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THRESHOLD EFFECTS IN THE RELATIONSHIP BETWEEN BANKING CRISIS AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

The necessity to find out whether a threshold level exists for banking crisis beyond which it becomes detrimental to economic growth made the study to be imperative. On this premise, the specific objective is to ascertain optimal threshold level of banking crisis. The investigation was conducted using Hansen (2000) threshold regression approach. The results confirmed the existence of threshold effect in the relationship between banking crisis and economic growth in Nigeria. Although it is an inverse relationship, the optimal threshold level was established at 1%-2%, beyond which banking crisis was not conducive to the economy.

Key Words: ***Threshold effect, Banking Crisis, Economic Growth, Nigeria JEL Classification: G01, O40***

1.0 INTRODUCTION

According to Cecchetti, Kohler and Upper (2009), banking crises have plagued the world for centuries, touching virtually all regions and generations. In Nigeria, for example, the establishment of African Banking Corporation in 1892 ushered in modern banking (Familoni, 1995; Unugbro, 2010), but, according to Ndekwu (1994), it was also the first bank to face failure in Nigeria. From 1930 to 1959, the Nigerian banking system experienced failures and out of the 26 banks established during the colonial period, only four survived (Owualah, 1999). To Alashi (2002), the pre-1950s distress-syndrome was again experienced in the late 1980s, such that 60 out of the 115 banks as at December 1995 were distressed and most were closed by the Central Bank of Nigeria (CBN). Meanwhile, Nigeria Deposit Insurance Corporation (NDIC) (1994-2003) put the number of banks closed

between 1994 and 2003 at 34. Soludo (2004) revealed that as at March 2004, out of 89 banks in existence, 14 were marginal and 11 were unsound.

According to Sanusi (2010), the mass distress experienced in the banking system laid the foundations for the 2004 banking sector consolidation in Nigeria. By December, 2005 the deadline for the banking sector consolidation exercise, the number of banks reduced from 89 to 25 (NDIC, 2009). Besides, the 2007 USA global financial crisis also impacted on the Nigerian banking system. The takeover of eight banks by the Central Bank of Nigeria (CBN) in 2009 was an indication that the Nigerian banking system was still troubled. In the words of Ogunleye (2010) "contrary to expectation that the bank consolidation programme initiated in 2004 would ensure the emergence of stronger banks and a more resilient banking system, distress syndrome still pervades the banking system"(p.15). However, Cook (2011) remarked that the Nigerian banking reform of 2005 only enhanced safety and soundness by different measures but bank distress was not reported or under reported after 2005. Moreover, Obinagwan (2014) and Nnodim (2014) reported evidences of crisis in Nigeria banking system in 2013 and 2014.

Apparently, a crisis ridden banking system may be unable to discharge its roles efficiently and effectively. The roles as stated by the West African Institute for Financial and Economic Management (1998), Kama (2010) and Adeyemi (2010) include financial intermediation, provision of an efficient payment system and a vehicle for implementation of monetary policies. In addition, other effects of bank crisis in Nigeria are deposit run, massive portfolio shift to safer assets, reduction of the quality of bank credits, unemployment, demonetisation, instability in money demand, distortion in money supply, retardation of rate of the capital formation, low output as well as slow pace of economic growth and development (Ebhodaghe, 1995 & Ebhodaghe, 1996).

Annual growth rate of gross domestic product (GDP) in percentage that is most often used as proxy of economic growth that was 6.47% in 1989 rose to 12.76% in 1990 and this undefined rise in GDP percentage was overwhelming. Thereafter, it fell erratically till 2013 and never rose to the 1990's value except for 2004 that experienced a growth rate of 33.73%. Since the trend analysis indicates that GDP annual growth rate was adversely affected in the period of banking crisis, that is, 1989q1 to 2014q2 chosen by this study, it is then obvious that banking crisis has an adverse relationship with economic growth. Further, it is the contention of this study that the effects of banking crisis on the economy are always presented as if it is homogenous. Besides, the specific character of the relationship between banking crisis and economic growth is yet to be unraveled. In essence, consideration has not been given to finding out a threshold level of banking crisis above which it becomes harmful to growth. On this note, the study sets out to provide an answer to the question: What is the

threshold level of banking crisis beyond which it becomes detrimental to growth? Hence, this study focuses on ascertaining the threshold level of banking crisis in Nigeria between 1989q1 and 2014q2.The next section of this paper presents a review of selected previous studies and is followed by the research methodology**.** Thereafter comes the presentation and analysis of results. Finally, Concluding remarks are given in the last portion.

2.0 REVIEW OF SELECTED PREVIOUS STUDIES

Among the number of available studies that have attempted to establish the relationship between banking crisis and economic growth is the work of Barro (2001) that has analyzed the impact of banking crisis on growth in 67 industrialized and emerging countries using panel data analysis. The result indicated that banking crisis reduced GDP per capital growth rate. Dell Aricica, Detragiache, and Rajan (2004) examined the effect of banking crisis on growth and the industrial sector with the aid of United States of America data. The study used simple regression to estimate the single equation model. The results showed that sectors which rely more on external finance, value added and capital formation experienced a relatively less growth than sectors that rely less on external finance. Overall, bank crises have shown negative effects on growth. Put differently, bank crises have been shown to have exerted adverse exogenous effects on the real economy.

