"Financial intermediation and economic growth: a test for causality in Nigeria"

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NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
0	0	0

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Abstract

This study tests for causality between financial intermediation and economic growth in Nigeria between 1990 and 2013. Utilising the Toda-Yamamoto Granger non-causality test, it reveals that causality is absent between financial intermediation and economic growth. It recommends that government should design and implement reforms that would increase the banks' capacity to intermediate funds to the real sector as well as deepen the financial sector.

Introduction

Financial resources are basic ingredients for the growth of an economy – provided they are not idle. These resources become active through financial intermediation. Financial intermediation is the process whereby financial resources are mobilized by banks in the form of savings and transformed into credit. It is the root institution in the savings-investment process (Gorton and Winton, 2002). Financial intermediation creates a pathway for financial resources to be channeled from savers to investors.

Banks act as conduit for financial intermediation and they are regarded as financial intermediaries. Sulaiman, Migiro and Yeshihareg (2015) opine that financial intermediaries play a significant role within a nation's financial system by mobilising funds from the surplus economic units and channelling them to the deficit economic units of the economy. In developing economies, banks have a greater propensity to influence the degree of financial intermediation because the financial system of these countries is bank-based. The pace of economic growth is a function of the efficiency of banks in the financial intermediation process. Banks' efficiency is determined by their ability to facilitate savings and allocate credit optimally for investment purposes. Banks can only intermediate perfectly in an imperfect market. Scholtens and Van Wensveen (2003) note that if they operate in a perfect market, they become irrelevant because both savers and investors neglect the use of perfect information which is mandatory to directly access each other.

Financial intermediation efficiently managed contributes greatly to a vibrant financial system, increased output levels, employment, and income (Agbada and Osuji, 2013). Greenwood and Jovanovic (1990) recognize that financial intermediation allows capital to earn a higher rate of return – thus enhancing economic growth. Mckinnon (1973) and Shaw (1973) acknowledge financial intermediation as a principal determi-

nant of economic growth. They both consider that the level of investment influenced by the level of savings determines the economic growth rate. An economy tends to grow when savings and investment move in an upward direction. Through increased savings, more investments are undertaken. This leads to an increase in the rate of capital formation – consequently resulting in economic growth.

A high degree of financial intermediation indicates the existence of a well-functioning financial sector. However, Hesse (2007) observes that a low degree of financial intermediation is a characteristic of the Nigerian financial sector. This is the outcome of low deposit rates and high lending rates, which are common among Nigerian banks. Against this background, the aim of which was to provide intrinsic evidence on the influence of financial intermediation in the Nigerian economy.

How financial intermediation links with economic growth remains equivocal. Studies have shown financial intermediation drive economic growth and vice-versa. Therefore, this study seeks to provide clear evidence on the causality that exists between financial intermediation and economic growth in Nigeria. As pointed out by Levine et al. (2000), providing evidence on causality will directly impact on the level of urgency involved with the implementation of policy reforms designed to foster development of financial intermediaries. The structure of the rest of this study is as follows. Section 1 presents the literature review. Section 2 discusses the methodology. Section 3 presents the empirical results and Final Section concludes.

1. Literature review

1.1. Cross-country studies. Shabbir (1997) – based on a study of 8 developing Asian countries and 5 developed countries – suggested that financial intermediation via efficiency in investment caused an upward trend in growth per capita. Odedokun (1998) performed a cross-sectional analysis to determine the impact of financial intermediation on the growth of 90 developing countries during the 1970s and 1980s, and discovered that financial intermediation influenced growth positively.

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Levine et al. (2000) in a study of 71 countries found that financial intermediary development has a positive impact and a strong causal influence on economic growth. Aziakpono (2003) assessed the relationship between financial intermediation and economic growth in economic integration – considering the experience of the Southern African Customs Union (SACU). The study found that domestic financial intermediation remains vital to the growth of countries in SACU.

Adusei and Afrane (2013) examined how financial intermediation relates to economic growth in 12 Credit Union (CU) countries using the panel GMM estimation technique. It was found that financial intermediation exerts a significant positive influence on economic growth. Dima and Opris (2013) evaluated a panel data set consisting of 28 emerging economies and found that financial intermediation and economic growth are directly related. zaghadoudi et al. (2013) assessed the bearing of banking intermediation on the growth of 10 Middle East and North Africa (MENA) countries. The results pointed out that all the indices of banking intermediation in the study inversely relate to economic growth.

1.2. Country-specific studies. This section is further divided into two. The first part reviews empirical literature on Nigeria alone (i.e. local empirical evidence), while the second offers empirical evidence from outside Nigeria (i.e. foreign empirical evidence).

