altering quantity of reserves in the banking system; and there must be imperfect price adjustment which prevents the neutrality of any monetary policy shock.

According to Mishkin (1996), the bank lending channel is based on the special role that banks play within the financial system in solving problems of asymmetric information and other imperfections in credit markets. As such, banks serve as an avenue to provide funds to certain borrowers who do not have access to credit markets. Imperfections are reflected in the size of external finance premium which is the difference between the costs of externally generated funds of a firm (through issuing equity or debt) and internally generated funds (retained earnings). Following the special role of banks in channelling of funds for productive use, this posits that bank provide indirect finance while acting as financial intermediaries between savings surplus units and savings deficit units. In line with the ongoing, the view of Grodzicki, Halaj & Zochowski (2000) postulates that the existence of bank lending channel is based on two essential assumptions: monetary policy decisions affect liquidity position of banks and changes in supply of loan from banks affect borrowers due to limited access to other substitute sources of finance. Thus, the bank lending channel of monetary policy has a greater consequence on smaller firms which are more dependent on bank loans than larger firms which have direct accessibility to other sources of finance in credit markets (Gertler & Gilchrist, 1994).

Nonetheless, the non-accessibility of smaller firms to other substitute sources of finance hamper their investment (Nilsen, 2002), which concurrently affects aggregate output within an economy. Evidence of this assertion emerges in the studies of Obamuyi (2010) and Luper (2012). The former study reveals that high
interest rates and meticulous lending policies has reduced the aggregate performance of small and medium scale enterprises (SMEs) in Nigeria. Additionally, the latter study reveals that banking consolidation reforms in Nigeria has declined financing of SMEs from 5.78 per cent to 0.47 per cent. The bank lending of monetary policy has been the most controversial transmission mechanism.

Notably, the study of Romer & Romer (1989) argues that loans do not perform an essential role since monetary policy contraction has effect on interest rates through bank deposits, not loans. In response to this, the view of Kashyap, Stein & Wilcox (1993) postulates that during monetary contractions firms issue commercial papers as an alternative source of finance to counteract drain of deposits. This further implies that firms are using the alternative source of finance due to reduction in loan supply and not reduction in loan demand arising from activity slowdown (Nilsen, 2002). As such, Oliner & Rudebusch (1996) argues in line with Gertler & Gilchrist (1994) that only large firms issue commercial papers. Thus, small and large firms exhibit distinct behaviour during monetary contractions which renders the bank lending channel less important.

A later study of Kashyap, Stein & Wilcox (1996) responds to the assertion of Oliner & Rudebusch (1996) and argues that differences between small and large firms during monetary contraction do not cut against the bank lending view. In this regard, Kashyap, Stein and Wilcox (1996) postulates that contraction by monetary authorities reduces supply of loans to small firms, in search of alternative source of finance, small firms broaden their account payables. Concurrently, the demand for account payables of large firms increases, leading them to raise more external finance through issuing commercial papers to meet the demand. As such, the financial intermediation function of banks will be moderately and imperfectly taken over by large firms through surge in commercial papers. Despite the significance of bank lending channel in channelling of funds to productive use, the view of Romer & Romer (1989) argues that loans do not play an essential role as monetary policy contraction initially affects interest rates through deposits rather than loans. Following the credit creation theory of banking, this study argues the assertion of Romer & Romer (1989) by stressing the essential role of loans, as banks do not loan existing money but create new money.

2.2. Trend of Bank Lending in Nigeria

Banking in Nigeria has undergone five different phases: free banking era (1892 to 1952), regulation era (1952 to 1986), deregulation era (1986 to 2004), consolidation era (2004 to 2009) and post-consolidation era (2009 till date). The most notable phase in the Nigerian banking industry is the consolidation era which began with an increase in minimum capital base of banks in Nigeria from N2 billion to N25 billion to be fulfilled by the end of December 2005. The policy was announced in July 2004 by the Central Bank of Nigeria (CBN) as part of the '13-point Reform Agenda'. Over the years, commercial banks in Nigeria have been engaging in the bank lending channel through their special role as financial intermediaries between savings surplus units (SSUs) and savings deficit units (SDUs). As such, aggregate loans and advances data of commercial banks in Nigeria from 1960 to 2016 is shown in figure 1.

Figure 1: Aggregate Loans and Advances of Commercial Banks in Nigeria, 1960 to 2016 (₦ Million)

Source: Author’s Compilation (2019) from Central Bank of Nigeria Statistical Bulletins
From figure 1, the trend of bank lending in Nigeria remained fairly stable from 1960 to 2000, with significant increase afterwards. Despite momentous regulatory increase in minimum capital base of banks in 2004, bank lending in Nigeria kept increasing until 2008 when significant decrease occurred, reflecting the effects of the 2007/2008 financial crisis. Prior to consolidation era, the minimum capital base of banks was ₦2 billion. Nonetheless, regulatory policy compelled existing banks in Nigeria to maintain a capital base of ₦25 billion into the financial crisis. As such, this study argues that without such proactive capital base policy, the Nigerian banking industry would have experienced systemic risk with a minimum capital requirement of ₦2 billion at eruption of the financial crisis. The hit of the financial crisis caused global credit crunch and bank lending in Nigeria decreased from 2008 to 2011. However, bank lending started increasing in 2012 after recovery from the financial crisis and remains uninterrupted.