In addition, Cerra, and Saxena (2008) explored the effect of financial crisis on output in 190 countries for the period spanning 1960 - 2000. The result revealed that financial crisis affected GDP over a period of ten years after the crisis had come to an end. Similarly, Reinhart and Rogoff (2009) as well as Claessens, Rose, and Terrores (2009) in their respective study showed that in the long-term, economic growth was adversely affected by financial crisis. Cecchetti, Kohler, and Upper (2009) looked at the output costs of 40 systemic banking crisis from 1980 using cluster and trend analysis as well as multivariate regression. The study showed that only 20% of the crises had permanent effect on the level of GDP. The authors held that most systemic banking crises synchronised with periods of decreased growth and for recovery to reach previous levels of GDP, it took a number of years.

Furceri and Mourougane (2009) used 30 high-income countries of the Organisation for Economic Co-operation and Development (OECD) to study the impact of banking crisis on potential output over the period between 1960 and 2007. The study came to the conclusion that potential output would be reduced permanently by almost 1.5%. Ksantini and Boujelben (2014) used a dynamic panel model to evaluate the impact of financial crisis on GDP growth and investment in 25 countries that included Argentina, Austria, South Korea, Mexico and United

Kingdom. The study spanned 1998 – 2000. The results revealed an adverse relationship between banking crises and growth as well as banking crises and investment.

Hemen, Williams, and Olaniyi (2014) investigated the effect of the global financial crisis on economic growth in Nigeria for the period 1981-2011. The study used Zivot Andrews test for structural break and instrumental variable regression as well as ordinary least squares (OLS). The study established 2009 as the structural break point as well as that global financial crisis negatively affected economic growth, consumption and investment. The review above reveals that in the evaluation of the relationship between banking crisis and economic growth, no study used threshold regression analysis. Thus, the exact level effect of banking crisis beyond which it is detrimental to the economy has not been explored and understood.

3.0 METHODOLOGY

3.1 The Model

This study draws from Hansen's (2000) threshold autoregressive method of determining threshold level to address the objective of this study which is to ascertain optimal threshold level of banking crisis. The Hansen method specifies that individual observations are capable of falling into discrete classes premised on the value of an observed (threshold) variable; the threshold model of banking crisis for the study is specified as follows:

$$LOG(RGDP)_t = \omega_0 + \omega_1 LOG(RGDP)_{t-1} + \omega_2 LOG(BCI - BCI^*)_t + \omega_3 LOG(INV)_t + \omega_4 CPI_t$$
$$\omega_5 M_2 GDP_{t-1} + \omega_6 GEXP_{t-4} + \omega_7 PEM_t + \omega_8 FEM_t + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

BCI is Banking crisis index.

INV is Investment.

CPI is Consumer price index.

GEXP is Government expenditure as a ratio of gross domestic product.

M2GDP is M2 as a ratio of gross domestic product.

PEM is Parallel market exchange rate.

FEM is Foreign exchange market rate.

BCI^* is obtained from dummy variable with values 1 if $BCI_t >$ K* or 0 otherwise and K^* is the threshold of banking crisis to be computed.

3.2 Estimation procedure

The estimation process starts with data description and involves examining the nature of the data series used which is followed with the determination of their time series properties by applying Augmented Dickey-Fuller (ADF) and Dickey Fuller-Generalised Least Square (DF-GLS). Next, is the co integration test and estimation to ascertain banking crisis optimal threshold level through the threshold model, that is, equation 1. The first step in the procedure involved using the banking crisis index series to generate dummies. This was done through iteration of observations of uniform differential between values in discrete classes the banking crisis index series has been grouped into. Once this is completed, the study progresses to the second step. The second step involved the use of OLS to estimate the threshold model with each of the dummies in accordance with Hansen (2000). The sum squared residual (RSS) and adjusted R^2 recorded for each estimation of the threshold model were used to establish the threshold level of banking crisis. This was done by choosing the K* that minimized the RSS and maximized adjusted R^2 as the threshold level for banking crisis. Nevertheless, appropriate diagnostic tests were performed.

4.0 PRESENTATION AND ANALYSIS OF RESULTS

4. 1 Data description results

In this section, the variables engaged to ascertain the optimal threshold of banking crisis are described. The first of the variables is RGDP used to represent real output. It is the nominal income, that is, GDP adjusted for the effect of increasing prices. Put differently, it is the summation of the value added or income in the Nigerian economy within a given period that is adjusted to take care of the influence of increasing prices. For banking crisis index (BCI) variable, it is a composite index made up of two banking crisis indicators, namely ratio of non-performing loan to total loan and ratio of capital equity to total banks assets. Investment (INV) is another variable and it is the aggregate investment taken as gross fixed capital formation while CPI is used to indicate price level, that is, inflation and it is CPI with 2003 as the base year. In addition, broad money as a ratio of GDP (M_2GDP) variable is the value of broad money relative to the value of GDP.

