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An Empirical Assessment of Financial Sector Development and Economic Growth in Nigeria

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Abstract

The objective of this paper has been is to examine empirically, the implications of financial development for economic growth in Nigeria. Time series data covering the period between 1990 and 2011 from Nigeria. The cointegration technique with its implied Error Correction Mechanism (ECM) was applied. This commenced with the ADF unit root test, followed by the Johansen cointegration test. The Overparameterize and Parsimonious ECM was next and this was followed by the Vector Error Correction, diagnostic tests and Cholesky variance decomposition. The variables included Real Gross Domestic Product, Financial deepening which is a ratio of money supply to Gross Domestic Product, liquidity ratio, interest rate and credit to the private sector. Financial sector development has not significantly improved private sector development. The minimum capital base and liquidity ratio has improved the level of economic growth in Nigeria. The Johansen cointegration test suggests a long run relationship among the variables and the significant ECM which is negatively signed supports the long run relation among the variables and indicates a satisfactory speed of adjustment. Although financial sector development has on the aggregate significantly improved the level of economic performance, the credit to the private sector did not play significant role. The result recommends, amongst others, that further development of the financial sector should be oriented towards the development of the private sector.

Key Words: *Financial Sector Development Indicators, Economic Growth, Cointegration, Variance Decomposition.*

Introduction

A well-developed financial system engenders technological innovation and economic growth through the provision of financial services and resources to entrepreneurs who have the highest probability of implementing innovative products and processes (Schumpeter, 1911). Inadequate access to the formal financial sector in Nigeria has been as a result of the lack of collateral required due to risks involved in lending but also due to high costs involved in small financial services and weak legal enforcement (Ray, 1988). In Nigeria, financial markets have not developed to expectations and the underdeveloped financial markets have further deteriorated the level of economic growth in Nigeria. Although the Nigerian financial system recorded some progress in the last few years, like the national economy, it has been faced with many challenges. The problem of macroeconomic instability has continued to be a hindrance to the development of the financial sector in Nigeria. Frequent policy reversals have caused disinvestment in the financial and real sectors which have negatively affected macroeconomic performance.

The lack of adequate coordination and harmonization of fiscal and monetary policies have even deteriorated the performance of the Nigerian financial sector. The high cost of assessing funds has also discouraged investors from patronizing the banking system. The development of the financial sector in Nigeria has also been hindered by poor state of infrastructure utilized in the financial sector. These include power supply, problem of telecommunication, which include difficulty in internet access etc. This has increased the cost of operation. The lack of efficient payment system has also hindered the development of the financial sector in Nigeria. The excessive use of cash has not enhanced the development of the financial sector in Nigeria. In addition, the competitiveness that resulted from the entry of new banks into the financial system and the liberalization of interest rates brought about a sharp rise in nominal deposit and lending rates. Maximum lending rate which averaged 12.0 percent in 1986 rose to 26.5 percent in 2003 (Nnanna, Englama and Odoko, 2004). Although interest rates responded positively to financial liberalization, real rates behaved differently. For most of the reform years, real deposit rate was negative and averaged -13.5 percent compared to -7.7 percent during financial repression. High inflation rates during the reform coupled with re-imposition of interest rate ceiling brought about negative real deposits rates which hindered macroeconomic performance. The objective of this paper is thus to examine empirically, the implications of financial development for economic growth in Nigeria.

Other than this introductory section, the rest of the paper is divided into four sections. The second section is on the review of literature. The third section is on the methodology which is closely followed by the fourth section which is on results and discussions. The fifth section concludes this paper.