2.3. Review of Empirical Studies

The study of Gambacorta & Mistrulli (2004) investigates influence of bank capital on lending behaviour of Italian banks. The study reveals that bank capital matters in transmission of various shocks to bank lending. Olokoyo (2011) investigates the determinants of bank lending behaviour of commercial banks in Nigeria for the period 1980 to 2005 using volume of deposits, cash reserve requirements, interest rate, liquidity ratio, investment portfolio, exchange rate and GDP at market price as explanatory variables of aggregate lending of commercial banks in lending. The study using a vector error correction model reveals that volume of deposits, GDP at market prices, foreign exchange and investment portfolio have significant impact on aggregate loans and advances of commercial banks in Nigeria. As such, interest rate, liquidity ratio and cash reserve ratio do not influence bank lending in Nigeria.

The study of Ogunyomi (2011), examines the influence of broad money supply, minimum rediscount rate, liquidity ratio, exchange rate and political stability on bank lending in Nigeria using vector error correction model for the period 1975 to 2009. The study reveals that only broad money supply show positive statistical significance in influencing commercial banks lending in Nigeria while other regressors do not influence bank lending. The study of Olusanya, Oyebo & Ohadere (2012) examines influence of foreign exchange, interest rate, cash reserve ratio, investment portfolio, GDP at market price, liquidity ratio and volume of deposits on loans and advances of commercial banks in Nigeria for the period 1975 to 2010 using vector error correction model. The study reveals that interest rate and investment are not statistically significant on loans and advances while other regressors in the model prove to be statistically significant.

The study of Ajayi & Atanda (2012) investigates the influence of liquidity ratio, inflation, exchange rate, minimum policy rate and cash reserve ratio on loans and advances of commercial banks in the Nigeria for the period 1980 to 2008. The study reveals that exchange rate and cash reserve ratio are statistically significant on loan and advances of commercial banks while other regressors prove to be insignificant. Also, the study finds no long run relationship between the independent and dependent variables in the model. As such, the study argues that monetary policy tools in Nigeria are not credit stimulants on the long-run. Jegede (2014) investigates the effects of monetary policy on lending of commercial banks in Nigeria for the period 1988 to 2008 using interest rate, exchange rate, money supply and liquidity ratio as explanatory variables of aggregate loans and advances in Nigeria. The findings of the study using vector error correction model reveal that money supply and liquidity ratio show negative influence on bank lending in Nigeria, while interest rate and exchange rate show positive influence.

In the Ethiopian context, the study of Malede (2014) using OLS reveals that bank size, credit risk, liquidity ratio and GDP determines commercial bank lending in Ethiopia while deposit, investment, interest rate and cash reserve ratio are statistically insignificant for the period 2005 to 2011. The research of Uyagu & Osuagwu (2015) examines the influence of interest rate, liquidity ratio, inflation, cash reserve ratio, loan-to-deposit ratio on loans and advances of commercial banks in Nigeria for the period 1994 to 2013 using ordinary least square regression technique. The outcome of the study shows that interest rate has negative statistical insignificance on loans and advances while other regressors have negative statistical significance. The study of Pham (2015) investigates determinants of bank credit in 146 different economic countries for the period 1990 to 2013 using GMM. The study reveals that bank credit is enhanced by domestic liquidity and high level of interest rate. Also, the study reveals that credit supply is negatively related to exchange rate, capital requirements ratio, non-performing loans, bank concentration and KAOPEN index. Additionally, the study provides evidence of country specific influence of economic growth on bank lending.

In the Nepalese perspective, the study of Bhattarai (2016) investigates determinants of lending behaviour among commercial banks in Nepal for the period 2007 to 2014 using a model which regresses cash reserve ratio, investment portfolio, deposit-to-capital ratio, bank size and liquidity on loans and advances. The study using ordinary least square regression reveals that bank lending in Nepal is determined by investment portfolio, bank
size, liquidity and cash reserve ratio. The study of Olaoaluwa & Shomade (2017) investigates the impact of monetary policies on bank lending behaviour in Nigeria for the period 1980 to 2014 using volume of deposits, foreign exchange, reserve requirement, interest rate and GDP as regressors on loans and advances. The study utilises ordinary least square regression and vector error correction model reveals that exchange rate, interest rate, volume of deposits and reserve requirements have impact of bank lending behaviour of commercial banks in Nigeria. In addition to the ongoing debate, the study of Kim & Sohn (2017) which investigates insured US commercial banks reveals that bank capital exerts a significant positive on bank lending after sufficient liquid assets are retained by large banks.

