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An Analysis of Bank Intermediation and Economic Growth; The Nigeria Experience: Using Ardl Estimation

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Abstract

The study is an attempt to investigate an analysis of bank intermediation and economic growth; the Nigeria experience: using ARDL estimation for a quarterly period from 2009-2022. Bank intermediation variables for the study are Credit to Private Sector, Unstructured Supplementary Service Data, Automated Teller Machine, Point of Sales and Bank Deposits while economic performance is proxy by Total Investment. The ARDL error correction model shows that credit to private sector (CPS) has a positive but insignificant effect on total investment. Also, USSD transactions have a positive but insignificant impact on total investment. Automated teller machine (ATM) had positive but insignificant effect on total investment in Nigeria. Finally, Bank deposit (BDD) had a positive but insignificant impact on total investment. The study therefore concludes that bank intermediation has a significant impact on economic growth in Nigeria. The study therefore recommends that increase access to credit for the private sector by implementing policies and measures to stimulate economic growth and promote total investment.

Keywords: Economic Growth, Nigeria, Credit to Private Sector, ARDL Estimation, Financial Development

Introduction

It is largely held that financial development is a multifaceted notion and comprises a possibly crucial means for long run economic growth (Albert et al., 2021). The development of the banking sector facilitates economic activities to improve the growth of the economy in a country (Paudel, 2020). The distribution of loanable funds and the accumulation of capital through financial development promote economic development by facilitating investment opportunities and industrialization (Ahmad et al., 2020). The effectiveness of a country's level of financial development is a pointer to the financial services banks make available (Oyedokun et al., 2022).

The development of the banking sector promotes economic growth through efficient allocation of capital (Asante et al., 2023). The identification and marshalling of the needed financial resources through development of the financial sector provides resources to exploit such investment opportunities (Oyedokun et al., 2022). Financial market development is measured in terms of domestic credit to the private sector, the stock market capitalization to gross domestic products

turnover ratio, credit issued to private sector to liquid liabilities, value traded ratio (Odi & Oji, 2022).

A developed financial sector makes it unchallenging for enterprises to evade funding impediments, making it possible for an effective investment flow and accelerated expansion (Ahmad et al., 2021). The development of the financial sector has become essential in most economies' policy frameworks due to its capacity to mobilize savings and direct funds into productive ventures (Asante et al., 2023). The growth of the financial sector creates complexity involving the sum total of financial instruments (Mbona, 2022). The economy has not been affected positively regardless of the growth sustained in the financial sector (Tabash et al., 2022).

Finance is the keystone of sustainable economic growth (Azure, 2022), the cornerstone and survival of any economy (Ogunlokun & Liasu, 2021). Finance is a prerequisite used by all economic agents (Yeboah, 2020), and it contributes to incontestable development in an economy through adequate provision of efficient and equitable redistribution of capital (Menyelim et al., 2021). It is the allotment of diverse funds like credit, loans or invested money to those business enterprises that may utilize them most effectively (Talha et al., 2022). Economic growth is measured in terms of the level of productivity within the economy (Yeboah, 2020). Economic growth is an increase of income per person. It has three pillars: human capital, which fuels growth and boosts higher labor productivity; physical infrastructure, which is a prerequisite for inward investment and productive activities, and; good governance, which have necessary elements such as having efficient and transparent public sector institutions, stable financial system, and independent judicial system (Monsura & Villaruz, 2021).

Over the years, there has been significant increase in the number of intermediary institutions in the financial space. A number of financial markets (primary and secondary), banks (commercial, investment, discount houses, non-bank institutions, and development banks), financial services and instruments (cash and derivatives) have been developed to allow for intermediation. This is an important intervention for attracting foreign capital for economic activity. For example, a number of studies show that intermediation of the financial space leads to economic performance and development (Osei-Fosu et al., 2017). This has suggested that financial intermediation stimulate economic performance (also see, Onuh et al., 2022; Onwe & Adeleye, 2018).

on the contrarily others literatures suggested that financial intermediation does not spure economic growth This is because of the poor state of bank intermediation in the country is as a result of a lack of trust in the financial system, limited access to credit facilities and the high cost of borrowing (also see, Chinanuife et al., 2019; Aloefuna et al., 2020; Nwankwo & Agbo 2021).

