On the Efficiency of Financial Intermediation in Nigeria's Growth Performance: A Two Stage Least Square Approach

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Abstract

We test the efficiency of financial intermediation in Nigeria's economic growth performance using the Two Stage Least Square (TSLS) technique of regression analysis. Relying on a tripartite simultaneous equation regression model, the results show that financial intermediation process in Nigeria has been partly effective but sub-optimal. Evidence from the structural parameter estimates indicate that low savings coupled with poor credit support to the real sector attenuated the growth effect of financial intermediation in Nigeria. This is attributable to high interest spread, low per capita income, poor banking habit and high inflation, among others. It is recommended that the devices for improving financial intermediation and Nigeria's growth performance are to set a positive and moderate interest rate, increase the volume of deposit, increase bank branches, increase income per capita and continue with liberalization.

Keywords: Financial intermediation, economic growth, TSLS, Nigeria.

1. Introduction

Economic growth is the process of a sustained increase in income over a long period of time. However growth and development do not take place in a vacuum. The quantum and direction of economic growth is influenced by financial intermediation. The recognition of a positive and significant relationship between financial intermediation and economic growth dates back at least to the theory of economic development by Schumpeter (1934).

Notably, one of the commonest views on the link between financial intermediation and economic growth focuses on the key functions of financial systems in the saving – investment and growth nexus. These include acting as an effective conduit for: (a) channeling funds from surplus units to deficit units by mobilizing resources and ensuring an efficient transmission of funds into real productive capital; (b) transforming maturity of portfolio of savers and investors while providing sufficient liquidity to the system as the need arises and (c) reducing risks from the system through diversification and techniques of risk sharing and pooling.

As we see in Adam (1998:26), the economic significance of financial intermediation results from the special role it plays in making contractual arrangement that link borrowers and lenders more efficiently than if these agents had to trade directly. In a developing country like Nigeria, the main objective of any financial reform is to enhance financial deepening through intermediation. In particular, the banking system enhances financial intermediation and thus promotes economic growth. The original role of banks was to transform short-maturity liabilities into long-maturity assets (Cechetti, 1999). But today, financial intermediation revolves around channeling the savings of households into the investment of firms. Because the financial system ought to efficiently mobilize and allocate societal savings, it is expected to also promote growth by raising the "financialized" savings rate, channeling savings into investment, enhancing the efficiency of capital accumulation and eliminating costly disruptions to the investment and productivity process.

Undoubtedly, the efficiency of financial intermediation in a developing economy like Nigeria possess several economic and institutional peculiarities as discussed in detail by King and Levine (1992), Oyejide (1994) and Yaron et al (1998). First, there is the problem of inadequate mobilization of fund as the surplus spending units (SSUs) may be unable to save sufficient fund for use by the deficit spending units (DSUs). Second, there is the problem of high interest rate spread which implies an anomalous divergence between deposit and lending rates. Savings deposit rate has been persistently low, indeed, as low as 5% on the average. The loan or lending rate has remained as high as 26% or more in many cases. Low deposit rate kills incentive to save and result in channeling of fund into unproductive sectors or, worse still, keeping of fund as idle balance. The result is that little or no fund will be available for productive investment. In the same vein, high lending rate create disincentive for investment and hence dampens economic growth.

Given these challenges, a thorough appraisal of the efficiency of financial intermediation process in the context of Nigeria's growth performance is needful. We set out by investigating the impact of interest rate, savings, loans and other financial intermediation variables on Nigeria's growth performance.

From the standpoint of theoretical economics, modern economic theory provides certain intellectual framework for examining the relationship between financial intermediation and economic growth. These theories include: (a) the financial repression theory due to McKinnon (1973) and Shaw (1973); (b) the structural hypothesis by Gerschenkron (1962) and Schumpeter (1934) and (c) the supply-leading and demand-following hypothesis which were prescribed by Robinson (1952:86) and popularized by Hugh (1966). The McKinnon-Shaw hypothesis contend that financial liberalization in the form of appropriate rate of return on real cash balances is the vehicle for promoting economic growth. Thus, their standard recommendation is that government controls should be dismantled so that the true scarcity price of capital can allocate funds to users thereby improving savings mobilization, promoting efficient investment and accelerating economic growth. This has stimulated a flourishing body of empirical work including those that are based on the endogenous growth models (King and Levine 1992). On the other hand, the structural hypothesis emphasizes the stage of development of the economy as the major determinant of the role of financial intermediaries. Notably, the financial repression and the structural theorists have a common underlying thread; that is, the efficient utilization of resources enhances economic growth. This can be achieved via a highly liberated, organized and developed financial system. In the case of supply-leading finance, a leading positive role is assigned to the financial sector such that financial institutions have to be created before demand for its facilities really becomes evidence. In this regard, the financial system is seen as playing a dynamic role in industrialization and overall growth and development of the economy. According to Hugh (1966), demand-following finance refers to the type of finance that is somehow accommodating or reacting passively to the growth of the economy. The late 18^{th} and 19^{th} century England is regarded as a historical example of a system of demand-following finance (Meier 1976). Again, the structural and supply/demand-following theorists have a common underlying feature, namely, that they assign more prominent role to financial intermediaries in developing countries than developed ones.