However, few studies focus on bank capital in Nigeria. For instance, the study of Matousek & Solomon (2018) investigates bank lending channel in Nigeria for the period 2002 to 2008 (period of consolidation) using disaggregated data from twenty-three (23) banks in Nigeria. The study reveals that bank size, liquidity and capitalisation are significant determinants of loan supply during this period. Furthermore, the study of Ebire & Ogunyinka (2018) examines determinants of demand and supply of bank loans in Nigeria for the period 2002Q1 to 2017Q1. On the demand side, the study shows that real GDP and lending rate have a negative relationship with bank loans. However, inflation has a positive relationship with bank loans. On the supply side, bank capital has an insignificant positive relationship with bank loans, inflation has an insignificant positive relationship with bank loans, borrowing rate has a significant positive relationship with bank loans and lending rate has a significant negative relationship with bank loans.

3. Data and Model Specification

From review of empirical studies on determinants of bank lending, it can be deduced that researchers have utilised various determinants of bank lending in their models. However, the contribution of this study is based on the argument of Gambacorta & Mistrulli (2004) that bank capital has not been fully considered in the context of bank lending channel. In this regard, this study extends existing studies of Gambacorta & Mistrulli (2004) and Kim & Sohn (2017) which examines bank capital in the context of bank lending channel. In Nigeria, very few studies such as Matousek & Solomon (2018) and Ebire & Ogunyinka (2018) have investigated bank capital as a determinant of bank lending despite huge attention on bank capital by the CBN since consolidation era. It is against this backdrop, that this study seeks to empirically contribute to the few existing studies on bank capital in Nigeria. Also, following the bank lending channel as earlier discussed, this study considers broad money as a monetary policy tool, loan-to-deposit as a liquidity measure determined through bank regulation and inflation as a macroeconomic indicator of general price level. Hence, the model for this study takes the form:

\[ gloa_t = f(gld_t, ginf_t, gbrm_t, gbc_t) \] (1)

Converting equation 1 into econometric model, we have equation 2 below:

\[ gloa_t = a_0 + a_1gld_t + a_2ginf_t + a_3gbrm_t + a_4gbc_t + u_t \] (2)

Where gloa is growth in aggregate loans and advances of commercial banks in Nigeria, gld is growth in loan-to-deposit ratio, ginf is growth in inflation, gbrm is growth in broad money and gbc is growth in bank capital, \(a_0\) is the intercept, \(a_{1,4}\) is the slope of coefficient of explanatory variables, \(t\) is the time period and \(u\) is error term. The data for loan, ltd and bc were obtained from CBN statistical bulletin, data for inf and brm were obtained from World Bank. The data were computed to grow form by the researcher in order to capture how growth in bank lending is influenced by the regressors.

4. Results and Discussion

4.1 Descriptive Statistics

The descriptive statistics for the variables under investigation are shown in table 1. The statistics show 56 number of observations for longitudinal time span 1961 to 2016. Additionally, the statistics show the mean and standard deviation of the variables over the period under investigation. The mean values illustrate dawdling average growth rates of the variables are less than 1%. Furthermore, the minimum values show that negative growth rates have been recorded for the variables from 1961 to 2016. On the other hand, maximum values for gloa, gld, gbrm and gbc illustrate a slow growth in the variables over the period under investigation at maximum growth of 1.27%, 0.805%, 0.89% and 2.4% respectively. However, ginf show a maximum growth rate of 22.16% for the period under investigation indicating a period of lofty growth rate in inflation.
As such, this study examines a bounds testing approach of Pesaran, Shin & Smith (2001). As such, the new approach to testing existence of cointegration between the variables under investigation is applicable whether the variables are purely I(0) or I(0)-I(1) and I(1)-I(1). In this regard, a bounds testing approach tests the F-statistic based on critical value bounds of I(0) and I(1). In order to test cointegration among the variables under investigation, the hypotheses are stated thus:

\[ H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = 0 \] (null: no co-integration or levels relationship)

\[ H_1: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq 0 \] (alternate: co-integration or levels relationship exists)

According to the bounds test approach of Pesaran, Shin & Smith (2001), if the F-statistic is less than critical value for I(0) regressors, then the null hypothesis cannot be rejected which implies that there is no cointegration or levels relationship. However, if F-statistic exceeds critical value for I(1) regressors, then the null hypothesis can be rejected which implies existence of cointegration or levels relationship. The bounds testing procedure results for the model under investigation is shown in table 3 below for critical value bounds of I(0) and I(1).

### Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>gloa</td>
<td>56</td>
<td>0.263119</td>
<td>0.2797177</td>
<td>-0.2921926</td>
<td>1.275479</td>
</tr>
<tr>
<td>gltd</td>
<td>56</td>
<td>0.0244646</td>
<td>0.2289661</td>
<td>-0.5992024</td>
<td>0.8059701</td>
</tr>
<tr>
<td>ginf</td>
<td>56</td>
<td>0.702275</td>
<td>3.100117</td>
<td>-1.510436</td>
<td>22.16667</td>
</tr>
<tr>
<td>gbrm</td>
<td>56</td>
<td>0.2358559</td>
<td>0.1933712</td>
<td>-0.1265871</td>
<td>0.8919787</td>
</tr>
<tr>
<td>gbc</td>
<td>56</td>
<td>0.2487749</td>
<td>0.3827979</td>
<td>-0.3702444</td>
<td>2.442009</td>
</tr>
</tbody>
</table>

Source: Author’s Computation (2019)

### Table 2: Unit Root Test Results for Variables at Level

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF test statistic</th>
<th>PP test statistic</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept</td>
<td>With trend</td>
<td>Intercept</td>
</tr>
<tr>
<td>gloa</td>
<td>-6.640 (-2.926)</td>
<td>-6.591 (-3.495)</td>
<td>-6.640 (-2.926)</td>
</tr>
<tr>
<td>gltd</td>
<td>-8.504 (-2.926)</td>
<td>-8.424 (-3.495)</td>
<td>-8.504 (-2.926)</td>
</tr>
<tr>
<td>ginf</td>
<td>-7.161 (-2.926)</td>
<td>-7.406 (-3.495)</td>
<td>-7.161 (-2.926)</td>
</tr>
<tr>
<td>gbrm</td>
<td>-4.475 (-2.926)</td>
<td>-4.417 (-3.495)</td>
<td>-4.475 (-2.926)</td>
</tr>
<tr>
<td>gbc</td>
<td>-10.291 (-2.926)</td>
<td>-10.014 (-3.495)</td>
<td>-10.291 (-2.926)</td>
</tr>
</tbody>
</table>

Note: 5% critical values in parentheses
Source: Author’s Computation (2019)

From table 2, the unit root tests are based on testing the null hypothesis that a variable is non-stationary or has a unit root. As such, the ADF and PP results (without and with trend) show that the variables under investigation are I(0) or stationary at level as the test statistics are greater than 5% critical values. Hence, the null hypotheses are rejected. As such, a cointegration test is considered to examine cointegration amid the variables.

### 4.3 Cointegration Test

This study examines cointegration between the variables under investigation using ARDL bounds testing approach developed by Pesaran, Shin & Smith (2001). As such, the new approach to testing existence of relationship between the variables is applicable whether the variables are purely I(0), purely I(1) or a mix of I(0) and I(1). In this regard, a bounds testing approach tests the F-statistic based on critical value bounds of I(0) and I(1). In order to test cointegration among the variables under investigation, the hypotheses are stated thus:

\[ H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = 0 \] (null: no co-integration or levels relationship)

\[ H_1: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq 0 \] (alternate: co-integration or levels relationship exists)
Table 3: Bounds Testing Results

<table>
<thead>
<tr>
<th>Model</th>
<th>F-Statistic</th>
<th>Regressors</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>gloa = f (gltd, ginf, gbrm, gbc)</td>
<td>13.183</td>
<td>I(0) 2.45, 2.86</td>
<td>Cointegration exists</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I(1) 3.52, 4.01</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s Computation (2019)

On the one hand, the results show that the value of F-statistic exceeds critical value for I(0) regressors. Thus, the null hypothesis of no cointegration or levels relationship is rejected. On the other hand, the value of F-statistic also exceeds critical value for I(1) regressors. Hence, the null hypothesis of no cointegration or levels relationship is rejected. By and large, the bounds testing results show that there is existence of cointegration or levels relationship among growth in loans and advances, growth in loan-to-deposit ratio, growth in inflation, growth in broad money and growth in bank capital in Nigeria.

Based on the bounds test results which show existence of cointegration among the variables, the study will investigate the short and long-run relationship as the Autoregressive Distributed Lag (ARDL) model of cointegrating vector is re-parameterized into error correction model (ECM) expressed in equation 3.

\[
\Delta \text{gloa}_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta \text{gloa}_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta \text{gltd}_{t-i} + \sum_{i=1}^{n} \alpha_{3i} \Delta \text{ginf}_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta \text{gbrm}_{t-i} + \sum_{i=1}^{n} \alpha_{5i} \Delta \text{gbc}_{t-i} \\
+ \lambda \text{ECT}_{t-1} + \epsilon_t
\]

(3)

Where gloa is growth in loans and advances; gltd is growth in loan-to-deposit ratio, ginf is growth in inflation, gbrm is growth in broad money and gbc is growth in bank capital; \( \alpha_0 \) is constant; \( \Delta \) is difference operator; \( \alpha_{1i} \) to \( \alpha_{5i} \) are short-run dynamic coefficients; \( \lambda \) is speed of adjustment; ECT\(_{t-1}\) is lagged error correction term; \( \epsilon_t \) is white noise error term.

