



Modeling Bank Financial Intermediation Functions: Theoretical and Empirical Evidence from Nigeria

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

This research examined the modeling of the financial intermediation functions of banks in Nigeria. The effectiveness of financial intermediation was determined by its impact on economic growth in Nigeria. Secondary time series data were collected to determine the association between variables. The study adopted an ex post facto research design and used ordinary least squares regression tests that reveal the predictive power of the model as well as the relative statistics of the short-term variables, while testing for the existence of a long-term equilibrium relationship, based on the multivariate cointegration technique performed. The results of the study suggest that there are both short-term and long-term relationships between financial intermediation and economic growth in Nigeria. Specifically, CBCPS has a positive relationship with GDP, while MS and MLR have a positive and significant relationship with GDP in the long run. The study recommends, inter alia, that monetary authorities, in particular the Central Bank of Nigeria, has to use measures to force banks to reduce their interest rates on loans. This will increase investment and enhance the overall performance of the economy's productive sectors.

Keywords: *Financial intermediation; banks; credit to private sector; maximum lending rate; money supply; economic growth.*

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1. INTRODUCTION

Banks play an important role in financial intermediation in the financial system of every economy of the World. They distribute resources from surplus spending units to deficit spending units. Financial intermediation functions of banks act as major catalyst for propelling the functioning of financial system/ institutions of economies of the world with Nigeria not been an exception [1]. By moving money from savers to borrowers in a way that supports the investment in physical capital and promotes innovation and the creative process, financial intermediaries are shown by evidence from the literature to play important roles in the growth of the real economy [2].

In order to allocate bank credit to the real economic sectors in the middle of the 1980s, a controlled interest rate structure and direct control over credit allocation were utilized. According to this arrangement, banks were legally required to lend the majority of their available capital to key industries like solid minerals, housing, manufacturing, and agriculture at low interest rates in order to encourage high investment and output, which would inevitably lead to the expansion of the domestic economy [1]. The fragility of the regulated regime, however, gave way to the implementation of market-based policies in September 1986 in order to eliminate inefficiencies and enhance effective resource mobilization and utilization, which would ultimately result in a healthy and stable banking industry. There is no doubt that one of the main elements affecting a nation's economic development is financial system stability and sustainable financial intermediation are key components of development. One cannot emphasize enough the importance of financial intermediaries. Banks exist in every economy. The primary financial intermediaries assisting in savings' mobilization are other financial institutions, then lending them to individual/corporate investors.

Development of the economy and financial intermediation nexus has attracted a lot of research attention over the past ten years, particularly in developing economies. Although some researchers found a strong connection between variables of interest, others claimed there was a bad correlation between economic growth and intermediation [3].

Therefore, economic development aims to boost an economy's capacity for production by utilizing its resources to lower risks and eliminate obstacles that may otherwise drive up prices and discourage investment. By means of the financial intermediation process, the banking system contributes significantly to the promotion of economic growth and development. Numerous economists have acknowledged that the financial system, which mostly consists of banks, creates connections across various economic sectors and encourages a high degree of specialization, competence, economies of scale, and an enabling environment. Different government economic initiatives being put into action. Achieving non-inflationary growth, stable exchange rates to attain balance of payments equilibrium, and high employment levels are the goals of these policies.

In the literature, the importance of finance to economic growth is well acknowledged. The central function of financial intermediation in the growth of the economy. He maintained that the banking system's role in financial intermediation, which affects how savings are allocated and, ultimately, productivity, technological advancement, and the pace of economic growth, is vital for economic development. He thought that the best way to do this was by effectively allocating savings to entrepreneurs who had the most potential for introducing novel goods and production techniques. However, the financial system's modifications to the economy and the expected development are now illusions.

From the standpoint of decision-makers and private investors, the question of whether the intermediation functions performed by banks are still important for economic growth and development after domestic agents have access to foreign markets has taken on significant importance in this regard. It is not an exaggeration to say that deposit money banks must provide credit to both the public and private sectors of an economy in order for them to engage in more productive activities that will improve the performance of the country as a whole. The goal of this study is to ascertain how Nigeria's economic growth is impacted by banks' financial intermediation activities.

