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Branch Banking and Economic Growth in Nigeria: A Vector Autoregression Analysis

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ABSTRACT
Bank performance has been identified as a function of many variables of which branch banking is one. In a country where branch banking enjoys prominence over other banking structure, one tempts to trace the mechanism through which the established branches translate to economic growth. This is the major objective of this study. The study made use of Autoregressive distributed lag bound test approach to cointegration to analyse the impact of branch banking on economic growth in Nigeria. The study concludes among others that branch banking is negatively related to economic growth. This conclusion is in tandem with macroeconomic theory that establishes the fact that savings among others constitute leakages in any given economy. The study therefore recommends that government should provide an enabling environment for transaction velocity to be on the rise. This will have an ultimate positive effect on aggregate demand and economic growth.

Keywords: Branch Banking, Economic Growth and Autoregressive Distributed Lag.

INTRODUCTION

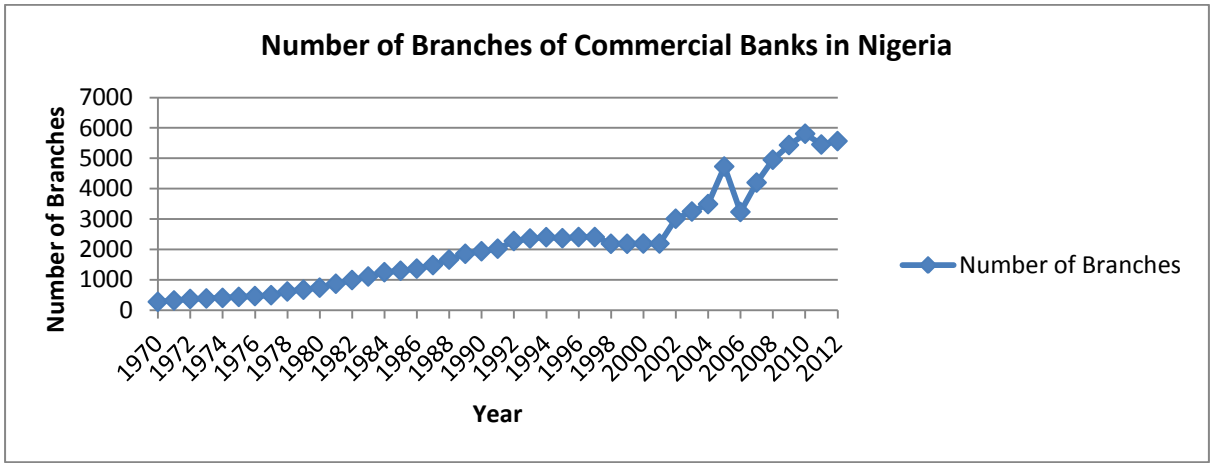
The banking sector is one of the most prominent sectors of the Nigerian economy. While most analysts will consider the other sectors of the economy as the engine which propel the economy, the banking sector can as well passed on as the engine oil that oil these other sectors for economic growth and development. Addressing the banking sector presupposes a discussion on both the central banking and the other deposit taking banks formerly referred to as commercial banks. While the banking examination and supervisory roles of the Central bank are never in doubt, the economy propelling roles are much more vested with these deposit taking banks. Deposits taking banks or commercial banks as the case may be have driven the economy of Nigeria ever before the country's independence. Not minding the series of problems that the commercial banks have faced in the name of bank liquidation and bank distress, their role in financial intermediation is well acknowledged.

In the quest to fulfill their statutory role in a very competitive environment, couple with enabling law that permits the operations of the banks beyond their head offices, commercial banking network has expanded tremendously over the years in the country. From the establishment of the African Banking Corporation in 1892 up to the merger and acquisition that took place in 2003 following the bank recapitalization of 2005, the number of branches of commercial banks has increased over the years. These branches have impacted on the asset base, deposit base and the total money in circulation. The unfolding questions are what is the nature of the banking structure in Nigeria, are the

banking structure backed by the law, what is branch banking, what is the trend of commercial banks branches in Nigeria, how has the growth or otherwise of the bank branches affected the deposit base, asset base, the money supply and ultimately economic growth. The answers to these questions lead us to the objective of the study, which is to empirically examine the impact of branch network on economic growth in Nigeria.

