# Investigating the Dynamics of Bank Credit in Nigeria: The Role of Bank Consolidation[1]

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*This paper examines the dynamics of deposit money banks (DMB) credit and the role of consolidation in credit growth in Nigeria using vector error correction model and Granger causality test. The empirical investigation involved DMBs that have maintained a unique name and some market characteristics before and after the 2004 banking sector consolidation. Using quarterly data from 1999Q1 – 2013Q2 of the selected DMBs, the results show a positive relationship between post-consolidation credit supply growth and the real gross domestic product. The results also show that despite the one-sided positive causality from credit supply to economic growth, the total contribution of the consolidated credit growth to real activity was not significant. The paper, therefore, recommends that in order to improve the credit channel of monetary policy transmission, policy makers should take into account how the banks react to such policies.*

**Keyword:** Bank Consolidation, Credit Growth, Economic Activity, Monetary Policy

**JEL Classification: E20, E51, E52**

## 1.0    Introduction

It is well established that financial intermediaries have a fundamental role in determining the amount and distribution of credit to the economy. Nevertheless, there is less agreement about the precise way in which alternative structures of the banking industry due to bank consolidation will manifest their influence on the economy. Over the past two decades, the Nigerian banking sector has undergone remarkable changes, prominent among which is financial consolidation influenced largely by weak capital base of the banks, overdependence on public sector deposits, insolvency and internally focused competition (Soludo, 2004; Pat and James, 2011). In 2004 specifically, DMBs in Nigeria decreased from 89 to 25, primarily due to the wave of bank mergers and acquisitions (see Barros and Caporale, 2012). Alao (2010) also advocated for further mergers of DMBs in consonant with a

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former Governor of the Central Bank of Nigeria ideology of no more than 10-20 megabanks all over the world by 2025 and 2050 (see also Soludo, 2004). Of particular interest to the policy makers and analysts was the hope of an efficient banking system that will also make an extensive contribution to economic growth in the country through credit to private sector and establishment of robust asset management outlook (Pat and James, 2011; Lemo, 2005; Soludo, 2004).

According to Kashyap and Stein (1995), the sensitivity of loan to changes in monetary policy is related to bank size. In other words, it is believed that credits of big banks have greater sensitivity to changes in monetary policy than those of smaller banks. However, the existence of many banks may shelter small firms from the negative asymmetric effect of monetary policy, whereas a significantly concentrated banking industry may penalize them more than large firms. It is also evident in Nigeria that real activity which is encapsulated in gross domestic product (GDP) and consumer price index (CPI) is driven more by small firms than large firms. Bernanke and Gertler (1995) reported that increased riskiness of small firms during the periods of restrictive monetary policy causes banks to concentrate their loans on larger, more diversified firms. Given the dominance of small firms in Nigeria, the relationship between economic growth and DMB's credit growth after the merger at any instance of monetary policy shock motivates this study.

The objective of this paper therefore is to examine the dynamics of bank credit growth in Nigeria before and after bank consolidation. The intuition is that if a positive relationship exists between DMBs' credit growth and economic activity after the consolidation, then any wave of further bank mergers may be impactful to economic growth in Nigeria. This underpinning phenomenon, to the best of our knowledge, has since been an open problem until now. The remaining sections of the paper present a brief background of the study, the related literature, the methodology adopted for the analysis, estimation results, concluding remarks and policy implications.

## 1.1    Stylized Facts on DMBs in Nigeria and Consolidation

Bank consolidation is considered to be one of the major policy instruments in correcting deficiencies in the financial sector as well as accelerating the rate of growth in the sector (Barros and Caporale, 2012).

**Table 1:** Post-Consolidated Banks in Nigeria after 2004 Banking Reform

| S/N | Bank Name | Members of the Group | S/N | Bank Name | Members of the Group |
|---|---|---|---|---|---|
| 1 | **Access Bank Plc** | Marina Bank / Capital Bank International / Access Bank | 16 | **Skye Bank Plc** | Prudent Bank / Bond Bank / Coop Bank / Reliance Bank / European Investment Bank (EIB) |
| 2 | **Afribank Plc** | Afribank Plc / Afrimerchant Bank | 17 | **Springbank Bank Plc** | Guardian Express Bank / Citizens Bank / Fountain Trust Bank / Omega Bank / TransInternational Bank / African Continental Bank (ACB) |
| 3 | **Diamond Bank Plc** | Diamond Bank / Lion Bank / African International Bank (AIB) | | | |
| 4 | **EcoBank** | EcoBank | 18 | **Stanbic Bank Ltd** | Stanbic Bank |
| 5 | **Equitorial Trust Bank Plc** | Equatorial Trust Bank (ETB) / Devcom | 19 | **Standard Chartered Bank Ltd** | Standard Chartered Bank Ltd |
| 6 | **First City Monument Bank Plc (FCMB)** | FCMB / Co-operative Development Bank / Nig-American Bank / Midas Bank | 20 | **Sterling Bank Plc** | Magnum Trust Bank / NBM Bank / NAL Bank / Indo-Nigeria Merchant Bank / Trust Bank of Africa |
| 7 | **Fidelity Bank Plc** | Fidelity Bank / First Savings Bank / Manny Bank | | | |
| 8 | **First Bank Plc (FBN)** | FBN plc / FBN Merchant Bank / Muslim Commercial Bank (MBC) | 21 | **United Bank for Africa Plc (UBA)** | Standard Trust Bank (STB) / UBA / Continental Trust Bank |
| 9 | **FirstInland Bank Plc** | IMB International Bank / Inland Bank / First Atlantic Bank / NUB International Bank Limited | 22 | **Union Bank Plc** | Union Bank / Union Merchant Bank / Universal Trust Bank / Broad Bank |
| 10 | **Guaranty Trust Plc (GT)** | GT Bank | | | |
| 11 | **IBTC-Chartered Bank Plc** | Regent / Chartered / IBTC | 23 | **Unity Bank Plc** | New Africa Bank / Tropical Commercial Bank / Centre-Point Bank / Bank of the North / New Nigeria Bank (NNB) / First Interstate Bank / Intercity Bank / Societe Bancaire / Pacific Bank |
| 12 | **Intercontinental Bank Plc** | Global / Equity / Gateway / Intercontinental | | | |
| 13 | **Nigerian International Bank (NIB)** | Nigerian International Bank | | | |
| 14 | **Oceanic Bank Plc** | Oceanic Bank / In't Trust Bank | 24 | **Wema Bank Plc** | Wema Bank / National Bank |
| 15 | **Platinum-Habib Bank Plc** | Platinum Bank / Habib Bank | 25 | **Zenith International Bank Plc** | Zenith International Bank Plc |