This has sparked the reason to empirically investigating bank intermediation and economic performance by using ARDL estimation. Hence the study also will creates awareness to banks and financial institutions to promote the growth of the financial sector through efficiency and effectiveness of fund management and utilization to create stability in the financial system in order to sustain economic growth.

2.1 Theoretical Framework

The theory underpinning this study is the credit channel theory. The credit channel theory was propounded by Friedman and Schwarz in (1963). The theory primarily focuses on how changes in monetary policy influence the borrowing capacity of businesses and households, thereby impacting their spending and investment decisions. The main assumption of this theory is that a Central Bank's policy affects the amount of credit that banks issue to forms and consumers for purchases, which in turn affect the real economy. The implication is that monetary policy should control the money supply and banks' ability to channel credit. Monetary policy can have an impact on the supply of intermediated credit, which in most countries is predominantly provided by banks. The credit channel explains the role of banks in establishing the effect of monetary policy on the real and nominal sectors of an economy (Rashid et al., 2020).

Given the dominance of the banking sector, the bank lending sub-channel is better placed to surmount the problem of information asymmetry inherent in the financial markets. This therefore gives banks a critical role to play in the credit channel (Iddrisu & Alagidede, 2020). The bank lending channel operates on condition that bank deposits cannot be perfectly substituted for other avenues of raising funds. In this regard, when a central bank embarks on an expansionary monetary policy, loanable funds increases or bank loan increases since bank deposits and reserves become more available. As the amount of bank loans increase, and since firms and consumers depend on bank loans, consumer and firm investment spending increases (Mishkin, 1996).

Schematically, M↑→ bank deposits↑ → bank loans↑ → I↑→Y↑.

The key feature of the bank lending channel is that changes in monetary policy would significantly impact businesses that depend more on bank loans as compared to businesses that can raise finance from the capital markets and can therefore protect their portfolio when monetary policy changes. Similarly, the loan portfolio of banks that is unable to raise funds for lending apart from deposits would be significantly impacted as compared to banks that are able to raise funds from other sources (Mishkin, 1996).

2.2 Empirical Review

Ogaga and Robert, (2024) carried out a study to examined the effect of public debt on investments (private and public) in Nigeria for the long-run period of 1981 to 2022. The study examined a number of significant public debt variables that are difficult to neglect when trying to understudy the effects of public debt. The variable is government domestic debt (DMD). The control variables, which are GDP growth rate, total government revenues, total government expenditures, inflation and private sector credits in Nigeria, are coded GDPG, GVR, GVX, INF and CPS. The findings of the study showed that government domestic debt boosted private investment. The study concludes that government domestic debt boosted private investment. In all, private investments have benefitted more from domestic public debt. This means that domestic public debt crowd in more of private investments, all things being equal. The study recommended that the most concern drawn from the positive significance of government domestic debt is that its increases impede

private sector credits. As this is, it means that the complementary role of the monetary policy has not been seen. The CBN, in the face of increasing domestic public debt, should enhance policy directions to also increase private sector credits.

Chinanuife et al. (2019) conducted a study on empirical determination of the causal link between private sector credit and manufacturing output in Nigeria. The study utilized quarterly time series data from 1981 to 2015. The study adopted Toda and Yamamoto approach to granger causality in determining the existence of long run association between private sector access to credit and manufacturing output. The result of the Toda Yamamoto Granger causality test showed that there exists a bi-directional causality between private sector access to credit and manufacturing output in Nigeria. The findings of the study revealed that the Nigerian economy has been skewed towards a mono-economy with much reliance on the oil sector. However, with the fall in global oil price, there is now a shift of interest to a more promising sector capable of liberating the economy. The study concludes that the result of this test confirmed bi-directional causality between manufacturing output and private sector credit accessibility. The study recommended that in order to boost the manufacturing productivity in Nigeria, credit should be made available to the private sector at lower cost and effort should be made by government to establish a monitoring framework that will guide the activities of the manufacturing sector to ensure effective utilization of the available credit.