Literature Review

The link between the financial system and economic performance has been scrutinized by a large number of studies. Some stress that the importance of the financial system is overstated (see Lucas, 1988, in King and Levine, 1993a, Svensson, 2007) and others are of the view that the financial sector plays a minor role in economic development where instead the development of financial markets is a consequence of economic growth (Kuznets, 1995, in Luintel and Khan, 1999). In early economic literature, Schumpeter (1911), in King and Levine, 1993a) and Hicks (1969, in Luintel and Khan, 1999) viewed financial development as a cause of growth. Ndebbio (2004) investigated financial deepening, economic growth and development in selected Sub-Saharan African countries. Using OLS regression, the study found that financial development weakly affect per capita growth of output. This was attributed to shallow finance and absence of well functioning capital markets. Nnanna (2004) examined financial sector development and economic growth in Nigeria. Using the OLS, the study shows that financial sector development did not significantly affect per capita growth of output. Svensson (2007) examined microfinance, financial systems and economic growth in Bolivia. The study showed on the micro-level that there is limited impact of microfinance on productive assets and income generation. The study further showed that at very low levels of incomes and vulnerability affect the use of cfredit for productive purposes. Nzotta and Okereke (2009) studied financial deepening and economic development in Nigeria. Using data covering the period between 1986 and 2007, the study found that financial deepening did not support economic growth in Nigeria. Antonio (2010) assessed financial development and economic growth in Ireland. The study used data covering the period between 1965 and 2007. the Vector Error Correction Mo0del (VECM) was applied. The study found that economic growth has a positive effect on industrial production. Adelakan (2010) empirically investigated financial sector development and economic growth in Nigeria. The Ordinary Least Squares (OLS) was applied. The result showed that financial sector development has a substantial positive effect on economic growth in Nigeria. Samson and Elias (2010) studied financial sector development and economic growth in Nigeria. Their study covered the period between 1960 and 2009. They tested the competing finance-growth nexus hypothesis using Granger causality test in a VAR framework. They found that various measures of financial development granger cause output even at 1 percent level of significance with the exception of ratio of broad money to GDP. They also found that net domestic credit is equally driven by growth in output, indicating unidirectional causality. Michael (2012) studied financial development and economic growth and assessed whether Schumpeter was right.

Using South Africa as a case study and data ranging from 1965 to 2010 and applying Full Modified Ordinary Least Squares (FMOLS) and Two Stage Least Squares (2SLS)found that contrary to prediction of Schumpeter, finance promotes growth. The empirical results suggest that financial development does nor promote economic growth both in the short run and long run. The paper concludes that Schumpeter may not be right in theorizing that finance promotes economic growth.

Methodology

The conventional approach to time-series econometrics is based on the implicit assumption of stationarity of time-series data. A recent development in time-series econometrics has cast serious doubts on the conventional time-series assumptions. There is substantial evidence in the recent literature to suggest that many macroeconomic time series may possess unit roots. That is, they are non-stationary processes. A time-series integrated of order zero I(0), is level stationary, while a time-series integrated of order one, I(1), is stationary in first difference. Most commonly, series are found to be integrated of order one, or I(1). The implication of some systematic movements of integrated variables in the estimation process may yield spurious results.

In the case of a small sample study, the risk of spurious regression is extremely high. In the presence of I(1) or higher order integrated variables, the conventional t-test of the regression coefficients generated by conventional OLS procedure is highly misleading (Granger and Newbold, 1977). Resolving these problems requires transforming an integrated series into a stationary series by successive differencing of the series depending on the order of integration (Box and Jenkins, 1970). However, Sargan (1964), Hendry and Mizon (1978) and Davidson, Hendry, Sbra and Yeo (1978) have argued that the differencing process loses valuable information in data, especially in the specification of dynamic models. If some, or all, of the variables of a model are of the same order of integration, following the Engle-Granger theorem, the series are cointegrated and the appropriate procedure to estimate the model will be an error correction specification. Hendry (1986) supported this view, arguing that error correction formulation minimizes the possibilities of spurious relationships being estimated as it retains level information in a non-integrated form (Hendry, 1986).

Davidson, Hendry, Sbra and Yeo. (1978) proposed a general autoregressive distributed lag model with a lagged dependent variable, which is known as the 'error-correction' term. Davidson, Hendry, Sbra and Yeo (1978) also advocated the process of adding lagged dependent and independent variables up to the point where residual whiteness is ensured in a dynamic specification. Therefore, error correction models avoid the spurious regression relationships. To guard against the possibility of estimating spurious relationships in the presence of some nonstationary variables, estimation is performed using a general-to-specific Hendry-type error correction modelling (ECM) procedure. This procedure begins with an over-parameterised autoregressive distributed lag (ADL) specification of an appropriate lag. The consideration of the available degrees of freedom and type of data determine the decision on lag length. With annual data, one or two lags would be long enough, while with quarterly data a maximum lag of four can be taken. Under this ECM procedure, the long run relationship is embedded within the dynamic specification.

The Johansen (1991, 1995) technique has become an essential tool in the estimation of models that involve time series data. This approach is preferred as it captures the underlying time series properties of the data and is a systems equation test that provides estimates of all cointegrating relationships that may exist within a vector of nonstationary variables or a mixture of stationary and nonstationary variables (Harris, 1995).

