



Journal of Internet Banking and Commerce

An open access Internet journal (<http://www.icommercentral.com>)

Journal of Internet Banking and Commerce, May 2017, vol. 22, no. S8

Special Issue: Mobile banking: A service provider perspective
Edited By: Mihail N. Dudin

CO-INTEGRATION ANALYSIS OF FINANCIAL INTERMEDIATION AND ECONOMIC GROWTH IN NIGERIA

ADEDIRAN OLUWASOGO

Department of Economics and Development Studies, Covenant
University, Ota, Nigeria

Tel: +234-08067427261;

Email: oluwasogo.adediran@covenantuniversity.edu.ng

EKEJIUBA C PRINCESS

Department of Economics and Development Studies, Covenant
University, Ota, Nigeria

MATTHEW A OLUWATOYIN

Department of Economics and Development Studies, Covenant
University, Ota, Nigeria

ADEGBOYE B FOLASADE

Department of Banking and Finance, Covenant University, Ota, Nigeria

Abstract

This study examined the effect of financial intermediation on economic growth in Nigeria. The study period covered between 1980 and 2014. The introduction of financial

intermediation by financial intermediaries in Nigeria was necessary due to the challenges, issues and limitations of the direct financing system. The unit root test was carried out using the Augmented Dickey-Fuller and Philip-Perron tests in order to confirm the stationarity of the data, then the Johansen co-integration test was used to estimate the long run relationship between the dependent and independent variables in this study. The Vector Error Correction Model (VECM) test was conducted. The result showed that financial intermediation has a long-run relationship with economic growth in Nigeria. Therefore, the study recommended that the regulatory authorities of financial intermediaries such as the Central Bank of Nigeria (CBN), having obtained knowledge from this research work on the impact of financial intermediation on economic growth should encourage and enhance the activities of financial intermediaries. This could be done by reducing the level of the cash-reserve ratio in order to make more funds available for credits to the private sector of the economy.

Keywords: Financial Intermediation; Economic Growth; Johansen Co-integration; VECM

© Adediran Oluwasogo, 2017

INTRODUCTION

In any economy, there will be some individuals, organizations or the government who need more resources than they can generate on their own. At the same time, there will be others who have more than they required. Hence, it becomes necessary to transfer funds from those who have surplus to those who are in deficit. This arrangement whereby funds are transferred from surplus sector to the deficit sector is known as financial Intermediation. Hamilton as cited by Levine et al. said that banks were the happiest engines that ever were invented for spurring economic growth. The main advantages of financial intermediation to the economy are matching depositor's savings requirement with the borrower's investment requirement that is the intermediary's skill in resource allocation and also help to eliminate wastes and promotes efficiency in resources allocation. Therefore, the success of financial intermediaries in their intermediation process depends on the various essential qualities which include first, minimum cost which implies that In the process of financial intermediation, the cost borne by the deficit sector and surplus sector such interest charges, commission should be minimal. Second, convenience which means that there should be simplicity in the operations of financial intermediaries. In other words, the people should be able to transact business with the financial intermediaries with relative ease. Finally, confidence which implies that in order to make financial intermediation successful and effective, both the surplus and deficit sectors should have confidence in the intermediaries. This confidence will make the surplus sector to save and the deficit sector to borrow. The Nigerian financial system comprises of the banking system such as commercial bank, merchant bank, development bank and so on, the non-bank such as insurance company, finance houses, discount houses and so on, the supervisory and regulatory authority such as the central bank of Nigeria, national insurance commission and other financial market participants that play the role of financial intermediation. The financial intermediary obtains the fund from the net savers and makes them available to the net

borrowers (investors) through credits, sales of securities, bonds and so on. In previous studies such as Levine et al. and Ibrahim, it had been identified that financial intermediaries through their intermediation process has a positive short-run relationship with economic growth in Nigeria, which an exception of the past decade. The long-run effect of the financial intermediaries on economic growth in Nigeria was not considered in previous studies. Thus, the objective of this study is to examine the long-run effect of financial intermediation on economic growth in Nigeria. This long-run effect is most important due to the fact that it takes a long time for the credits or funds given to the private sector to generate more productivity which ensure economic growth. Thus, this study formulates the null hypothesis that: there is no significant long-run effect of the intermediation process of financial intermediaries on economic growth in Nigeria.