A few recent studies have investigated the empirical relationship between financial intermediation and economic growth in Nigeria. Most of them use the ordinary least square (OLS) technique of regression analysis. A common trend in literature is to examine the issue for either: (a) a number of countries using cross section or panel data approach (Roubini and Sala-i-Martin 1992, Demetriades and Hussen 1996, Luintel and Khan 1999 and Jung 1986) or (b) a particular country using time series approach. See Odedekun (1989) for Nigeria, Lyons and Murinde (1994) for Ghana, Murinde and Eng (1994) for Singapore, Agung and Ford (1993) for Indonesia and Wood (1993) for Barbados. Generally, the studies on cross-country analysis find that country differences in financial development explain a significant portion of the cross country differences in average growth. McKinnon (1973) and Shaw (1973) examine the benefits of an efficient and well-functioning financial system and find that investors in economies with underdeveloped financial markets have limited possibilities of receiving external finance while self-finance is most prevalent in developed ones. The crux of McKinnon-Shaw findings is that financial liberalization improves savings mobilization, promotes efficient investments and eventually accelerates economic growth. Ahmed and Ansari (1995) investigate the "McKinnon-Shaw" hypothesis for Bangladesh and found some, though weak, support for their hypothesis. Coming back to Nigeria, Olumola (1997) uses OLS to examine the empirical relationship between financial deepening and real private sector investment in Nigeria for the period 1960-1996. His finding provides evidence of a positive and significant relationship between the two variables. Thus, he concludes that improved financial intermediation would help bridge the gap between domestic saving and investment in Nigeria. Similar conclusions have been reached by Obadan and Odusola (1999). Ajakaiye and Odusola (1995) employ OLS to examine the empirical determinants of financial savings in Nigeria for the period 1980-1993. Their findings show a positive relationship between savings and real deposit rate during the period of financial regulation and a negative one during the deregulated era. Essien and Onwioduokit (1998) examine the effects of financial liberalization on savings mobilization in Nigeria for 1987-1993 using quarterly data and error correction model. Their findings provide evidence for absence of long-run relationship between savings and its determinants.

A consideration of the various contemporary studies on the relationship between financial intermediation and economic growth in Nigeria indicates that many of them suffer from weak methodological approach. First, the single equation models that are often used by these studies can scarcely capture the true relationship between the indicators of financial intermediation and economic growth due to the existence of simultaneity bias in the relationship. If simultaneity bias exists, the least square estimators will be inconsistent and biased (Pindyck and Rubinfeld 1998: 338-339 and Gujarati 2004). Second, a two-way causation has been identified between financial development and real sector growth (Oyejide 1994; khan and Senhaji 2000; Adam 1998). Given this bi-directional relation, it is important to think of many channels through which both variables affects each order. For instance, commercial banks' credit which enters as a regressor (argument) in the growth equation may also appears as an endogenous (dependent) variable in another equation of the same model. If this happens, the error term of the reduced-form equation of this endogenous variable will correlate with the error term of the structural model thereby introducing 'simultaneity bias' into the model (Koutsoyiannis 1977:384). This study, thus, brings additional value to literature in this area by employing the Two Stage Least Squares (TSLS) technique of regression analysis that correct for the existence of simultaneous equation biases in the model. The TSLS method is appropriate because the interplay between financial intermediation variables and economic growth arises both exogenously and endogenously. Furthermore, the interaction between banks' inputs (deposits) and outputs (loans) requires a model that is solved simultaneously because financial intermediation seeks to achieve equilibrium in input and output relationships.

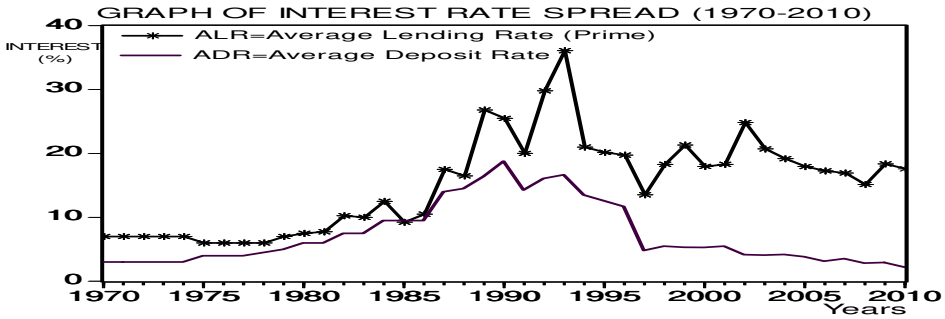
The balance of the paper is structured as follows: Section 2 provides an overview of several key indicators of financial intermediation in Nigeria, with a view to assessing their performances. Section 3 describes the data set and explains the methodology used in the empirical tests. Section 4 contains the preliminary results of data and model diagnosis as well as the main results. The paper is concluded in Section 5 with policy-oriented suggestions.