*Source: CBN Publication (2006)[4]*

According to the Nigerian Companies and Allied Matters Act 1990, bank consolidation is defined as ''any amalgamation of the undertakings or any part of the undertakings or part of the undertakings of one or more companies and one or more bodies corporate'' (Alao, 2010). In other words, it is viewed as the reduction in the number of banks and other deposit taking institutions with a simultaneous increase in size and concentration of the consolidation entities in the sector as well as strengthening the institutional framework for the

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[4] http://www.cenbank.org/OUT/PUBLICATIONS/BSD/2006/COMPONENTS OF MERGED BANKS.PDF

conduct of monetary policy (see Assaf *et al.*, 2012; Balogun, 2007). Prior to the 2004 banking sector consolidation, the banking system was viewed as being highly oligopolistic with remarkable features of market concentration and leadership (Lemo, 2005).

In 2004, the banking industry of Nigeria consisted of 89 deposit money banks. The industry was disjointed into relatively small, weakly capitalized banks. It was observed that 19.2% of the total assets in the banking system as at June, 2004 was accounted for by marginal and unsound banks with 17.2% of total deposit liabilities, while industry non-performing assets was 19.5% of the total loans and advances (Soludo, 2004). The result of a new, much larger capital requirement was the consolidation of banks into larger entities where a number of mergers and acquisitions among Nigerian banks took place in order to meet the new capital requirement. In the end, the 89 banks that existed in 2004 decreased to 25 larger, better-capitalized banks (Table 1).

## 2.0    Review of Literature

Over the past decade, many studies have been conducted on the impact of mergers and acquisitions in various industries and in various countries. A substantial portion of these studies focused on the impact of mergers on bank loan and deposit rates (Craig and Dinger, 2008). However, it is believed from the theory of multiple-lending that mergers and acquisitions increase banks' lending capacities (Carletti *et al.*, 2006; Karceski *et al.*, 2004; Degryse *et al.*, 2004). Thus, most of the literature on the impact of bank consolidation focused basically on testing the validity of two hypotheses. One states that the consolidated banks might realize economies of scale and other efficiency gains, transferring these to the customers in the form of more beneficial interest rates; while the other states that they may exploit their increased market power and impose interest rates that are disadvantageous to customers (Craig and Dinger, 2008).

Literature on bank lending channel has also given credence to the role of banks in the monetary transmission mechanism (Chang and Jansen, 2005). De Graeve *et al.* (2007) reported that in the Belgian banking market, the loan prices of well capitalised and highly liquid banks are least responsive to changes in market rates, while Opiela and Kishan (2000) reported that loan growth of small, undercapitalized banks is more responsive to changes in

monetary policy than loan growth at lager and better-capitalized banks. Kashyap and Stein (1993) opined that in the period 1964 to 1989, interest rates on loans in the US depended positively on the real GDP and inflation rate. Several other commentators believed that the sensitivity of loans to changes in monetary policy is related to bank size (Chang and Jansen, 2005; Kashyap and Stein, 1995).

Hannan and Berger (1991) and Neumark and Sharpe (1992) documented that deposit rates adjusted sluggishly to changes in market interest rates. Other related studies include Berger and Hannan (1989) who showed, in a static framework, that high market concentration results in lower deposit rates. Later on, Hannan and Prager (1998) examined bank mergers and explored the dynamics of deposit rate changes. They found that after a substantial in-market merger, the merging banks significantly decreased their deposit rates, which they explained by an increase in market power. However, Focarelli and Panetta (2003) maintained that the post-merger period examined by Hannan and Prager was too short. They extended the analysis time and argued that, whereas merging banks tend to decrease deposit rates in the transition period (up to three years after the merger), deposit rates of merged banks go up and beyond those of rival banks in the long-run.

Montoriol-Garrige (2008) also investigated the impact of bank mergers and acquisitions on the average interest rates of firms and found significant impacts of bank consolidations on loan interest rate. In particular, the study finding showed significant positive effects of mergers for borrowers that continue their lending relationship with the consolidated bank. On average, consolidated banks were found to reduce loan interest rates and the most beneficial mergers from the borrower point of view were those involving two large banks and commercial banks.

Badreldin and Kalhoefer (2009) conducted a study to measure the performance of Egyptian banks that have undergone mergers or acquisitions during the period 2002-2007. Their findings indicated that not all banks that undergone deals of mergers or acquisitions shown significant improvements in performance and return on equity when compared to their performance before the deals. Thus the study suggested that mergers and acquisitions had no clear effect on the profitability of banks in the Egyptian banking sector. Pat and James (2011) investigated the impact of the consolidation of the banking industry on the Nigerian Capital Market between 2004 and 2008

using primary (questionnaires) and secondary data from the Nigerian Stock Exchange.

Azeez and Oke (2012) examined the effect of banking reforms on the economic growth of Nigeria from 1986 to 2010. The study modeled Gross Domestic Product as being dependent on Interest Rate Margin, Credit to Private Sector, Savings and Inflation, all representing banking reform indices. The overall findings suggested that banking reforms has not adequately and positively impacted on the economy.

Okafor (2012) evaluated the performance of Nigerian banks before and after the consolidation exercise, using t-test statistic to ascertain whether there was a significant difference in the performance of banks before and after consolidation. The result showed that consolidation had improved the performance of the Nigeria banking industry in terms of asset size, deposit base and capital adequacy. It concluded that the profit efficiency and asset utilization efficiencies of the banks deteriorated since the conclusion of the consolidation programme.