2. LITERATURE REVIEW

2.1 Conceptual Framework

The process by which intermediaries create a connection between surplus units and deficit

units in the economy is known as financial intermediation. According to Afolabi [4], the success of financial intermediation depends on three factors: cost, convenience, and confidence. A variety of organizations, individuals, and other economic agents use finance for a variety of purposes. There are many different institutions offering financial services in order to provide the required financing. Financial institutions are what we call these organizations. Among these organizations that offer financial services are commercial banks. Akinsulire [5] referred to this as "direct finance.". Direct financing has a number of drawbacks, such as asymmetries in information between lenders and borrowers' requirements and borrowers' requirements, as well as transaction costs.

The liabilities of financial intermediaries, especially banks, are specified for a fixed amount that is unrelated to the performance of the portfolio, deposits are short-term and of a shorter term than their assets, a large portion of their deposits are checkable (can be withdrawn on demand), and liabilities and assets are largely un-transferable [6]. In turn, it gives financial intermediaries the ability to lessen or do away with the issues brought on by direct financing.

The regulatory and supervisory authorities that regulate the activities of the institutions, the financial market, its participants, and the traded instruments are all part of the financial system, which is made up of a variety of financial institutions that operate in an orderly manner to ensure the smooth flow of funds. Ezirim [7] added that the collection of financial market arrangements, institutions, and agents that interact with one another and other economic units, as well as the rules and regulations that govern those interactions, make up the financial system. According to Onoh [8], the Nigerian financial sector is divided into a number of segments, including the regulatory and supervisory agencies for banks and non-bank financial institutions, the money market and its institutions, and the capital market and its participants. The financial system transfers savings from surplus units (lenders) to deficit units (borrowers).

The amount of credit made available to economic units for investment, in accordance with Barnisile (2005), determines the rate of economic growth as indicated by the Gross Domestic Product. According to Nzotta [9], interest rates, credit ceilings, and sectoral allocation have been found

to be helpful in ensuring resource allocation efficiency as well as the growth of institutions' innovative ideas. Financial intermediaries boost efficiency while also promoting capital accumulation, which promotes economic growth.

Montiel [10] asserts that in order to convert savings into investments for economic growth, the development of financial services networks, financial markets, and financial instruments is essential. Beck [11], on the other hand, discovered evidence that the financial sector affects economic growth via productivity rather than capital accumulation. Depending on a nation's level of economic development, the financial impact conduit for economic growth may also change. Capital accumulation is more significant for developing countries than industrialized countries, who may be more sensitive to the productivity path [12].

Financial intermediation, in light of the aforementioned, entails merely providing and directing financial resources from areas of abundance to areas of needs. As a result, financial resources become more readily available to the productive sector, which in turn stimulates economic growth and development.

2.2 Theoretical framework

The fundamental ideas of the Schumpeterian Growth model and contemporary theory of financial intermediation serve as the foundation for this study's theoretical framework. In order to address the problems with the direct financing method, Gurley and Shaw (1960) proposed the modern theory of financial intermediation. It clarifies the significance of the financial intermediaries' intermediation process for the economy at large. According to the theory, financial intermediation increases the amount of money available to the productive sector of the economy, increasing production and ultimately leading to economic growth. In 1911, Austrian-American economist Joseph Schumpeter introduced the Schumpeterian growth model. He made explicit reference to the function of financial intermediation in economic growth, which is unlike most growth theories. According to Aghion [13], the second iteration of the endogenous growth theory is the Schumpeterian growth model.

In addition to pointing out that capital and labor are the two main factors that can affect economic growth, Schumpeter also proposed the concept

of financial capital, which most researchers had previously overlooked as a substitute for actual capital. The Schumpeterian Growth model generally outperforms the earlier growth models. The majority of economists began to take the role of financial intermediaries seriously as a result of the financial crisis that hit Latin America in the early 1980s, [14].