The Johansen technique has several advantages over other cointegration based techniques, which will be discussed in the following sections. This technique is preferred in this study as it allows us to estimate a dynamic error correction specification, which provides estimates of both the short and the long run dynamics. There are several steps that have to be followed in implementing the Johansen methodology.

Harris (1995) and Seddigh, Lawler and Katos (2000) both outlined the eight steps that are involved in applying this methodology. Because these steps are so detailed and highly interrelated, only some of the most relevant issues in these steps were discussed. The first issue is to determine the stationary (order of integration) of all the variables. The next is performing cointegration tests in order to identify any long run relationships in the variables, a short run vector error correction model, then estimated on condition of finding cointegration in the previous step. This is followed by an estimate of a persimonious and overparameterize model and finally, residual diagnostic checks form the last step.

Results and Findings

The model used for the study is stated below:

RGDP = $b_0 + b_1R + b_2$ MCB + b_3LR + b_4CPS+ b_5FDEEP + Ut

RGDP = Real Gross Domestic.
R = Interest rate.
MCB = Minimum capital base
LR = Liquidity ratio
CPS = Credit to the private sector
FDEEP = Financial deepening computed as the ratio of broad money supply to Gross Domestic Product

Sources of Data

The data where collected from various issues of the Central Bank of Nigeria Statistical Bulletin and various issues of the World Bank Indicator for Nigeria.

Results and Findings

The Augmented Dickey Fuller (ADF) unit root test was used to test whether the variables are stationary and their order of integration. The ADF was preferable as it corrects for possible autocorrelation in the model. The result of the ADF unit root test is shown in table 1 below:

Table1: Summary of ADF unit root test result

Variables	Level data	1st difference	1% CV	5%CV	10%CV	Order of Integration
R	-2.14	-5.04*	-3.68	-2.97	-2.62	I(1)
RGDP	1.35	-4.14*	-3.68	-2.97	-2.62	I(1)
MCB	-0.31	-3.84*	-3.68	-2.97	-2.62	I(1)
LR	0.18	-3.25**	-3.68	-2.97	-2.62	I(1)
FDEEP	-4.58*	-6.47	-3.68	-2.97	-2.62	I(0)
CPS	-0.08	-3.49**	-3.68	-2.97	-2.62	I(1)

NB: * Indicates stationary at the 1% level & **Indicates stationary at the 5% level

The ADF unit root test indicates that all the variables except financial deepening were non-stationary, but became stationary after the first difference was take. Financial deepening was stationary at the levels because it is a ratio variable. However, following Harris(1995) and Gujarrati (2003), both I(1) and I(0) variables could be carried forward to test for cointegration which forms the basis of the next section.

The Johansen cointegration test was used to test for the existence or not of a long run relationship among the variables. The Johansen methodology was preferable for the study because it has the advantage amongst others of allowing for more than one cointegrating vector. The result of the Johansen cointegration test is shown in table 2 below:

Table 2: Johansen cointegration test result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.765811	106.0136	94.15	103.18
At most 1	0.569285	62.46477	68.52	76.07
At most 2	0.405283	37.19551	47.21	54.46
At most 3	0.375707	21.60542	29.68	35.65
At most 4	0.218462	7.471334	15.41	20.04
At most 5	0.002549	0.076572	3.76	6.65

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None *	0.765811	43.54881	39.37	45.10
At most 1	0.569285	25.26926	33.46	38.77
At most 2	0.405283	15.59009	27.07	32.24
At most 3	0.375707	14.13408	20.97	25.52
At most 4	0.218462	7.394763	14.07	18.63
At most 5	0.002549	0.076572	3.76	6.65

The trace statistic indicates one cointegrating equation. The Max-Eigen test also indicates one cointegrating equation. Thus, it could be concluded that a long run relationship exists among financial deepening, credit to the private sector, liquidity ratio, minimum capital base, interest rate and the level of economic growth. The existence of at least one cointegrating equation permits the estimation of the overparameterize and the parsimonious (preferred) Error Correction Mechanism (ECM) which forms the basis of the next section. The overparameterize ECM result is shown in table 3 below:

Table 3: Summary of Overparameterize ECM Result. Modeling : DLRGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLR	-1.242305	0.521817	-2.380732	0.0326
DLR(-1)	-0.006636	0.074387	-0.089204	0.9304
DLR(-2)	-0.056514	0.060606	-0.932469	0.3695
DLMCB	1.824392	0.796242	2.370651	0.0242
DLMCB(-1)	0.414820	0.127027	3.265616	0.0029
DLMCB(-2)	-0.005345	0.031190	-0.171356	0.8668
DLLR	-0.011696	0.030571	-0.382582	0.7087
DLLR(-1)	0.019640	0.017896	1.097470	0.2940
DLLR(-2)	1.014519	0.407969	2.486757	0.0194
DLCPS	-0.053646	0.069830	-0.768241	0.4572
DLCPS(-1)	0.014603	0.076176	0.191706	0.8512
DLCPS(-2)	-0.007926	0.073383	-0.108014	0.9158
FDEEP	0.029857	0.087054	0.342972	0.7376
FDEEP(-1)	0.908106	0.089434	10.15393	0.0000
FDEEP(-2)	0.058007	0.089892	0.645298	0.5309
ECM(-1)	0.508886	0.270997	1.877827	0.0849
C	0.095589	0.040974	2.332929	0.0379

R^2= 0.65, F statistic = 18.29, DW = 2.20, AIC= 2.64, SC=1.84

The overparameterize ECM result involves two lags of each variable. The parsimonious ECM result was gotten by deleting insignificant variables from the overparameterize ECM result. The result of the parsimonious or preferred ECM is shown in table 4 below:

Table4: Summary of Parsimonious ECM Result: Modeling: DLRGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLR	-0.458960	0.116556	-3.937669	0.0005
DLMCB	0.323472	0.152070	2.127118	0.0493
DLMCB(-1)	0.933229	0.406489	2.295827	0.0355
DLLR(-2)	0.653086	0.079786	8.185428	0.0000
FDEEP(-1)	0.060065	0.006947	8.646735	0.0000
ECM(-1)	-0.537264	0.178116	-3.016366	0.0063
C	0.118204	0.028801	4.104149	0.0005

R^2=0.74, Fstatistic= 21.68, DW = 2.07, aic = -2.89, SC = -2.56

The parsimonious ECM result highlighted the significance of the development of the financial sector on economic growth in Nigeria. The result indicated that the financial sector has recorded mixed performance. The credit to the private sector was not statistically significant and was dropped from the parsimonious ECM. This is am indication that the credit to the private sector has not played the desired role in generating the desired level of economic growth in Nigeria. This is not surprising however, given the slow pace of private sector investment in Nigeria. The difficulty by the private sector to obtain credit facilities is another consequence of this poor performance. The result however indicated that the minimum capital base which is a key financial sector development indicator has significantly improved the level of economic growth in Nigeria. The Vector Error Correction (VEC) result is shown in table 5 above:

Table5: Summary of VEC result

Cointegrating Eq:	CointEq1			
LRGDP(-1)	1.000000			
LR(-1)	-2.730173			
	(1.26019)			
	[-2.16647]			
LMCB(-1)	0.395820			
	(0.28400)			
	[1.39375]			
LLR(-1)	-1.535333			
	(0.48607)			
	[-3.15867]			
FDEEP(-1)	-7.058784			
	(1.65319)			
	[-4.26981]			
C	-15.62838			
Error Correction:	D(LRGDP)	D(LR)	D(LMCB)	D(LLR)
CointEq1	-0.019885	0.018864	-0.108872	-0.083990
	(0.00452)	(0.03401)	(0.11273)	(0.11047)
	[-4.39486]	[0.55470]	[-0.96579]	[-0.76028]

This was probably as a result of the banking sector reform and hence recapitalization. The result showed that an increase in the minimum capital base in both the current and immediate past periods by 1 percent improved the level of economic growth by 32 percent and 93 percent respectively.

The high elasticity is symptomatic of the important role played by the minimum capital base in generating the desired level of economic growth. This indicates some level of credibility of the financial sector reforms in Nigeria. The result showed further that the liquidity ratio which is a key financial sector development indicator has also played important role in influencing the level of economic growth in Nigeria.

The ECM result showed that an increase in the liquidity ratio by 1 percent increased the level of economic growth by 65 percent. The level of financial deepening played a significant role in influencing the level of economic growth in Nigeria. The results overall, indicates some level of credibility of financial sector development in Nigeria. The statistical significant of the one period lagged ECM which is also negatively signed is an indication of a satisfactory speed of adjustment.