Overall, literature suggests that bank mergers will influence changes in credit supply, which will in turn affect real activity (Craig and Dinger, 2008; Bernanke and Gertler, 1995).

## 3.0    Methodology

This study is based on selected DMBs that have maintained the same brand name and some market characteristics for the pre and post-2004 banking reform on merger and acquisition with effect from January 1, 2006. Theory suggests that mergers will motivate positive changes in credit supply, which will in turn affect real activity. Using vector error correction model (VECM), we examined the influence of mergers on DMBs' credit growth and its relation with real activity at any instance of monetary policy shocks. To account for the impact of macroeconomic environment on credit demand, we include price changes captured by CPI and real GDP growth (Beņkovskis, 2008). The evidence on DMBs' credit dynamics is obtained by estimating the GDP growth that takes into account not only the monetary policy rate and CPI but also DMBs loans-specific differences in reaction to total deposit and required reserves. The thrust of this study is to establish whether or not there

exists a significant and positive relationship between loan growth and real activity after bank consolidation.

## 3.1 Model Specification

In order to achieve the stated objective, we first consider a dynamic vector autogression (VAR) model of the form:

$$\boldsymbol{X_t} = \boldsymbol{\mu} + A_1\boldsymbol{X_{t-1}} + A_2\boldsymbol{X_{t-2}} + \cdots A_p\boldsymbol{X_{t-p}} + \varphi_t + \boldsymbol{\varepsilon_t}; t = 1, \cdots, T \quad (1)$$

where $\boldsymbol{X_t} = (x_{1t}, x_{2t}, x_{3t}, \ldots, x_{kt})'$, is the numbers of endogenous variables; $\varphi$ denotes an exogenous dummy variable; $p$ is the lag length; $A$ is an $(k \times k)$ matrix of coefficients; $\boldsymbol{\varepsilon_t} = (\varepsilon_{1t}, \ldots \varepsilon_{kt})'$ denotes the shocks in the VAR system, and $t$ is the time period. Given non-stationarity in the series of interest, it became imperative to carry out a cointegration test to verify whether the series in the VAR model were cointegrated or not. With the existence of cointegration, the VECM version for Equation (1) is specified in the form:

$$\Delta\boldsymbol{X_t} = \boldsymbol{\pi_1}\Delta\boldsymbol{X_{t-1}} + \boldsymbol{\pi_2}\Delta\boldsymbol{X_{t-2}} + \cdots \boldsymbol{\pi_{p-1}}\Delta\boldsymbol{X_{t-p+1}} + \boldsymbol{\Phi}\boldsymbol{X_{t-1}} + \varphi_t + \boldsymbol{\varepsilon_t};$$
$$t = 1, \cdots, T \quad (2)$$

where $\boldsymbol{\pi_j} = -(I - A_1 - \cdots - A_j)$, $j = 1, \ldots, p - 1$; and $\boldsymbol{\Phi} = -(I - A_1 - \cdots - A_p)$. $\boldsymbol{\Phi} = \alpha\beta'$ where $\alpha$ is the speed of adjustment to disequilibrium and $\beta$ is a matrix of long-run coefficients.

Equation (2) is transformed into Equation (3) where the economic growth is regressed on its lag and lagged selected DMBs consolidated loan, CPI, monetary policy indicator, and DMBs specific characteristics like total deposit and required reserves. The log of real gross domestic product measures aggregate economic activity as follows:

$$\Delta lY_t = \mu + \sum_{i=1}^{k} \alpha_i \Delta lY_{t-j} + \sum_{i=1}^{k} \gamma_i \Delta lnX_{t-j} + \sum_{i=1}^{k} \eta_i \Delta lZ_{t-j} + \sum_{i=1}^{k} \lambda_i \Delta lR_{t-j}$$
$$+ \sum_{i=1}^{k} \theta_i \Delta LP_{t-j} + \sum_{i=1}^{k} \beta_i \Delta MPR_{t-j} + MD_t + \varepsilon_t \quad (3)$$

Here, $Y$ and $P$ denote real gross domestic product and consumer price index, respectively, which are proxies for real activity, $x$ is the consolidated credit to private sector, $MPR$ is monetary policy rate, $Z$ is the total deposit, $R$ is the required reserves and $MD$ denotes a merger/acquisition dummy assigned to

reflect the pre and post-merger era. The dummy variable takes the value of 1 when the data refers to the post-merger period ($i.e., when\ t = 2006Q1 - 2013Q2,$) and zero for the pre-merger period ($1999Q1 - 2005Q4$).

Various researchers have suggested several bank characteristics that determine how sensitive different banks are to changes in real activity and monetary policy to include bank size, reserve requirement and total deposits (Kashyap and Stein 1995; Peek and Rosengren, 1995). These formed the basis for including these variables in the model with the assumption that the size of the selected banks is large as a result of the merger.

## 3.2     Estimation Procedure

Prior to the estimation of the model, preliminary analyses were carried out due to the properties of most time series (see Figure 1 and Table 3). These include unit root tests using Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) test statistics to certify the stationarity of each series. Individual effect from the series was eliminated by taking the natural logarithm of the variables except ($MPR$) and differencing the equation once. Stability diagnosis was also carried out after selection of optimal lag length (Table 5). In what followed, a possible cointegrating relationship between the series was investigated using Johansen multivariate cointegration technique (Johansen, 1988). This technique provided two different likelihood ratio tests based on trace statistics and maximum eigenvalue statistics (Table 6). These tests were carried out to ensure stationarity and stability of the estimated coefficients on the condition that the disturbance in equation (1) is not subject to serial correlation. Cointegration between the variables could exist, as is the case in this work. At this instance, the model was analyzed as a VECM, with impulse response functions and forecast error variance decomposition defined as:

$$y_t = \Omega_0 u_t + \Omega_1 u_{t-1} + \Omega_2 u_{t-2} + \cdots, \tag{4}$$

$with\ \Omega_0 = I_k\ and\ \Omega_s$ computed recursively according to:

$$\Omega_s = \sum_{j=1}^{s} \Omega_{s-j} A_j \ for\ s = 1,2,\dots \tag{5}$$

where $A_j = 0\ for\ j > p$.

