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Sources and Impact of Excess Liquidity on Monetary Policy in Nigeria

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Abstract

This paper examined the sources and effects of excess liquidity in the Nigerian banking system. The Deposit Money Banks (DMBs) in Nigeria do not hold voluntary reserve over and above the required reserve for precautionary reasons depending on their risk appetite. The practice over the years has been that DMBs constrained themselves by holding involuntary reserve which is a major concerns to the monetary authorities. The ideal situation is that banks should deploy excess reserves as loans to the public and invest in government securities, but on the contrary this is not done based on the profit maximisation tendencies of the DMBs. The Ordinary Least Squares (OLS) estimation result using monthly data from 2002 – 2012 showed that banks foreign assets and government deposits were important contributors to observed excess liquidity in the system. Government deposit featured as a key determinant of the demand for excess reserves. The paper also found a positive relationship between excess reserves and inflation.

Keywords: Banks, excess reserves, Monetary Policy Effectiveness
JEL Classification: E2, E4, E5

I. Introduction

There is considerable interest in understanding the interaction between asset prices and monetary policy. This is because much of the transmission of monetary policy comes from the influence of short-term interest rates on other asset prices. Movements in other asset prices including long -term interest rates, bond prices, yields, and stock prices determine private borrowing costs and changes in wealth, which in turn influences real economic activity and the response of financial markets. Monetary policy has considerable influence on the behaviour of the financial markets. Thus, accurate estimates of the response of asset prices to monetary policy impulse are critical to effective investment decisions and risk management as well as the efficacy of monetary policy.

The principal objective of the Central Bank of Nigeria, under its enabling Act No. 7 of 2007, is to ensure monetary and price stability which contributes to the attainment of the other policy objectives such as promotion of a sound financial system. Under the current monetary policy framework, the Bank uses Cash Reserve Requirement (CRR) as one of the policy tools in influencing or controlling

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the amount of credit provided by the DMBs and the rate of interest prevailing in the money market.

However, high statutory reserve requirements constrain DMBs' balance sheets. Banks also voluntarily hold reserves over the required reserve, for precautionary reasons, depending on their risk profile. Excess liquidity results from a combination of deliberate actions of banks as well as the involuntary flows of liabilities from the general public. DMBs with excess reserves could deploy them rapidly, at will, which could alter the monetary conditions from their preferred levels.

As Saxegaard (2006) put it, Nigeria is one of the countries in the sub-Saharan Africa that has liquidity management challenges. Whereas central banks gross claims on DMBs are often relatively small, liabilities which include excess reserves, required reserves, term deposit and Open Market Operations (OMO) bills of commercial banks are substantial. Thus, excess liquidity in an economy typically comes from three sources: build-up of foreign exchange reserves, lending to government by the central bank and lender of last resort operations by the central bank.

Since 1973, oil exports proceeds has been the dominant foreign exchange earnings for Nigeria relative to other inflows in the balance sheet item of the government. The process of monetising this revenue inevitably leads to the creation of foreign assets by the CBN. The essence of the CBN managing foreign exchange is with a view to achieving exchange rate stability and mitigating exchange rate pass-through to domestic prices. As a result, the central bank purchases the foreign exchange earnings of Government (monetisation), thereby impacting domestic currency liquidity. In the past, lending to government by the central bank contributed to liquidity surplus in the economy but recent macroeconomic reforms have reduced its occurrence.

Agénor, Aizenman, and Hoffmaister (2004) have associated the persistence of excess liquidity in the banking system of countries like Nigeria to other factors such as a high degree of risk aversion by DMBs, insufficient development of financial markets, chronic macroeconomic instability and fiscal dominance. In most developing economies, the banking system is the most prominent source of financing unlike in developed countries (Stiglitz, 1989). In advanced economies, central Banks' balance sheets are liabilities driven, because they experience reserve scarcity. The demand for central bank liabilities enables them to provide cash and clearing balances for mostly payment purposes.