4.4 ARDL/ECM Test

Table 4 shows the long-run and short-run results for model 3. For short-run, coefficients for only gltd and gbrm are shown as ginf and gbc show a lag of zero (0) by Akaike’s Information Criterion (AIC) lag selection criteria. The short-run result shows that gltd ratio has a significant negative relationship with gloa. As such, a 1% increase in gltd would decrease gloa by 0.8786742 in Nigeria. Also, gbrm has a significant negative relationship with gloa. In this regard, a 1% increase in gbrm would decrease gloa by 1.221274 in Nigeria.

On the long-run, there is a significant positive relationship between gltd, gbrm and gbc with gloa. As such, a 1% increase in gltd, gbrm and gbc would increase gloa by 0.5585591, 0.9266307 and 0.2294982 respectively in Nigeria. As such, this study argues the study of Uyagu & Osuagwu (2015) which finds a negative statistical significance between loan to deposit and bank lending in Nigeria. For broad money, this study supports the study of Ogunyomi (2011) and contradicts the study of Jegede (2014) which finds a negative relationship between broad money and bank lending in Nigeria on the long-run. However, ginf shows a significant negative relationship with gloa. Thus, a 1% increase in ginf would reduce gloa by 0.026358 in Nigeria. As such, this outcome contradicts the outcome of Ajayi & Atanda (2012) and Ebire & Ogunyinka (2018) which reveal that inflation has a positive statistical insignificant influence on bank lending in Nigeria.
Table 4: Long-run and short-run Coefficients

<table>
<thead>
<tr>
<th>D.gloa</th>
<th>ADJ</th>
<th>Long-run coefficients</th>
<th>Short-run coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>gloa</td>
<td>-0.64131***</td>
<td>gltd</td>
<td>0.5585591***</td>
</tr>
<tr>
<td>L1.</td>
<td>0.006451</td>
<td>ginf</td>
<td>-0.026358***</td>
</tr>
<tr>
<td>_cons</td>
<td>0.019697</td>
<td>gbrm</td>
<td>0.9266307***</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.6130***</td>
<td>gbc</td>
<td>0.2294982***</td>
</tr>
</tbody>
</table>

Diagnostics

<table>
<thead>
<tr>
<th>Durbin-Watson</th>
<th>1.8021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breusch-Godfrey</td>
<td>0.3337</td>
</tr>
<tr>
<td>White's Test</td>
<td>0.4354</td>
</tr>
<tr>
<td>Ramsey Test</td>
<td>0.3809</td>
</tr>
</tbody>
</table>

Note: * significant at 10% level. **significant at 5% level. ***significant at 1% level.

Source: Author’s Computation (2019)

From table 4, the coefficient of error correction term or speed of adjustment towards equilibrium is -0.64131 and significant at 1% level. This denotes that any disequilibrium would converge to equilibrium at speed of 64.1% on the long-run. Additionally, R-Squared result shows that gltd, ginf, gbrm and gbc jointly account for 61.30% variation in gloa. Hence, other possible regressors not included in the model of this study account for 38.70% variation in gloa.

The White’s test investigates null hypothesis of homoskedasticity in the model which shows a p-value of 0.4354 in table 4. As such, the null hypothesis cannot be rejected as the p-value is not statistically significant. Hence, it can be deduced that the residuals of the model are homoskedastic or there is no heteroskedasticity problem. Furthermore, this study conducts Ramsey test to examine model misspecification for the null hypothesis of ‘no omitted variables’. The p-value of 0.3809 as shown in table 4 is not statistically significant. As such, the null hypothesis cannot be rejected which implies that there is no serial correlation in the residuals of the model.

4.5 Causality Tests

In addition to the ECM results as shown in table 4, this study further conducts Granger causality tests to address the common phrase in statistics ‘correlation does not imply causation’. Consequently, testing for causality on determinants of bank lending in Nigeria is another contribution of this study to existing studies such as Olokoyo (2011), Ogunyomi (2011), Oyebo & Ohadebere (2012), Ajayi & Atanda (2012), Jegede (2014), Uyagu & Osuagwu (2015), Ololuwad & Shomade (2017), Matousek & Solomon (2018) and Ebire & Ogunyinka (2018).

As such, conclusion and policy recommendations will be based on the causality test results rather than ECM which only shows relationship. Following the existence of cointegration among the variables, VECM Granger causality was conducted to examine long-run causality and Wald test was conducted to examine short-run causality among the variables under investigation as shown in table 5.