## 3.2    Data

The analysis was carried out using quarterly data for the period from the first quarter of 1999 until the second quarter of 2013 (58 observations) (Table 2). Data on loans and DMBs specific characteristics were computed from the quarterly CBN Statistical Bulletins, CBN Annual Reports and other CBN financial data sources.

The sample covers all banks that were operating with a unique name before and after the 2004 merger/acquisition. It is assumed that the selected DMBs share common characteristics before and after the merger. Other DMBs were not included in the analysis due to lack of unique data of specific characteristics in their balance sheets. We treat mergers in such a way that DMBs involved in a merger were consolidated and subsequently reported under the absorbing bank for the whole sample period. Thus, DMBs that were absorbed were not included in the original sample, which consists of 5 independent DMBs.

## 4.0    Empirical Results

The graphical representation in Figure 1 shows that except for MPR and R all other series exhibited trend effects while the descriptive statistics in Table 3 shows the asymmetries in the series, implying they are not normally distributed. The standard deviation for all the series except for P and MPR was relatively large.

A preliminary check for stationarity of the series shows in general that all the series are integrated of order 1 using Augmented Dickey-Fuller (ADF), Phillips-Peron (PP) and Kwiatkowski-Phillips-Schmidt-Shin test statistic.

Table 2: Unit Root Statistics

| Variable | ADF | PP | KPSS | Decision |
|---|---|---|---|---|
| LY | -7.85884* | -17.7736* | 0.215362*** | I(1) |
| LX | -4.70873* | -4.69498* | 0.106057* | I(1) |
| LZ | -2.52367** | -9.35574* | 0.435931*** | I(1) |
| LR | -8.66793* | -8.67212* | 0.14424* | I(1) |
| LP | -7.638837 * | -12.28522 * | 0.162868*** | I(1) |
| MPR | -6.664* | -6.65919* | 0.306413 * | I(1) |

*(\*;\*\*;\*\*\* impliy significance at 5%, 10% and not significance at 5%)*

While ADF and PP hypothesized on existence of unit root, KPSS hypothesized on existence of stationarity. The results presented in Table 2 give a confirmation of two out of the three tests statistics which is sufficient to conclude the non-stationarity of the series.

**Table 3:** VAR Lag Order Selection Criteria

| Endogenous variables: LY LX LZ LR LP MPR | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Exogenous variables: C MERGER | | | | | | |
| Lag | LogL | LR | FPE | AIC | SC | HQ |
| 0 | -6.116784 | NA | 8.09E-08 | 0.696799 | 1.147086 | 0.869429 |
| 1 | 244.2279 | 423.6603 | 2.16E-11 | -7.547228 | -5.746080* | -6.85671 |
| 2 | 309.6276 | 95.58418 | 7.44E-12 | -8.677986 | -5.525977 | -7.46958 |
| 3 | 364.4923 | 67.52578 | 4.26E-12 | -9.403551 | -4.900681 | -7.677257 |
| 4 | 438.083 | 73.59068* | 1.41e-12* | -10.84935* | -4.995615 | -8.605164* |

\* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

For selection of appropriate lag length, the Schwarz information criterion (SIC) used indicates that the VAR has lag length of one (Table 3).

**Table 4: Johansen Maximum Likelihood Tests for Cointegration**

| Unrestricted Cointegration Rank Test (Trace) | | | | Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Hypothesized | Trace | 0.05 | | Hypothesized | Max-Eigen | 0.05 | |
| No. of CE(s) | Eigenvalue Statistic | Critical Value | Prob.** | No. of CE(s) | Eigenvalue Statistic | Critical Value | Prob.** |
| None * | 0.877957 177.3352 | 95.75366 | 0.0000 | None * | 0.877957 113.5825 | 40.07757 | 0.0000 |
| At most 1 | 0.418768 63.75272 | 69.81889 | 0.1385 | At most 1 | 0.418768 29.30067 | 33.87687 | 0.1597 |
| At most 2 | 0.30937 34.45205 | 47.85613 | 0.4773 | At most 2 | 0.30937 19.98813 | 27.58434 | 0.342 |
| At most 3 | 0.188587 14.46392 | 29.79707 | 0.8136 | At most 3 | 0.188587 11.28482 | 21.13162 | 0.6189 |
| At most 4 | 0.057172 3.179104 | 15.49471 | 0.9582 | At most 4 | 0.057172 3.179077 | 14.2646 | 0.9341 |
| At most 5 | 5.04E-07 2.72E-05 | 3.841466 | 0.9981 | At most 5 | 5.04E-07 2.72E-05 | 3.841466 | 0.9981 |

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level     Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
\* denotes rejection of the hypothesis at the 0.05 level     \* denotes rejection of the hypothesis at the 0.05 level
\**MacKinnon-Haug-Michelis (1999) p-values     \**MacKinnon-Haug-Michelis (1999) p-values

Given that all series have unit roots, a Johansen Maximum Likelihood ratio tests for cointegration was conducted. The results given in Table 4 indicate the existence of one cointegrating vector.

Thus, our benchmark model was identified as a first-order linear VECM. Hence, a causal inference was drawn via Granger causality tests (Table 5).