1.2.1. Local empirical studies. Ekpenyong and Acha (2011), through an error correction model, estimated the role of banks in the form of savings mobilization and credit allocation, to the real sector on the growth of the economy. It was discovered that bank intermediation insignificantly impacts on growth. Acha (2011) tested for the causality between financial intermediation provided and economic growth and found no evidence of causality between savings/credit and economic growth. Shittu (2012), to the contrary however, found that financial intermediation significantly impacted on economic growth using an error correction modelling approach.

Using the Ordinary Least Square (OLS) method, Agbada and Osuji (2013) discovered that financial intermediation had a direct relation on economic output. Efayena (2014) applied the correlation test to establish that financial intermediaries have a strong positive relationship with economic growth.

Chinweoke et al. (2014) analyzed the effect of financial intermediation on economic growth using the OLS technique, and revelaed that financial intermediation has a significant positive impact on economic growth. Ogiriki and Andabai (2014) employed the co-ntegration test and Vector Error Correction Mechanism (VECM) to unearth the relationship between

financial intermediation and growth. The study found that a long-term relationship is present and that financial intermediation explains a considerable amount of variation in economic growth.

Yakubu and Affoi (2014) examined the contribution of the credit of commercial banks allocated to the private sector towards economic growth. The regression results showed that credit to the private sector, which is a proxy of financial intermediation, significantly and directly impacts the economy. Similarly, Mamman and Hashim (2014) observed through OLS regression analysis that bank-lending activities have statistical relevance on economic growth.

From the empirical literature on Nigeria, it can be observed that there is lack of consideration for the size of the banking sector, accessibility to financial intermediaries, and the cost of financial intermediation as measures of financial intermediation. It can also be observed that causal relationship evidence is narrow in Nigeria. Hence, the goal of this study is to address the gaps inherent in the local empirical literature.

1.2.2. Foreign empirical evidence. Hao (2006) found that advancement in financial intermediation impacted on the economic growth of China during the post-1978 reform era through two channels: household savings' mobilization and replacement of loans for state budget appropriation. Ventura (2008) found that financial intermediation was beneficial to the growth of the Colombian economy both in the short and long-term using the ARDL modelling technique. Murty et al. (2012), with co-integration methodology, found that in Ethiopia, bank credit to the private sector had a long-run positive impact on economic growth.

In Tunisia, Bouzid and Radhia (2014) examined the relationship between financial intermediation and economic growth. Adopting the Vector Autoregressive (VAR) approach, the study put forth that financial intermediation positively impacts on economic growth. Sahoo (2014) analyzed the input of financial intermediation on the development of the Indian economy. The Granger causality test revealed that causality flows from private sector credit to growth – thus confirming that financial intermediation drives growth while no causality emerged between stock market capitalization and growth. The ARDL method indicated that bank-based financial development plays a greater positive role than market-based financial development.

2. Methodology

2.1. Sample period, data and method of analysis. The sample period is from 1990 to 2013 and the time-series data on annual basis are obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin.

This study assumes that there is no causality between financial intermediation and economicgrowth. The measures of financial intermediation are savings, investment, cost of financial intermediation, size of the banking sector, and accessibility to financial intermediaries. The Granger non-causality test is employed to determine the causality between financial intermediation and economic growth.

Table 1. Data description

Variable	Short form	Definition	Proxy
Nominal gross domestic product	GDP	This is the total monetary value of goods and services at current basic prices.	Economic growth
Total savings	SAV	It is the total amount of financial resources mobilized in the banking sector	Savings
Credit to private sector	CPS	Funds channeled to the real sector in form of credit for investment.	Investment
Interest rate spread	IRS	The difference between lending rate and deposit rate	Cost of financial intermediation
Banks' total assets	BTA	This is the total value of fixed and current assets of all banks	Size of the banking sector
Number of bank branches	NBB	This is the total number of bank branches owned by Nigerian banks excluding branches domiciled abroad	Accessibility to financial intermediaries

Source: Authors' compilation.
Note: The logarithm form of the variables was used in the empirical analysis and L is the prefix attached to the short form.

2.2. Specification of the models. The Granger non-causality test is performed within a multivariate Vector Autoregressive (VAR) system which treats all variables as endogenous. The VAR (p) models are specified as follows:

$$LGDP_t = \propto + \sum_{i=1}^{p} \beta_{1i} LGDP_{t-i} + \sum_{i=1}^{p} \beta_{2i} LSAV_{t-i} + \sum_{i=1}^{p} \beta_{3i} LCPS_{t-i} + \sum_{i=1}^{p} \beta_{4i} LIRS_{t-i} + \sum_{i=1}^{p} \beta_{5i} LBTA_{t-i} + \sum_{i=1}^{p} \beta_{6i} LNBB_{t-i} + \varepsilon_t. \quad (1)$$