Broad money is the measure of money supply which includes currency in circulation with the non-banking public and demand deposits (current accounts), savings as well as time deposits of the deposit money banks (CBN, 2011). The broad money measures total liquidity in the economy. With respect to GDP, it is the GDP at current price. It is the country's economic activity or nominal income. Another variable is government expenditure as a ratio of gross domestic product (GEXP) which measures the level of government expenditure

relative to GDP at current price. Government expenditure means the payment of flow of financial resources out from government (CBN, 2011) while GDP means economic activity of the country. Parallel market exchange rate (PEM) is another variable and it is the black market period average of the price of the naira relative to USA one dollar. It is the exchange rate for the naira vis-à-vis the USA dollar that is not the same with the official exchange rate fixed by government. Finally, the foreign exchange market rate (FEM) is the official period average price of the naira relative to the USA one dollar. Added to the above is the results and discussion of the descriptive statistics and correlation matrix in sub-sections 4.1.1 and 4.12, respectively which gave greater picture of the nature of the data shown in what follows.

4.1.1 Descriptive summary statistics results

From Table 1 which presents the descriptive summary statistics results, it is evident that the mean values of BCI, FEM, INV, CPI and PEM are less than their standard deviation values. This implies that there are impossible extreme values or outliers. It would be important to point out that, what is being observed is correct in the sense that by natural occurrence of these variables data, some of the values are negative while others experienced shock arising from transformation in the economy. Therefore, the result is not out of place. However, the mean values of M_2GDP, RGDP and GEXP are higher than their standard deviation values. It is therefore obvious that the variables' data have no extreme values and outliers. One out of the eight variables, that is, BCI is negatively skewed while the rest variables are positively skewed. This is consistent with economic theory. Again, that the mean values of all the variables are higher than the median, support the skewness result.

It is only RGDP and INV that have Kurtosis value above 3 while the rest are below 3. There is therefore evidence of lighter than normal tail. Apart from RGDP and INV, the other variables are almost inclining to satisfy the Kurtosis expected value of 3. The Jarque Berra statistics value at 5% level is insignificant and implies that distribution of the series follows normal distribution. In addition, the probability values that are low support the normal distribution. This implies that the data is normally distributed. It is also observable that the sum squared deviation of all the variables are all far from their respective means, which implies that the data are not reverting to their respective long term mean. Therefore, there is the possibility of trend in the data. The descriptive statistics as presented shows that the data are valuable. In addition, the nature of the data suggests that they are good for the purpose for which they were collected.

Table 1: Descriptive Statistics of Variables used in Ascertaining Optimal Threshold level of Banking crisis

	M2GDP	BCI	RGDP	FEM	INV	CPI	GEXP	PEM
Mean	0.993	-0.144	80525.370	50.302	198213.400	61.611	7.674	60.527
Median	0.938	-0.096	67362.350	15.560	26455.970	8.740	6.900	19.290
Maximum	1.694	0.000	348672.000	157.950	2590816.000	264.830	20.500	170.890
Minimum	0.359	-0.544	1028.000	0.540	883.000	0.220	1.200	0.000
Std. Dev.	-0.144	0.152	70692.160	61.242	419300.500	80.986	4.646	63.904
Skewness	0.313	-0.558	1.184	0.705	3.687	1.128	0.683	0.414
Kurtosis	2.149	1.957	4.275	1.680	18.972	2.889	2.835	1.443
Jarque-Bera	7.849	17.292	53.665	27.677	2295.293	37.866	14.030	23.076
Probability	0.020	0.000	0.000	0.000	0.000	0.000	0.001	0.000
Sum	176.7601	-25.611	14333516	8953.67	35281991	10966.73	1366	10773.82
Sum Sq. Dev.	17.2944	4.114921	8.85E+11	663852.2	3.11E+13	1160901	3820.381	722808.8

Source: Author's computation with data from CBN Statistical Bulletin,2008,2014; CBN Database; NDIC Quarterly,1992-1997; NDIC Annual Reports and Statement of Accounts ,1989-2014; and World Bank World Development Indicators CD ROM (2014).

4.1.2 Correlation matrix results

The correlation matrix as given in Table 2 shows mixed results. For example, a number of the variables like BCI displayed negative correlation. However, the correlation is not very strong with all variables. It is observable that GEXP and CPI have no strong correlation with 3 other variables while RGDP has no correlation with one variable. The correlation values are not strong enough. Therefore, it could be concluded that collinearity problem does not exist. On a general note, the data are good for a healthy model. In addition, when it is recalled that the state of correlation does not give the true picture of the relationship which exists between variables, the use of the data becomes reasonable.

Table 2: Correlation Matrix of Variables used in Ascertaining Optimal Threshold level of Banking Crisis

	M2GDP	BCI	RGDP	FEM	INV	CPI	GEXP	PEM	
M2GDP	1.00	0.22	0.43	0.29	-0.06	0.35	-0.10	0.18	
BCI	0.22	1.00	-0.27	-0.26	-0.16	-0.16	0.20	-0.38	
RGDP	0.43	-0.27	1.00	0.88	0.53	0.94	-0.62	0.87	
FEM	0.29	-0.26	0.88	1.00	0.51	0.94	-0.62	0.96	
INV	-0.06	-0.16	0.53	0.51	1.00	0.46	-0.34	0.53	
CPI	0.35	-0.16	0.94	0.94	0.46	1.00	-0.63	0.92	
GEXP	-0.10	0.20	-0.62	-0.62	-0.34	-0.63	1.00	-0.59	
PEM	0.18	-0.38	0.87	0.96	0.53	0.92	-0.59	1.00	

Source: Author's computation with data from CBN Statistical Bulletin, 2008, 2014; CBN Database; NDIC Quarterly, 1992-1997; NDIC Annual Reports and Statement of Accounts, 1989-2014; and World Bank World Development Indicators CD ROM (2014).

