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 determinants 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,
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 Underpinnings and 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, recognizing such variables as monetary base B and bank reserves R, is given by

\[ M = F + BD \]  

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):

\[ B = F + R \]  

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

\[ M = F + BD_B \]  

Dividing eqn.3 by BD gives

\[ F = R \]  

\[ M = (F/BD) + 1 \]  

\[ (F/BD) + \mu \]  

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.

\[ \mu = \frac{M}{B} \]  

The orthodox practice in banks’ intermediation role of deposit creation considers funds flow 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 if it 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 and to fully appreciate the macroeconomic relationships 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:

\[ BD = b_0 + b_1 BB + b_2 BI + b_3 R + b_4 CPI + ut \]

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 statistics as shown in table 1 below:
Table 1: Summary of Result of Descriptive Statistics

<table>
<thead>
<tr>
<th>Date: 03/27/12</th>
<th>Time: 11:07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample: 1980-2010</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LR</th>
<th>LCPI</th>
<th>LBI</th>
<th>LBD</th>
<th>LBB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.773486</td>
<td>6.787130</td>
<td>8.669808</td>
<td>10.82202</td>
</tr>
<tr>
<td>Median</td>
<td>2.901422</td>
<td>7.620091</td>
<td>8.655341</td>
<td>10.66282</td>
</tr>
<tr>
<td>Maximum</td>
<td>3.568016</td>
<td>9.161287</td>
<td>12.56096</td>
<td>13.64410</td>
</tr>
<tr>
<td>Minimum</td>
<td>1.945910</td>
<td>3.744787</td>
<td>5.783517</td>
<td>8.103555</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.430296</td>
<td>1.827395</td>
<td>1.762164</td>
<td>1.788778</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.456955</td>
<td>-0.314684</td>
<td>0.298667</td>
<td>0.084248</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.394726</td>
<td>1.575290</td>
<td>2.514535</td>
<td>1.586925</td>
</tr>
</tbody>
</table>

The skewness which measures the asymmetry of the distribution around its mean has values greater than 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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level data</th>
<th>1st difference</th>
<th>1% critical value</th>
<th>5% critical value</th>
<th>10% critical value</th>
<th>Order of integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>-2.143729</td>
<td>-5.977726</td>
<td>-3.6852</td>
<td>-2.9705</td>
<td>-2.6242</td>
<td>I (1)</td>
</tr>
<tr>
<td>CPI</td>
<td>-1.383423</td>
<td>-4.915677</td>
<td>-3.6852</td>
<td>-2.9705</td>
<td>-2.6242</td>
<td>I (1)</td>
</tr>
<tr>
<td>BI</td>
<td>3.091613</td>
<td>-1.119045</td>
<td>-3.6852</td>
<td>-2.9705</td>
<td>-2.6242</td>
<td>I (0)</td>
</tr>
<tr>
<td>BD</td>
<td>-1.458697</td>
<td>-4.110299</td>
<td>-3.6852</td>
<td>-2.7705</td>
<td>-2.6242</td>
<td>I (1)</td>
</tr>
<tr>
<td>BB</td>
<td>0.303180</td>
<td>-3.671258</td>
<td>-3.6852</td>
<td>-2.7705</td>
<td>-2.6242</td>
<td>I (1)</td>
</tr>
</tbody>
</table>

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 Gujarati (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

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Trace Statistic</th>
<th>5 Percent Critical Value</th>
<th>1 Percent Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>None **</td>
<td>0.850941</td>
<td>97.85169</td>
<td>68.52</td>
<td>76.07</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.577309</td>
<td>44.55607</td>
<td>47.21</td>
<td>54.46</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.371692</td>
<td>20.44491</td>
<td>29.68</td>
<td>36.65</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.231869</td>
<td>7.432600</td>
<td>15.41</td>
<td>20.64</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.001628</td>
<td>0.045627</td>
<td>3.76</td>
<td>6.63</td>
</tr>
</tbody>
</table>

("**") denotes rejection of the hypothesis at the 5%(1%) level. Trace 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 over-parameterize and parsimonious Error Correction model. The summary of the over-parameterize and parsimonious ECM results are shown in tables 4 and 5 below:
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 4: Summary of Overparameterize ECM Model: Dependent Variable: DLBD

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLBB</td>
<td>7.360792</td>
<td>2.649420</td>
<td>2.757883</td>
<td>0.0154</td>
</tr>
<tr>
<td>DLBB(-1)</td>
<td>3.621153</td>
<td>2.985273</td>
<td>1.213006</td>
<td>0.2452</td>
</tr>
<tr>
<td>DLBB(-2)</td>
<td>4.219739</td>
<td>3.135883</td>
<td>1.345630</td>
<td>0.1998</td>
</tr>
<tr>
<td>DLBI</td>
<td>0.635655</td>
<td>0.406815</td>
<td>1.345630</td>
<td>0.1998</td>
</tr>
<tr>
<td>DLBI(-1)</td>
<td>-0.080573</td>
<td>0.417937</td>
<td>-1.927500</td>
<td>0.0745</td>
</tr>
<tr>
<td>DLBI(-2)</td>
<td>-0.250312</td>
<td>0.322847</td>
<td>-0.775327</td>
<td>0.4510</td>
</tr>
<tr>
<td>DLCPI</td>
<td>-0.373723</td>
<td>0.418681</td>
<td>-0.892520</td>
<td>0.3871</td>
</tr>
<tr>
<td>DLCPI(-1)</td>
<td>-0.224702</td>
<td>0.452488</td>
<td>-0.496592</td>
<td>0.6272</td>
</tr>
<tr>
<td>DLCPI(-2)</td>
<td>-0.334265</td>
<td>0.099132</td>
<td>-3.371914</td>
<td>0.0030</td>
</tr>
<tr>
<td>DLRI</td>
<td>-0.416761</td>
<td>0.620366</td>
<td>-0.665381</td>
<td>0.5166</td>
</tr>
<tr>
<td>DLRI(-1)</td>
<td>0.599184</td>
<td>0.131474</td>
<td>4.557272</td>
<td>0.0002</td>
</tr>
<tr>
<td>DLRI(-2)</td>
<td>0.109360</td>
<td>0.645896</td>
<td>0.169316</td>
<td>0.8680</td>
</tr>
<tr>
<td>ECM(-1)</td>
<td>-0.099130</td>
<td>0.248539</td>
<td>-2.812960</td>
<td>0.0038</td>
</tr>
<tr>
<td>C</td>
<td>0.600273</td>
<td>0.327166</td>
<td>1.834765</td>
<td>0.0879</td>
</tr>
</tbody>
</table>

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 a 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 utilized.

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.

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**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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