This long-run effect is examined using the Johansen co-integration estimation technique, which is a more advanced technique compared to the techniques used in previous studies, this is done in order to obtain a more robust and accurate result. To achieve this task, this paper is divided into five sections. The second section examined the review of literature and theoretical framework, section three focuses on the methodology, section four focuses on the analysis of results and discussion of findings, while the final section focuses on the summary, recommendations and conclusion.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Financial intermediation in Nigeria dates back to the evolution of money as a means of the exchange of goods and services. There have always been some people who possess money in excess of their immediate needs -surplus economic unit and those whose present money cannot finance their needs -deficit economic unit [1]. Initially lenders (surplus unit) and borrowers (deficit unit) had to search for themselves and deal directly; this is known as direct financing. At this time, there were no financial intermediaries to aid in the process of transferring money from the surplus unit to the deficit unit. As the Nigerian economy grew and the needs of the deficit unit expanded, the direct financing system was not adequate enough to handle it. The introduction of the intermediation by financial intermediaries in Nigeria was necessary due to the challenges, issues and limitations of the direct financing system. It has also brought about the easy operations of the financial activities in the financial sector of the economy thereby transcending to economic growth. Different challenges has been faced by intermediaries in the intermediation process are less compared to the issues involved in direct financing system. In recent times the Central Bank of Nigeria (CBN) has been the apex regulatory agency for all financial intermediaries in Nigeria.

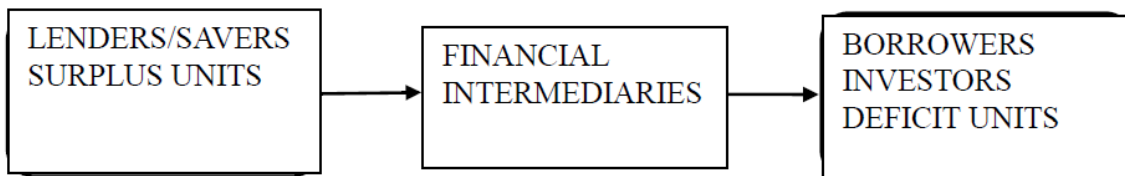
The financial intermediaries act as the middle man to undergo the risk transformation in the economy. If this process of financial intermediation is effectively carried out in the Nigerian economy, there would not be issues of lack of funds for production and productive activities which will increase the growth rate of the gross domestic product of the Nigerian economy. Acha [1] examined whether banks through financial intermediation activities cause economic growth. He used various explanatory variables such as credit to private sector, total bank deposit and GDP growth rate as a proxy for economic growth which he obtained from CBN Statistical Bulletin. Using the period of

1980 to 2008, the Granger Causality test was used to test the hypothesis by developing two models to test the causality between savings and economic growth and between credit and economic growth. After Acha [1] analysis he discovered that there was no significant causal relationship between banks savings/credit and economic growth, this was due to the economy's stage of development at that time. Shittu made use of time series data gotten from Nigeria for the period of 1970 to 2010. He conducted the unit root test and the co-integration test on the variables, also the model was estimated using the Engle-Granger technique.

The impact of financial intermediaries was measure with two proxies which are broad money supply and credit to the private sector, growth rate of real GDP was used to represent economic growth. The result of his analysis indicated that financial intermediation has a positive impact on economic growth in Nigeria. The annual growth rate of Nigerian gross domestic product has been identified to increase as the amount of loan obtained by the private sector investors is increased. This estimation method used had some biases so he recommended that more advanced technique such as the Johansen estimation technique should be used for further studies to ensure a more accurate result.

The process of financial intermediation can be illustrated as follows (Figure 1):

Figure 1: Process of Financial Intermediation.



