Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.5, No.10, 2014

Macroeconomic Determinants of Bank Deposits in Nigeria

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Abstract

The paper empirically examines the macroeconomic determinants of bank deposits in Nigeria using data covering the period between 1980 and 2010. It tries to analyze the effects of various macroeconomic indicators, on the performance of banks within the context of deposit mobilization of banks and its determinants. The parsimonious ECM result showed that in Nigeria, bank investment, bank branches, interest rate and the general price level are important determinant of bank deposit. The Vector Error Correction and Johansen cointegration test indicates a long run relationship among the variables and the ECM result showed a satisfactory speed of adjustment. It is thus recommended among others that both the banks and the monetary authorities should take these factors into serious consideration when attempting to improve the deposits of banks and this will go a long way in increasing aggregate investment.

Keywords: Bank Deposits, resources mobilization, macroeconomic determinants Vector Error Correction Model,

Introduction

The banking industry and its monetary reforms all over the world recognize the imperativeness of bank deposits in its resource mobilization drive. A precursor to reaching any economy's dream in this regard is the understanding of how banks generate their funds, which essentially has its roots in bank deposit creation. Bank deposits have been of interest to many scholars, investors and the government in past decades yet not much has been realized in terms of research and literature. Most studies in recent past tended to focus on interest rate spread rather than on determinants of deposit creation in banks in defense of efficiency in the banking sector. Demirgue-Kunt and Huizinga (1999), Moore and Craigwell (2000) and Sologoub (2006). However there seemto be a slightly counter view by Brock and Franken (2002) holding on to the view that individual bank's specific characteristics are more potent in impacting on commercial banks net interest margins. This study however takes a look at the determinants of bank deposits recognizing bank investment, interest rate, bank branches and consumer price index (proxy for inflation) as relevant macroeconomic indicators of bank deposit creation.

To an investor, deposits are the most secured and liquid financial assets available, which can accelerate bank lending to various sectors. In this nexus it is imperative to state that deposit mobilization behaviour in any economy is closely tied with the lending behaviours and as a consequence an analysis of the determinants of bank deposits ii imperative. To buttress this need, bankers of international repute Nwankwo(2000);Herald Finger and HeikoHesse (2009) made sounding observation on the need for deposit creation. . According to Nwankwo (2000), credit constitutes the largest single income-earning asset in the portfolio of most banks in Nigeria hence the need for banks to spend enormous resources to estimate, monitor and manage credit quality. This is undoubtedly a practice that impact greatly on the lending behavior of banks as large resources are involved. Similarly, Finger and Hesse (2009) observed that commercial bank deposits are key to ensuring continued government financing in Lebanon because with the high government debt largely held by the domestic commercial banks, their continued funding mainly from resident and non-resident deposits is an important gauge to the viability of the Lebanese financing model. They argued further that available statistics do not shed more light on the origins of deposit; it is pretty difficult to substantiate bank deposits in isolation without recourse to lending behavior theories which provide the basis for fund mobilization in the banking industry.

It needs be noted that commercial banks are highly sensitive organization open to public scrutiny. As such, they must continuously ensure their profitability, which is essential for their growth and viability as also for infusing public confidence. Thus, banks have assumed greater responsibilities in mobilizing domestic resources for financing the priorities of the economy. Resource mobilization is an integral part of banking activity. Bank deposits have certain peculiar features which combine the cannons of liquidity, profitability and security. Further, the main objective of bank nationalization is tapping of potential savings and marshalling them for strategic uses for productive purposes. To an investor, deposits are the most secure and liquid financial assets available, which can accelerate banks lending to various sectors.

Deposit mobilization is the most important function of commercial banks since their successful functioning depends on the extent of funds mobilized. The government has directed banks from time to time to make all possible efforts to mobilize new deposit, which can only expedite the pace of lending activities by banks from the surplus units to deficit units in the development of the economy. From historical perspectives, commercial banks are the most important savings, mobilization and financial resource allocation institutions. In performing these roles, banks are expected to have the potential scope and prospects for mobilizing financial resources and allocating them to productive investments, thus lending, which is underscored by bank deposit determinants in this study, constitute a major source of the creation of deposits to meet the growing needs of the economy In the light of the above therefore, this paper seeks to examine the macroeconomic determinants of bank deposits within the context of banks' lending behaviours as influenced by lending policy of commercial banks in Nigeria. The rest part of the paper made up of the theoretical underpinning and literature review, followed by model specification and estimation procedure, while the last section dwells on conclusion