2.3 Empirical Review

The impact of financial intermediation on Nigeria's economic development was studied by Emmanuel and Odum [15]. Determining how financial intermediation affected Nigeria's economic development was the main goal. In order to analyze the impact of financial intermediation on Nigeria's economic development, the study used an ex post facto research design. While unemployment rate and the rate of real GDP growth were used as dependent variables in the study, credit to the private sector, money supply, and lending rate were used as explanatory variables. For analyses, the auto-regressive distributed Lag (ARDL) technique was used. Findings showed that lending rates are high and that private sector credit does not positively contribute to the growth of the Nigerian economy. The study makes several recommendations, including that the monetary authority implement policies to compel banks to reduce their lending rates in order to encourage the productive sectors of the economy to perform better and that more credit should be made available to viable and productive sectors of the economy in order to promote economic growth and development.

Emmanuel & Odum [15] examined the impact of financial intermediation on economic development in Nigeria. The overall objective was to determine the impact of financial intermediation on economic development in Nigeria. The study used an ex post facto research design to analyze the impact of financial intermediation on Nigeria's economic development. The study considered private sector loans, money supply and lending rate as explanatory variables, while unemployment rate and real GDP growth rate were used as dependent variables. The Autoregressive Distributed Delay (ARDL) technique was used for the analyses. The results indicate that lending to the private sector does not make a positive contribution to the development of the Nigerian economy, while the lending rate has a high impact on the development of the economy.

Among other things, the study recommends that the monetary authority take steps to force banks to lower their lending rates in order to encourage productive sectors of the economy to perform better, and that viable and productive sectors of the economy have better access to credit to stimulate economic growth and development.

Iwedi M & Igbani [16] conducted a study on modeling the financial intermediation functions of banks in Nigeria. The research aimed to measure the impact of financial intermediation indicators on GDP and thus measure the actual level of the financial intermediation function of banks as a necessary factor to promote economic growth. The study used the Dickey-Fuller augmented unit root test as an analytic technique for measuring variable estimates. The results indicate a bidirectional causal relationship between the money supply (MOS), deposit liabilities (DLS) and gross domestic product (GDP), as MOS and DLS drive GDP, while causality also arises from GDP and DLS, respectively. The study recommended a systematic analysis of the manufacturing sector of the Nigerian economy for a better and more accurate understanding of the inverse relationship between private sector lending and Nigeria's economic performance.

Kenn-Ndubuisi [17] examined the impact of the financial intermediation function of commercial banks on economic growth in Nigeria; using the Engle-Granger technique for error correction model estimation, Pearson correlation, and vector autoregression model. Following a detailed analysis of the time series from 1987 to 2016 sourced from the Central Bank of Nigeria. The results indicated that the financial intermediation function of commercial banks is positively correlated with economic growth in Nigeria, although the relationship is not significant and regression estimates show that however important all variables are for economic growth, they have a minimal influence on real GDP. The study again indicated that interest rates are a very important factor in lending, as they have a significant negative relationship with private sector lending, the capital stock and the money supply. Among other things, the study recommends that the credit department of commercial banks extend more loans to the private sector, which are used for economic activities that boost the real economy, such as manufacturing and agriculture, and that the government can also stimulate economic growth by introducing incentives such as tax exemptions

and low export tariffs, among others, for participants in sectors that stimulate real economic growth.

3. METHODOLOGY

The study used ex post facto research design and secondary data were collected from the Central Bank of Nigeria (CBN) Statistical Bulletin for the period 1990-2020. The analytical framework for this research includes preliminary estimation analyzes such as stationarity tests. This is intended to show the pattern or behavior of the data on the variables under study. In the stationarity test, we examine the stationarity of the variables; Non-stationarity can lead to incorrect regression results. Such an incorrect relationship between variables may be evident in time series data that exhibits transient values. The ADF test was adopted because it can handle more complex models than the Dickey-Fuller test and is also more powerful. An ordinary least squares regression test shows the predictive ability of the model as well as the relative statistics of the short-term variables, while the test for the existence of a long-term equilibrium relationship is performed on the basis of cointegration multivariate from Johansen [18]. This test is necessary because Johansen's cointegration test only considers long-term relationships between variables, but does not show the direction of the relationship.