4.3 Time series properties results

The stationarity tests results performed by applying Augmented Dickey-Fuller (ADF) and Dickey Fuller-Generalised Least Square (DF-GLS) are as presented in Tables 3 and 4, respectively. The tests were conducted on each of the variables, namely log of RGDP, banking crisis index, log of investment, ratio of broad money (M_2) to GDP, consumer price index, ratio of government expenditure to GDP, parallel market exchange rate and foreign exchange market rate.

From Table 3, the Augmented Dickey-Fuller stationarity tests shows that the ADF test statistic are greater than the critical value of at least the 5 % significant level. Therefore, the series are non-stationary at their level form. At the first difference, the table reveals that the ADF statistics of the series are less than their critical values of at least 5 % significant level. Therefore, the series are stationary and suggest that the variables are integrated of order that is, I (1).

Table 3: Augmented Dickey Fuller Unit Root Test

Variables	Levels ADF statistic		First Difference ADF statistic		Order of Integration
	Constant	Constant and Trend	Constant	Constant and Trend	
LOG(RGDP)	2.3148	2.5843	-5.6301*	-11.9919*	I(1)
BCI	1.8071	2.1255	-16.1059*	-16.1052*	I(1)
LOG(INV)	1.4341	2.3444	-13.5564*	-13.5185*	I(1)
M2GDP	-2.3944	-2.4591	-5.8122*	-5.7954*	I(1)
CPI	1.9656	0.0804	-1.6835	-3.6632**	I(1)
GEXP	-1.6702	-3.1526	-9.8025*	-9.9015*	I(1)
PEM	0.3385	-2.0247	-10.5445*	-10.6I63*	I(1)
FEM	0.4512	-1.7391	-11.8619*	-11.9454*	I(1)

*significant at 1% level.

**significant at 5% level.

Source: Author's computation with data from CBN Statistical Bulletin,2008,2014; CBN Database; NDIC Quarterly,1992-1997; NDIC Annual Reports and Statement of Accounts ,1989-2014; and World Bank World Development Indicators CD ROM (2014).

The same results were obtained for all the variables when DF-GLS unit root test was applied as evident in Table 4. The Elliot-Rothenberg-stock DF-GLS test statistic for all the variables in absolute terms are less than their respective test critical values at 5 % level of significance at level form. Therefore, the null hypothesis of non-stationarity can be accepted for all the variables. At first difference, the Elliot-Rothenberg-stock DF-GLS test statistics for all the variables in absolute terms are greater than their individual critical values of 5 % level of significance. Thus, the null hypothesis of unit root process for all the variables is rejected. Therefore, the variables are I (1).

Table 4: DF - GLS Unit Root Test

Variables	Levels				First Difference				Order of Integration
	Constant		Constant and Trend		Constant		Constant and Trend		
	Sic Lags	DF-GLS Statistic	Sic Lags	DF-GLS Statistic	Sic Lags	DF-GLS Statistic	Sic Lags	DF-GLS Statistic	
LOG(RGDP)	4	0.9035	4	-1.4351	3	-5.6164*	3	-5.6979*	I(1)
BCI	1	-1.3788	0	-2.1954	0	-16.1515*	0	-16.1716*	I(1)
LOG(INV)	0	0.2476	0	-2.1896	0	-13.5112*	0	-13.5803*	I(1)
M2GDP	4	-1.5401	4	-2.3497	3	-4.8357*	3	-5.4929*	I(1)
CPI	7	1.9656	7	0.0804	6	-1.6835	6	-3.6632**	I(1)
GEXP	4	-1.6702	4	-3.1526	3	-9.8025*	3	-9.9015*	I(1)
PEM	1	0.3385	1	-2.0247	0	-10.5445*	0	-10.6163*	I(1)
FEM	0	0.4512	0	-1.7391	0	-11.8619*	0	-11.9454*	I(1)

*, ** denote significance at 1% and5%, level respectively.

Source: Author's computation **wi**th data from CBN Statistical Bulletin, 2008, 2014;CBN Database; NDIC Quarterly, 1992-1997; NDIC Annual Reports and Statement of Accounts, 1989- 2014; and World Bank World Development Indicators CD ROM (2014).

4.4 Cointegration test results

Considering the fact that all the variables are differenced stationary, it could be concluded that results of OLS regression may not yield spurious results. With this, the study progressed to ascertain whether long run

relationships exist among the variables using cointegration process. To facilitate this, the Engle-Granger two-step (EGTS) procedure was applied on the residual of the long run model of these variables. The results as presented in Tables 5 and 6 reveal that the ADF test statistic at level is less than the test critical value of 5 % level of significance. Hence, the null hypothesis of unit root process of the residual is rejected. Arising from these results is the conclusion that the variables of concern are cointegrated. By and large, a stable long run relationship exists among the variables. However, in the short run there could be some measure of distortions.