**Table 5:** VEC Granger Causality/Block Exogeneity Wald Tests

| Dependent variable: D(LY) | | | | Dependent variable: D(LX) | | | | Dependent variable: D(LP) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Excluded | Chi-sq | df | Prob. | Excluded | Chi-sq | df | Prob. | Excluded | Chi-sq | df | Prob. |
| D(LX) | 22.46009 | 1 | 0.0000 | D(LY) | 0.04114 | 1 | 0.8393 | D(LY) | 0.197456 | 1 | 0.6568 |
| D(LZ) | 6.42391 | 1 | 0.0113 | D(LZ) | 1.580857 | 1 | 0.2086 | D(LX) | 0.001068 | 1 | 0.9739 |
| D(LR) | 5.352613 | 1 | 0.0207 | D(LR) | 4.52218 | 1 | 0.0335 | D(LZ) | 0.801313 | 1 | 0.3707 |
| D(LP) | 0.003353 | 1 | 0.9538 | D(LP) | 1.52742 | 1 | 0.2165 | D(LR) | 0.683013 | 1 | 0.4086 |
| D(MPR) | 0.044315 | 1 | 0.8333 | D(MPR) | 9.904124 | 1 | 0.0016 | D(MPR) | 0.047982 | 1 | 0.8266 |
| All | 31.57961 | 5 | 0.0000 | All | 14.72752 | 5 | 0.0116 | All | 1.847487 | 5 | 0.8698 |

A cursory observation of Table 6 shows that in line with theoretical expectation, DMBs loan supply growth after the merger have a positive relationship with gdp that measures aggregate economic activity, at 95% percent level of confidence. Interestingly, it could also be seen that increased real activity which include changes in GDP and CPI as a benchmark for loan demand, does not incites loan growth of DMBs. Diagnosing the empirical model's dynamic behavior through forecast error variance decompositions (Table 8) and impulse response functions (Figure 2) present further detailed explanations.

The results in Table 5 show that CPI may not be contributing significantly directly to loan supply but to required reserves which is believed to be one of the catalysts for loan growth but exhibits a decline in its contribute to CPI after the first quarter. Other catalysts like total deposit continue to show an increase in contribution to loan growth while policy rate at any instance have a higher contribution to loan growth as expected. The contribution of loan supply to economic activity keeps fluctuating from the second to the twelfth quarters. Although loan growth granger caused economic activity as shown in Table 4, the decomposition in Table 5 shows that loan catalysts indicate higher contribution to economic activity than loan itself. In other word, the possibility of asymmetric loan distribution to large firms rather than small firms that drives the economy could not be over-emphasized.

The Impulse Response Functions in Figure 2 reflect how individual variables respond to shocks from other variables in the system. It gives a visual representation of the behaviour of GDP and price in response to shocks to loans in the VECM system. In other word, the interpretation of the impulse

response functions takes into consideration the first differencing of the variables and the vector error correction estimates for a response forecast period of three years to enable us capture both the long term and short term responses.

**Table 6:** Post Merger Forecast Error Variance Decompositions

| Variance Decomposition of LY: | | | | | | | | Variance Decomposition of LX: | | | | | | |
| Period | S.E. | LY | LX | LZ | LR | LP | MPR | Period | S.E. | LY | LX | LZ | LR | LP | MPR |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0.0481 | 100.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1 | 0.0503 | 0.0958 | 99.9042 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2 | 0.0692 | 51.6243 | 1.8852 | 3.9820 | 31.3505 | 3.3536 | 7.8045 | 2 | 0.0919 | 0.3085 | 90.6377 | 0.9824 | 0.3505 | 1.1103 | 6.6106 |
| 3 | 0.0809 | 60.7064 | 1.6584 | 4.4149 | 24.0604 | 2.6469 | 6.5129 | 3 | 0.1292 | 0.8678 | 87.0745 | 0.9780 | 0.2790 | 1.4991 | 9.3018 |
| 4 | 0.0848 | 55.6854 | 4.1320 | 6.9334 | 24.7743 | 2.5434 | 5.9316 | 4 | 0.1638 | 0.7069 | 84.5146 | 1.3976 | 0.4599 | 1.8472 | 11.0737 |
| 5 | 0.0951 | 59.7310 | 5.6763 | 5.7987 | 20.3564 | 2.6466 | 5.7911 | 5 | 0.1941 | 0.5231 | 83.1579 | 1.4837 | 0.4810 | 1.8524 | 12.5020 |
| 6 | 0.1026 | 52.3015 | 4.8766 | 6.4282 | 24.4307 | 3.1499 | 8.8132 | 6 | 0.2210 | 0.4830 | 82.0223 | 1.4622 | 0.4625 | 1.8654 | 13.7047 |
| 7 | 0.1072 | 54.0999 | 4.4704 | 6.1466 | 22.9632 | 2.9093 | 9.4106 | 7 | 0.2457 | 0.5501 | 81.1595 | 1.4908 | 0.5196 | 1.9096 | 14.3705 |
| 8 | 0.1091 | 52.5002 | 5.7835 | 6.7748 | 22.8761 | 2.8173 | 9.2482 | 8 | 0.2688 | 0.5274 | 80.6377 | 1.5696 | 0.6067 | 1.9398 | 14.7188 |
| 9 | 0.1142 | 53.5914 | 6.7334 | 6.3320 | 21.1689 | 2.8424 | 9.3319 | 9 | 0.2902 | 0.4709 | 80.2842 | 1.6005 | 0.6268 | 1.9353 | 15.0823 |
| 10 | 0.1187 | 50.3076 | 6.3236 | 6.4011 | 22.8648 | 3.1088 | 10.9942 | 10 | 0.3098 | 0.4536 | 79.9480 | 1.5890 | 0.6191 | 1.9311 | 15.4591 |
| 11 | 0.1212 | 50.4998 | 6.1141 | 6.2680 | 22.4316 | 3.0237 | 11.6629 | 11 | 0.3284 | 0.4777 | 79.6511 | 1.5954 | 0.6390 | 1.9445 | 15.6923 |
| 12 | 0.1223 | 49.7215 | 6.9059 | 6.4832 | 22.1724 | 2.9727 | 11.7444 | 12 | 0.3463 | 0.4711 | 79.4564 | 1.6262 | 0.6753 | 1.9561 | 15.8150 |