3.1 Model Specification

The normal form of the model is stated as follows:

$$GDP_{\Delta} = f(\text{CBCPS}, \text{MS}, \text{MLR},) \quad (1)$$

The explicit form of the model is show as:

$$GDP_{\Delta} = \lambda + \beta_1 \text{CBCPS}_{it} + \beta_2 \text{MS}_{it} + \beta_3 \text{MLR}_{it} + \pi_{it} \quad (2)$$

Where:

λ = Intercept of relationship in the model/constant

GDP_{Δ} = Gross Domestic Product i in period t

CBCPS_{it} = Commercial Bank Credit to Private Sector i in period t

MS_{it} = Money Supply (M2) i in period t

MLR_{it} = Maximum lending rate i in period t

β_1 - β_3 = coefficient of each exogenous variable (parameters to be estimated)

π_{it} =Stochastic error term

4. ESTIMATES AND DISCUSSION

The Augmented Dickey-Fuller test and the Philip-Perron test, as shown in Tables 1 and 2, are used for the unit root test, which is the first test carried out, all to the first difference. To determine if the dependent variable and the explanatory factors have a long-term connection, the cointegration test is carried out using the Johansen cointegration approach. The VECM test (Vector Error Correction Model), which gauges each dependent variable's rate of convergence or absence thereof.

The unit root test is employed to determine if each variable is stationary. The Philip Perron Test (PPT) and the Augmented Dickey-Fuller Test (ADF) were used to evaluate it. Table 1's findings demonstrate that all of the study's variables are integrated series of order 1(1). Not all variables are stationary, according to ADF level statistics. This illustrates the contrast between the absolute values of the ADF test statistics and the crucial values on the levels. The test had to go on to the first difference since all the variables were stationary at that point. When only absolute values are taken into account and the ADF or PPT value is higher than the critical value, the variable is said to be stationary (see Table 2).

4.1 Johansen Co-Integration Test

Johansen's cointegration test is performed to determine the long-term relationship between variables. The results in Table 3 indicate that the estimated number of cointegrating equations using the statistical test Trace. The values of the trace statistic are compared with the critical values. A result is chosen in which the value of the Trace statistic is greater than the critical value corresponding to a significance level of 5 percent. Here it is clear that there is a cointegrating equation in the model with a Trace statistic of 67.33658 and a critical value of 54.07904 at a 5% significance level. The trace statistics test is based on the maximum likelihood test. The trace statistics show a cointegrating equation at levels of 0.05; This means that financial intermediation and economic growth are closely linked in Nigeria. In Nigeria, both short-term and long-term relationships exist between financial intermediation and economic growth.

The normalized co-integration coefficients for the case when there is at least one co-integration equation are shown in Table 4. The importance

of the independent variable over the long term is demonstrated using the t-statistic. The variable is significant if the t-statistic is two or above, while the opposite is true if it is less than two. The findings indicate that whereas MS and MLR have substantial and positive relationships with GDP, CBCPS has a favorable association with GDP.

4.2 Vector Error Correction Model (VECM)

The most important decision criteria when using the vector error correction model are the coefficient and the t-statistic. The use of the coefficient requires the sign to be negative, showing that there is convergence of the variables to the same long-term equilibrium path after each period of imbalance, and the VECM must be between zero (0) and one (1). The t statistic is used to check the significance of the variable. The results in Table 5 show that the error correction model shows that the magnitude of corrected GDP in the cointegrating equation D(CBCPS) is about 20% and that its value has been correctly signed, the magnitude of

corrected GDP in the cointegrating equation D(MLR) is about 133% and this value has been correctly signed. Moreover, the error correction model shows that the magnitude of D(BIP) corrected in the D(MS) cointegration equation is about 0.033% and that this value has been correctly signed. A further analysis of the result shows a t-statistic value of 2.05064, which indicates it is significant and acceptable result because it is greater than 2. This result is in line with Iwedi M & Igbanibo [16] which showed the impact of financial intermediation indicators on GDP and thus measure the actual level of the financial intermediation function of banks as a necessary factor to promote economic growth [19,20].