$$LSAV_t = \propto + \sum_{i=1}^{p} \delta_{1i} LSAV_{t-i} + \sum_{i=1}^{p} \delta_{2i} LGDP_{t-i} + \sum_{i=1}^{p} \delta_{3i} LCPS_{t-i} + \sum_{i=1}^{p} \delta_{4i} LIRS_{t-i} + \sum_{i=1}^{p} \delta_{5i} LBTA_{t-i} + \sum_{i=1}^{p} \delta_{6i} LNBB_{t-i} + \varepsilon_t. \quad (2)$$

$$LCPS_t = \propto + \sum_{i=1}^{p} \lambda_{1i} LCPS_{t-i} + \sum_{i=1}^{p} \lambda_{2i} LGDP_{t-i} + \sum_{i=1}^{p} \lambda_{3i} LSAV_{t-i} + \sum_{i=1}^{p} \lambda_{4i} LIRS_{t-i} + \sum_{i=1}^{p} \lambda_{5i} LBTA_{t-i} + \sum_{i=1}^{p} \lambda_{6i} LNBB_{t-i} + \varepsilon_t. \quad (3)$$

$$LIRS_t = \propto + \sum_{i=1}^{p} \gamma_{1i} LIRS_{t-i} + \sum_{i=1}^{p} \gamma_{2i} LGDP_{t-i} + \sum_{i=1}^{p} \gamma_{3i} LSAV_{t-i} + \sum_{i=1}^{p} \gamma_{4i} LCPS_{t-i} + \sum_{i=1}^{p} \gamma_{5i} LBTA_{t-i} + \sum_{i=1}^{p} \gamma_{6i} LNBB_{t-i} + \varepsilon_t. \quad (4)$$

$$LBTA_t = \propto + \sum_{i=1}^{p} \phi_{1i} LBTA_{t-i} + \sum_{i=1}^{p} \phi_{2i} LGDP_{t-i} + \sum_{i=1}^{p} \phi_{3i} LSAV_{t-i} + \sum_{i=1}^{p} \phi_{4i} LCPS_{t-i} + \sum_{i=1}^{p} \phi_{5i} LIRS_{t-i} + \sum_{i=1}^{p} \phi_{6i} LNBB_{t-i} + \varepsilon_t. \quad (5)$$

$$LNBB_t = \propto + \sum_{i=1}^{p} \psi_{1i} LNBB_{t-i} + \sum_{i=1}^{p} \psi_{2i} LGDP_{t-i} + \sum_{i=1}^{p} \psi_{3i} LSAV_{t-i} + \sum_{i=1}^{p} \psi_{4i} LCPS_{t-i} + \sum_{i=1}^{p} \psi_{5i} LIRS_{t-i} + \sum_{i=1}^{p} \psi_{6i} LBTA_{t-i} + \varepsilon_t. \quad (6)$$

3. Empirical results

3.1. Unit root test. The Dickey-Fuller GLS (ERS) unit root test. The null hypothesis (H_0) for the Dickey-Fuller GLS (ERS) test is that the time-series (X_t) has unit root. To confirm that data are free from unit root, the test statistic must be greater than the test critical value in absolute term. Table 2 reports the summary of result of the test and the order of integration of the series.

Table 2. Unit root test results

Variable	Dickey-Fuller GLS (ERS)		Order of Integration
	Test statistic	Critical value	
LGDP	-4.131149c	-2.674290*	I (1)
LSAV	-3.261671c	-2.674290*	I (1)
LCPS	-3.993117c	-2.674290*	I (1)
LIRS	-1.650818c	-1.608175***	I (0)
LBTA	-3.692659c	-2.685718*	I (1)
LNBB	-3.957741c	-2.674290*	I (1)

Source: Authors' analysis.
Note:* and *** indicate 1% and 10% critical level respectively,c denotes only intercept included in test equation.

The results in Table 2 show that all the series are non-stationary series except IRS and this indicates they are the variables integrated in different order.

3.2. Test for Granger non-causality. Granger causality is a term expressing that history of a variable determines the present and future of another variable. The Toda-Yamomoto (1995) approach for testing for Granger non-causality test was adopted for this study due to the different order of integration of the series. The null hypotheses for testing for non-causality between two variables, say X and Y are stated as:

H_{o1}: X does not Granger cause Y.

H_{o2}: Y does not Granger cause X.

The optimality of the lag length for the VAR model is first determined using the lag length selection criteria. The criteria are sequential modified LR test statistic (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQ). Table 3 (below) presents the lag length selection criteria performed at 5% significance level.

Table 3. Lag length selection criteria

Lag	LR	FPE	AIC	SIC	HQ
0	NA	1.69e-07	1.433562	1.731119	1.503658
1	173.7886*	4.75e-11	-6.879620	-4.796720*	-6.388951
2	43.25379	2.58e-11*	-8.412868*	-4.544627	-7.501627*

Source: Authors' analysis.
Note: *indicates lag length selection by the criterion.