In Nigeria and other developing economies, central bank balance sheets are asset-driven, requiring the banks to increase asset items in their balance sheet in

order to meet the economies demand for their liabilities (Gray, 2006). Under the different policy frameworks that the Bank has adopted, excess liquidity has persisted. Therefore, understanding the sources of excess liquidity and its consequences are important for effective monetary management.

The objective of this paper is to identify the determinants of excess liquidity persistence in the Nigerian banking system. Following this introduction, section 2 provides a review of the literature. Section 4 deals with the methodology and interpretation of results. The paper is concluded in Section 5 with some recommendations.

II. Review of Literature

II.1 Conceptual Framework

Liquidity means different things to different economic agents. In financial terms, liquidity means the ability to transact a given assets at a predictable price. Deposit Money Banks (DMBs) and other financial institutions are interested in a viable balance sheet and the ability to meet liquidity requirement while the investors are concerned with market liquidity.

Monetary authorities on the other hand, are concerned mostly about system-wide or macro liquidity because of its relationship with credit conditions, interest rates, and future inflationary pressures in the economy (Carney, 2008). It is in the interest of any economy that there is adequate liquidity to ensure the functioning of all markets in the system. This is why central banks are interested in the availability of just sufficient liquidity in the financial system because liquidity crisis disrupts the functioning of the markets. It is through the alteration of the supply of liquidity in the financial market that central banks transmit monetary policy. Excess bank liquidity or excess reserve is a situation in which the amount of reserve funds that a DMB holds is higher than the required amount which is allowed to hold. It is also referred to as the holdings of liquid assets above the statutory level.

In Nigeria, the DMBs are the major sources of finance and thus, their liquidity is of concern to the Central Bank. The balance sheet of DMBs contains assets that are classified as disposable liquidity because they can be easily converted to cash to meet their customers' withdrawals, banks' expenses and other liabilities. Assets that are included in disposable liquidity include eligible securities, net lending in the repo market and net foreign assets which indicate that DMBs have resources for investment. Regulatory actions provide for a minimum holding of these assets (liquidity and required reserves ratios) through deposits and interbank lending. Any part of DMBs' disposable liquidity that exceeds their investment demand and

daily liquidity requirements constitute excess liquidity. It is from excess liquidity that banks give loans, advances and make investments. In the 19th and early 20th Century, high volumes of loan were usually disbursed by banks when their reserve was perceived as high and vice versa when low (Bindseil, 2004). When DMBs do not have sufficient loan requests or are not willing to give loans, the resulting excess liquidity is expected to be invested temporarily in assets that yield returns that are lower than those from loans and advances. It follows that too much liquidity (excess liquidity) can lead to unproductive use of funds, which can limit the profits of banks.

From the perspective of central banks, excess reserves are referred to as transactional account holdings in excess of the central bank requirements. Changes in central bank policy (interest) rates would set off movements in a series of prices in the financial markets, that in turn produce changes in DMBs' excess liquidity holdings. Efficient markets make it possible to forecast the outcomes of monetary policy actions, thereby promoting regulatory effectiveness. The conduct of open market operations (OMO) expands or contracts bank reserves by buying or selling Treasury Securities and constitute pure monetary policy actions under a Monetary Policy regime termed Reserve Position Doctrine, RPD (Meigs, 1962). Monetary authorities, all over the world are assumed to be able to stimulate money markets and also guide the direction of short-term interest rate because they are the sole issuers of banknotes and custodian of bank reserves in their economies. This assumption implied that it was impossible to set both the quantity (reserve target) and price (interest rate target) successfully. It was by varying the scarcity of bank reserves in order to manage the spread between the interbank interest rate and interest paid on reserves that Pure Monetary Policy works, whether or not interest is paid actually on (excess) reserves (Goodfriend, 2011). Keynesians considered that the immediate effect of an increase in the investments of a central Bank was to cause an increase in the reserves of DMBs, thereby motivating an increase in loans and advances. This suggests that increase in loans and advances by DMBs on account of increase in reserves would reduce short-term interest rates. This traditional model of excess reserves demand has been well developed and applied in the United States of America and the Euro Area (Friedman, 2000; Woodford and Eggertsson, 2003 and Goodhart 1989). It was in the early 1990s when central banks resumed explicit interest rate targeting that the assumptions of Pure Monetary Policy was reversed.