| Variance Decomposition of LP: | | | | | | | | Variance Decomposition of LR: | | | | | | |
| Period | S.E. | LY | LX | LZ | LR | LP | MPR | Period | S.E. | LY | LX | LZ | LR | LP | MPR |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0.0342 | 0.4200 | 1.7468 | 3.7050 | 6.3606 | 87.7676 | 0.0000 | 1 | 0.3135 | 1.4854 | 8.9869 | 3.7088 | 85.8188 | 0.0000 | 0.0000 |
| 2 | 0.0472 | 0.3207 | 2.2437 | 5.7949 | 4.4012 | 87.2043 | 0.0352 | 2 | 0.4256 | 1.0257 | 6.9514 | 9.3827 | 77.9598 | 4.3763 | 0.3041 |
| 3 | 0.0560 | 0.2292 | 2.9248 | 5.3148 | 3.6027 | 87.9027 | 0.0258 | 3 | 0.5159 | 1.0247 | 5.2898 | 8.8082 | 76.9679 | 7.6476 | 0.2617 |
| 4 | 0.0643 | 0.2544 | 3.4302 | 5.2058 | 3.1921 | 87.8942 | 0.0234 | 4 | 0.5925 | 0.9149 | 4.3266 | 9.4308 | 76.7122 | 8.2111 | 0.4044 |
| 5 | 0.0716 | 0.2282 | 3.6082 | 5.2931 | 3.1239 | 87.6995 | 0.0472 | 5 | 0.6599 | 0.8368 | 3.6943 | 9.5799 | 76.5147 | 8.8433 | 0.5310 |
| 6 | 0.0782 | 0.2006 | 3.7357 | 5.3511 | 2.9817 | 87.6740 | 0.0568 | 6 | 0.7212 | 0.8283 | 3.2599 | 9.6997 | 76.3867 | 9.1737 | 0.6518 |
| 7 | 0.0841 | 0.1739 | 3.9514 | 5.2617 | 2.7778 | 87.7799 | 0.0553 | 7 | 0.7789 | 0.8345 | 2.9189 | 9.8082 | 76.3400 | 9.3654 | 0.7330 |
| 8 | 0.0897 | 0.1776 | 4.1330 | 5.1914 | 2.6621 | 87.7775 | 0.0585 | 8 | 0.8328 | 0.8080 | 2.6488 | 9.9177 | 76.3212 | 9.5070 | 0.7973 |
| 9 | 0.0951 | 0.1681 | 4.2004 | 5.2209 | 2.6451 | 87.6954 | 0.0701 | 9 | 0.8827 | 0.7799 | 2.4452 | 9.9854 | 76.2784 | 9.6501 | 0.8610 |
| 10 | 0.1001 | 0.1532 | 4.2470 | 5.2463 | 2.5980 | 87.6796 | 0.0759 | 10 | 0.9299 | 0.7769 | 2.2869 | 10.0238 | 76.2362 | 9.7605 | 0.9157 |
| 11 | 0.1048 | 0.1398 | 4.3391 | 5.2079 | 2.5108 | 87.7271 | 0.0753 | 11 | 0.9754 | 0.7811 | 2.1507 | 10.0673 | 76.2215 | 9.8260 | 0.9535 |
| 12 | 0.1094 | 0.1388 | 4.4247 | 5.1725 | 2.4561 | 87.7314 | 0.0766 | 12 | 1.0189 | 0.7699 | 2.0325 | 10.1158 | 76.2165 | 9.8817 | 0.9836 |

The interpretation of impulses and corresponding responses in Figure 2 is very clear as was earlier discussed. The first graph in Figure 2 shows that there is immediate negative response of real GDP to loan supply starting from the first quarter and reverted at the second quarter to equilibrium at the fourth quarter. The response of price to loan supply was however positive and stable though not significant. There was no sign of reversion to equilibrium even up to the third year. A shock to policy rate at all instance records a significant negative

response of economic activity with a possible reversion to equilibrium after two or three quarters except the initial shock that took just a quarter. This could not be said of price that glove around equilibrium though with slight negative influence. On the other hand, a sharp negative response was recorded from quarter two of loan to policy rates. The negative response stabilizes from quarter six up to the third year without reverting to equilibrium.
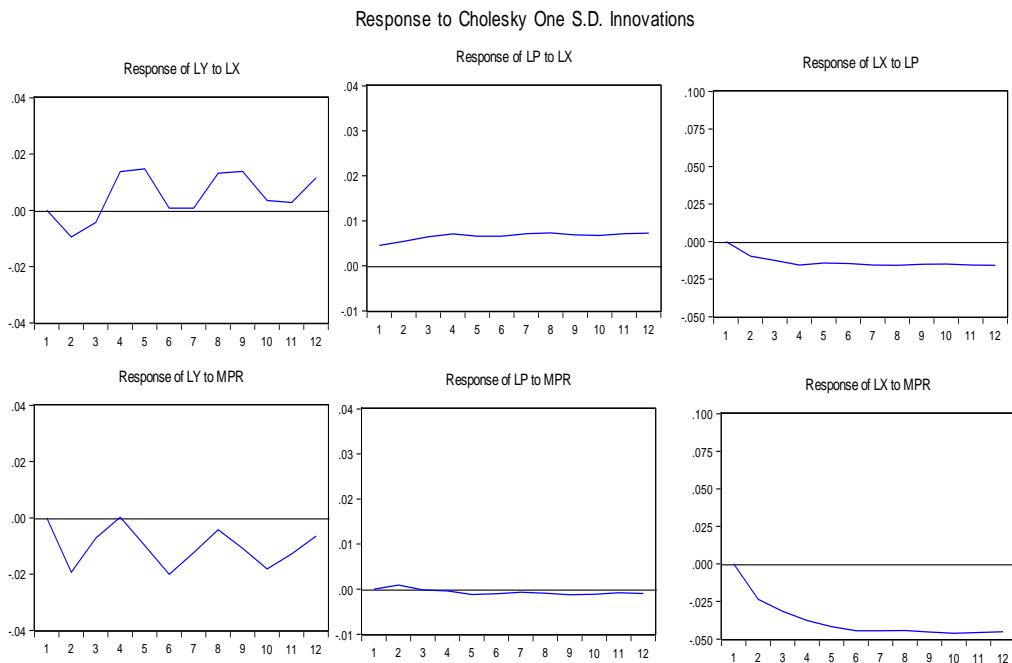
Response to Cholesky One S.D. Innovations