Table 3 shows that LR and SIC selected a lag order of 1 while FPE, AIC and HQ chose lag order 2. A lag length of 2 is chosen for the VAR model estimation and VAR residual normality and stability tests were performed on the VAR model to further confirm the appropriateness of the lag length of 2. The VAR residual normality test using cholesky of covariance (Lutkepohl) orthogonalization method ac-cepts the *null hypothesis* that the residuals in theVAR model are multivariate normal. The AR Roots Graph presented below shows that no root lies outside the circle, thus indicating that the model is stable and not mis-specified.
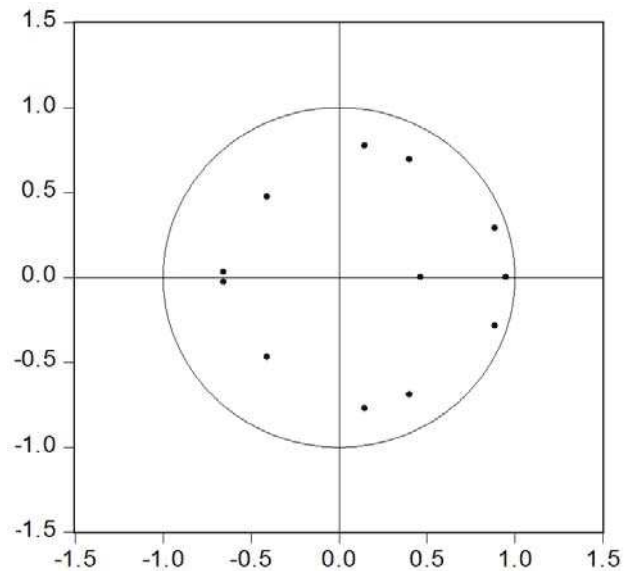

Fig. 1. AR Roots Graph

The Toda-Yamamoto (T-Y) approach uses a modified Wald test (MWALD) to test for non-causality. The MWALD test does not consider whether series are stationary or co-integrated; hence the T-Y is capable overcoming issues associated with ordinary Granger non-causality test. This approach requires that the maximum order of integration (d_{max}) to be known so as to determine the number of lags to add to the optimal lag length (p). Using the T-Y approach, the optimal lag length is $p + d_{max}$. $p = 2$ and $d_{max} = 1$, therefore, the optimal lag length for the T-Y VAR model is 3. Table 4 presents the results of the non-causality test.

Table 4. Toda-Yamamoto Granger non-causality test results

Dependent variable	Equation 1 LGDP	Equation 2 LSAV	Equation 3 LCPS	Equation 4 LIRS	Equation 5 LBTA	Equation 6 LNBB
LGDP	DV	(3.312053)	(2.081224)	(0.807837)	(0.975590)	(1.835456)
		[0.1909]	[0.3532]	[0.6677]	[0.6140]	[0.3994]
LSAV	(0.028183)	DV	(0.090188)	(1.331877)	(6.940324)	(2.951392)
	[0.9860]		[0.9559]	[0.5138]	[0.0311]**	[0.2286]
LCPS	(4.165565)	(1.313576)	DV	(1.168985)	(15.18645)	(13.25608)
	[0.1246]	[0.5185]		[0.5574]	[0.0005]*	[0.0013]*
LIRS	(2.165459)	(10.02092)	(7.516560)	DV	(0.319294)	(13.77372)
	[0.3387]	[0.0067]*	[0.0233]**		[0.8524]	[0.0010]*
LBTA	(0.847773)	(0.322076)	(2.616048)	(0.811080)	DV	(1.243689)
	[0.6545]	[0.8513]	[0.2704]	[0.6666]		[0.5370]
LNBB	(1.058078)	(5.483453)	(3.665203)	(1.512791)	(0.038914)	DV
	[0.5892]	[0.0645]***	[0.1600]	[0.4694]	[0.9807]	

Source: Authors' analysis.
Note: *,** and *** imply rejection of null hypothesis at 1%, 5% and 10% significance level respectively, MWALD statistic in ( ), *p*-value in [ ] and DV denotes Dependent variable.

From Table 4, it can be observed that there is no causality between GDP and each measure of financial intermediation because the *p*-value attached to their respective MWALD statistic does not fall below the acceptable significance levels of 1%(0.01), 5%(0.05) and 10%(0.1).

Conclusion

The issue of direction of causality between financial intermediation and economic growth generates diverse views. This study aimed to determine the existing causality between financial intermediation and economic growth, particularly in Nigeria where there is

no substantial evidence. It was found that there is no causality existing between each measure of financial intermediation and economic growth. This indicates that financial intermediation is not a determinant of economic growth in Nigeria. This may be due to the low efficiency and the shallow nature of the Nigerian banking sector. Based on this research outcome, government should design and implement reforms that would increase the banks' capacity to intermediate funds to the real sector as well as deepen the financial sector.

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