Theoretical Underpinningsand Literature Review

The theoretical basis for understanding the crucial position of bank deposit in the banking activities has been highlighted by Darby (1976) in which emphasizes was laid on the importance of deposits in the money supply process for banking activities. Accordingly, money supply, M,inrecognizing such variables as monetary base B and bank reserves R, is given by

$M = F + BD$ ---------- 1

Where M = money supply

F = currency and coin held by non-bank public

BD = Bank deposits

Taking B, the monetary base as comprising of total amount of government-created money made up of the sum of currency and coin held by the non-bank public and bank reserves of currency and coin ("vault cash") plus deposits at the Fed (Federal Reserve System in the U.S):

$B = F + R$ ---------- 2

Dividing eqn. 1 by eqn. 2 and multiplying both sides by B gives

$M = \frac{F + BD_B}{F + R}$ ---------- 3

Dividing eqn.3 by BD gives

$M = \frac{(F/BD) + 1_B}{(F/BD) + (R/BD)}$ ---------- 4

$= \frac{(F/BD) + 1}{(F/BD) + (R/BD)}$ money multiplier, μ ---------- 5

Where F/BD = cash deposit ratio which measures public desired holdings of currency and coin relative to bank deposits

R/BD = reserve deposit ratio and measures the banks' desired holdings of reserves as a fraction of bank deposits.

$M = \mu B$

The orthodox practice in banks' intermediation role of deposit creation considers fundsflow mechanics from the surplus (sellers) unit to the deficit (buyers) unit in the financial sector investment process and as catalyst or pivot of economic growth. If the mechanics is not properly addressed in a liberalized, global openness policy setting the domestic economy becomes depressed in trade deficit and exchange rate disability, thus lending credence to dependency theory (Eriemo, 2009).McKinnon (1973) and Shaw, (1973) collectively emphasized this phenomenon in their pioneering insight that the financial sector could be catalyst of economic growth it if is developed and healthy. Accordingly, the benefits accruable from a healthy and developed financial system relate to savings mobilization and efficient financial intermediation functions of the financial institutions, savers and borrowers are linked up and this reduces transaction and search costs. Second, they create liquidity in the economy by borrowing on short-term and lending on long-term. Third, they reduce information costs, provide

risk management services and reduce risks involved in financial transactions. Fourth, the intermediaries bring the benefits of asset diversification to the economy. Fifth, they mobilize savings from atomized individuals for investment, thereby solving the problem of indivisibility in financial transactions. Finally, mobilized savings are invested in the most productive ventures irrespective of the source of the savings.

Guided by the above andto fully appreciate the macroeconomicrelationships that it engenders in its connection with lending policy of banks, a few theories have been advanced to explain the crucial roles played by these in the development of the banking business.

a. **Credit Market Theory**: A model of the neoclassical credit market postulates that the terms of credits clear the market. If collateral and other restrictions (covenants) remain constant, the interest rate is the only price mechanism. With an increasing demand for credit and a given customer supply, the interest rate rises, and vice versa. It is thus believed that the higher the failure risks of the borrower, the higher the interest premium (Ewert et al, 2000).

b. **Loan Pricing Theory**: Banks cannot always set high interest rate, e.g. trying to earn maximum interest income. Banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship (Boyd, John H., and David E. Runkle, 1993). If banks set interest rates too high, they may induce adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behavior or so called borrower moral hazard since they are likely to take on highly risky projects or investments. From the reasoning of Boyd, and Runkle , it is usual that in some cases we may find that the interest rate set by banks is commensurate with the risk of the borrowers.

c. **Theory of Multiple-Lending**: It is found in literature that banks should be less inclined to share lending (loan syndication) in the presence of well developed equity markets and after a process of consolidation. Both outside equity and mergers and acquisitions increase banks' lending capacities, thus reducing their need of greater diversification and monitoring through share lending. (Carletti et al, 2006; Ongene& Smith, 2000; Karceski et al, 2004; Degryse et al, 2004). This theory has a great implication for banks in Nigeria in the light of the current financial reform and the pervasive developments of the global economic melt-down.