The Nigerian economy had an unstable history of growth. This could be traceable to the colonization, the period of Structural Adjustment Programme, inflation and other challenges that had been faced by the economy in its process of growth. As at from 1960 to 1970 there was a growth rate of the average of 3.1percent, during the oil boom era that is 1970 to 1978, the growth rate increased to about 6.8 percent. Moreover in the past few years the Nigerian economy has experience some improvement in her growth rate which is about 7 percent, this is because of the increase in industrialization and better research and development (World Development Indicators, 2014). Generally, there are two main factors that influence economic growth in most developing economies. They include: the economic factors and the non-economic factors. Economic factors are very important and contribute more to the growth of any economy. They are; capital formation, natural resources, agricultural development, level of foreign trade, economic system and so on. Non-economic factors include the social factor, human factor and political or administrative factors. These factors have an effect on economic growth but not as much as that of the effect of the economic factor on economic growth.

The relationship between financial intermediation and economic growth has over time been viewed by different researchers in three ways. First, is the view that financial intermediation leads to economic growth. Second, is that economic growth lead to financial intermediation by creating more demand for the intermediaries? Third, is the view that there is a bi-directional relationship between financial intermediation and economic growth such that both variables have an effect on each other. These different relationships are most times specific to different economies depending on the level of growth attained. The first scenario will be used in this study as it has been identified in various studies to have been the occurrence in Nigeria. Gaytan and Ranciere [2] said that the wealth in an economy has an effect on the relationship between financial intermediation and economic growth especially in most middle income emerging economies.

The theoretical framework of this study is based on the basic propositions of the modern theory of financial intermediation and the Schumpeterian Growth model. The modern theory of financial intermediation was propounded by Gurley and Shaw in order to solve the shortcomings that were discovered in the direct financing method. It explains the importance of the intermediation process of financial intermediaries in the economy as a whole. The theory is of the view that financial intermediation brings about more funds available to the productive sector of the economy which will increase production then eventually growth in the economy. The Schumpeterian growth model was propounded by Joseph Schumpeter, an Austrian-American economist in the year 1911. Unlike most growth theories, he explicitly referred to the role of financial intermediation in economic growth. The Schumpeterian growth model could be referred to as the second variant of the endogenous growth theory [3]. Schumpeter noted that economic growth in a country could be influenced by two major factors which are capital and labour, he introduced financial capital which was ignored by most researchers as a proxy for capital. The Schumpeterian Growth model tends to improve on the previous growth models. It was due to the financial crisis of the Latin America in the early 1980's that made most economists to take the role of financial intermediaries seriously [4].

METHODOLOGY

The model of this study expresses the growth rate of real gross domestic product which is a proxy for economic growth as a function of financial intermediation, the control variable and other factors that affects economic growth which is represented by the error term (μ). Financial intermediation is represented by two variables which are: the ratio of domestic credit to private sector to the nominal gross domestic product which measures the financial opportunities available to private firms and the loan-deposit ratio which is used to assess the liquidity of financial intermediaries (banks) by dividing total loans by total deposits [5]. The control variable is the total labour force which is a proxy for labour and it measures the proportion of the population ages 15 and older that are economically active, that is, those who supply labour for the production of goods and services.

The model can be stated as follows:

$$GRGDP=f(CPSN, LTD, LABOUR) \tag{1}$$

The growth model is assumed to have a non-linear relationship existing between the variables based on the Cobb-Douglas production function. Hence, equation (2) is expressed in Cobb-Douglas form as follows:

$$GRGDP=A LCPSN^{\beta_1} LLTD^{\beta_2} LLABOUR^{\beta_3} \tag{2}$$

The Cobb-Douglas production function is a regression function in which the explicit solutions of the unknowns cannot be obtained except it is transformed to a linear function. Thus, the linear transformed equation is expressed in an explicit econometric form as:

$$GRGDP=\beta_0+\beta_1 LCPSN+\beta_2 LLTD+\beta_3 LLABOUR+\mu \tag{3}$$

(+)
(-)
(+)

Where

GRGDP: Growth Rate or Real Gross Domestic Product

LCPSN: Logged form of Ratio of Domestic Credit to Private Sector to the Nominal Gross Domestic Product

LLTD: Logged form of Loan-Deposit Ratio

LLABOUR is the logged form of total labour force

μ: Stochastic or random error term, which represents other variables that affects economic growth.