Muthoni et al. (2020) conducted a study on credit management practices and loan performance: empirical evidence from commercial banks in Kenya. The study used explanatory research design and the research philosophy adopted was positivism. The target population was 44 commercial banks in Kenya and a census approach was used. Both primary and secondary data were used. Primary data was collected through structured questionnaires and related to credit management practices while secondary data was obtained from review of existing bank loan records in relation to loan amount advanced and non-performing loans for a period of four years from 2015-2018. The data collected was analyzed using both descriptive and inferential statistics with the help of SPSS version 22. The findings of the study found out that debt collection policy and lending policy had a positive significant effect on loan performance of commercial banks in Kenya. However, client appraisal had no significant effect on loan performance of commercial banks in Kenya. Therefore, the study concluded that commercial banks' loan performance could be largely attributed to the efficiency of the credit management practices put in place at the institutions. The study recommended that commercial banks to regularly evaluate and update practices relating to debt collection policy, client appraisal and lending policy that are capable of ensuring that credit risks are identified and recorded from departmental level to the institution at large.

3 Model Specification

The model follows the Credit Channel Theory proposed by Friedman and Schwarz in (1963) on the channel through which financial intermediation affect growth process. The functional model is specify as follows

$$TINV_t = f(CPS_t, USSD_t, ATM, POS_t, BDD_t) \quad (1)$$

Transforming the functional equation (1) to a mathematical model is as follows:

$$TINV_t = \alpha_0 + \alpha_1 CPS_t + \alpha_2 USSD_t + \alpha_3 ATM_t + \alpha_4 POS_t + \alpha_5 BDD_t \quad (3)$$

Transforming the functional equation (2) to an Ordinary Least Squares (OLS) linear regression equation as follows:

$$TINV_t = \alpha_0 + \alpha_1 CPS_t + \alpha_2 USSD_t + \alpha_3 ATM_t + \alpha_4 POS_t + \alpha_5 BDD_t + \mu_t \quad (3)$$

The corresponding econometric model is specified after taking the logarithmic transformation of the variables as follows;

$$\log TINV_t = \alpha_0 + \alpha_1 logCPS_t + \alpha_2 logUSSD_t + \alpha_3 logATM_t + \alpha_4 logPOS_t + \alpha_5 logBDD_t + \mu_t \quad (4)$$

Where:

TINV = Total Investment
CPS = Credit to Private Sector
USSD = Unstructured Supplementary Service Data
ATM = Automated Teller Machine
POS = Point of Sales
BDD = Bank Deposits
u = Error Terms

Apriori Expectations $\beta_1, \beta_2, \beta_3\ \beta_4 and\ \beta_5 > 0$. $\alpha_1, \alpha_2, \alpha_3, \alpha_4 and\ \alpha_5 > 0$

4 Results

Table 1 Descriptive Nature of the Variables

	TINV	ATM	POS	USSD	CPS	BDD
Mean	5944.236	1.47E+08	54584425	60352368	7218.507	7219.272
Median	3605.600	1.24E+08	10765892	10578284	4282.780	5420.397
Std. Dev.	4745.120	87440312	71738600	92606419	7403.283	3540.842
Skewness	1.332537	0.235933	1.056276	1.267066	1.597292	0.514641
Kurtosis	3.568063	2.031728	2.645927	2.863375	4.860786	1.937225
Jarque-Bera	17.01635	2.658811	10.51473	14.75945	31.32225	5.016260
Probability	0.000202	0.264635	0.005209	0.000624	0.000000	0.081420
Observations	56	56	56	56	56	56