Model Specification and Estimation Procedure

The estimation procedure for the study is the autoregressive conditional heteroskedasticity (ML – ARCH) method which encompasses Vector Error Correction Model (VEC). The instability in the Nigeria financial system specifically and the world economy in general has necessitated the estimation of the model of the determinants of bank deposits in Nigeria. For this purpose, the Vector Error Correction Model (VECM) which will also the Johansen cointegration test with its implied Error Correction Model (ECM) will be utilized. The model to be estimated is stated linearly as:

$$BD = b_0 + b_1 BB + b_2 BI + b_3 R + b_4 CPI + ut$$

$$b_1 > 0 \quad b_2 > 0 \quad b_3 > 0 \quad b_4 > 0$$

where:

BD = bank deposits

BI = bank investment

R = interest rate

CPI = consumer price index

BB = No. of bank branches

Ut = random variable

The first stage in the estimation process is the descriptive statisticsas shown in table 1 below:

Table 1: Summary of Result of Descriptive Statistics

Date: 03/27/12 Time: 11:07
Sample: 1980 2010

	LR	LCPI	LBI	LBD	LBB
Mean	2.773486	6.787130	8.669808	10.82202	4.601800
Median	2.901422	7.620901	8.653541	10.66282	4.483003
Maximum	3.586016	9.161287	12.56096	13.64410	5.247024
Minimum	1.945910	3.744787	5.783517	8.103555	4.080922
Std. Dev.	0.430296	1.827395	1.762164	1.788778	0.393911
Skewness	-0.458965	-0.314684	0.298667	0.084248	0.511423
Kurtosis	2.394726	1.575290	2.514535	1.586925	1.800196
Jarque-Bera	1.561562	3.133455	0.765293	2.615848	3.210755
Probability	0.458048	0.208727	0.682054	0.270381	0.200814
Sum	85.97806	210.4010	268.7640	335.4825	142.6559
Sum Sq. Dev.	5.554642	100.1812	93.15665	95.99183	4.554966
Observations	31	31	31	31	31

The skewness which measures the asymmetry of the distribution around its mean has values greater that 0 except in one occasion. This is an indication that the distribution has a long right tail. The kurtosis measures the flatness or peakedness of the series. The result shows that the LBI satisfies that condition. The other four variables have values less than 3. The result from the Jarque-bera test indicates an acceptance of the null hypothesis that the random variables are normally distributed.

The test for stationarity which forms the next stage was done with the Augmented Dickey Fuller (ADF) unit root test. The summary of the ADF unit test result is shown in table 2.

Table 2: Summary of ADF Unit Root Test Result

Variables	Level data	1st difference	1% critical value	5% critical value	10% critical value	Order of integration
R	-2.143729	-5.977726	-3.6852	-2.9705	-2.6242	I)1)
CPI	-1.383423	-4.915677	-3.6852	-2.9705	-2.6242	I (1)
BI	3..091613	-1.119045	-3.6852	-2.9705	-2.6242	I (0)
BD	-1.458697	-4.110299	-3.6852	-2.7705	-2.6242	I (1)
BB	0.303180	-3.671258	-3.6852	-2.7705	-2.6242	I (1)

The result of the ADF unit root test shows that all the variables except bank investment were originally non stationary after taking the first difference. Following Harvey (1990) and Gujarrati (1995), who showed that both I(1) and I(0) variables can cointegrate, we therefore carry all the variables along to test for cointegration.The Johansen methodology was adopted for this purpose because amongst others, it gives room for more than cointegrating vector. The summary of the Johansen cointegration test is presented in table 3.

Table 3: Summary of Johansen Cointegration test Result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.850941	97.85159	68.52	76.07
At most 1	0.577309	44.55607	47.21	54.46
At most 2	0.371692	20.44491	29.68	35.65
At most 3	0.231889	7.432600	15.41	20.04
At most 4	0.001628	0.045627	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 1 cointegrating equation(s) at both 5% and 1% levels

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.850941	53.29552	33.46	38.77
At most 1	0.577309	24.11116	27.07	32.24
At most 2	0.371692	13.01232	20.97	25.52
At most 3	0.231889	7.386973	14.07	18.63
At most 4	0.001628	0.045627	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 1 cointegrating equation(s) at both 5% and 1% levels