The VEC result shows that the RGDP equation constitutes the true cointegrating equation. The rest were statistically flawed since they were either not significant or are wrongly signed.

The variance decomposition indicates changes in the dependent variable that is due to shocks in the independent variables. The result of the variance decomposition is shown in table 6 below:

Table 6: Summary of Cholesky Ordering Variance Decomposition

Variance Decomposition of LRGDP:

Period	S.E.	LRGDP	LR	LMCB	LLR	FDEEP
1	0.032074	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.047602	97.29306	0.092730	0.033087	0.954320	1.626804
3	0.057685	92.06807	0.228143	0.613183	2.388069	4.702534
4	0.079614	49.70544	2.678757	0.557938	20.99059	26.06727
5	0.104575	29.57119	10.45724	0.364498	33.16437	26.44271
6	0.134689	19.02730	14.55111	0.259206	37.90707	28.25531
7	0.166534	13.86396	19.68495	0.301645	35.60406	30.54539
8	0.203709	11.91912	22.61344	0.202530	34.80229	30.46261
9	0.241149	11.33049	23.96519	0.146609	35.22401	29.33370
10	0.279722	11.02212	25.19492	0.123511	34.55434	29.10511

Variance Decomposition of LR:

Period	S.E.	LRGDP	LR	LMCB	LLR	FDEEP
1	0.241078	23.44717	76.55283	0.000000	0.000000	0.000000
2	0.294642	15.88739	74.26526	3.065899	5.880737	0.900715
3	0.363983	11.38841	72.90924	6.580869	8.468726	0.652755
4	0.405247	11.15756	73.84660	7.144381	7.302880	0.548586
5	0.447322	11.93865	74.64946	6.892433	6.018309	0.501153
6	0.488066	11.33166	74.97766	7.797229	5.360482	0.532967
7	0.535325	11.07125	75.46699	7.965631	4.871258	0.624868
8	0.574030	11.55522	76.04421	7.547267	4.274796	0.578514
9	0.610330	11.68167	76.31329	7.624516	3.823757	0.556769
10	0.649454	11.64976	76.36125	7.827592	3.457382	0.704019

Variance Decomposition of LMCB:

Period	S.E.	LRGDP	LR	LMCB	LLR	FDEEP
1	0.799127	1.659695	0.003010	98.33729	0.000000	0.000000
2	1.060389	1.084958	0.127507	96.04735	2.135583	0.604600
3	1.266783	0.817301	0.577998	93.80847	4.140959	0.655272
4	1.456244	0.989912	0.439781	94.22640	3.137350	1.206560
5	1.609200	1.448952	0.593279	94.12333	2.569786	1.264651
6	1.755172	1.777959	0.857758	93.00403	2.161832	2.198424
7	1.898646	2.326863	1.508231	91.55765	1.847475	2.759782
8	2.047309	2.957058	1.922477	90.31043	1.667451	3.142580
9	2.175650	3.438114	2.370978	88.99362	1.540331	3.656953
10	2.306669	4.009798	2.986615	87.22141	1.454043	4.328132

Variance Decomposition of LMCAP:

Period	S.E.	LRGDP	LR	LMCB	LLR	FDEEP
1	0.783136	8.989530	9.951948	2.081240	78.97728	0.000000
2	1.151337	10.72217	6.081611	4.263568	78.04444	0.888205
3	1.425162	10.28296	4.001567	7.230529	73.86102	4.623925
4	1.633696	13.85980	4.222134	6.696538	70.84014	4.381387
5	1.879626	15.67280	3.275091	5.168458	72.19340	3.690248
6	2.076695	15.92308	2.912765	5.950333	71.28552	3.928299
7	2.303652	16.93505	3.161036	5.855193	69.02486	5.023863
8	2.543838	18.36486	3.286209	5.083155	68.29175	4.974024
9	2.763245	19.03196	3.356861	4.730563	67.83412	5.046497
10	2.972980	19.39265	3.714772	4.792436	66.37175	5.728394

Variance Decomposition of FDEEP:

The result showed that order than shocks to itself which is about 100 percent in the first period, shocks to interest rate explained about 15 percent of shocks to economic growth in the 6th period which increased to 25 percent in the last period. Shocks to liquidity ratio explained about 21 percent of shocks to economic growth in the fourth period. This increased to about 35 percent in the last period. The financial deepening explained about 5 percent of shocks to economic growth in the third period which increased to about 29 percent in the last period.