The signs below the variables in brackets indicate the apriori expectations.

RESULTS AND FINDINGS

The first test carried out is a test for multicollinearity; this is carried out to verify the extent of relationship between the explanatory variables. Correlation gives an indication of the degree of relationship between variables [6]. There is positive correlation between two variables when an increase in one brings about an increase in the other, otherwise, the correlation is negative. Correlation takes values between -1 and +1. For perfect negative correlation, the correlation coefficient is -1 while for perfect positive correlation it is +1. From the results in Table 1, all the variables have either low or negative correlation with one another. This implies that there is no multicollinearity among the variables so we can proceed with the estimations of the equations.

The second test carried out is the unit root test; this was conducted using the Augmented Dickey-Fuller test and Philip-Perron test. The Co-integration test is run using the Johansen co-integration technique in order to test for the existence of a long run relationship between the dependent variable and the explanatory variables (Table 2). The Vector Error Correction model (VECM) test which measures the speed of adjustment and the convergence or otherwise of each of the variables the dependent

variable was also conducted.

Table 1: Correlation Matrix.

	GRGDP	LCPSN	LLTD	LLABOUR
GRGDP	1.000000	0.024292	-0.314567	0.481093
LCPSN	0.024292	1.000000	0.107788	0.448697
LLTD	-0.314567	0.107788	1.000000	-0.332637
LLABOUR	0.481093	0.448697	-0.332637	1.000000

Source: Estimated by the Authors, 2016.

Table 2: Unit Root Test Results.

Variables	1 st Difference			1 st Difference		
	ADF	Critical Value at 5%	Remarks	PPT	Critical Value at 5%	Remarks
GRGDP	-9.201791	-2.957110	S	-23.43024	-2.957110	S
CPSN	-5.229783	-2.957110	S	-6.414772	-2.957110	S
LTD	-7.663073	-2.957110	S	-7.849086	-2.957110	S
LLABOUR	-2.970200	-2.957110	S	-3.070805	-2.957110	S

Source: Estimated by the Authors, 2016. Note: S=Stationary, ADF=Augmented Dickey Fuller, PPT=Phillip-Perron test.

The unit root test is used to test for the stationarity of each variable was tested using the Augmented Dickey-Fuller (ADF) test and the Philip-Perron test (PPT). The results in Table 2 show that the variables in the study which are GRGDP, LCPSN, LLTD and LLABOUR are all integrated series of order 1(1). ADF statistics at levels shows that not all variables are stationary [7]. This is shown by the comparison of the absolute values of ADF test statistics and the absolute values of critical values at levels. There was a need to proceed to test at 1st difference at which all variables were stationary. A variable is stationary when ADF value or PPT value is greater than the critical value, by considering only the absolute values.

Johansen Co-integration Test

After confirming that the data of the variables is stationary, the next step is the co-integration test. This is done using the Johansen Co-integration test, which was conducted to determine the long run relationship among variables. The results in Table 3 show the estimated number of co-integration equations using the Trace statistics test. The Trace statistic values are compared with the critical values. A result is chosen where the Trace statistic value is greater than the corresponding critical value at 5 percent level of significance. Here, it is evident that there is one co-integrating equation in the model with a Trace statistic is 67.33658 and a critical value of 54.07904 at 5

percent level of significance. The trace statistics test is based on the maximum likelihood test [8]. The trace statistics indicate one co-integrating equation at 0.05 levels; this means that financial intermediation and economic growth are co-integrated in Nigeria. There exist both short-run and long-run relationships between financial intermediation and economic growth in Nigeria.