II.2 Theoretical Literature

II.2.1 Sources of Excess Liquidity

DMBs would normally, on voluntary basis, hold reserves for precautionary reasons, beyond the regulatory required reserve (CRR). The demand for precautionary money balances by DMBs has been widely debated. It is assumed that a private bank's objective is to reduce the projected cost of holding reserves, within an inventory management model in which there are two fundamental determinants: the penalty for illiquidity and the value of the alternative foregone in holding reserves. The optimal condition would be to hold that amount of reserves at which the marginal reduction in expected liquidity costs equals to the marginal cost of holding reserves. The behaviour of banks in an economy under this traditional model was first presented by Phillips (1920), but was brought to limelight by the outstanding works of Baltensperger (1974, 1980). New applications of the model have been presented by Bindseil (2004), Heller and Lengwiler (2003), Dow (2001), Selgin (2001), Allen and Gale (1998) and Nautz (1998). Thus, the holding of excess reserves for precautionary reasons by DMBs is an optimising behaviour.

But there are also excess reserves held involuntarily according to Saxegaard (2006). A lot of reasons have been proffered for the holding of unremunerated reserves by DMBs. Among other reasons, institutional factors have been identified as the major cause for holding precautionary reserves by depository institutions. DMBs in remote areas for example must necessarily hold excess reserves in the form of vault cash due to transportation cost. Similarly, where the payment system is underdeveloped with no Real Time Gross Settlement system (RTGS) for example, there will be the need to hold considerable precautionary excess liquidity. Agénor, Aizenman, and Hoffmaister (2004) pointed out that during the Asian financial crisis, commercial banks held a large amount of voluntary excess reserves because of the increased uncertainty and risk of default in the financial market at the time. In addition, the phenomenon of excess liquidity would exist in jurisdiction where the interbank money market is not well developed. DMBs in such countries or regions would have to hold a lot of excess reserves with the central bank to cover for contingencies that ordinarily should be met through the interbank market. In the same way, where banks cannot ascertain their net position with the central bank, real time or at short notice, they would be compelled to hold excess reserves to avoid sanctions.

Due to the shallowness of instruments in the financial market, there is the preference for cash holding by the public thereby availing the DMBs high involuntary excess reserves. Ritz (2009) suggested that while risk-averse DMBs are

expected to hold voluntary excess reserves, risk-neutral ones could find themselves holding involuntary excess reserves. For example, banks in the euro area were holding involuntary excess reserves, even when interest rates were low because weak economic growth prospects resulted in weak borrowing (Wyplosz, 2005). Since DMBs are risk averse in advancing loans to the needy public especially to real sector, they are expected to lessen their involuntary excess reserves by purchasing government bonds to earn some return. The assumption is that they would continue to buy bonds with involuntary excess reserves until the economy enters a liquidity trap - when bond yields become zero. However, in an undeveloped and inefficient financial market, the DMBs would still hold reserves in excess of the mandatory requirements and may still be hesitant in granting credits even when interest rates of instruments are positive. (O'Connell and Stephen 2005).

Since the recent global financial crisis, new thoughts have emerged which suggest that total reserves in the banking system of an economy is influenced by the policy decisions of central banks and not the profit-maximising decisions of private lending banks (Martin et. al., 2011; Gray, 2006; Hornstein, 2010; and Keister and McAndrews, 2009). Their argument is that the marginal lending rate of interest is not dependent on the quantity of reserves but rather on the interest on reserves. Thus a bank will prefer a loan rate that compensates for risks, marginal transaction costs and a rate equivalent to that on a safe foreign asset. In situations where the marginal loan customer is unable to pay the minimum rate, the non-remunerative excess liquidity is held by the banks instead of granting loans. In such markets, non-remunerative excess liquidity and loans become perfect substitutes (Khemraj, 2008).