The result from both the trace statistic and the max-eigen statistics indicate one cointegrating equation in each case. This suggests a long run relationship among the bank deposits, interest rate, consumer price level, bank branches and the level of bank investment. The existence of at least one cointegrating equation permits us to estimate the ove-rparameterize and parsimonious Error Correction model. The summary of the ove-rparameterize and parsimonious ECM results are shown in tables 4 and 5 below:

Table 4: Summary of Overparameterize

ECM Model: Dependent Variable: DLBD

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLBB	7.306792	2.649420	2.757883	0.0154
DLBB(-1)	3.621153	2.985273	1.213006	0.2452
DLBB(-2)	4.219739	3.135883	1.345630	0.1998
DLBI	0.835855	0.406815	2.054632	0.0591
DLBI(-1)	-0.805573	0.417937	-1.927500	0.0745
DLBI(-2)	-0.250312	0.322847	-0.775327	0.4510
DLCPI	-0.373723	0.418681	-0.892620	0.3871
DLCPI(-1)	-0.224702	0.452488	-0.496592	0.6272
DLCPI(-2)	-0.334265	0.099132	-3.371914	0.0030
DLR	-0.418761	0.629355	-0.665381	0.5166
DLR(-1)	0.599164	0.131474	4.557272	0.0002
DLR(-2)	0.109360	0.645896	0.169316	0.8680
ECM(-1)	-0.699130	0.248539	-2.812960	0.0138
C	0.600273	0.327166	1.834765	0.0879

R-squared	0.880875	Mean dependent var	0.168059
Adjusted R-squared	0.866890	S.D. dependent var	0.699903
S.E. of regression	0.629256	Akaike info criterion	2.218294
Sum squared resid	5.543476	Schwarz criterion	2.884397
Log likelihood	-17.05612	F-statistic	81.49253
Durbin-Watson stat	2.278406	Prob(F-statistic)	0.000000

The parsimonious ECM result is gotten by deleting the insignificant and wrongly signed variables from the parsimonious ECM model. The appropriate lag length was selected with Akaike information criteria, the Schwarz criterion and the log likelihood. The summary of the parsimonious ECM model is presented below:

Table 5: Summary of Parsimonious ECM Result

Dependent Variable: DLBD

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLBB	4.533515	2.259579	2.006354	0.0573
DLBI	0.126757	0.049069	2.583240	0.0178
DLCPI(-2)	-0.210039	0.028056	-7.483633	0.0000
DLR(-1)	0.376861	0.154516	2.438968	0.0213
ECM(-1)	-0.667471	0.246564	-2.707087	0.0472
C	0.343605	0.261982	1.311559	0.2032

R-squared	0.910861	Mean dependent var	0.168059
Adjusted R-squared	0.905147	S.D. dependent var	0.699903
S.E. of regression	0.644717	Akaike info criterion	2.147398
Sum squared resid	9.144512	Schwarz criterion	2.432870
Log likelihood	-24.06357	F-statistic	41.96402
Durbin-Watson stat	2.085894	Prob(F-statistic)	0.000000

The parsimonious ECM result showed that the number of branches a bank has positively and significantly influence bank deposits in Nigeria. The result showed bank deposits. The result showed further that an increase in the branches of banks by 1 percent will increase the deposits generated by the banks by 4.53 percent. The implication of this is that an attempt by banks to open more branches, particularly in the non-banking rural communities in Nigeria will drastically increase the deposits generated by the banks which is good for aggregate investment. The result also showed that the previous level of the general price level proxy by consumer price index,CPI is a major determinant of bank deposit in Nigeria. The result showed that an increase in the general price level by 1 percent will reduce the level of bank deposits by 0.21 percent. This is implicative since high

level of prices discourages people from saving their money with the banks. The result also showed that the deposit interest rate is a major determinant of bank deposits in Nigeria. Although the coefficient for deposit rate is relatively high, the reality of this situation in Nigeria gets little or even negative discounts by depositing their money in the bank. This discourages people from depositing their money in the bank. Some actually see the bank as just safe place for keeping money because of high crime rates. Another important determinant of bank deposits in Nigeria is the bank investment which is the use to which money deposited are utilize.