Table 5: Granger causality test results

<table>
<thead>
<tr>
<th>Dep. variable</th>
<th>Short-run causality (independent variables)</th>
<th>Long-run causality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δgloa</td>
<td>0.0306**</td>
<td>0.590</td>
</tr>
<tr>
<td>Δgltd</td>
<td>0.1538</td>
<td>0.000***</td>
</tr>
<tr>
<td>Δgbrm</td>
<td>0.0754*</td>
<td>0.175</td>
</tr>
<tr>
<td>Δgbc</td>
<td>0.2577</td>
<td>0.533</td>
</tr>
<tr>
<td>Δgloa</td>
<td>0.8241</td>
<td>0.285</td>
</tr>
<tr>
<td>Δgltd</td>
<td>0.8351</td>
<td></td>
</tr>
</tbody>
</table>

Note: * significant at 10% level. **significant at 5% level. ***significant at 1% level.

Source: Author’s Computation (2019)
The causality test results in Table 5 show a bidirectional short-run causal relationship between gltd and gloa. This implies a feedback effect between the two variables. Thus, growth in loan-to-deposit ratio causes growth in bank lending and a growth in bank lending causes growth in loan-to-deposit ratio on the short-run. Also, this study finds a unidirectional short-run causal relationship running from gbrm to gloa. This result is an evidence of effective expansionary monetary policy using money supply as tool in Nigeria on the short-run. This implies that as the CBN increases money supply in the economy, this causes aggregate loans and advances of commercial banks in Nigeria to increase. The relevance of broad money as a monetary policy tool in Nigeria supports the study of Oyebowale & Karley (2018).

However, this study finds no evidence of short-run causality in any direction among gloa, ginf and gbc. This implies that on the short-run, growth in inflation and bank capital does not cause growth in bank lending. During a period of inflation, prices of goods and services increase and money loses its purchasing power. As such, it is expected that monetary authorities would increase interest rate as a contractionary monetary policy measure in order to reduce spending and investment in the economy. The consequence of such policy reduces bank lending as borrowing would appear less attractive to households and firms. Additionally, this study reveals that growth in bank capital does not granger cause growth in bank lending in Nigeria on the short-run. As such, this study argues that commercial banks in Nigeria acquire more capital in adherence to regulation rather than to boost lending. A significant regulatory policy in Nigeria occurred in 2004 which marked the commencement of consolidation banking era in 2004. During this period, minimum capital base of banks in Nigeria was increased to ₦25 billion from ₦2 billion as announced on July 4, 2004 effective from December 31, 2005. In the quest to comply with this new policy, the eighty-nine (89) banks operating in Nigeria prior to the policy were reduced to twenty-five (25) through regulatory merger and acquisition at the start of 2006 (Sanusi, 2010). However, the number of banks in Nigeria was later reduced to twenty-four (24) through market-induced merger and acquisition (Sanusi, 2010). In this regard, the new causal evidence provided in this paper argues the research findings of Matousek & Solomon (2018) and Ebire & Ogunyinka (2018).

For long-run, there is a unidirectional causal relationship running from gloa to gltd while the short-run causality running from gltd to gloa fades out on the long-run. This supports theoretical expectation as it indicates that on the long-run, growth in bank lending causes growth in loan-to-deposit ratio. The implication of this is that as bank lending increases resulting from increase in bank deposits, this shows that banks are lending too much of their deposits. Thus, liquidity of banks will be at risk which will cause loan-to-deposit ratio to increase. Nonetheless, this study finds no evidence of long-run causality in any direction among gloa, ginf, gbrm and gbc. In this regard, the short-run causality effects for ginf and gbc as earlier discussed remain stable on the long-run. However, short-run causality running from gbrm to gloa fades out on the long-run. As such, this outcome argues the view of Oyebowale & Karley (2018), and further argues that effectiveness of broad money as a monetary policy tool in Nigeria is only a short-run measure. This can be a result of existing conflicts between monetary and fiscal policy in Nigeria (Ogbole, Amadi & Essi, 2011) which has deterred Central Bank of Nigeria’s instrument independence.

4.6 Impulse Response Functions (IRFs) and Forecast Error Variance Decomposition (FEVD)

The general limitation of Granger causality test is that it does not capture the strength of causal relationship among variables beyond the selected time period (Shahbaz et al., 2013). As such, this study applies innovative accounting approach using impulse response function and forecast error variance decomposition approach to address the limitation of Granger causality test. IRF shows effect of orthogonalized shocks on the alteration path of variables, while FEVD shows proportional contribution in one variable resulting from innovative shocks in other variables (Pesaran, Shin & Smith, 1999).

Table 6 shows IRF and FEVD results, while Figure 2 shows the IRF graphs. The IRF shows that an orthogonalized shock in gltd causes a positive effect on gloa in period 1. This further show a negative effect from period 2 to 5, a positive effect is observed again in period 6 to 8 and a negative effect afterwards from period 9. For ginf, an orthogonalized shock causes an initial positive effect on gloa in period 1. This further shows a negative effect in period 2, positive effect from period 3 to 6, a negative effect in period 7 and a positive effect afterwards from period 8. An orthogonalized shock in gbrm causes a positive effect on gloa in period 1 to 3, a negative effect is observed only in period 4 and a positive effect afterwards from period 5. For gbc, an orthogonalized shock causes initial negative effect on gloa from period 1 to 3, a positive effect in period 4, negative effect in period 5 and 6, positive effect in period 7 and a negative effect afterwards from period 8.