According to Murta and Garcia (2009), factors that lead to excess liquidity can be broadly classified into structural and cyclical factors. Structural factors limit portfolio allocation (Saxegaard, 2006) because of the absence or shallowness of financial markets in developing countries. High degree of risk aversion is another structural factor which leads to a low demand for loan facilities. Both of these factors can result in excess liquidity in the banking system and explain the coexistence of high inflation and excess liquidity. Among the cyclical factors are inflation and high capital flows. High and volatile inflation adversely affect investment decision through increasing their riskiness so that banks would prefer higher returns investments and charge higher risk premium to be on a safer level. High risk premia may lead to a contraction in credit demand while credit rationing may limit availability of credit; both responses would therefore result in involuntary accumulation of excess reserves.

Ariyo (2005), opines that capital inflow from oil exports dominates public revenue, and is the major source of excess liquidity in Nigeria. The public revenues are not efficiently utilised by the different levels of government due to low absorptive capacity but end up in the banking system to fuel excess liquidity. The persistence of structural excess liquidity has made liquidity management by the Central Bank of Nigeria very difficult and costly. Other factors contributing to the incidence of excess liquidity in the Nigerian financial system can be attributable to the fiscal dominance and the underdeveloped nature of money market.

As noted by Agénor and Elaynaoui (2010), bank liquidity has been a concern to the monetary authorities based on its effect on price stability mandate, while it shortages will have significant effect on banks' solvency. In his view Saxegaard (2006) posited that significant amount of involuntary excess liquidity reduced the effectiveness of monetary policy transmission in controlling inflation based on his findings on some selected African countries. These two positions have been a subject of policy discuss by the monetary authorities and relevant stakeholders.

II.3 Empirical Literature

II.3.1 Measurement of Excess Liquidity

Drescher (2011) argued that there are different perceptions of appropriate monetary policy stance because of differences in the measurement of excess liquidity using variables such as interest rates, credit and monetary aggregates. The variables act as indicators of excess or shortage of liquidity in an economy. In a modern market economy, DMBs create liquidity by borrowing and lending among themselves during normal times using securities as collaterals in repo and reverse repo operations. In managing aggregate liquidity, the central bank sets minimum reserve requirements for DMBs such that holdings in excess of this are technically, excess liquidity.

But Caprio and Honohan (1993), have pointed out that regulatory minimum reserve requirement is not a sufficient reference point for measuring excess liquidity because of the existence of voluntary excess reserves. Saxegaard (2006) and Owoundi (2009) suggested methods for estimating DMBs' demand function for bank reserves and for isolating precautionary (voluntary) excess reserves in order to determine involuntary excess reserves, as a way out. Their formula is based on the fact that effective liquidity management by central banks requires measurement of excess liquidity over and above levels required for precautionary purposes. The difficulty in applying their methods is that it conflicts with official definition of excess liquidity as total bank liquidity less required bank liquidity, and involves modeling of the motives for holding reserves.

Thorsten and Dieter (2005), were of the view that involuntary excess reserves is the difference between the actual stock of money from a projected level to what will bring an economy to an equilibrium state. In determining an equilibrium money stock, the monetary aggregates would be consistent with the economy's inflation and output capacity. The relationship is represented by equation 1.

$$M \quad x \quad V = Y \quad x \quad P \qquad (1)$$

Where M represents the stock of money;
V represents the velocity of money;
Y represents real output; and
P represents the price level.

To calculate a money supply growth, given a policy reference growth rate, the identity equation can be solved in logarithmic form.

$$\Delta m \quad + \quad \Delta V \quad = \Delta Y \quad + \quad \Delta P$$, which can be solved for (2)

$$\Delta m \quad = \quad \Delta Y \quad + \Delta P \quad - \quad \Delta V \qquad (3)$$

Δm, Δy, Δp and Δv represents respectively, the policy money supply growth rate; the potential output growth rate, the forecast inflation; and the trend velocity of money in the economy, respectively.