Table 3: Unrestricted Co-integration Rank Test (Trace).

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.683525	67.33658	54.07904	0.0021
At most 1	0.343976	30.52024	35.19275	0.1464
At most 2	0.257008	17.03039	20.26184	0.1314
At most 3	0.209532	7.524173	9.164546	0.1014
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: Authors' Computation using E-views, 2016.				

Table 4 shows the normalized co-integration coefficients of the situation where there is at least one co-integration equation. The t-statistic is used to show the significance of the independent variable in the long run. If the t-statistic is 2 or greater than two, the variable is significant but the reverse is the case when the t-statistic is less than two. The result shows that LCPSN has a negative relationship with the GRGDP, while LLTD and LLABOUR have positive relationships with GRGDP.

Table 4: The Normalized Co-integrating Coefficient.

GRGDP	LCPSN	LLTD	LLABOUR
1.000000	1.970669 (3.01584) [0.65345]	-20.75161 (6.44828) [-3.21816]	-16.95791 (4.65142) [-3.64575]
Source: Estimated by the Authors using E-views, 2016. Note: () represents the standard error values and [] represents the t-stat values.			

Vector Error Correction Model (VECM)

The major decision criteria in using the Vector error correction model are the coefficient and the t-statistic. In the use of the coefficient, it is required that the sign be negative showing that there is convergence of the variables to the same long run equilibrium path following every period of disequilibrium and the VECM must be between zero(0) and one (1). The t-statistic is used to check for the significance of the variable. The results in Table 5 reveal that the error correction model shows that the magnitude of GRGDP that was corrected in the co-integrating equation D(LCPSN), is about 20 percent and its value was correctly signed, the magnitude of GRGDP that was corrected in the co-

integrating equation D(LLTD) is about 133 percent and this value was correctly signed also the error correction model shows that the magnitude of GRGDP that was corrected in the co-integrating equation D(LLABOUR), is about 0.033 percent and this value was correctly signed [9]. A further analysis of the result shows a t-statistic value of 2.05064, which indicates it is significant result because it is less than 2.

Table 5: The Vector Error Correction Estimates.

Variable	D(GRGDP)	D(LCPSN)	D(LLTD)	D(LLABOUR)
ECN(-1)	-0.852322	0.024050	0.020486	0.000265
Standard errors	(0.41661)	(0.01349)	(0.00899)	(0.00013)
T-Statistics	[2.05064]	[1.78297]	[2.27898]	[2.01571]
Source: Computed by the Authors using E-views, 2016.				

Generally, this study established the fact that loan to deposit ratio and credit to private sector to nominal gross domestic product which are indicators for financial intermediation has long run relationship with growth rate of real gross domestic product which was used to represent economic growth [10]. Total labour force which is the control variable has a long run relationship with economic growth. From the result of the estimation and the significance of the t-statistics, the null hypothesis formulated in this study was accepted. This proposed that there is no significant long-run effect of the intermediation process of financial intermediaries on economic growth in Nigeria.

SUMMARY, RECOMMENDATIONS AND CONCLUSION

Summary of Findings

In this study, it has been established that financial intermediation has a long-run effect on the growth of the Nigerian economy. There exist a long-run relationship between the indicators of financial intermediation in the Nigerian economy which are credit to private sector to nominal gross domestic product and the loan-to-deposit ratio and the indicator of economic growth which is the growth rate of real gross domestic product. Therefore, a well regulated, effective and efficient financial sector will to a great extent lead to a sustained economic growth in Nigeria. Also, from this study it was established that the labour force in Nigeria has a vital role to play in the growth of the economy. This is indicated by the long-run relationship that exist between the total labour force and growth rate of real gross domestic product which is used to represent economic growth in Nigeria.