The findings of this study is limited to the fact that not all variables were examined in this relationship. Therefore, the research is ascertained with the limitation of the scope covered. Hence further studies in this area are encouraged by researchers to broaden the scope of this subject.

Table 1. Unit root test estimates (ADF)

Variable	ADF	Critical Values	Remarks
GDP	-10.20179	-2.957110	1(1).
CBCPS	-6.229666	-2.957110	1(1).
MS	-7.78666	-2.957110	1(1).
MLR	-2.90007	-2.957110	1(1).

Source: E-views 10 Output, 2023

Note: ADF=Augmented Dickey Fuller

Table 2. Unit root test estimates (PPT)

Variable	PPT	Critical Values	Remarks
GDP	-25.43065	-2.957110	1(1).
CBCPS	-6.56666	-2.957110	1(1).
MS	-8.76554	-2.957110	1(1).
MLR	-3.65544	-2.957110	1(1).

Source: E-views 10 Output, 2023

Note: PPT=Phillip-Perron test

Table 3. Unrestricted co-integration rank test

Hypothesized No. of CE(s)	Eigen value	Trace statistic	0.05 critical value	Prob.**
None *	0.683525	67.3365	54.07	0.0032
At most 1	0.3439	30.5202	35.1927	0.1564
At most 1	0.2570	17.0303	20.2618	0.0156
At most 1	0.2095	7.5241	9.1625	0.0021

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: E-views 10 Output, 2023

Table 4. The normalized co-integrating coefficient

No. of CE(s)	GDP	CBCPS	MS	MLR
				(4.65142) [-3.64575]
1.0000		1.970669 (0.02112) [2.65345]	20.75161 (0.00121) [2.21816]	16.95791 (0.01135) [2.64575]

Source: E-views 10 Output, 2023

Note: () represents the P values and [] represents the t-stat values.

Table 5. Vector error correction estimates

Variables	D(GDP)	D(CBCPS)	D(MS)	D(MLR)
			(4.65142) [-3.64575]	
ECN(-1)	-0.852322	0.024050	0.020486	0.000265
Standard errors	(0.41661)	(0.01349)	(0.00899)	(0.000265)
T-Statistics	[2.05064]	[1.7829]	[2.27898]	[2.01571]

Source: E-views 10 Output, 2023

5. CONCLUSION AND RECOMMENDATIONS

The findings of this study showed that bank intermediation operations had a statistically significant influence on economic growth in Nigeria. This implies that financial intermediaries' performance has an impact on economic expansion. The ADF unit root test's findings demonstrated that all variables were established as stationary. The outcome of Johansen's cointegration test demonstrated that the variables had a lasting link.

However, indices that have a non-significant effect and an unexpected relationship with economic growth were found to indicate that the role of banking intermediation is not fully affected by the Nigerian economy. The bank intermediation activity indices in the study account for a larger share of changes in economic growth. This is due to the level of economic and complexity in implementing banking intermediation that hinders their roles from achieving the desired results. Previous studies are related to this study because of the recent call and need for bank intermediation operations to contribute to economic performance of the economy; hence notably showing the role of financial intermediation in overall economic growth.

The study therefore recommends are as follows:

- i. In order to increase access to credit for the viable and productive sectors of the

economy, the Central Bank of Nigeria should develop better credit regulations.

- ii. The monetary authorities, in particular the Central Bank of Nigeria, has to use measures to force banks to reduce their interest rates on loans. This will increase investment and enhance the overall performance of the economy's productive sectors.
- iii. The monetary authority specifically the Central Bank of Nigeria should enable adequate money supply, in order to regulate inflation in the economy.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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