Monetary policy action to expand or contract the balance sheet of DMBs would be taken if there is deviation from Δm, the reference policy money supply growth rate.

II.3.1.1 The Price Gap Approach

The price gap and other challenges have led to measures of excess liquidity based on other concepts. Hallman, Porter and Small (1991) introduced the Price Gap as a measure of excess liquidity based on short- and long-run equilibrium price levels, consistent with trend in the velocity of money and the potential output growth rate.

Given pt = mt + vt – yt; and Pt* = mt + vt trend - yt potential,

Where pt* represents the long-run or equilibrium price level. The difference between p_t * and p_t is termed price gap: $p_t^* - p_t^{trend} = (v_t - v_t + y_t - y_t^{potential})$. When the actual price level is below the long-term level, upward pressure on the (future) price level can be expected. But when it is above, downward pressure on the (future) price level would be expected. The price gap is made up of the

"liquidity gap" ($v_t^{trend} - v_t$), and the output gap ($y_t - y_t^{potential}$). From this information, the policy-maker can take decisions that alter macro-liquidity in the economy.

II.3.1.2 Real money gap

Gerlach and Svensson (2003), has suggested a different approach called the real money gap. They defined real money gap as actual money supply minus the actual price level: $m_{real,t} = mt - pt$. However, a model of equilibrium real money holding would be as follows: $m^*_{real,t} = mt - p_t^*$. The difference between the equilibrium and actual money supply, $[m^*_{real,t} - m_{real\ t} = (m_t - p_t^*) - (m_t - p_t) = p_t^* + p_t]$ would be the real money gap, which is not different from the price gap. This too, provides the Monetary Authority with a handle for decision making, in the face of excess liquidity.

II.3.2 Determinants of Excess Liquidity

Saxegaard (2006), using a modification of the methodology proposed by Agénor, Aizenman, and Hoffmaister (2004), studied the determinants of excess liquidity and the effect of excess liquidity on monetary policy transmission in the Central African (CEMAC) region, Nigeria and Uganda. In order to modify the estimated model by Agénor, Aizenman, Hoffmaister (2004) and Saxegaard (2006), the study estimated the following equation:

$$a_1(L)EL_t = a_2(L)\mathbf{X}_{t\,1} + a_3(L)\mathbf{X}^2_t + v_t \qquad (1)$$

Where

EL_t represents the ratio of statutory excess reserves to total deposits;
$\boldsymbol{a_j(L)}$ represent vectors of lag polynomials;
X1 and ***X2*** represent vectors of variables that explain the precautionary motive for holding excess reserves and the involuntary build-up of excess reserves, respectively and v_t is the error term.

The explanatory variables for excess liquidity included in the model were five year moving averages of the standard deviation of the output gap; cash to deposit ratio; private sector deposits divided by the five year moving average of the variable; five year moving averages of the standard deviation of government deposits divided by the five year moving average of the variable; ratio of demand to savings deposits; output gap; central bank discount rate; private sector deposits, expressed as a fraction of GDP; government deposits expressed as a fraction of GDP; ratio of private sector credit to GDP; ratio of bank credit to the central government and public enterprises to GDP; ratio of securitised

domestic debt to GDP; ratio of foreign aid inflows to GDP; ratio of oil exports to GDP; ratio of the quarterly percentage change in the price of oil; and commercial bank lending rate.

The estimation results, based on quarterly data from 1991 to 2003, found that Deposit Money Banks (DMBs) in the CEMAC, Nigeria and Uganda held excess liquidity over and above what was required to meet precautionary needs. In Nigeria, the most important determinants of the build-up of excess reserves were changes in the required reserve ratio, the maturity structure of the deposit base and the volatility of the cash to deposit ratio. In the CEMAC, Nigeria and Uganda, a non-linear structural VAR model estimate found that excess liquidity weakens the monetary policy transmission mechanism and consequently, monetary authorities' ability to influence demand conditions in the economy.