The FEVD results in Table 6 shows that in period 1, 100% forecast error variance in gloa is explained by innovative shocks in itself. As such, the contribution of other variables on gloa on the short-run is strongly exogenous. Nonetheless, the contribution of the regressors is observed in period 10 which reduces contribution of gloa to itself from 100% in period 1 to 63.56% in period 10. As such, innovative shocks in gltd, ginf, gbrm
and gbc show contribution of 3.51%, 4.78%, 18.63% and 9.51% respectively to gloa. This implies that gbrm has the highest contribution to gloa, followed by gbc, ginf and gltd respectively. Despite the contribution of gbrm, the variable only shows a unidirectional short-run causal relationship to gloa which fades off on the long-run. On the flip side, gltd which shows least contribution on gloa show a unidirectional short-run causality and bidirectional causality on gloa in Nigeria for the period under investigation.

### Table 6: IRF and FEVD Results

<table>
<thead>
<tr>
<th>Step</th>
<th>IRF (1)</th>
<th>FEVD (2)</th>
<th>IRF (3)</th>
<th>FEVD (4)</th>
<th>IRF (5)</th>
<th>FEVD (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>.28423</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>.077425</td>
<td>.014085</td>
<td>0</td>
<td>.082485</td>
<td>.111445</td>
<td>-0.91322</td>
</tr>
<tr>
<td>2</td>
<td>.081336</td>
<td>.757629</td>
<td>.00864</td>
<td>.01732</td>
<td>-0.67201</td>
<td>.059399</td>
</tr>
<tr>
<td>3</td>
<td>.114864</td>
<td>.662504</td>
<td>-.016287</td>
<td>.01937</td>
<td>.018497</td>
<td>.080296</td>
</tr>
<tr>
<td>4</td>
<td>.1364</td>
<td>.649241</td>
<td>-.093136</td>
<td>.003279</td>
<td>.00576</td>
<td>.071032</td>
</tr>
<tr>
<td>5</td>
<td>.115226</td>
<td>.637548</td>
<td>-.006343</td>
<td>.046915</td>
<td>.026934</td>
<td>.059556</td>
</tr>
<tr>
<td>6</td>
<td>.08191</td>
<td>.619846</td>
<td>.020431</td>
<td>.041419</td>
<td>.019487</td>
<td>.055598</td>
</tr>
<tr>
<td>7</td>
<td>.094959</td>
<td>.621458</td>
<td>.011845</td>
<td>.041394</td>
<td>-.026181</td>
<td>.054792</td>
</tr>
<tr>
<td>8</td>
<td>.102544</td>
<td>.618072</td>
<td>.001121</td>
<td>.039324</td>
<td>.003063</td>
<td>.054054</td>
</tr>
<tr>
<td>9</td>
<td>.132574</td>
<td>.623442</td>
<td>-.016288</td>
<td>.037138</td>
<td>.014786</td>
<td>.051078</td>
</tr>
<tr>
<td>10</td>
<td>.142342</td>
<td>.635631</td>
<td>-.069358</td>
<td>.035138</td>
<td>.001834</td>
<td>.047818</td>
</tr>
</tbody>
</table>

Note: (1) impulse = gloa, and response = gloa  
(2) impulse = gltd, and response = gloa  
(3) impulse = ginf, and response = gloa  
(4) impulse = gbrm, and response = gloa  
(5) impulse = gbc, and response = gloa  
Source: Author’s Computation (2019)
4.7 Model Stability Test

The stability of the model under investigation was checked using cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMQ) developed by Brown, Durbin & Evans (1975) as shown in figure 3 and 4. The plots of CUSUM and CUSUMQ statistics show that the residuals are within the critical bounds at 5% significance level (represented by the straight lines). Thus, this implies that all coefficients in the ECM model are stable over the period under investigation, 1961 to 2016.

Figure 3: Cumulative Sum of Recursive Residuals (CUSUM) Plot

![CUSUM Plot](image)

Source: Author’s Computation (2019)

Figure 4: Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) Plot

![CUSUM squared Plot](image)

Source: Author’s Computation (2019)
5. Conclusion and Policy Recommendations

This paper provides a threefold contribution to knowledge. First, this study builds on the studies of Gambacorta & Mistrulli (2004) and Kim & Sohn (2017) by providing further empirical evidence regarding bank capital as a determinant of bank capital. As such, this study provides empirical contribution to the studies of Matousek & Solomon (2018) and Ebire & Ogunyinka (2018) in Nigeria. Second, existing studies regarding determinants of bank lending channel in Nigeria focus on relationship without providing causal evidence. Against this backdrop, this study provides short and long-run causal evidence between the regressors and growth in bank lending in Nigeria. Third, the findings of this study are based on a wider time span dataset (1961 to 2016) in order to generate a robust and more valid outcome.