Figure 2: Post-Merger Impulse Response of Real Activity to DMBs Loan Supply at any instance of MPR

## 5.0     Conclusion and Policy Implications

This paper investigated claims in the literature that merger influences changes in loan supply which in turn affect real activity using selected DMBs in Nigeria. The results show that there exists a one sided positive relationship between economic growth and DMB's loan growth after the merger and at any instance of monetary policy shock. The results also show that despite the one sided positive causality between economic growth and loan supply, the total contribution of loan growth to real activity was about 11% which commensurate with Bernanke and Gertler (1995) report that increased riskiness of small firms during the periods of restrictive monetary policy causes banks to concentrate their loans on larger, more diversified firms. The stylize facts for policy implications therefore include:

- The persistence negative spread between loan and policy rate lessens the strength of the credit channel of monetary policy because the loan rate has a relatively positive influence over economic growth.
- The negative spread (a measure of lending conditions) affects the real activity.
- The transmission process of monetary policy which affects the supply of loans also depends on the structure of the financial system. This means that structural changes in financial area due to merger/acquisition may affect monetary transmission.

In conclusion, since the major interest of policy makers towards merger is the hope of efficient banking system that will also make an extensive contribution to economic growth, monetary policy on merger and acquisition can also have a distribution effect on the dynamic response of loan growth, as DMBs with different specific (or individual) characteristics will have an asymmetric reaction to monetary shock. Hence, we recommend that for any wave of further merger/acquisition, a policy formation that can takes into account not only the macroeconomic variables, but also DMBs-specific differences in the lending reaction to monetary policy actions will give a good account on the bank lending channel. Also, a further study on sectorial distribution of loan is emphasized to examine the exact sector of the economic activities that incited the positive one sided causal relationship between real GDP and DMBs loan supply.

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Table 2: Selected DMBs Consolidated Data (1999Q1- 2013Q2)