2. Descriptive Analysis

2.1. The Performance of Key Financial Intermediation Indicators

As we see in Adam (1998), interest rate is a major component of the Conference Board's Index of leading Economic Indicators. A high level of interest rate spread is generally indicative of inefficiency, excessive risk taking or lack of competition within the banking system (Enendu 2003:41). But it is also true that high interest spread can contribute to high bank earning which if channeled into capital base of the system may promote safety and stability. Figure 1 indicate that starting from about 1995, the economy witnessed increasing divergence between the lending (prime) rate and average deposit rate which is a pointer to poor competition and rising inefficiency within the banking system.

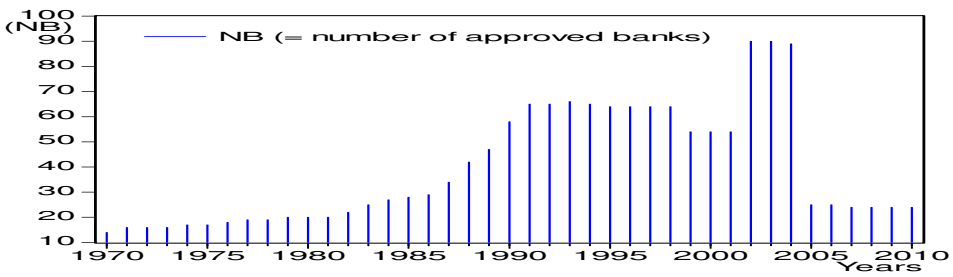
Figure 1: Interest Rate Spread in History (1970-2010)



Source: Study. Notes: Interest rate spread is defined as ALR less ADR. Figure 1 is based on data sourced from literature (see table 2 in the appendix 1)

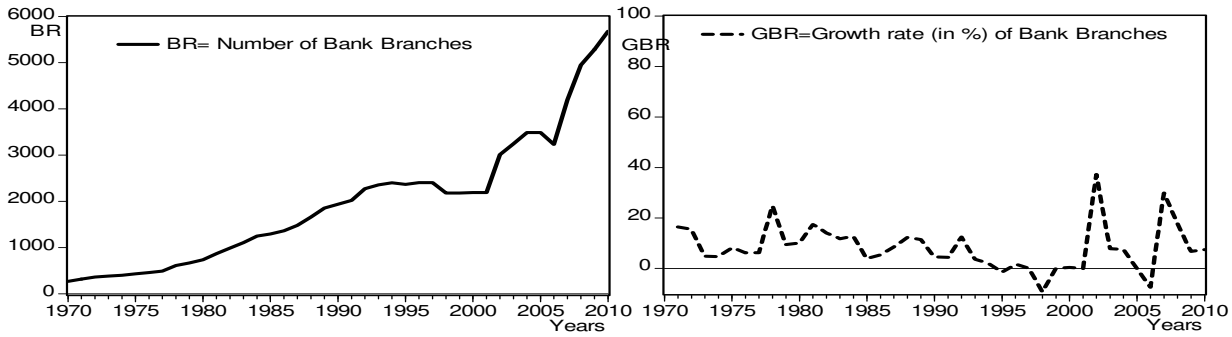
As regards the number and growth rate of financial intermediaries, the period of deregulation-starting from 1986-in which government assigned an increasing role to market forces witnessed increasing number of financial institutions in the system. For instance, between 1986 and 1990, about 65 new commercial and merchant banks were established (table 2). The former regulatory control may have inhibited growth, competition and efficiency in the system. The resulting competition brought about by the reform while encouraging financial intermediation in the banking industry had also tended to raise risk and sharp practices and hence led to the banking crisis of the 1990s (Afolabi and Mamman, 1996). Between 2002 and 2004, the number of approved banks in the country took a bullish trend-reaching a zenith of about 90 banks in 2003 before it plummeted (figure 2). The rising number of approved banks was also accompanied by impressive growth in number of bank branches (figure 3). However, following the 2005 bank consolidation reform which reduced the number of approved banks to 25, the impressive growth soon gave way to a bearish trend in the number of bank branches. This is partly responsible for the downward trend (starting from about the mid-2000s) in the growth rate of bank branches presented in figured 3.

Figure 2: Number of Approved Banks in History



Source: Study. Figure 2 is based on data sourced from literature (see table 2 in appendix 1).

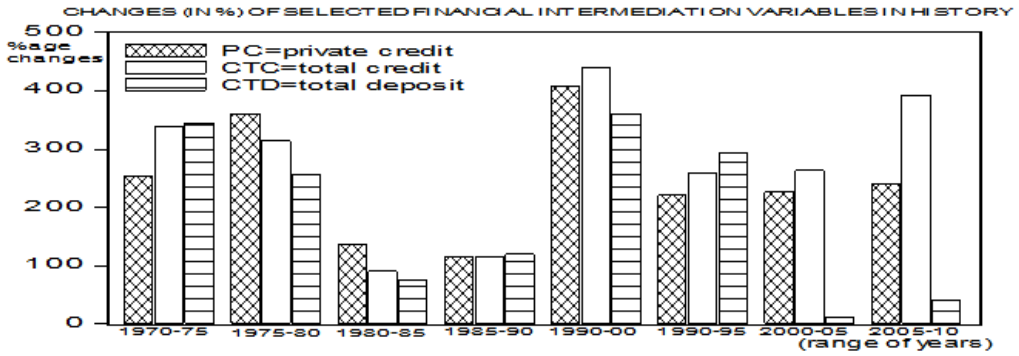
Figure 3: Number of Bank Branches and Growth Rate (%) of Bank Branches



Source: Study. Figure 3 is based on data in table 2.