Also, Johansen cointegration test was conducted to investigate the existence of long-run relationship among the variables. The result as given in Table 7 indicates that for two values, the trace statistics were higher than the critical values and their P-values were less than 0.05. This shows that the null hypothesis of no cointegration was rejected at the 5 % level of significance. Thus, two cointegration relationships exist. For the Maximum-Eigen statistics, the null hypothesis of no cointegration was rejected at 5 % level of significance for only one. This is because of the fact that it is only that one which has a P-value that is less than 0.05 as well as having the Max-Eigen statistics higher than the 5 % critical value. Therefore, with the Max-Eigen statistics we have one cointegrating equation. It could be inferred that the variables in the long run are capable of attaining equilibrium. In essence, if there is occurrence of short run deviation, the variables are capable of moving together in the long run.

Table 5 : Unit Root Test of Residual Results (at Constant)

		t – statistic	**Prob.***
Augmented Dickey - Fuller Test Statistic		-4.8653	0.0001
Test critical values:	1% level	-3.4695	
	5% level	-2.8786	
	10% level	-2.5760	

Source: Author's computation with data from the residual of long run model of the variables.

Table 6: Unit Root Test of Residual Results (at Constant &Trend)

		t – statistic	**Prob.***
Augmented Dickey - Fuller Test Statistic		-4.8414	0.0006
Test critical values:	1% level	-4.0136	
	5% level	-3.4368	
	10% level	-3.1425	

Source: Author's computation with data from the residual of long run model of the variables.

Table 7: Test Results for Cointegration between Pairs of Variables

Equation	Trace Test, k=1				Maximum Eigen values , k=1				No of Cointegrating Equation
	H_o	H_A	Trace Statistics	5% Critical Values	H_o	H_A	Max-Eigen Statistic	5% Critical Values	
Equation (1)	R=0 * R≤1 * R≤2 R≤3 R≤4 R≤5 R≤6 R≤7	R=0 R=1 R=2 R=3 R=4 R=5 R=6 R=7	184.6638 125.8167 87.4341 59.2718 37.8411 21.1959 9.1503 9.1503	159.5297* 125.6154* 95.7537 69.8189 47.8561 29.7971 15.4947 3.8415	R=0* R≤1* R≤2 R≤3 R≤4 R≤4 R≤4 R≤4	R=0 R=1 R=2 R=3 R=4 R=4 R=4 R=4	58.847127. 38.3826 28.1624 21.4307 16.6452 12.0456 9.1475 0.0029	26.91* 24.13* 12.89 14.26 3.95 27.5843 21.1316 14.2646	2

Trace test indicates 2 cointegrating equations at the 0.05 level.

Max-eigen value test indicates 1 cointegrating equation at the 0.05 level.

* denotes rejection of the hypothesis at the 0.05 level.

Source: Author's computation with data from CBN Statistical Bulletin, 2008,2014;CBN Database; NDIC Quarterly, 1992-1997; NDIC Annual Reports and Statement of Accounts ,1989-2014; and World Bank World Development Indicators CD ROM (2014).

4 .5 Estimation results of banking crisis optimal threshold level model: long run output results

The result of the estimation of the output function meant to facilitate attainment of ascertaining the optimal threshold level of banking crisis is as displayed in Table 8. On a general note, the outcome of the estimations could be considered as robust and satisfactory. It should be noted that the essence of the lagging is to make the model dynamic in order to be able to capture past and current effects of the variables. The logarithm of the lagged RGDP variable as could be seen in Table 8, has a positive sign which is in conformity with *a priori* sign. In addition, it is significant at 0.01% level of significance. This result reveals that 1% increase (decrease) in the past level of output leads to 0.84% increase (decrease) in current output. The results point out that in the Nigerian economy there is no disconnect within the production process.

The banking crisis index variable exhibited the expected negative sign and is significant at the 0.05% level of significance. The negative sign means that as banking crisis intensifies, output declines. However, as the estimated coefficient is -0.31, it means 1 unit increase in banking crisis index will lead to a 31% decrease in output over the study period. The implication is that banking crisis adversely affects output, thus, economic activity.

The investment variable has the right positive sign and it is in line with theoretical dictates. The result indicates that a 1% increase in investment leads to a 0.05% increase in output, but investment lagged six quarters has the correct sign that is not significant. The ratio of M_2 to GDP lagged one quarter period has a positive sign that is significant at 0.05% level. This result is consistent with economic theory. However, its six quarter period lagged has the right sign but it is not significant. The result reveals that 1 unit increase in the ratio of M_2 to GDP lagged one quarter period leads to 22 % increase in output. The result shows that financial deepening plays a crucial role in the constitution of output in the Nigerian economy.

Inflation has no right sign but it is significant. When one recalls that there is supposed to be an inverse relationship between inflation and output, this result becomes a surprise. That it is significant suggests that it should be seen as a cognate policy relevant variable. Government expenditure as a ratio of GDP (GEXP) lagged at 4 quarter periods is positive which supports theoretical expectation. It is significant at 0.05% level. The low coefficient of 0.01 means a 1% increase in GEXP leads to 1% increase in output and it suggests profligacy in government expenditure. The parallel market exchange rate and foreign exchange rate has the appropriate sign but are not significant, while two quarter period parallel exchange rate does not possess the right sign and is not

significant. The interpretation is that, output declines as there is depreciation of the naira at the official or parallel market.