BACKGROUND TO THE STUDY

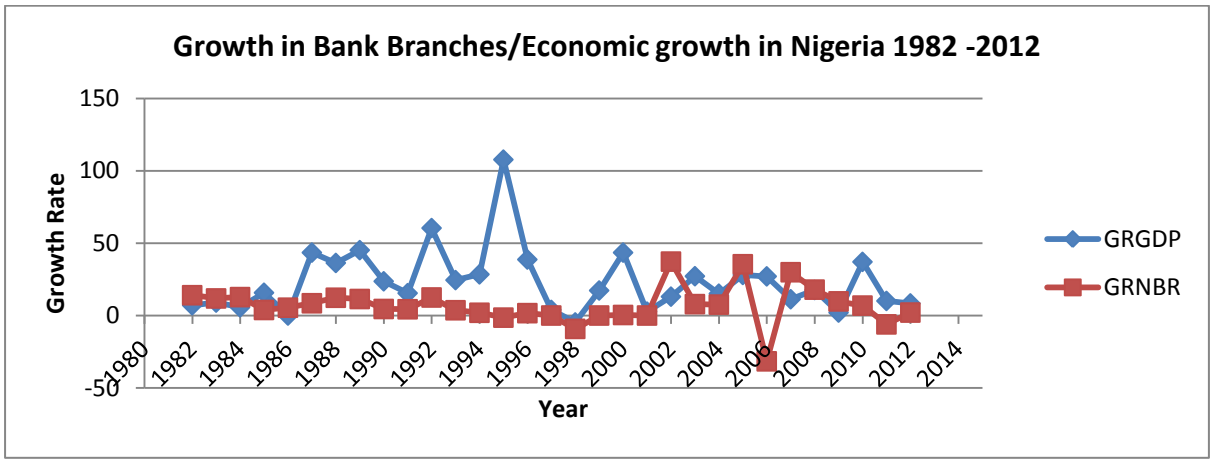
Branch banking is an aspect of banking structure. Where the commercial banking structure is defined as the number, organisation and the relative size of banking firms operating within a given market or markets (Swanson, 1974). The banking structures that exist in most economies include the branch banking, the unit banking and the bank holding companies. While the prominent argument in favour of branch banking is that it makes the availability of banking services to all the communities possible in any given economy, (Ajayi and Ojo 2006), the reasons for the adoption of the banking structure may be more than fulfilling the bank customer ratio of 1:4000. All the reasons adduced for it notwithstanding, the number of branches of banks has risen from 1, which it was in 1892 to approximately 5,566 in year 2012. The trend of the bank branches in Nigeria from 1970 till date is presented in figure 1 below.



Source: CBN Statistical Bulletin 2012

The figure above is a testimony of the consistent increase in number of branches of commercial banks in Nigeria from 1970 to 2012. The only period where a decline was noticed in the number of branches was between 2005 and 2006. This was the period immediately after the bank recapitalisation exercise that saw the minimum paid up capital raised from N2billion to N25billion. The reduction in the number of branches was attributable to the fall in number of commercial banks because some merger and acquisition could not be immediately concluded in year 2006, which was the year that followed the deadline for the recapitalisation exercise.

The effect of this steady rise of the number of branches on economic growth is shown in figure 2 below:



Source: CBN Statistical Bulletin 2012

While the growth of the number of branches has been steadily on the increase, its effect on economic growth has been less than steady growth. For the period under consideration, the trend fluctuates from 1982 and reach its peak in 1996. The growth rate fell from about 100% rate in 1996 to less than 50% the following year. The dwindling fortune of the economy persisted and maintained a steady growth rate of about 7% was maintained from 2004 to 2012.

REVIEW OF RELATED LITERATURE

The banking structure encompasses the forces of law and tradition that constitute the dynamic framework within which banking institutions function to provide the banking services required by the communities. The banking structure also encompasses the system of correspondent banking relationships that in many countries have enabled banks to work together in ways in which many smaller local banks can serve their communities to a degree far beyond their individual capabilities. It includes the diverse ways in which banks themselves are organized as unit banks or branch banks, and as commercial or merchant bank. According to Udegbunam, a branch bank is a single banking firm that offers a full line of banking services in two or more offices. The largest branch in the system (measures in terms of deposits) is generally known as the Head Office, although it may occasionally; happen that one of the branches will grow larger than the head office. Branching may occur in either of two ways: de novo branching, where a branch is developed from scratch, branching by merger, where one bank takes over another bank and then operates the acquired bank as a branch. In Nigeria, de novo branching is a common practice, as bank merger and acquisitions are still a rare occurrence.