Figure 4 presents variations (in percentages) of selected key indicators of financial intermediation, namely-total bank deposit, credit to the private sector and total credit-over some historical range of years. The general observation is that financial intermediation has been more variegated during the period of deregulation than the era of repression. Financial intermediation was at its lowest ebb in history for over a period ten years, 1980-1990. This was the era of windfall from the oil sector during which other sectors of the economy were relegated. Overall, figure 4 indicate that despite the modest changes in financial intermediation activities in the post-regulation era, financial intermediation in terms of deposit mobilization (a major indicator of banking habit) have been sub-optimal. The variations in level of total deposit have declined continuously since the early 1990s.

Figure 4: Variation (%) of key indicators of financial intermediation



Source: study. Figure 4 is based on data sourced from literature (see table 3).

3. Methodology and Data

3.1. Method of Analysis

The methodology used in this study follows Adam (1998) who is among the first to employ the TSLS technique of regression analysis to assess the efficiency of financial intermediation on growth performance. As earlier noted, we specify a simultaneous equation system to model the bi-directional relationships between economic growth and the indicators of financial intermediation. To fix the appropriateness of the TSLS technique, we identify our model using the necessary (order condition) and sufficient (rank condition) tests for identification (Madalla 2007:351 and Gujarati, 2004:744,750). This is important because a consideration of identification problem comes before consideration of estimation problem (Pindyck and Rubinfeld 1991). Again, to fix the appropriateness and reliability of the instrumental variable, we conduct the instrumental relevance test. Following Coviello (2004), this requires that variables that must serve as instruments be correlated with the endogenous variables but uncorrelated with the error term. Since standard inference procedures do not apply to regression that

contains non stationary regressors/regressands, we employ the ADF test for a unit roots on the time series. Finally, to determine whether or not a long run equilibrium relationship exists between the variables, we test for a co-integrating relation by using the Augmented Engle Granger (AEG) test.

3.2. The Model

Following McKinnon (1993), Fry (1991), King and Levine (1992), Adam (1998), and Levine et al (2000), we specify a tripartite simultaneous equation model as follows:

$$BDY = f(ADR, EXR, PCI, M2RGDP) \quad (1)$$

$$BCY = f(INV, GDP, BDY, ALR) \quad (2)$$

$$GDP = f(PCY, PUY, INV, BCY) \quad (3)$$

Where: DBY = total banks' deposit to real GDP (1984 factor cost) ratio; ADR = banks' average deposit rate (savings-deposit rate); EXR = exchange rate (official); PCI = per capita income; M2RGDP = monetization variable [defined as the ratio of broad money supply (M2) to GDP]; BCY = total banks' credit to GDP ratio; INV = investment (defined as the ratio of gross capital formation to GDP); GDPG= growth rate of real GDP; ALR = banks' average lending rate; PCY = ratio of banks' credit (to the private sector) to GDP; PUY = ratio of banks' credit (to the public sector) to GDP; Ui = white noise error term; Y=GDP.

To correct for possible non-linearity, we examine the variables in their log form (Gujarati 2004:564). Given this background, the structural specification of the model is as follows:

$$LBDY = \alpha_{11} + \beta_{11}LADR - \beta_{12}LEXR + \beta_{13}LPCI + \beta_{14}LM2RGDP + Ui \quad (4)$$

$$LBCY = \alpha_{21} + \beta_{21}LINV + \beta_{22}GDPG + \beta_{23}LBDY - \beta_{24}LALR + Ui \quad (5)$$

$$GDPG = \alpha_{31} + \beta_{31}LPCY + \beta_{32}LPUY + \beta_{33}LINV + \beta_{34}LBCY + Ui \quad (6)$$

Notes: α_{11}, α_{21} and α_{31} are the intercept terms and the βij (i=1 to 3; j = 1 to 4) are the "structural" coefficients; the preface "L" stand for natural log of the variables; the variables GDP, BCY and BDY are endogenous to the model in that their values are determined within the system of equations (Pindyck and Rubinfeld 1991). On the other hand the variables ADR, EXR, PCI, M2RGDP, INV, ALR, PCY and PUY are all predetermined variables in that their values are known in the current period, hence they are non-stochastic; these predetermined variables serve as the instruments. We say "structural" because the above systems of equations or model from which they are derived describe the structure of the economic system (Gujarati 2004:737 and Madalla 2007:346).

3.2.1. *A Priori* Expectation

The structural coefficients are expected to assume the signs presented in table 3.1 as follows:

Table 3.1: Theoretical *a priori* expectations about the signs of the coefficients of the variables.