| obs | P | X | Y | Z | R | MPR |
|---|---|---|---|---|---|---|
| 1999Q1 | 30.49292 | 395399.5 | 98099.48 | 396644.9 | 28365.02 | 19 |
| 1999Q2 | 31.15949 | 425237.1 | 98394.12 | 466669 | 62863.57 | 20 |
| 1999Q3 | 29.48156 | 437373.2 | 98546.73 | 494970.6 | 60541.59 | 20 |
| 1999Q4 | 29.62606 | 452411.1 | 98066.84 | 501060.2 | 64000.83 | 18 |
| 2000Q1 | 30.0578 | 470107.9 | 103201.2 | 592171.1 | 64211.73 | 18 |
| 2000Q2 | 32.98872 | 511632.8 | 103182.9 | 704749.2 | 73469.28 | 17 |
| 2000Q3 | 34.05504 | 552125.7 | 103234.4 | 732181.8 | 71318.11 | 16 |
| 2000Q4 | 33.92983 | 587486.2 | 102713.5 | 743349.8 | 75053.92 | 14 |
| 2001Q1 | 35.5281 | 690357.6 | 108099.8 | 969764.7 | 97670.33 | 16.5 |
| 2001Q2 | 38.286 | 729382.7 | 108093.2 | 957705.5 | 115172.7 | 16.5 |
| 2001Q3 | 40.56503 | 810457.9 | 108083.7 | 1015632 | 116993.5 | 20.5 |
| 2001Q4 | 39.52651 | 827122.9 | 107506.5 | 947182.9 | 118665.5 | 20.5 |
| 2002Q1 | 41.70377 | 871739.3 | 112633 | 1087258 | 107246 | 20.5 |
| 2002Q2 | 42.9658 | 925343.2 | 113328.2 | 1112235 | 113345.8 | 20.5 |
| 2002Q3 | 44.61127 | 944648.1 | 113096.1 | 1171273 | 106757.3 | 18.5 |
| 2002Q4 | 44.3363 | 938271.2 | 112728.4 | 1157112 | 98021.3 | 16.5 |
| 2003Q1 | 44.14844 | 1010638 | 124036.8 | 1417987 | 127697.3 | 16.5 |
| 2003Q2 | 48.9757 | 1047583 | 123928.7 | 1451040 | 149711.8 | 16.5 |
| 2003Q3 | 52.80752 | 1045848 | 123782.6 | 1313555 | 147287.9 | 15 |
| 2003Q4 | 54.89338 | 1191546 | 123259 | 1337296 | 139903.9 | 15 |
| 2004Q1 | 54.06462 | 1303422 | 114617.6 | 1621500 | 123139.1 | 15 |
| 2004Q2 | 55.88044 | 1372906 | 123702.9 | 1627090 | 143599 | 15 |
| 2004Q3 | 57.62641 | 1464170 | 142373.6 | 1643850 | 145413.9 | 15 |
| 2004Q4 | 60.38737 | 1507885 | 146881.9 | 1661482 | 144668.8 | 15 |
| 2005Q1 | 62.85967 | 1642872 | 120048.9 | 2036984 | 172772.5 | 13 |
| 2005Q2 | 66.2585 | 1816681 | 128755.5 | 2224021 | 186791.9 | 13 |
| 2005Q3 | 71.64075 | 1937515 | 153933.6 | 2303057 | 241570.3 | 13 |
| 2005Q4 | 67.37126 | 1950380 | 159193.4 | 2036090 | 99421.3 | 13 |
| 2006Q1 | 70.42555 | 2040808 | 128579.8 | 2620959 | 123760.8 | 13 |
| 2006Q2 | 71.88286 | 2257454 | 135438.6 | 3131259 | 159454.2 | 14 |
| 2006Q3 | 76.11975 | 2494475 | 162498.8 | 3572449 | 193775 | 14 |
| 2006Q4 | 73.13065 | 2556920 | 169304.4 | 3245156 | 108636.8 | 10 |
| 2007Q1 | 74.12236 | 2982217 | 135774.7 | 4158318 | 108715.6 | 10 |
| 2007Q2 | 76.50619 | 3463444 | 142790.5 | 4575371 | 121107.9 | 8 |
| 2007Q3 | 79.25319 | 4144173 | 173067.5 | 5117643 | 140998.8 | 8 |
| 2007Q4 | 77.93091 | 4968967 | 182618.6 | 5001471 | 141482.1 | 9.5 |
| 2008Q1 | 79.8864 | 5862327 | 142071.4 | 7280610 | 181322.9 | 9.5 |
| 2008Q2 | 85.72493 | 6655282 | 150862.2 | 7159926 | 268649.2 | 10.25 |
| 2008Q3 | 89.57538 | 7378526 | 183678.8 | 8040472 | 146090.7 | 9.75 |
| 2008Q4 | 89.66384 | 7909784 | 195590.1 | 7960167 | 149737.5 | 9.75 |
| 2009Q1 | 91.36326 | 8015573 | 149191.5 | 7913268 | 146944.5 | 9.75 |
| 2009Q2 | 95.32079 | 8305283 | 162101.2 | 8039511 | 72479.52 | 8 |
| 2009Q3 | 98.88258 | 9516412 | 197084.3 | 8228464 | 77047.55 | 6 |
| 2009Q4 | 102.1536 | 9895762 | 210600.4 | 9150038 | 84070.8 | 6 |
| 2010Q1 | 104.8958 | 9715608 | 160117 | 9762255 | 90134.01 | 6 |
| 2010Q2 | 108.76 | 9783650 | 174734 | 9606602 | 89445.99 | 6 |
| 2010Q3 | 112.4 | 9994874 | 212771.7 | 9689339 | 92246.42 | 6.25 |
| 2010Q4 | 114.2 | 9460534 | 228709.5 | 9784542 | 92562.99 | 6.25 |
| 2011Q1 | 118.3 | 9070175 | 171265.9 | 10193185 | 189119.5 | 7.5 |
| 2011Q2 | 119.9 | 9537712 | 187833.1 | 10659010 | 189119.5 | 8 |
| 2011Q3 | 124 | 10710576 | 228454.8 | 11052823 | 794448.3 | 9.25 |
| 2011Q4 | 126 | 13670373 | 246447.1 | 11452763 | 771736.2 | 12 |
| 2012Q1 | 132.6 | 13581772 | 182119.4 | 11533071 | 822825.8 | 12 |
| 2012Q2 | 135.3 | 14114785 | 199831.6 | 11787757 | 842406.8 | 12 |
| 2012Q3 | 138 | 14154969 | 243263.1 | 12390660 | 1254990 | 12 |
| 2012Q4 | 141.1 | 14485883 | 263678.9 | 13135887 | 1339731 | 12 |
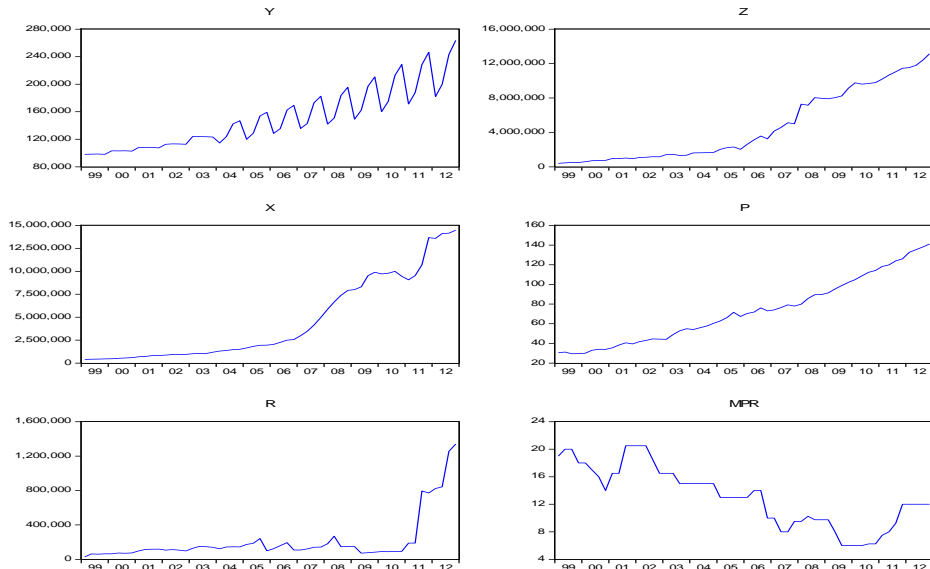
Figure 1: Graphical representation of each series of interest

Table 3: Descriptive Summary Statistical Analysis

|  | **Y** | **X** | **Z** | **R** | **P** | **MPR** |
|---|---|---|---|---|---|---|
| Mean | 149892.9 | 4546230 | 4642266 | 214084.2 | 72.9219 | 13.06696 |
| Median | 142222.5 | 1995594 | 2462008 | 123450 | 71.03315 | 13 |
| Maximum | 263678.9 | 14485883 | 13135887 | 1339731 | 141.1 | 20.5 |
| Minimum | 98066.84 | 395399.5 | 396644.9 | 28365.02 | 29.48156 | 6 |
| Std. Dev. | 43479.85 | 4526232 | 4108237 | 279157.4 | 33.08405 | 4.41163 |
| Skewness | 0.787431 | 0.857245 | 0.620986 | 2.810862 | 0.45552 | 0.036849 |
| Kurtosis | 2.751998 | 2.32303 | 1.82437 | 10.03257 | 2.089804 | 1.967534 |
| Jarque-Bera | 5.930616 | 7.928121 | 6.824067 | 189.1418 | 3.86972 | 2.499975 |
| Probability | 0.051545 | 0.018986 | 0.032974 | 0 | 0.144445 | 0.286508 |
| Sum | 8394001 | 2.55E+08 | 2.60E+08 | 11988714 | 4083.626 | 731.75 |
| Sum Sq. Dev. | 1.04E+11 | 1.13E+15 | 9.28E+14 | 4.29E+12 | 60200.49 | 1070.436 |