Source: Author's Computation 2024

Table 2 Unit Root Test using Augmented Dickey-Fuller (ADF) Test

Variables	*Augmented Dickey-Fuller Test*		Lag	Order of int.	Remark
	@ level	@ 1st Diff			
Log(RGDP)	-2.103864	-8.098487	Maxlag=9	I (1)	Stationary
Log(TINV)	-1.354450	-7.133945	Maxlag=9	I (1)	Stationary
Log(CPS)	-5.957407	-	Maxlag=9	I (0)	Stationary
Log(USSD)	-3.507800	-	Maxlag=9	I (0)	Stationary
Log(ATM)	-2.568887	-7.475908	Maxlag=9	I (1)	Stationary
Log(POS)	-2.453422	-9.539532	Maxlag=9	I (1)	Stationary
Log(BDD)	-3.400443	-8.815275	Maxlag=9	I (1)	Stationary
	1% level	-4.133838			
Test of CV	5% level	-3.493692			
	10% level	-3.175693			

Source: Author's own computation 2024

Table 3: ARDL Bounds Test result for cointegration

F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	3.793694	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Author's computation 2024

Table 4 ARDL-ECM Test

Dependent Variable: DLOG(TINV)

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(TINV(-1))	-0.304310	0.108782	-2.797421	0.0098
DLOG(TINV(-2))	-0.343310	0.110632	-3.103175	0.0047
DLOG(CPS)	0.726486	0.082577	8.797709	0.0000
DLOG(CPS(-1))	-0.115950	0.076472	-1.516245	0.1420
DLOG(CPS(-2))	-0.041081	0.072096	-0.569809	0.5739
DLOG(USSD)	-0.111084	0.066478	-1.670972	0.1072
DLOG(USSD(-1))	-0.044805	0.059165	-0.757283	0.4560
DLOG(USSD(-2))	0.075176	0.061617	1.220068	0.2338
DLOG(ATM)	0.053342	0.030716	1.736637	0.0948
DLOG(ATM(-1))	-0.073598	0.028176	-2.612104	0.0150
DLOG(ATM(-2))	-0.000311	0.033146	-0.009387	0.9926
DLOG(POS)	-0.140960	0.256129	-0.550348	0.5870
DLOG(POS(-1))	-0.097897	0.256460	-0.381724	0.7059

DLOG(POS(-2))	-0.271385	0.268242	-1.011717	0.3214
DLOG(BDD)	-1.064184	0.612962	-1.736134	0.0949
DLOG(BDD(-1))	1.360639	0.742650	1.832141	0.0789
DLOG(BDD(-2))	0.236239	0.589706	0.400604	0.6921
CointEq(-1)*	-0.107130	0.024724	-4.333013	0.0002

R-squared	0.829433	Mean dependent var	0.135774
Adjusted R-squared	0.735896	S.D. dependent var	0.355773
S.E. of regression	0.182836	Akaike info criterion	-0.283599
Sum squared resid	1.036294	Schwarz criterion	0.411356
Log likelihood	24.94817	Hannan-Quinn criter.	-0.019934
Durbin-Watson stat	2.047346		

* p-value incompatible with t-Bounds distribution.