Eq.4, Variables, coefficient-sign.		Eq. 5, Variables, coefficient-sign.		Eq. 6, Variables, sign.	
LADR:	$\beta 11>0$	LINV:	$\beta 21>0$	LPCY:	$\beta 31>0$
LEXR:	$\beta 12<0$	GDPG:	$\beta 22>0$	PUY:	$\beta 32>0$
LPCI:	$\beta 13>0$	LBDY:	$\beta 23>0$	LINV:	$\beta 33>0$
LM2RGDP:	$\beta 14>0$	LALR:	$\beta 24<0$	LBDY:	$\beta 34>0$

3.2.2. Model Diagnostic Tests

(a) Order and Rank Identification Conditions

To ensure that the coefficient we estimate truly belong to the variables we are interested in, we identify the model using the Order (necessary) and Rank (sufficient) Conditions (Gujarati 2004:748). To fix this idea, we restate (transform) the structural model as follows:

$$LBDY - \alpha_{11} - \beta_{11}LADR + \beta_{12}LEXR - \beta_{13}LPCI - \beta_{14}LM2RGDP - Ui = 0 \quad (7)$$

$$LBCY - \alpha_{21} - \beta_{21}LINV - \beta_{22}GDPG - \beta_{23}LBDY + \beta_{24}LALR - Ui = 0 \quad (8)$$

$$GDP - \alpha_{31} - \beta_{31}LPCY - \beta_{32}LPUY - \beta_{33}LINV - \beta_{34}LBCY - Ui = 0 \quad (9)$$

This transformed version of the structural model enables us to extract the matrices of structural coefficients and hence the matrices of excluded variables (for each equation of the model) from which rank identifications are secured. In a model of M simultaneous equations, in order for an equation to be identified (by order condition) the following conditions must hold: K-k1 ≥ m1-1. This provides us with a necessary but not sufficient identification condition. For the rank condition to hold, it must be possible to obtain at least one non-singular matrix from the coefficients of excluded variables in the equation (Gudjarati 2004). This is done by checking whether or not the determinant of the matrices of the excluded variables (from each of the equations) is non-singular. If at least one non-singular matrix of order M-1*M-1 can be obtained from the matrix of excluded variables in an equation, then that equation is said to be sufficiently identified. The results of the order and rank identifications and their implication on our model are presented in section 4.

Notes: K = total number of predetermined variables in the model (system of equations); k_1 = number of predetermined variable that appears in a given equation in the model; M = total number of endogenous variables in the model; m_1 = number of endogenous variables in a given equation in the model.

(b) Instrumental Relevance Test

As earlier noted, if simultaneity bias (resulting from the correlation of endogenous regressor with the structural innovations) exists in the simultaneous equation model, the parameter estimates will be biased and inconsistent. The choice of relevant instruments would therefore consist of finding a set of variables that are highly correlated with the endogenous variables but uncorrelated with the error terms (Coviello2004:3). Following Coviello (2004), we examine the pairwise correlation of the endogenous variable with the predetermined variables (potential instruments) to determine their degree of correlation. A high degree of pairwise correlation (positive or negative) suggests that the predetermined variables are useful and relevant instruments.

3.3. The Data (Type/Description)

This study makes use of secondary data sourced from CBN statistical bulletins and financial reviews. Data obtained from the National Bureau of Statistics (NBS) and World Development Indicators (WDI) is also employed.

4. The Results

4.1. Data/Model Diagnostics Results

The time series properties of the data investigated using the ADF-test indicate that three out of the twelve variables are stationary at level. The remaining nine variables are integrated of order one, I*(1)*. In specifics, LBDY, GDPG and LSY are I*(0)* at 5% level of significance. (See table 1 in the appendix). A perceptive appraisal of the structural model shows that none of the equations contain variables that are altogether stationary at level. This violates the fundamental assumption that our time series is a stationary process and necessitates a test for a co-integrating relation. The results of the Augmented Engle-Granger (AEG) tests in table 4.1 indicate that the equations in the model are all co-integrating relations.

Table 4.1: Summary of Augmented Engle-Granger (AEG) test for a co-integration regression on the structural model (equations 4, 5 and 6)

Eq. No.	Residual series	AEG critical tau statistic (proxied by ADF test statistic)	MacKinnon critical value at 5% level of significance	(R^2)	D-W statistic
4	RESIDO1	-3.567508	-2.6560	33	1.83
5	RESIDO2	-4.122311	-1.9540	39	1.98
6	RESIDO3	-5.487360	-2.9850	56	2.03

Source: study

The results in table 4.1, for instance, indicate that the ADF test statistic for resido 1 of -3.57 (when compared with the McKinnon critical value of -2.66) lie in the critical region. Hence, we reject the Ho of a unit root and accept the H_1 of no unit root in resido 1 series. When a parallel analogy is applied to resido 2 and 3 of equations 5 and 6 respectively, we find that they are also co-integrating equations. The implication is that the parameter estimates from the model represent the long-run equilibrium value and should be interpreted as such. There can be temporary disequilibrium among the variable in the equations. In the passing, the error correction mechanism (ECM) that was pioneered by Sargen (1984) and popularized by Engle and Granger (1987) corrects for such short-run disequilibrium (Gudjarati, 2004: 824).

4.1.1. Results of Order and Rank Identification Tests

The results of order-identification tests in table 4.2 shows that all the equation in our model are over-identified since the over identification condition (K-k1> m-1) held true for all the equations (4, 5, and 6).