Literature on the importance of branch banking to the development of the banking sector and by extension the development of the overall economy cannot be over-emphasises. The very many and diversed literature have often centres around the contribution of the branch banking to the development of the asset and deposit base of the bank. One of the earliest studies on branch banking was Jayaratne and Strahan (1995). The paper examines the effects of branch banking on economic growth. The study provides evidence that financial market can directly affect economic growth by studying the relaxation of bank branch restriction in the United States in the last 25 years preceding 1995. It was found out that the real, per capita growth in income and

output increase significantly following intrastate branch reform. The study equally argued that the observed changes in growth reflect causality flowing from financial sector reform to improved growth performance. This argument is supported by evidence from the process of branching deregulation, from the timing of such policy changes and from bank lending following branch reform. Moreover, the particular financial sector policy experiment studied here leads to faster growth by improving the quality of bank lending.

Abrams, Clarke and Settle (1999) investigates the hypothesis that economic growth is affected by banking structure and fiscal policies. The study uses data from the 48 contiguous states for the period 1950-1980 aggregated into six five-year time periods, primarily to test the effect of the following factors on growth of state per capita income: (i) restrictions over branch banking, (ii) restrictions over multibank holding companies, (iii) the depth of financial assets in a state, (iv) the financial-intermediary mix, (v) the size of state government, and (vi) the methods of financing state government. The study found no evidence to support the hypotheses that branch banking or multibank holding company restrictions affect growth. However, financial depth and the mix of financial intermediaries are strongly correlated with economic growth. Finally, the state fiscal policy variables had no significant effect on income growth.

In the study conducted by Carlson and Mitchener (2002), the paper revises the understanding of how branching affects financial stability. It was argued that states that permitted statewide branching experienced lower failures rates, not because branch banks are more diversified, but because these laws had transform in effects on state banking systems. They increased the level of competition by breaking up local geographic monopolies, and encouraged consolidation by forcing inefficient banks to merge or exit the system. Using data on national banks from the 1920s, it was found that branch- banking states had more voluntary liquidations and mergers, and consequently had lower failure rates during this period. In another paper, Shrestha (2005) analyses the impact that intrastate and interstate bank branching reforms had on real economic growth in the United States. Aggregate state level data were collected from 1970 to 1997 and analyzed using a fixed effects model. The models focus on two possible channels – quantity and quality of the banking sector – through which the banking reforms may have contributed to growth. In order to specifically study these two channels, two sets of two-part regression models were used. The first part looks at the impact of the reforms on quality and quantity of banking, and the second part looks at the impact of these on economic growth. The findings suggest that the banking reforms made a positive and significant impact on state level growth by improving banking quality and not by increasing the quantity of banking. Economies that deregulated both intrastate and interstate branching restrictions prior to 1990 received a growth push of about .46 percentage points. This growth push decreased to about .13 percentage points for those that deregulated after 1990. Approximately four-fifths of the growth push came from intrastate branching reform and the rest came from interstate branching reforms. The results also suggest that the growth push due to the branching reforms lasted for at least five years.

The attention of Beck, Levine and Levkov (2007) is a bit different on the impact of branch banking. Rather than examining its impact on the generality of the economy, the

study examines the impact of branch banking on income distribution in the U.S. The justification for the study was based on the disagreement among policy makers and economists about the impact the impact of bank regulations on the distribution of income. Exploiting cross-state and cross-time variation, the study tested whether liberalizing restrictions on intra-state branching in the United States intensified, ameliorated, or had no effect on income distribution. It was found out that branch deregulation lowered income inequality. Deregulation lowered income inequality by affecting labour market conditions, not by boosting the business income of the poor, nor by enhancing educational attainment. Reductions in the earnings gap between men and women and between skilled and unskilled workers account for the bulk of the explained drop in income inequality. In another dimension, Hirtle (2007) introduced a new twist in the study of branch banking by examining the impact of network size on bank branch performance. The study observed that despite significant technological innovation in retail banking services delivery, the number of U.S. bank branches has grown steadily over time. Further, more and more of these branches are held by banks with large branch networks. The paper therefore assesses the implications of these developments by examining measures of branch performance and asking how these measures vary across institutions with different branch network sizes. The study found out that banks with mid-sized branch networks may be at a competitive disadvantage in branching activities. The study found no systematic relationship between branch network size and overall institutional profitability, perhaps because banking organizations optimize the size of their branch network operations as part of an overall strategy involving both branch-based and non-branch-based activities.