The number of cointegrating equations and the number of lags provided a guide for the specification of a vector Error Correction Model. Table 6 shows the result of the VECM. The result of the VECM suggests that the bank deposit equation represents with a value of - 5.80320. The other variable, were statistically flawed. The VECM result thus shows how bank deposits responds to changes in bank investment, consumer price index, interest rate and bank branches.

The result from the cumulative sum of squares (CUSUM) and cumulative sum of squares of recursive residuals (CUSUM of squares) show that the model is stable over the study period. Fig 1 and Fig 2 show the result.

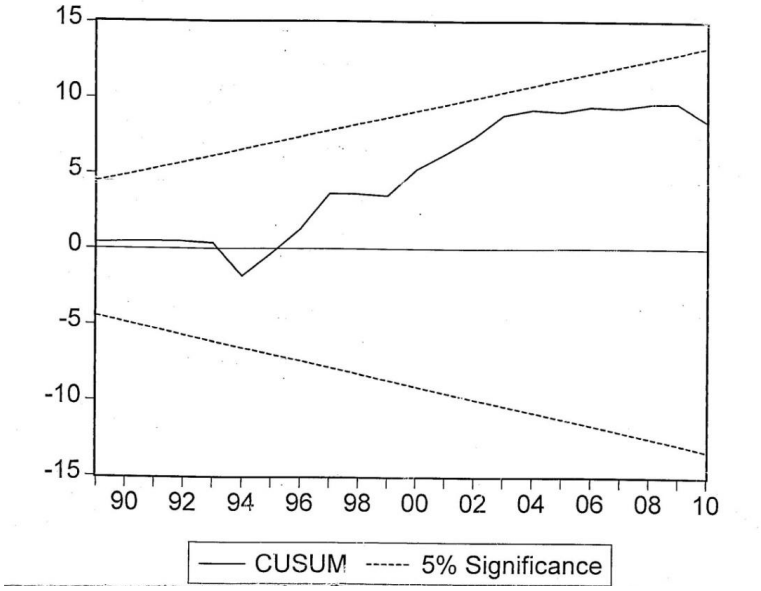

Figure 1: cumulative sum of squares (CUSUM)

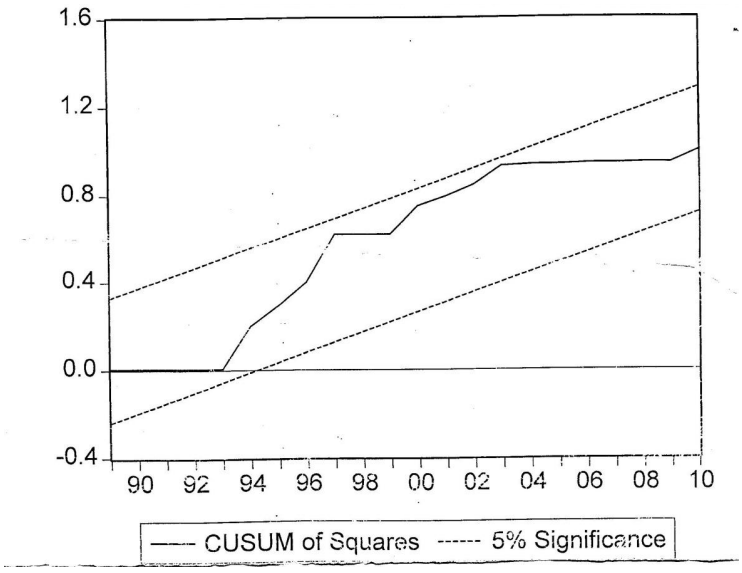

Figure 2: Cumulative (CUSUM of squares)

Conclusion

The paper examined the macroeconomic determinants of bank deposits within the context of fund mobilization in Nigeria.Accordingly, factors that determine bank deposits were carefully analyzed using the OLS technique and results are robust.The parsimonious ECM result showed that the number of branches, bank investment, interest rate and previous price level positively and significantly influence bank deposits in Nigeria. The paper thus brings to bear that bank deposit are determined by certain macroeconomic variables and the VECM result thus shows how bank deposits responds to changes in bank investment, consumer price index, interest rate and bank branches. The result from the cumulative sum of squares (CUSUM) and cumulative sum of squares of recursive residuals (CUSUM of squares) show that the model is stable over the study period as reflected in the results shown in Figures 1 and 2 and thus become a formidable policy reference point in banking reform planning

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