Table 4.2: Result of Model Identification by Order (a necessary) Condition

Eq. No.	Number of predetermined variables excluded (K-k1)	Number of endogenous variables included less one (m-1)	Identified?
4	8-4 = **4**	1-1 = **0**	Over identified
5	8-2 = **6**	3-1 = **2**	0ver identified
6	8-3 = **5**	2-1 = **1**	Over identified

Although the order necessary (order) conditions is satisfied, it may happen that an equation is not sufficiently identified (Gudjarati 2004:750). Interestingly, a summary of the rank (sufficient) condition test for identification in tables 4.3 and 4.4 indicate that our model is over-identified by the sufficient condition.

Table 4.3: Coefficients of structural variable (endogenous and predetermined) from which the matrices of excluded variables in table 4.5 is extracted

Eq.	intercept	Endo. variable		predetermined variables and their coefficients								
		LBDY	LBCY	GDP	LADR	LEXR	LPCI	LM2RGDP	LINV	LALR	LPVY	LPUY
4	-a11	1	0	0	- β11	-β12	- β13	- β14	0	0	0	0
5	-a21	- β23	1	- β22	0	0	0	0	-β21	β24	0	0
6	-a31	0	-β34	1	0	0	0	0	-β33	0	-β31	-β32

Source: Study. The coefficients are extracted from the transformed structural model (equations 7, 8 and 9).

Table 4.4: Result of Model Identification by Rank condition

Eq.No.	matrices of excluded variables					
4	1 - β34	- β22 1	-β21 - β33	β24 0	0 - β31	0 - β32
5	- β11 0	- β12 0	- β13 0	- β14 0	0 - β31	0 - β32
6	1 - β23	- β11 0	- β12 0	- β13 0	- β14 0	0 β24

Source: Study. Table 4.4 (matrices of excluded variables) is an extract from table 4.3

Table 4.4 shows that it is possible to obtain at least a non-singular matrix from each equation (4, 5 or 6) of the structural model. For instance, a non-singular determinant of value –β22.β34 can be obtained from the first two columns of the matrices of excluded variables in equation 4. Thus, the structural model is over-identified by both the order and rank conditions. This result fixes the appropriateness of the TSLS technique for the estimation of our structural model.

4.1.2. Instrumental Relevance Test Result

Table 4.5: Pairwise Correlation matrices of the endogenous variables against the predetermined variables

variables	INV	ADR	CSAV	PC	PU	
GDP	**0.78**	**-0.18**	**0.95**	**0.89**	**0.63**	
	EXR	ADR	CSAV	PC	PU	PCI
BC	**0.92**	**-0.81**	**0.99**	**0.67**	**0.62**	**0.21**
	EXR	ALR	ADR	PU	CSAV	
BD	**0.88**	**0.33**	**-0.57**	**0.66**	**0.92**	

Source: Study.

The result of the test of relevance of the instruments in table 4.5 indicates that most of the endogenous variables are highly correlated with the predetermined variables. Following Coviello (2004), we conclude that the predetermined variables pass the test of relevance and hence, are good instruments for our model.

4.2. Estimated Regression Results and Interpretations

Table 4.6: Summary of TSLS Estimation Result (1970-2010)

LBDY = -51.197 + 0.983LADR(-2) + 1.044LEXR + 6.722LPCI(- 3) – 0.924LM2RGDP-(1)					
tc =	(-4.149)	(3.801)	(4.063)	(4.129)	(-3.437)
	0.0004	0.0009	0.0004	0.0004	0.0022
	R = 0.53	*SER=0.49*	*D.W=1.34*	*F-stat=9.89*	*LM=0.080*
LBCY = -0.290 + 0.118LINV - 0.010GDPG + 0.792LBDY - 0.107LALR + [AR(1)=0.052]-(2)					
tc =	(-0.778)	(3.379)	(-0.941)	(9.736)	(-1.033)
	0.4440	0.0025	0.3559	0.0000	0.3117
	R =92	*SER=0.186*	*D.W=1.43*	*F-stat=43.28*	*LM=0.207*
GDPG = -6.420 - 0.511LPCY + 0.823LPUY + 24.102d(LINV) - 2.258LBCY + [AR(1)=0.002]-(3)					
tc =	(-0.230)	(-0.109)	(0.165)	(0.807)	(-0.216)
	0.8199	0.9136	0.8701	0.4279	0.8312
	R^2=0.92	*SER=11.003*	*D.W=2.232*	*F-stat=0.32*	

Notes: The figures in parentheses are the t-statistics; tc stands for computed t-statistic; SER stands for the standard error of the regression; D.W. is the Durbin-Watson statistic; the figures directly below the t-statistics are the probability values; R is the coefficient of determination; LM stands for Breusch Godfrey langrage multiplier (LM) serial correlation test and F-stat refers to the Fishers' correlation coefficient.