Pontes and Murta (2012) studied the determinants of the demand for excess reserves by banks in Cape Verde in the period 2003 to 2009, and also examined the effect of the global financial crisis which started in 2007 on excess reserves. In estimating the model of demand for excess reserves, macroeconomic variables such as the structure and level of development of the financial system were related to non-controllable autonomous factors such as foreign aid, emigrant's remittances and international trade receipts. The results showed that the precautionary variables were not important but involuntary variables (CRED, $BOND_{GOV}$ and IR) were. Also, the 2007 global financial crisis had a negative impact on excess reserve of the commercial banks. The country's economy became rather vulnerable and dependent on home remittances and foreign aid, which were reduced as a result of the financial crisis and high unemployment in advanced economies.

Jia (2012) estimated the relationship between inflation and excess liquidity in China from 2001 to 2010. Export-led development strategy resulted in rapid increase in foreign exchange reserves and foreign direct investment inflows into China. Given the country's exchange rate control policy, excess liquidity resulted. As a consequence, inflation became a macroeconomic problem from 1979, when the reformist policy of the government started. The result showed that there was a significant impact of excess liquidity on inflation, confirming the suggestion of macroeconomic theory that inflation is related to money supply and the capacity of potential output. It also suggested that the price gap as the measurement of excess liquidity is viable.

III. Methodology

The paper examined the determinants of excess liquidity in Nigeria, taking into account macroeconomic variables. In doing this, the Excess Reserve Models by Saxegaard (2006) and Agenor, Aizenman and Hoffmaisk (2004) were adopted. The model was estimated using the Ordinary Least Squares (OLS) as most of the variables were stationary at level i.e. I(0). The paper adopted monthly data from January, 2002 to December, 2012.

Excess Reserve holdings by DMBs were calculated as the difference between total reserves deposited in the CBN (as shown in balance Sheet) plus vault cash and the minimum requirement.

III.1 Model Specification

The model for excess reserve is specified as follows:

$$ExR_t = a_1 + a_2R_{Dt} + a_3VoLps_{t+} a_4VOLc_t + a_5DEPps_t + a_6DEP_{govt} + a_7CRED_t\ a_8BOND_{Govt} + a_9IR_t + a_{10}CRISIS_t$$

Below is table 3.1 depicting variable definitions and notations:

Variable Notation	Variable Definition
MPR	Monetary Policy Rate
BTDL	Banks' Total Deposits
PSD	Private Sector Deposits with Banks
DLTG	Deposits of Lower Tiers of Government with Banks (FGN excluded)
CIC	Currency in Circulation
HCPI	Headline (All Items) CPI
CBNFA	CBN Foreign Assets
BTA	Banks' Total Assets
BAC	Banks' Aggregate Credit
CLFGN	Claim on the Federal Government (credit to FGN)
EXR	Excess Reserves
$\mathbf{R_D}$	CBN Standing Lending Facility
$\mathbf{VOL_{PS}}$	Moving Average of the STDEV of PSD divided by the Moving Average of PSD
$\mathbf{VOL_C}$	Moving Average of the STDEV of CIC/BTDL divided by the Moving Average of the ratio
$\mathbf{DEP_{PS}}$	PSD divided by BTDL
$\mathbf{DEP_{GOV}}$	Government Deposit divided by BTDL
CRED	BAC divided by BTA
$\mathbf{BOND_{GOV}}$	Claim on the Federal Government (credit to FGN) divided by BTA
IR	CBNFA as a percentage of BTA
CRISIS	Episodes of Banking Crisis

A dummy variable ($CRISIS_t$) was used to represent the crisis period. Bank rescue as a factor in excess liquidity occured when there was banks crisis. "1" represent crisis period and "0" represents period of no crisis. Other than the CBN discount rate and the crisis variable, all others variable were ratios. The aim of transforming those variables into ratios is to ensure uniformity.