Table 8: Long Run Output Equation Results (Explanatory Variable: RGDP)

Variables	**Coefficient**	**Std.error**	**t-statistic**	Probability
C	0.4425	0.1749	2.5304	0.0124
LOG(RGDP(-1))	0.8439	0.0348	24.2585	0.0000
BCI	-03097	0.1501	-2.0629	0.0407
LOG(INV)	0.0534	0.0196	2.7225	0.0072
LOG(INV(-6))	0.0203	0.0219	0.9254	0.3562
M2GDP(-1)	0.2158	0.0938	2.3005	0.0227
M2GDP(-6)	0.1241	0.0874	1.4201	0.1575
CPI	0.0022	0.0009	2.4485	0.0154
GEXP(-4)	0.0088	0.0044	2.0262	0.0444
PEM	-0.0025	0.0024	-1.0574	0.2919
PEM(-2)	0.0018	0.0026	0.7066	0.4808
FEM	-0.0012	0.0010	-1.2104	0.2279
R-squared 0.9840				
Adjusted R-squared 0.9829				
Durbin-Watson stat 1.8415				

Source: Author's computation with data from CBN Statistical Bulletin, 2008, 2014; CBN Database; NDIC Quarterly, 1992-1997; NDIC Annual Reports andStatement of Accounts, 1989-2014; and World Bank World Development Indicators CD ROM (2014).

4.6 Estimation of banking crisis threshold level model results and discussions

The results of the estimation of the threshold level of banking crisis which established the optimal level of banking crisis that is conducive for economic activity in Nigeria is as shown in Table 9 below. The result indicates 1% and 2% as the point that maximised R^2 value, which is, 0.9841 and minimized RSS value, that is, 5.2941. Therefore, 1% and 2% are the optimal threshold levels of banking crisis. Therefore, anything below 1% and from 1% to 2% would not be inimical to growth while anything beyond 2% will not be conducive to economic activity.

Table 9: Estimation Results of Threshold Model and Determination of Banking Crisis Threshold

K	Variables	Coef.	Std.error	t-statistic	Prob.	RSS	R^2
1%	LOG(RGDP(-1)	0.8343	0.0359	23.2200	0.0000	5.2941	0.9841
	BCI-K1	-0.1174	0.0510	-2.3001	0.0227		
	LOG(INV)	0.0544	0.0196	2.7822	0.0060		
	LOG(INV(-6))	0.0184	0.0217	0.8447	0.3995		
	M2GDP(-1)	0.2269	0.0941	2.4113	0.0170		
	M2GDP(-6)	0.1531	0.0888	1.7246	0.0865		
	CPI	0.0019	0.0008	2.2533	0.0256		
	GEXP(-4)	0.0091	0.0043	2.0958	0.0377		
	PEM	-0.0029	0.0024	-1.2085	0.2287		
	PEM(-2)	0.0020	0.0026	0.7788	0.4373		
	FEM	-0.0011	0.0010	-1.1096	0.2689		
2%	LOG(RGDP(-1)	0.8343	0.0359	23.2200	0.0000	5.2941	0.9841
	BCI-K2	-0.1174	0.0510	-2.3001	0.0227		
	LOG(INV)	0.0544	0.0196	2.7822	0.0060		
	LOG(INV(-6))	0.0184	0.0217	0.8447	0.3995		
	M2GDP(-1)	0.2269	0.0941	2.4113	0.0170		
	M2GDP(-6)	0.1531	0.0888	1.7246	0.0865		
	CPI	0.0019	0.0008	2.2533	0.0256		
	GEXP(-4)	0.0091	0.0043	2.0958	0.0377		
	PEM	-0.0029	0.0024	-1.2085	0.2287		
	PEM(-2)	0.0020	0.0026	0.7788	0.4373		
	FEM	-0.0011	0.0010	-1.1096	0.2689		
3%	LOG(RGDP(-1))	0.8374	0.0355	23.5633	0.0000	5.3042	0.9841
	BCI-K3	-0.1145	0.0513	-2.2305	0.0271		
	LOG(INV)	0.0542	0.0196	2.7657	0.0063		
	LOG(INV(-6))	0.0178	0.0217	0.8206	0.4131		
	M2GDP(-1)	0.2197	0.0934	2.3510	0.0199		
	M2GDP(-6)	0.1531	0.0890	1.7202	0.0873		
	CPI	0.0019	0.0008	2.2276	0.0273		
	GEXP(-4)	0.0088	0.0043	2.0428	0.0427		
	PEM	-0.0029	0.0024	-1.2025	0.2310		
	PEM(-2)	0.0020	0.0026	0.7618	0.4473		
	FEM	-0.0011	0.0010	-1.0696	0.2864		
4%	LOG(RGDP(-1))	0.8423	0.0352	23.9623	0.0000	5.3276	0.9840