From equation 1, savings-deposit rate (LADR) and income per capita (PCI) met the *a priori* economic criterion for the evaluation of least square estimates in that they are positively signed as expected while the monetization variable (MR2RGDP) and exchange rate (EXR) did not. The coefficients of LADR and PCI have elastic impact of 0.983 and 6.722 respectively. This implies that while a unit increase in LADR will result in about 0.98 units increase in BDY, a unit rise in PCI will provoke about 6.7 units rise in BDY. Statistically, all the variables are significant judging from the t-statistic, probability values and the standard error-at the usual 5% level of significance. The R^2 of about 0.53 indicate that LADR, LM2RGDP and PCI explain about 53% of the total variations in banks' deposit ratio (LBDY). The F-statistic of 9.89 with a probability of less than 1% confirms that the model is robust and fits the data well. This is buttressed by the fact that the computed F-statistic of 9.89 falls inside the critical region when compared with the table F-statistic of about 1.89 ($F_{0.05,24,30}$=1.89). On the basis of the econometric criterion, the D-W statistic (1.34) shows that the tests for serial correlation in the error term are inconclusive. This is because the dL and du which defines the inconclusive region for our sample of 40 observations (with four exogenous regressors and at 5% significance level) are 1.25 through 1.72 respectively. Based on this, we resort to a more general test

for serial correlation, namely, the LM test. The non-zero probability value of the LM (0.08 in equation 1) indicates the absence of serial correlation (EViews 5.0 User Guide: p.24)

In equation 2, all the variables except the growth rate of real output (GDPG) met the expected signs. In addition to meeting the a priori expected signs, the coefficient of investment (LINV) and banks' deposit ratio (LBDY) are highly significant. This result points to the fact that increases in investment and banks' deposit ratio will enhance the capacity of banks to extent credit which will again result in greater level of investment and deposit mobilization if it is sustained. Over all, equation 1, 2 and 3 satisfy the *a priori*, statistical and econometric criteria for the evaluation of least square estimate as earlier discussed. However, none of the variables in equation 3 is statistically significant.

4.3. Summing up the Interpretation

Our findings clearly indicate a positive link between the saving-deposit rate and deposit mobilization. The significance of per capita income implies that substantial proportion of income will be channeled to savings rather than prodigious consumption spending if per capita income is increased. The unexpected positive relationship between exchange rate and deposit ratio means that increase in exchange rate (either by depreciation or devaluation) have not led to much diversion of funds from banks to speculative activities. One would have expected that frequent currency devaluation or depreciation would accelerate the rate of hard currency acquisition at the expense of financial savings. A possible explanation to this is the low investment awareness among Nigerians, coupled with low income and unpredictability of exchange rate. The positive link between deposit ratio and credit ratio implies that a sizeable chunk of deposit is being channeled into lending; it is further confirmed by the magnitude and statistical significance of this coefficient. The direct relation that exists between credit ratio and aggregate investment implies that banks' credit is a catalyst to investment and growth. Finally, the positive relationship between investment, private credit and banks' credit on growth rate of GDP shows that the theoretical expectation is upheld in Nigeria's context. The fact that these variables are insignificant indicates that their relative magnitudes have not been in adequate quantum that would generate noticeable impact on Nigeria's growth performance. In other words, the current state of financial intermediation is less than optimal.

5. Conclusions and Recommendation

The empirical findings revealed that financial intermediation in the context of Nigeria's growth performance are sub-optimal. Commercial banks' credit to private sector, investment and even total credit ratio has positive but weak (insignificant) influence on economic growth in Nigeria. The implication is that low savings coupled with poor credit support to the real sector attenuated the growth effect of financial intermediation in Nigeria. This is attributable to factors such as wide interest rate spread (low savings-deposit rate and high lending rate), lack of effective competition within the financial sector and poor banking habit among the populace. The level of banks' deposit has been too low (figure 4) to provide sufficient fund for on-lending to the real sector. This is partly because the savings-deposit rate has been perceived to be too low. Based on the findings of this study, the following recommendations are made: (a) efforts should be directed at raising the level of banks' deposits, engendering effective competition in the financial sector, increasing the scope of financial instruments, improving the regulatory framework and achieving macroeconomic stability (lower inflation). A device for raising the level of deposit, for instance, is to increase the number of branches of existing banks, raise income and set a positive interest rate; b) since some of the financial intermediation parameter such as per capita income are outside the control of players within the financial services industry, the government could improve their performance through a review of her minimum wage and tax policies with a view to raising per capita income of workers and their ability to

save, and (c) proactive measure should be taken to reduce the lending rate. This could be handled with relative ease by manipulating the reference rates, namely, the rediscount rates and Treasury bill rates.

The policy import of the paper is recognition of the need for increased savings mobilization through improved compensation for savings. In line with the findings of Obadan and Odusola (1999), the rise in the level of savings will reduce the cost of capital, promote investment and growth.

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Appendix 1

Table 1: Summary of Unit Root Test

Variable	ADF lags	ADF-test statistic	5% C.V (McKinnon)	Level of Integration
LBDY	0	-3.937782	-2.9472	I(0)
LADR	0	-5.952399	-2.9499	I(1)
LEXR	0	-5.09693	-2.9499	I(1)
LPCI	0	-5.821927	-2.9499	I(1)
LM2RGDP	0	-4.230318	-2.9499	I(1)
LBCY	0	-6.156247	-2.9499	I(1)
LINV	0	-2.462813	-1.951	I(1)
GDPG	O	-5.877096	-2.9499	I(0)
LALR	0	-6.940511	-2.9499	I(1)
LSY	2	-3.589464	-3.5514	1(0)
LPCY	0	-6.630445	-2.9499	I(1)
LPUY	0	-2.883159	-1.953	1(1)

Source: Summarized from ADF test results.