An inflation rate, (π) model in which inflation rate is regressed on excess reserves was also estimated using Ordinary Least Square (OLS). The model is expressed as follows:

$$\pi_t = a_0 + a_1 \Delta ExR_t + e_t$$

The inflation model is estimated to measure the effectiveness of monetary policy in Nigeria.

III.2 Data Analysis

All variables used were subjected to the Augmented Dickey Fuller (ADF) and the (KPSS) tests of stationarity or Unit Root (Table 3.1).

III.2.1 Pre-Estimation tests

Table 3.1: Augmented Dickey- Fuller Test (ADF)

	Constant		Constant and trend		Order of Integration
Variables	**t- Stat**	**P-Value**	**t- Stat**	**P-Value**	**Lags**
ExR	-10.7997	0	-4.581267	0.0017	I(0)
R_{Dt}	-11.02277	0	-11.2447	0	I(0)
$VoLps_t$	-3.475046	0.0102	-5.35064	0.0001	I(0)
$VOLc_t$	-3.100279	0.0291	-3.568614	0.0367	I(0)
$DEPps_t$	-3.331697	0.0154	-5.36155	0.0001	I(0)
DEP_{govt}	-12.6714	0	-5.677174	0	I(0)
$CRED_t$	-11.97296	0	-12.10998	0	I(0)
$BOND_{Govt}$	-13.55861	0	-13.5333	0	I(0)
IR_t	-13.5381	0	-13.51514	0	I(0)

The result showed that included variables were stationary at level, meaning that they individually exhibit mean reversion.

Table 3.2: Kwiatkowski, Phillips, Schmidte Shin (KPSS) Test

		Critical values			Order of Integration
Variables	**t-test**	**1 per cent**	**5 per cent**	**10 per cent**	**I(0)**
ExR	0.838668	0.739	0.463	0.347	I(0)
R_{Dt}	0.94656	0.739	0.463	0.347	I(0)
$VoLps_t$	0.625554	0.739	0.463	0.347	I(0)
$VOLc_t$	0.484658	0.739	0.463	0.347	I(0)
$DEPps_t$	1.08169	0.739	0.463	0.347	I(0)
DEP_{govt}	1.034906	0.739	0.463	0.347	I(0)
$CRED_t$	1.117964	0.739	0.463	0.347	I(0)
$BOND_{Govt}$	0.975321	0.739	0.463	0.347	I(0)
IR_t	0.553664	0.739	0.463	0.347	I(0)

III.3 Empirical Result

Table 3.3: Result of the (OLS) estimation on the determinant of the excess reserves in Nigeria

EXR = 23.9706 - RD 1.0038 - VOLPS 0.2518 + VOLC 0.3983 – DEPPS 1.0228 – DEPGOV 0.7226 - CRED 0.2289
(9.0445) (-1.7146) (-1.0056) (1.8048) (-0.6599) (2.0134) (0.0991)

- BONDGOV 0.0395 - IR 2.0073 - CRISIS 0.2890
(-0.2603) (5.1602) (-0.6932)

R-squared	0.4905	Akaike info criterion	3.1444
Adjusted R-squared	0.4529	Schwarz criterion	3.3628
F-statistic	13.0494	Hannan-Quinn criter.	3.2331
Prob(F-statistic)	0.0000	Durbin-Watson stat	1.5126

Table 3.4: Result of the regression of inflation rate on Excess Liquidity in Nigeria

EXR = 2.9851 + EXR 0.1205
(14.888) (6.896)

R-squared	0.2678	Akaike info criterion	0.4718
Adjusted R-squared	0.2622	Schwarz criterion	0.5155
F-statistic	47.5480	Hannan-Quinn criter.	0.4896
Prob(F-statistic)	0.0000	Durbin-Watson stat	0.2987

III.4 Result Interpretation

Results from the Excess Reserve determinant model (Table 4.3), indicated that only three (3) of the included variables were positively related to the dependent variables (ExR). The variables include VOLC, DEPGOV and CRED. With DEPGOV being the most crucial variable determining the accrual to excess reserves in Nigeria.