	BCI-K4	-0.1064	0.0516	-2.0614	0.0409		
	LOG(INV)	0.0538	0.0196	2.7420	0.0068		
	LOG(INV(-6))	0.0172	0.0218	0.7909	0.4302		
	M2GDP(-1)	0.2085	0.0927	2.2490	0.0259		
	M2GDP(-6)	0.1514	0.0893	1.6952	0.0920		
	CPI	0.0019	0.0008	2.1861	0.0303		
	GEXP(-4)	0.0085	0.0043	1.9665	0.0510		
	PEM	-0.0028	0.0024	-1.1606	0.2475		
	PEM(-2)	0.0019	0.0026	0.7218	0.4714		
	FEM	-0.0011	0.0010	-1.0291	0.3050		
5%	LOG(RGDP(-1))	0.8496	0.0347	24.5003	0.0000	5.3655	0.9839
	BCI-K5	-0.0943	0.0536	-1.7578	0.0807		
	LOG(INV)	0.0539	0.0197	2.7358	0.0069		
	LOG(INV(-6))	0.0162	0.0218	0.7414	0.4595		
	M2GDP(-1)	0.1890	0.0913	2.0693	0.0401		
	M2GDP(-6)	0.1518	0.0905	1.6774	0.0954		
	CPI	0.0018	0.0009	2.1378	0.0341		
	GEXP(-4)	0.0080	0.0043	1.8621	0.0644		
	PEM	-0.0027	0.0024	-1.1025	0.2719		
	PEM(-2)	0.0017	0.0026	0.6586	0.5111		
	FEM	-0.0010	0.0010	-0.9556	0.3407		
6%	LOG(RGDP(-1))	0.8496	0.0347	24.5003	0.0000	5.3655	0.9839
	BCI-K6	-0.0943	0.0536	-1.7578	0.0807		
	LOG(INV)	0.0539	0.0197	2.7358	0.0069		
	LOG(INV(-6))	0.0162	0.0218	0.7414	0.4595		
	M2GDP(-1)	0.1890	0.0913	2.0693	0.0401		
	M2GDP(-6)	0.1518	0.0905	1.6774	0.0954		
	CPI	0.0018	0.0009	2.1378	0.0341		
	GEXP(-4)	0.0080	0.0043	1.8621	0.0644		
	PEM	-0.0027	0.0024	-1.1025	0.2719		
	PEM(-2)	0.0017	0.0026	0.6586	0.5111		
	FEM	-0.0010	0.0010	-0.9556	0.3407		
7%	LOG(RGDP(-1))	0.8496	0.0347	24.5003	0.0000	5.3655	0.9839
	BCI-K7	-0.0943	0.0536	-1.7578	0.0807		
	LOG(INV)	0.0539	0.0197	2.7358	0.0069		
	LOG(INV(-6))	0.0162	0.0218	0.7414	0.4595		
	M2GDP(-1)	0.1890	0.0913	2.0693	0.0401		

	M2GDP(-6)	0.1518	0.0905	1.6774	0.0954		
	CPI	0.0018	0.0009	2.1378	0.0341		
	GEXP(-4)	0.0080	0.0043	1.8621	0.0644		
	PEM	-0.0027	0.0024	-1.1025	0.2719		
	PEM(-2)	0.0017	0.0026	0.6586	0.5111		
	FEM	-0.0010	0.0010	-0.9556	0.3407		
8%	LOG(RGDP(-1))	0.8496	0.0347	24.5003	0.0000	5.3655	0.9839
	BCI-K8	-0.0943	0.0536	-1.7578	0.0807		
	LOG(INV)	0.0539	0.0197	2.7358	0.0069		
	LOG(INV(-6))	0.0162	0.0218	0.7414	0.4595		
	M2GDP(-1)	0.1890	0.0913	2.0693	0.0401		
	M2GDP(-6)	0.1518	0.0905	1.6774	0.0954		
	CPI	0.0018	0.0009	2.1378	0.0341		
	GEXP(-4)	0.0080	0.0043	1.8621	0.0644		
	PEM	-0.0027	0.0024	-1.1025	0.2719		
	PEM(-2)	0.0017	0.0026	0.6586	0.5111		
	FEM	-0.0010	0.0010	-0.9556	0.3407		
9%	LOG(RGDP(-1))	0.8496	0.0347	24.5003	0.0000	5.3655	0.9839
	BCI-K9	-0.0943	0.0536	-1.7578	0.0807		
	LOG(INV)	0.0539	0.0197	2.7358	0.0069		
	LOG(INV(-6))	0.0162	0.0218	0.7414	0.4595		
	M2GDP(-1)	0.1890	0.0913	2.0693	0.0401		
	M2GDP(-6)	0.1518	0.0905	1.6774	0.0954		
	CPI	0.0018	0.0009	2.1378	0.0341		
	GEXP(-4)	0.0080	0.0043	1.8621	0.0644		
	PEM	-0.0027	0.0024	-1.1025	0.2719		
	PEM(-2)	0.0017	0.0026	0.6586	0.5111		
	FEM	-0.0010	0.0010	-0.9556	0.3407		
10%	LOG(RGDP(-1))	0.8496	0.0347	24.5003	0.0000	5.3655	0.9839
	BCI-K10	-0.0943	0.0536	-1.7578	0.0807		
	LOG(INV)	0.0539	0.0197	2.7358	0.0069		
	LOG(INV(-6))	0.0162	0.0218	0.7414	0.4595		
	M2GDP(-1)	0.1890	0.0913	2.0693	0.0401		
	M2GDP(-6)	0.1518	0.0905	1.6774	0.0954		
	CPI	0.0018	0.0009	2.1378	0.0341		
	GEXP(-4)	0.0080	0.0043	1.8621	0.0644		
	PEM	-0.0027	0.0024	-1.1025	0.2719		