Recommendations

In view of the findings of this study, the following recommendations are made:

It has been observed that there is no efficient wide spread of financial intermediation in the Nigerian economy which is due to the underdevelopment of most rural areas. This can be resolved by enhancing the development of the rural areas through the provision of amenities. As a result of this, more financial intermediaries will be encouraged to establish its branches in such rural areas. From the study it was also established that the labour force of the Nigerian economy is also very vital and has a long-run effect on economic growth. This is indicated by the long-run relationship between total labour force and the growth rate of real gross domestic product. The Government should provide more job opportunities and also support the formulation of small and medium enterprises (SMEs') by encouraging the financial intermediaries through the central bank of Nigeria (CBN) to provide credits for small and medium enterprises. This will lead to the expansion of such SMEs' therefore leading to increased productivity and growth in the economy.

The regulatory authorities of financial intermediaries such as the Central Bank of Nigeria (CBN), having obtained knowledge from this study on the effect of financial intermediation on economic growth should enhance the activities of financial intermediaries. This could be done by reducing the level of the cash-reserve ratio in order to make more funds available for credits to the private sector of the economy. Nigeria is a nation blessed with many business opportunities that could enhance the overall economic growth. This is been hindered by lack of funds required to start such businesses. The financial intermediaries are faced with the responsibility to provide such funds in the form of loans and this can only be possible if these intermediaries have benefits from the loans. By this the interest rate should be maintained at a level that will encourage more deposits in commercial banks thereby more funds are available to be given out as loans to investors. Also the lending interest rate of financial intermediaries should not be too high because this could discourage the private sector from obtaining loan thereby leading to low productivity in the Nigerian economy and as a result, there will be a decrease in the growth rate of the economy.

Finally, the study recommended that the regulatory authorities of financial intermediaries such as the Central Bank of Nigeria (CBN), having obtained knowledge from this research work on the impact of financial intermediation on economic growth should encourage and enhance the activities of financial intermediaries. This could be done by reducing the level of the cash-reserve ratio in order to make more funds available for credits to the private sector of the economy.

CONCLUSION

This study had examined the effect of financial intermediation on economic growth of Nigeria using the Johansen Co-integration technique. It found out that there exist a long-run relationship between the indicators of financial intermediation in the Nigerian economy which are credit to private sector to nominal gross domestic product and the

loan-to-deposit ratio and the indicator of economic growth which is the growth rate of real gross domestic product. Thus, a well regulated, effective and efficient financial sector will to a great extent lead to a sustained economic growth in Nigeria. The exercise of merging of some financial intermediaries has led to more efficiency in the financial sector, this is commendable. There is still a lot to be done by the government through the regulating authorities, this is by ensuring that all financial intermediaries are well equipped, have enough capital base and perform their role effectively so that the issues faced previously will not be repeated in this present time.

REFERENCES

1. Acha IA (2011) Does Bank Financial Intermediation causes Growth in Developing Economies: The Nigerian Experience. *International Business and Management*, 3: 156-161. www.cscanada.org
2. Gaytan A, Ranciere R (2004) Wealth, Financial Intermediation and Growth. UPF Economics and Business Working Paper 851.
3. Aghion P (2004) Growth and development: A Schumpeterian approach. *Annals of Economics and Finance* 5, Peking University Press.
4. Sinha T (2001) The Role of Financial Intermediation in Economic Growth: Schumpeter Revisited. *Economic Theory in the light of Schumpeter's Scientific Heritage*, India: Spellbound Publishers.
5. Aghion P, Akcigit U, Howitt P (2013) What do we Learn from Schumpeterian Growth Theory?. Brown University and NBER.
6. Babatunde MA, Adefabi RA (2005) Long Run Relationship between Education and Economic Growth in Nigeria: Evidence from the Johansen's Co-integration Approach. *Regional Conference on Education in West Africa*.
7. Gujarati DN, Porter DC (2009) *Basic Econometrics*. McGraw – Hill International Edition, New York.
8. Jhingan ML (2010) *The Economics of Development and Planning*. Vrinda

Publications (P) Limited.

9. Obadan MI (2012) *Research Process, Report Writing and Referencing*. Benin City: Goldmark Press Limited.
10. Todaro MP, Smith SC (2011) *Economic Development*. India: Pearson Education Limited.