Table 2: Key Indicators of Financial Intermediation.

Obs	GBR	ADR	ALR	BR	CTC	CTD	IRS	NO	PC
1970	na	3	7	273	0.35	0.63	4	14	0.44
1971	16.48352	3	7	318	0.5	0.66	4	16	
1972	15.40881	3	7	367	0.62	0.79	4	16	
1973	4.904632	3	7	385	0.75	1.01	4	16	
1974	4.675325	3	7	403	0.94	1.69	4	17	
1975	8.188586	4	6	436	1.54	2.8	2	17	1.56
1976	6.192661	4	6	463	2.12	4.16	2	18	
1977	6.263499	4	6	492	3.07	5.24	2	19	
1978	24.79675	4.5	6	614	4.11	5.3	1.5	19	
1979	9.446254	5	7	672	4.62	6.96	2	20	
1980	10.11905	6	7.5	740	6.38	10	1.5	20	7.19
1981	17.43243	6	7.75	869	8.6	10.68	1.75	20	
1982	14.03913	7.5	10.25	991	10.28	12.02	2.75	22	11.37
1983	11.80626	7.5	10	1108	11.1	13.94	2.5	25	
1984	12.72563	9.5	12.5	1249	11.5	15.73	3	27	12.94
1985	3.843074	9.5	9.25	1297	12.17	17.6	-0.25	28	17
1986	5.39707	9.5	10.5	1367	15.7	18.14	1	29	17.37
1987	8.485735	14	17.5	1483	17.53	23.09	3.5	34	
1988	12.27242	14.5	16.5	1665	20.05	29.07	2	42	29.77
1989	11.41141	16.4	26.8	1855	22.22	27.16	10.4	47	
1990	4.528302	18.8	25.5	1939	26.08	38.78	6.7	58	36.63
1991	4.33213	14.29	20.01	2023	31.76	53.21	5.72	65	45.33
1992	12.45675	16.1	29.8	2275	41.81	75.05	13.7	65	61.02
1993	3.648352	16.66	36.09	2358	48.06	110.45	19.43	66	92.5
1994	1.908397	13.5	21	2403	92.62	142.54	7.5	65	122.3
1995	-1.45651	12.61	20.18	2368	141.15	178.96	7.57	64	185.6
1996	1.646959	11.69	19.74	2407	169.24	214.36	8.05	64	219.7
1997	0	4.8	13.54	2407	230.6	280.03	8.74	64	272.5
1998	-9.2231	5.49	18.29	2185	272.9	314.3	12.8	64	352.4
1999	0	5.33	21.32	2185	353.1	476.35	15.99	54	455.21
2000	0.366133	5.29	17.98	2193	508.3	702.1	12.69	54	596
2001	0	5.49	18.29	2193	796.16	47.2	12.8	54	854.99
2002	37.2549	4.15	24.85	3010	954.63	1209.75	20.7	90	955.76
2003	7.873754	4.11	20.71	3247	1210.24	1417	16.6	90	1035.38
2004	7.545427	4.19	19.18	3492	1519.24	1778	14.99	89	1507.9
2005	0	3.83	17.95	3492	1899.34	781	14.12	25	1950.4
2006	-7.41695	3.14	17.26	3233	2524.29	800.34	14.12	25	1947.5
2007	29.9103	3.55	16.94	4200	4813.49	793.4	13.35	24	3463.44
2008	17.90476	2.84	15.14	4952	7806.75	803.13	12.3	24	6655.67
2009	6.785137	2.94	18.36	5288	8791.8	799.6	15.42	24	na
2010	7.450832	2.21	17.59	5682	9358.45	1112	15.38	24	na

Source: World Bank Development Indicators (WDI) and Global Development Statistics, CBN Statistical Bulletin, CBN Economic and Financial Review, NBS (Various issues).

Note: The classification of banks into rural and urban stopped in 2005 following the bank sector consolidation reform. The number of banks were reduced to 25 in 2005 as part of the consolidation.

KEY: BR= number of bank branches at home and abroad (including their subsidiaries), ALR=average lending rate (prime), ADR=average deposit rate, CBT=commercial banks' total deposit, CTC=total credit, PC=total credit to private sector, IRS=interest rate spread, GBR= growth rate of bank branches, NO=number of approved banks.

Table 3: Percentage changes and averages of selected indicators of financial intermediation

period	PC(%)	CTC(%)	CTD(%)	PERIOD	PC	CTC	CTD
1970-75	254.6	340	344.4		AVERAGE		
1975-80	360.9	314.3	257.1	1980-86	13.2	10.8	14
1980-85	136.4	90.8	76	1987-93	53.1	29.7	50.9
1985-90	115.5	114.3	120	1992-10	1219.31	2185.9	633.45
1990-95	406.7	441.2	361.5				
1995-00	221.1	260.1	292.3				
2000-05	227.2	263.5	11.23				
2005-10	241.8	392.7	42.4				

KEY: PC=credit to private sector; CTC=total credit; CTD-total deposit.