Source: *Author's own computation*

Diagnostic Tests

1 Normality Test (Jaque-Bera Test)

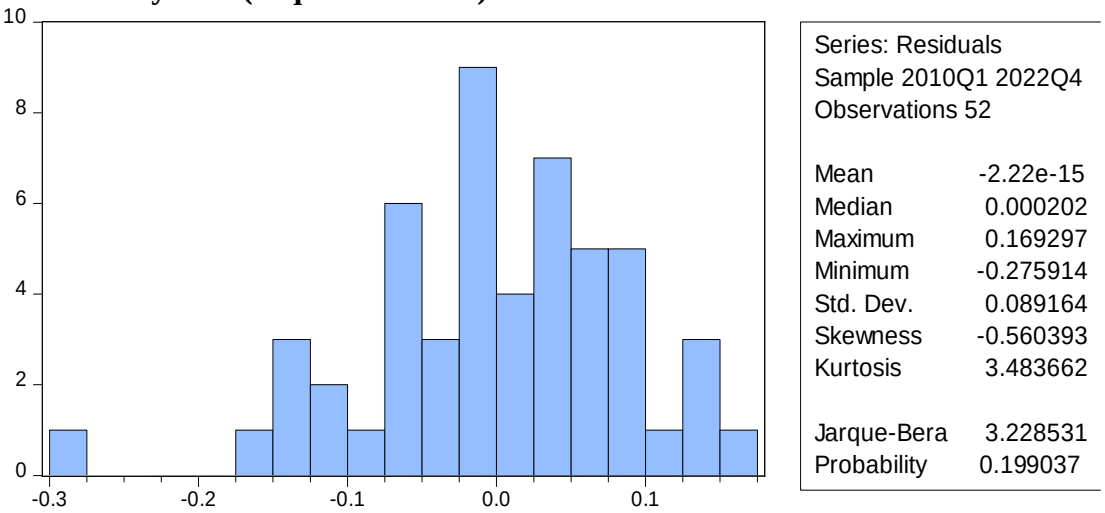

Figure 1 Normality Test

Table 5 Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.854440	Prob. F(2,36)	0.0836
Obs*R-squared	11.04516	Prob. Chi-Square(2)	0.3040

Source: *Author's own computation*

Table 6 Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.536101	Prob. F(13,38)	0.8869
Obs*R-squared	8.058919	Prob. Chi-Square(13)	0.8397

Scaled explained SS	5.344411	Prob. Chi-Square(13)	0.9668

Source: *Author's own computation*

Table 7 Ramsey Reset Test

	Value	df	Probability
t-statistic	1.339248	37	0.1887
F-statistic	1.793586	(1, 37)	0.1887
F-test summary:			
	Sum of Sq.	df	Mean Squares
Test SSR	0.018746	1	0.018746
Restricted SSR	0.405464	38	0.010670
Unrestricted SSR	0.386718	37	0.010452

Source: Author's own computation

5 ARDL model Stability Test (CUSUM AND CUSUM OF SQUARE)

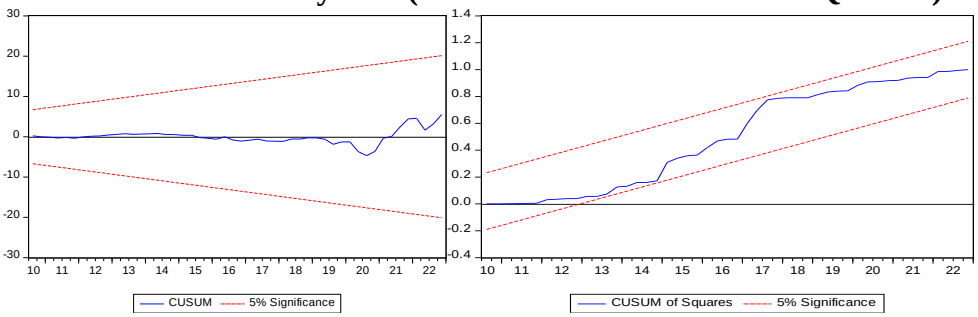

Figure 2: CUSUM and Cumulative Sum square for the Model 2

4.1 Discussion of Results

Table 1 shows the mean, value of total investment (TINV) for the period under review was 5944.236 billion naira. The skewness statistic value of 1.332537 for TINV indicates that the series is also positively skewed. This also means that the series is tilted towards the right, while the Jargue-Bera statistic value of 17.01635 and its corresponding probability value of 0.000202 shows that the series (TINV) is not normally distributed. This assertion is made because the probability value of 0.000202 is less than 0.05, thus, the hypothesis of the TINV not being normally distributed is accepted. Therefore, we conclude that total investment is not normally distributed.

The above results revealed that the following variables both dependent and independent variables (RGDP, TINV ATM, POS and BDD) were stationary at first difference that is integrated of order one that is I (1), while CPS and USSD were stationary at level that is I (0). The mixed order of integration (at level and first difference) suggests an underlying long run relationship; hence, the use of the autoregressive distributed lag (ARDL) approach is justified.