The diagnostic test include the Breusch-Godfrey Serial correlation LM test used to test for residual serial correlation, the jarque-bera normality test is used to test whether the residuals are normally distributed and the white heteroskedasticity test is used to test whether the residual is homoskedastic or heteroskedastic. The Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) are both used to test residual stability. The summary of the diagnostic tests results are shown in table 7, Figure 1 and Figure2.

Table 7: Diagnostic test result

Jarque-Bera normality test			
Jarque-bera	1.48	Probability	0.48
Breusch-Godfrey Serial Correlation LM test			
F Statistic	0.87	Probability	0.44
White heteroskedasticity test			
F Statistic	0.55	Probability	0.86

The jarque-bera test in table 7 indicates the acceptance of the null hypothesis that the errors are normally distributed. The Breusch-Godfrey serial correlation LM test indicated an acceptance of the null hypothesis that the errors are not serially correlated and the white heteroskedasticity test indicates an acceptance of the

alternative hypothesis that the errors are homoskedastic. The result of the CUSUM and CUSUMQ tests are shown in Figure1 and Figure 2 below:

Figure1: CUSUM test

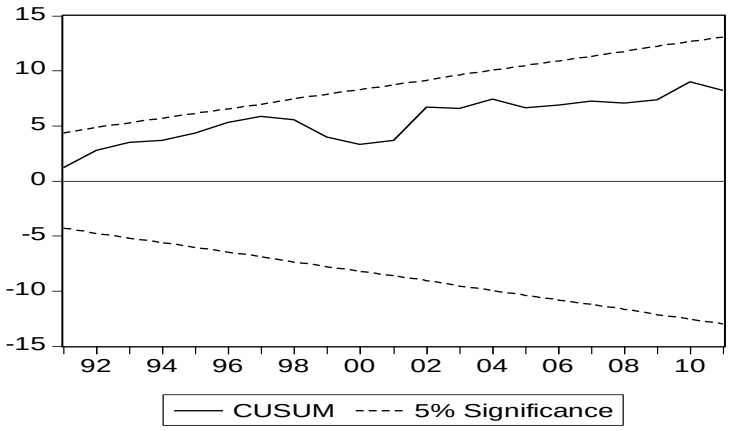
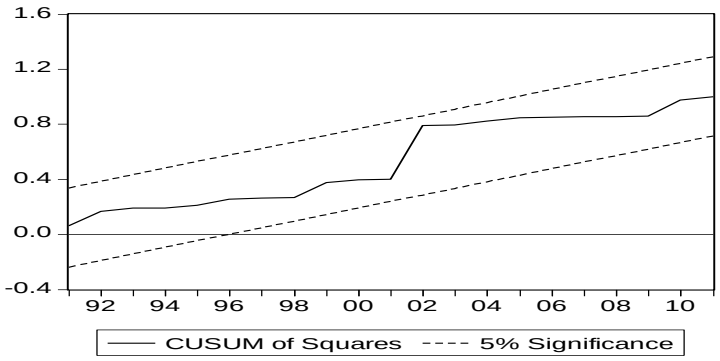


Figure2: CUSUMQ test



Both the CUSUM and CUSUMQ tests show that the model is stable since both the CUSUM and CUSUMQ lines fell in-between the two 5 percent lines.

Conclusion

This study has been on financial sector development and economic growth in Nigeria. The study indicates that the financial sector development in Nigeria showed mixed performance. The result showed that the financial sector development has not significantly favoured the expansion of the private sector in Nigeria. This is probably among the causative factor of the poor performance of the private sector in Nigeria. The significance of the minimum capital base, financial deepening and liquidity ratio are indications of some level of credibility of the financial sector reforms (including the banking sector recapitalization) in Nigeria. The Johansen cointegration test revealed a long run relationship among the variables. The statistical significance of the one period lagged ECM supports this long run relationship and a satisfactory speed of adjustment. The diagnostic test result showed that the residuals are stable, normally distributed and not serially correlated. The result thus recommends that further development of the financial sector should be oriented towards the development of the private sector in Nigeria. This could be through making more fund available to the private sector through reduced interest rate on loans to the private sector and the removal of collateral bottlenecks in assign credit. The monetary authorities should continue with the banking sector reforms since the banking sector recapitalization has increased the strength of the banks in Nigeria. The cashless policy should be pursued with more vigour putting the realities of the Nigerian situation into consideration.

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