	PEM(-2)	0.0017	0.0026	0.6586	0.5111		
	FEM	-0.0010	0.0010	-0.9556	0.3407		
11%	LOG(RGDP(-1))	0.8496	0.0347	24.5003	0.0000	5.3655	0.9839
	BCI-K11	-0.0943	0.0536	-1.7578	0.0807		
	LOG(INV)	0.0539	0.0197	2.7358	0.0069		
	LOG(INV(-6))	0.0162	0.0218	0.7414	0.4595		
	M2GDP(-1)	0.1890	0.0913	2.0693	0.0401		
	M2GDP(-6)	0.1518	0.0905	1.6774	0.0954		
	CPI	0.0018	0.0009	2.1378	0.0341		
	GEXP(-4)	0.0080	0.0043	1.8621	0.0644		
	PEM	-0.0027	0.0024	-1.1025	0.2719		
	PEM(-2)	0.0017	0.0026	0.6586	0.5111		
	FEM	-0.0010	0.0010	-0.9556	0.3407		
12%	LOG(RGDP(-1))	0.8532	0.0342	24.9627	0.0000	5.3775	0.9838
	BCI-K12	-0.0895	0.0542	-1.6513	0.1006		
	LOG(INV)	0.0537	0.0197	2.7242	0.0072		
	LOG(INV(-6))	0.0157	0.0219	0.7180	0.4738		
	M2GDP(-1)	0.1815	0.0907	2.0006	0.0471		
	M2GDP(-6)	0.1486	0.0905	1.6420	0.1026		
	CPI	0.0018	0.0009	2.1194	0.0356		
	GEXP(-4)	0.0078	0.0043	1.8161	0.0712		
	PEM	-0.0027	0.0025	-1.0826	0.2806		
	PEM(-2)	0.0016	0.0026	0.6311	0.5289		
	FEM	-0.0009	0.0010	-0.9146	0.3618		
13%	LOG(RGDP(-1))	0.8532	0.0342	24.9627	0.0000	5.3775	0.9838
	BCI-K13	-0.0895	0.0542	-1.6513	0.1006		
	LOG(INV)	0.0537	0.0197	2.7242	0.0072		
	LOG(INV(-6))	0.0157	0.0219	0.7180	0.4738		
	M2GDP(-1)	0.1815	0.0907	2.0006	0.0471		
	M2GDP(-6)	0.1486	0.0905	1.6420	0.1026		
	CPI	0.0018	0.0009	2.1194	0.0356		
	GEXP(-4)	0.0078	0.0043	1.8161	0.0712		
	PEM	-0.0027	0.0025	-1.0826	0.2806		
	PEM(-2)	0.0016	0.0026	0.6311	0.5289		
	FEM	-0.0009	0.0010	-0.9146	0.3618		
14%	LOG(RGDP(-1))	0.8532	0.0342	24.9627	0.0000	5.3775	0.9838

	BCI-K14	-0.0895	0.0542	-1.6513	0.1006		
	LOG(INV)	0.0537	0.0197	2.7242	0.0072		
	LOG(INV(-6))	0.0157	0.0219	0.7180	0.4738		
	M2GDP(-1)	0.1815	0.0907	2.0006	0.0471		
	M2GDP(-6)	0.1486	0.0905	1.6420	0.1026		
	CPI	0.0018	0.0009	2.1194	0.0356		
	GEXP(-4)	0.0078	0.0043	1.8161	0.0712		
	PEM	-0.0027	0.0025	-1.0826	0.2806		
	PEM(-2)	0.0016	0.0026	0.6311	0.5289		
	FEM	-0.0009	0.0010	-0.9146	0.3618		

Source: Author's computation with data from CBN Statistical Bulletin, 2008, 2014; CBN Data base; NDIC Quarterly, 1992-1997; NDIC Annual Reports and Statement of Accounts, 1989-2014; and World Bank World Development Indicators CD ROM (2014).

5.0 DISCUSSIONS AND CONCLUSIONS

This study examined the relationship between banking crisis and economic growth in Nigeria with focus on the threshold effects of the former variable on the latter. To this end quarterly data from 1989q1 to 2014q2 and Hansen (2000) threshold autoregressive method was used to estimate the threshold level. The findings suggest banking crisis threshold level of 1% to 2%. The finding reveal that low banking crisis does not affect economic growth but banking crisis above the threshold is detrimental to economic growth. The findings obtained in this study have made it reasonable to prescribe the following for the purposes of policy. The monetary authorities should introduce banking crisis targeting framework. It is recommended that CBN and NDIC prescribe a target banking crisis point which should be below the optimal level to facilitate stabilisation of economic activities.

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CONFLICT OF INTEREST

We share no conflict of interest in this study.

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