Table 3 revealed the long-run properties of the variables in the model specified. The result showed that the variable exhibits joint convergence in the long-run. In other words, there is a long-run relationship among the variables in the first model. This is because the ARDL F-statistic value of 7.123128is greater than the 5% upper bound (I1 Bound) value of 3.38 and lower bound value of 2.39. Thus, the null hypothesis of no level relationship or no long-run relationship is rejected and its alternative hypothesis is accepted. This is a sufficient condition to estimate the conventional ARDL error correction model (ECM). The result of the ARDL ECM is presented in Table 4.11 below. However, it is only wise to select the best ARDL model in the midst of various competing model. To achieve this, the Akaike information criteria were used to select the best ARDL model from the top twenty (20) models.

The short run relationship between the explanatory variables (CPS, USSD, ATM, POS and BDD) and the dependent variable (TINV) is explained by estimating the ARDL Error Correction Model. Table 4 explained the short run effects of changes in the explanatory variables on total investment in the second model. The model exhibits a high explanatory ability of 0.829433, implying that 82 percent of change in total investment is explained by credit to private sector (CPS), transaction of (USSD), automated teller machine (ATM), point of sales (POS) and bank deposit (BDD) as stated in the model two. The error correction factor (ECM) integrates the short run dynamics with that of the long run equilibrium. The error correction term ECM_{t-1} indicates the speed of adjustment from a short run deviation to the long run equilibrium. The coefficient of the ECM_{t-1} is negative (-0.107130) which is moderate and is statistically significant, supporting the ARDL bounds test result of cointegration. It indicates that about 11 percent of the previous year's deviation from the long run equilibrium will be restored within a year. Furthermore, the result revealed that the Durbin-Watson (DW)-statistic of 2.047346 indicates that there is no problem of serial correlation which conforms to the classical assumption of ARDL.

Figure 1 shows that the residuals of the estimated model two in this study are not normally distributed. This is because the Jarque-Bera statistic value of 3.228531 and its corresponding probability value of 0.199037 are statistically insignificant at 5% level of significance. Thus, the hypothesis of the residuals not being normally distributed is rejected. Therefore, we conclude that the variables in model two are normally distributed.

The result in table 5 shows that the model estimated does not have the problem of serial or auto-correlation as observed R-squared (Obs*R-squared) value of 11.04516 and its corresponding probability Chi-Squared (Prob. Chi-Square(2) of 0.3040are not statistically significant at 0.05 level. Thus, the null hypothesis of the residuals of the model being serially correlated is rejected therefore we concluded that there is no presence of serial correlation. This also makes the estimates of the model valid for making predictions and also for sound policy options.

The result in table 6 shows that the model estimated has the presence of homoscedasticity (constant variance of the error term) as observed R-squared (Obs*R-squared) value of 8.058919and its corresponding probability Chi-Squared (Prob. Chi-Square(2)) of 0.8397are not statistically

significant at 0.05 level. Thus, the null hypothesis of the residuals of no constant variance is rejected and its alternate hypothesis of constant variance is accepted.

From the above table 7 the Ramsey Reset Test revealed that the model is stable over time and it good for forecasting and policy formulation as the coefficient of the t-statistics and F-statistics and their probability value is greater than 5 percent level of significance. Therefore, we concluded that model one is stable.

The CUSUM and CUSUM of Squared graph expressed in Figure 2 revealed that the residuals of the estimated ARDL model one is stable, as the cumulative sum of squares plot lie in between the upper- and lower-5 percent significance bounds.

5 Conclusion and Recommendation

The study examined the impact of bank intermediation and economic performance in Nigeria. In the study, regression analysis was developed and tested at the 0.05 level of significance were used to respond to eight research objectives and hypotheses. A review of relevant literature was conducted. The study employed the Auto-Regressive Distributed Lag (ARDL) approach and diagnostic test on key variables to address the objectives of the study. Secondary quarterly data spanning the period of 2009Q1 to 2022Q4 was compiled from Central Bank of Nigeria Statistical Bulletin. From the empirical results we discovered that both bank intermediation dimensions are key determinants of total investment in Nigeria which is in conformity with some empirical literatures. The study therefore concludes that bank intermediation has a significant impact on economic growth in Nigeria. The study therefore recommends that increase access to credit for the private sector by implementing policies and measures to stimulate economic growth and promote total investment.

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