Closely linked to Carlson and Mitchener (2002) is Mitchener and Wheelock (2010). While the former examine the impact of branch banking on the financial stability of the bank, the latter examines the impact of branch banking on economic growth of the United States. The study made use of a new dataset on manufacturing industry-level growth rates and banking market concentration for U.S. states during 1899-1929—a period when the manufacturing sector was expanding rapidly and restrictive branching laws segmented the U.S. banking system geographically. It was found out that banking market concentration had a positive impact on manufacturing sector growth in the early twentieth century, with little variation across industries with different degrees of dependence on external financing or access to capital. However, because regulations affecting bank entry varied considerably across U.S. states and the industrial organization of the U.S. banking system differs markedly from those of other countries, the study also examines the impact of other aspects of banking market structure and policy on growth. The finding on this shows that banking market concentration boosted industrial growth. In addition, it was found out that a greater prevalence of branch banking and more banks per capita increased the growth of industries that rely relatively heavily on external financing or have greater access to external funding sources, while deposit insurance depressed growth in the manufacturing sector. Regulations on bank entry and other banking market characteristics thus appear to exert an independent influence on manufacturing growth in geographically fragmented banking markets.

Theoretical Framework and Methodology

The model adopted for this work followed Jayaratne and Strahan (1995) that examines the mechanism through which branch banking leads to economic growth. The model is presented in equation 1 below:

$$Y_{t,i} \Big/ Y_{t-1,i} = \alpha_i + \beta_i + \gamma D_{t,i} + \varepsilon_{t,i} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where:

$Y_{t,i}$ = equals a measure of real per capital income (output) during year t in state i.

$D_{t,i}$ =a branching indicator equal to 1 for states without restrictions in branching via merger and acquisition.

$B_{t,i}$ = measures the state-specific component of long run economic growth.

a_i = measures the common, economy wide shock to growth at time t;

γ = measures the increase in per capita economic growth stemming from branch deregulation.

Equation 1 above was modified to reflect the objective of the study, which was to empirically examine the impact of branch network on economic growth in Nigeria. The modified equation is presented in equation 2 below:

$$GDP = f(NBR, DPB, BASB, MS) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where:

GDP = Proxy for Economic Growth

NBR = Number branches of commercial banks in Nigeria

BASB = Commercial Bank Asset base

DPB = Commercial bank deposit base

Estimation Procedure: The ARDL Bound Test Approach to Cointegration

The study adopted the autoregressive distributed lag bound test approach to cointegration estimating the above equation. The choice of the ARDL became necessary to handle the possibility of the series that make up the model having different order of integration. According to Pesaran, Shin and Smith (2001), while other studies like Engle and Granger (1987), Phillips and Oularis (1990) and Johansen (1991, 1995) have all tested the existence of cointegration among variables that make up a model, those have been based on the assumption that the series are integrated of order 1 or are *I(1).*In reality hardly would all the series that make up a model will be I(1). Thus a new set of approach that takes care of whether the regressors are I(1) or I(0) or are mutually cointegrated was proposed by the studies. The ARDL Bounds test approach is based on the ordinary least square (OLS) estimation of a conditional unrestricted error correction model (UECM) for cointegration analysis. It is used to estimate the coefficients of both the long run and short run in a given model. From the ARDL we can derive a dynamic error correction model (ECM) following a simple linear transformation (Bannerjee *et al*., 1993), where the ECM integrates short run dynamics with long run equilibrium without losing long run information (Shrestha & Chowdhury, 2005). According to Pesaran and Pesaran (1997) and Pesaran and Shin (2001) (cited in Pahlavani *et al*., 2005), the augmented ARDL model can be expressed in the following form:

$$y_t = c_0 + c_{1t} + \lambda_{yx} z_{t-1} \sum_{i=1}^{\rho-1} \varphi y_{t-1} + \sum_{i=1}^{\rho-1} \varphi x_{t-1} + \delta_t \omega_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

where y_t is the dependent variable, c_0 is the constant term, x_{it} are the independent variables, w_t is the $s\times1$ vector of deterministic variables including intercept terms, dummy variables, time trends and other exogenous variables with fixed lags. The (conditional) unrestricted ECM version of the selected ARDL model can be obtained by rewriting Eq. (3) in terms of the lagged levels and first difference of y_t, x_{1t}, x_{2t}....x_{kt} and w_t as follows:

$$\Delta y_t = c_0 + c_{1t} + \lambda_{yx} z_{t-1} \sum_{i=1}^{\rho-1} \varphi \Delta y_{t-1} + \sum_{i=1}^{\rho-1} \varphi \Delta x_{t-1} + \delta_t \omega_t + \mu_t \quad \text{.....4}$$

where Δ is the first difference operator, t is the trends, the coefficient φ_i is expressing the short run dynamics of the model's convergence to equilibrium and $z_t = (y_t^{'}, x_t^{'})$. In the branch banking-growth nexus equation, the unrestricted error correction model can be expressed as:

$$D(GDP) = \pi_0 + \pi_1 \sum_{i=1}^{n} D(GDP)_{t-i} + \pi_2 \sum_{i=1}^{n} D(NBR)_{t-i} + \pi_3 \sum_{i=1}^{n} D(DPB)_{t-i} + \pi_4 \sum_{i=1}^{n} D(BASB)_{t-i} + \pi_5 \sum_{i=1}^{n} D(MS)_{t-i}$$
$$+ \pi_6 GDP_{t-i} + \pi_7 NBR_{t-i} + \pi_8 DPB_{t-i} + \pi_9 BASB_{t-i} + \pi_{10} MS_{t-i} + \varepsilon_t \quad \text{.....5}$$

The parameters π_i (i=1-5) explains the short run dynamics coefficients, while 6-10 are the estimates of the long run coefficients.

PRESENTATION AND DISCUSSION OF RESULTS

The vantage position for our analysis is the unit root test to determine the presence of serial or autocorrelation in the model. This was done using Augmented Dickey Fuller approach. The result of which are presented in table 1 below:

Table 1: Augmented Dickey Fuller Test for Unit Root (Critical values for 1%, 5% and 10% are -4.2845, -3.529 and -3.2153 respectively

Regressors	**Level**	**1st Difference**	**Order of Integration**
GDP	-1.1560	-3.8537**	I(1)
NBR	-2.6984	-7.0786*	I(1)
DPB	-3.3453***		I(0)
BASB	-4.1356**		I(0)
MS	-7.0984*		I(0)

*Significant at 1%, **Significant at 5% and ***Significant at 10%

Table 1 above shows that 2 of the regressors are I(0) while the remaining three are I(1). This is a perfect example of the proposition of Pesaran, Shin and Smith (2001). Following the determination of the mixed order of integration in the regressors, the next step conducted was the estimation of the ARDL model. This was made possible after the determination of the optimal lag length presented in table 2 below:

Table 2: Optimal Lag Selection Criteria

VAR Lag Order Selection Criteria						
Endogenous variables: GDP NBR DPB BASB MS						
Exogenous variables: C						
Included observations: 30						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	149.9134	NA	4.39e-11	-9.660895	-9.427362	-9.586185
1	299.6325	239.5505	1.10e-14	-17.97550	-16.57430*	-17.52724
2	333.6539	43.09382*	7.04e-15*	-18.57693*	-16.00806	-17.75512*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Four of the selection criteria have chosen lag 2, we however chosen to use Schwarz Bayesian Criterion (SBC). This is because Pesaran and Smith (1998) argue that the Schwarz Bayesian Criterion (SBC) should be used in preference to other model specification criteria because it often has more parsimonious specifications. More so number of observation for this model is 30, which makes it adequate for the argument of the bound test technique being most suitable for small sample sizes. Therefore the result of the ARDL based on lag 1 is presented in table 3 below:

Table 3: Estimates of the ARDL model based on SBC

Dependent Variable: D(GDP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.3379	0.4176	-0.8093	0.4284
D(GDP(-1))	0.0750	0.1577	0.4770	0.6398
D(NBR(-1))	0.1225	0.2123	0.5700	0.5707
D(DPB(-1))	0.7695	0.7504	1.0255	0.3180
D(BASB(-1))	0.6408	0.4912	1.3047	0.2076
D(MS(-1))	-1.2546	0.6001	-2.0906	0.0502
GDP(-1)	-0.6283	0.1538	-4.0860	0.0006
NBR(-1)	0.2305	0.1826	1.2622	0.2222
DPB(-1)	-2.5993	0.6800	-3.8226	0.0011
BASB(-1)	0.6876	0.4405	1.5608	0.1351
MS(-1)	2.4454	0.5933	4.1219	0.0006
R-squared	Adjusted R-squared=0.510.68	DW=2.10		F=14.03

From table 3 above, we then tested for the existence of long run relationship among the regressors. This was done using the Wald test as presented in table 4 below:

Table 4: Wald Test for the Existence of Long Run

Wald Test:			
Test Statistic	Value	df	Probability
F-statistic	5.429766	(5, 19)	0.0029
Chi-square	27.14883	5	0.0001
Null Hypothesis: C(7)=C(8)=C(9)=C(10)=C(11)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(7)		-0.6283	0.1538
C(8)		0.2305	0.1826
C(9)		-2.5994	0.6800
C(10)		0.6876	0.4405
C(11)		2.4454	0.5934
Restrictions are linear in coefficients.			

The statistic that is of utmost importance for our analysis is the F statistic. This is needed to make a comparison with the two set of critical values as given by Pesaran *et al* (2001). Of the two set of the critical values, one assumes that all the variables are I(0) and the other assumes all the variables are I(1). With the H_0 of no cointegration, if the F statistic obtained from the Wald test exceeds the upper bound value of the Pesaran critical, the H_0 is rejected and we conclude that there is cointegration. However if the F statistic is less than the lower bound value of the Pesaran critical test, we do not reject the null hypothesis. But if the F statistic falls within the two sets of values, there is inconclusive evidence of the presence of cointegration in the model.

Based on the foregoing the result of bound test for cointegration analysis is presented in table 5 below:

Table 5: Bound testing for Cointegration Analysis

Model	Variables Examined	Lag length	F statistic	5% Bound Values	Remark
1	GDP, NBR, DPB, BASB, MS	1	5.43	3.78-4.85	H_0 is rejected, there is cointegration

Table 5 above shows that there exists long run relationship among the series that make up the model. Other diagnostic tests conducted on the model include the serial correlation test and stability test as shown in table 5 and figure 1 below:

Table 6: Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.828585	Prob. F(2,17)	0.4536
Obs*R-squared	2.664664	Prob. Chi-Square(2)	0.2639

With H_0 of no serial correlation, the probability value for F statistic of 0.45 implies that we cannot reject the null hypothesis of no serial correlation. The stability test as

established by the CUSUMSQ test also shows that the model is reasonably stable judging by the figure 3 below.