By and large, the research outcome reveals that growth in inflation and growth in loan-to-deposit ratio are long-run determinants of bank lending in Nigeria. However, growth in broad money only shows a short-run causality on bank lending in Nigeria and growth in bank capital is not a determinant of bank lending in Nigeria. As such, this study argues that implementation of monetary policy in Nigeria by the CBN is ineffective in the bank lending channel. According to Ogbole, Amadi & Essi (2011), conflict between monetary and fiscal policies in Nigeria has been one of the key factors hindering economic growth in Nigeria. In this regard, this study recommends effective long-run implementation of monetary policy in Nigeria which can be achieved through segregation of monetary and fiscal policy measures. However, the possibility of segregation between the two policy measures is determined by the degree of central bank independence.

In 2007, the CBN Act was passed into law in Nigeria by the National Assembly and assented by the President. The provisions of CBN Act 2007 focus on strengthening the previous CBN amendment Decree No. 37 of 1998 and Banks and Other Financial Institutions Act (BOFIA) amendment Decree No. 38 of 1998. However, this study argues that provisions of the CBN Act of 2007 are conflicting. For instance, section 1(3) of CBN Act of 2007 states that the CBN shall enjoy operational autonomy. Thus, the CBN should possess the authority to run its own operations without extreme involvement of the government, such as appointing staff and setting budgets (CBN, 2012). Consequently, CBN (2012) further accentuates that operational independence should help facilitate goal and instruments independence. In the same CBN Act of 2007, sections 8, 10 and 11 state that appointment of the Governor, the Deputy Governors and non-executive directors shall be decided by the President subject to the Senate’s confirmation. Also, the removal of removal of the Governor is subject to confirmation of the Senate. Additionally, composition of the Monetary Policy Committee (MPC) as stated in section 12 of the CBN Act 2007 includes the Governor, four Deputy Governors, two members of the Board of Directors of the Bank, three external members appointed by the President and two external members appointed by the Governor.

Following the highlighted provisions of the CBN Act 2007, this study argues that the operational independence of the CBN as claimed in section 1(3) is in jeopardy. This argument is based on the fact that the President and the Senate are involved in appointment of key positions in CBN. In this regard, this study further argues that the independence of CBN is only ‘on paper’ rather than actual implementation. Hence, this has adverse effects on facilitation of goal and instruments independence which has stimulated the existing conflict between fiscal and monetary policy measures in Nigeria. In line with these assertions and arguments, this study recommends amendment of the current CBN Act of 2007 to prevent involvement of the government in the appointment of CBN staff. By so doing, the CBN can enjoy operational independence which will further facilitate goal and instruments independence. Based on the essential interaction between fiscal and monetary policies within an economy, achieving goal independence by the CBN might be somewhat difficult. However, the CBN should enjoy instrument independence with operational independence in order to ensure appropriate use of monetary policy tools to achieve policy goals. Consequently, this will enhance long-run effectiveness of monetary policy tools in Nigeria.

Furthermore, this study argues that bank lending channel in Nigeria is disrupted by the wary attitude for capital requirements regulation by banks. This is evident during the consolidation era which increased minimum capital base of banks in Nigeria from N22 billion to N25 billion which led to series of mergers and acquisitions among banks. Till date, Nigerian banks still consider maintaining a buffer beyond the regulatory capital requirements to prevent distortion in banking activities. Recently, the licence of Skye Bank was revoked on 21 September, 2018 as the bank required urgent recapitalisation based on the outcome of the CBN’s examinations and forensic audit. Thus, the CBN in consultation with the Nigeria Deposit Insurance Corporation (NDIC) established a bridge bank, Polaris Bank to take-over the activities of Skye Bank effective from 24 September, 2018. The first intervention in this strategy was the injection of N786 billion into Polaris Bank by the Asset Management Company of Nigeria (AMCON). As such, this study recommends that the CBN should adopt moral suasion
policy in order to encourage bank lending while banks remain highly capitalised in the economic interest of the country. According to Breton & Wintrobe (1978), moral suasion serves as an instrument of direct communication between central banks and commercial banks. Thus, moral suasion can be used to reveal some constraints facing the central bank, perspectives that the central bank holds about the economy, suitability of monetary policy and causes of economic problems to commercial banks (Breton & Wintrobe, 1978). As this study reveals that growth in bank capital does not cause increase in bank lending in Nigeria, adoption of moral suasion will help the CBN communicate such constraint to commercial banks in order to persuade banks increase lending reasonably without erosion of capital.

References


**Copyrights**

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/3.0/).