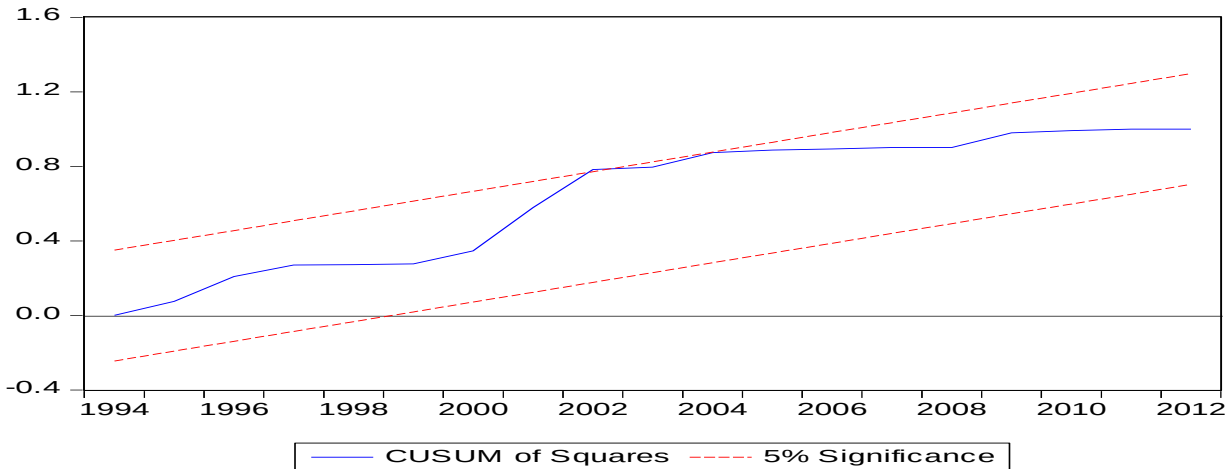


Figure 3 plots the CUSUM of squares statistics for Eq. (5). The results clearly indicate the absence of any instability of the coefficients during the investigated period because the plots of the statistics are confined within the 5% critical bounds pertaining to the parameter stability.

SYNTHESIZING THE RESULTS WITH THE OBJECTIVES

Attempt to achieve the result stated in the objective informs the decision to adjust equation 3 above into an econometric model under the ECT framework as follows:

$$D(GDP) = \beta_0 + \beta_1 \sum_{a=0}^{m} D(NBR) + \beta_2 \sum_{b=0}^{m} D(DPB) + \beta_3 \sum_{c=0}^{m} D(BASB) + \beta_4 \sum_{d=0}^{m} D(MS) + \beta_5 ECT(-1).....(6)$$

ECT is the error correction mechanism for the model. The significance of the ECT in the model is to indicate how disequilibrium in national income can be adjusted in the long run. The result of the Error Correction Model is presented in the table 7 below:

Table 7: Error Correction Model

Dependent Variable: D(GDP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0488	0.0265	1.8423	0.0773
D(NBR)	-0.2975	0.2157	-1.3792	0.1800
D(DPB)	-0.5061	0.6253	-0.8094	0.4259
D(BASB)	0.2047	0.4259	0.4805	0.6350
D(MS)	0.7708	0.5044	1.5281	0.1390
ECT(-1)	-0.5502	0.1427	-3.8573	0.0007
R-squared	0.411321	Mean dependent var		0.0851
Adjusted R-squared	0.293585	S.D. dependent var		0.0697
S.E. of regression	0.058548	Akaike info criterion		-2.6660
Sum squared resid	0.085697	Schwarz criterion		-2.3884
Log likelihood	47.32233	Hannan-Quinn criter.		-2.5755
F-statistic	3.493589	Durbin-Watson stat		1.6830
Prob(F-statistic)	0.015678			

The above result is a product of time series data for 33 years spanning the period of 1981 to 2012. The results clearly show that both number of branches and deposit base of the commercial banks are negatively related to gross domestic product. This result is nothing but a confirmation of the economic that states that S, T and M (i.e. Savings, Tax and Import respectively) are leakages to the economic and are always affecting economic growth negatively. Explain empirical the aggregate equation using the data on Nigeria. Bank assets and money supply however were found to be positively related to the economy. From the result, a unit rise in number of bank branches will bring about a decline in economic growth to the tune of 0.30unit. On the other hand, a unit rise in money supply will bring 0.77 unit positive change to economic growth.

On the long associationship among the variables, the coefficient of the ECT is not only negative but it is equally significant given the t ratio of -3.86. The significance of ECT is to indicate how the departure from the long run disequilibrium is corrected in the short run. With a coefficient of -0.55, the speed of adjustment which is significant at both 5% and 1% suggests that about 55% of the disequilibrium in the previous year's shock adjusts back to the long run equilibrium in the current year.

SUMMARY AND CONCLUSION

From the foregoing, it has been observed that the importance of branch banking on economic growth cannot be over-emphasised. Theories and empirical studies have attested to this and this empirical study on the Nigerian economy equally confirms that. It therefore recommended that government should provide enabling environment for transaction velocity to be on the rise. This could be done by way of policies that reduce inflation in the economy and enhances the spending pattern of the populace. The ripple effect of this spending will reflect positively on the nation's economy.

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