As Government release funds in the economy for FAAC distribution and other means, the level of money supply in the economy increases. The revenue that comes into Nigerian economy is oil based, therefore oil price is an important factor in determining Government revenue, hence liquidity in the system. Government deposit incorporates oil prices because oil revenue goes straight into government deposit. As Government deposits increase by a unit, the level of liquidity expands by 72.26 basis points. This support the a-priori expectation that increase in Government funds released at a point in time has a positive effect on liquidity hence inflation. Monetary authority should have to apply caution at any time government releases funds to the system so as to curb inflation pressures. As the ratio of currency in circulation to banks total deposit denoted by VOLC increases, this increases liquidity in the banking system. High volume of currency

circulation in an economy indicates high liquidity in the system. The CBN watches closely the level of currency in circulation on a daily basis and takes necessary actions if it goes beyond the required levels. From our result, we found that a unit increase in currency in circulation beyond the required level would increase liquidity position by 39.30 basis point.

The Inflation model: The estimation result (Table 4.4) showed that excess liquidity (ExR) is positively related to inflation (π). This result is in consonance with economic theory and also Jia (2012) findings for China. From our result, it can be deduced that one unit increase in excess liquidity is expected to lead to 0.12 unit increase in inflation.

V. Conclusion and Recommendation

This paper sought to investigate the sources and implications of excess liquidity for monetary policy in Nigeria. It identified government deposit as a crucial determinant of excess liquidity in Nigeria. As Government releases funds into the economy especially during FAAC disbursement, there is expansion in the liquidity condition. During these periods, money market rates decline and there is usually mopping activities performed by the CBN and Bonds issuance by the Debt Management Office (DMO).

Currency in circulation also exhibits a demonstrable impact on excess liquidity. The results showed statistically significant and positive relationship between excess liquidity and inflation, implying that the CBN has to continuously rein-in excess liquidity as part of efforts to stabilise inflation.

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Appendix I: Monetary Authority's Analytical Accounts - Liabilities (N' Million) 1981-2011

Period	Net foreign Asset	Net Domestic Asset	Broad Money (M2)	DMBs Deposit (Reserves)
1981	2,585.00	16,203.40	16,161.70	2,638.2
1982	888.10	22,272.00	18,093.60	3,210.6
1983	501.40	28,687.90	20,879.10	3,238.0
1984	1,110.70	32,020.60	23,370.00	3,265.2
1985	1,418.40	34,462.60	26,277.60	2,876.8
1986	5,367.80	37,850.50	27,389.80	2,846.1
1987	3,700.50	44,140.00	33,667.40	4,131.2
1988	9,492.40	54,813.10	45,446.90	4,601.2
1989	22,524.30	37,004.20	47,055.00	4,648.8
1990	43,909.90	58,209.30	68,662.50	6,585.0
1991	56,045.30	81,705.00	87,499.80	13,768.4
1992	35,778.30	171,071.00	129,085.50	4,648.8
1993	63,559.10	280,697.60	198,479.00	13,768.4
1994	280,697.60	439,113.80	266,944.90	41,415.0
1995	108,663.00	474,361.40	318,763.50	180,021.2
1996	237,978.50	371,079.00	370,333.50	237,352.8
1997	234,015.70	365,870.60	429,731.30	244,236.2
1998	247,041.60	512,490.30	525,637.80	229,763.7
1999	666,271.20	632,010.10	699,733.70	167,700.4
2000	1,275,016.90	472,011.70	1,036,079.50	185,006.0
2001	1,347,554.80	848,992.80	1,315,869.10	277,481.1
2002	1,282,215.50	1,329,401.30	1,599,494.60	402,601.5
2003	1,388,233.80	18,039,381.10	1,985,191.80	563,286.9
2004	2,644,672.70	2,020,173.30	2,263,587.90	885,130.5
2005	4,098,471.90	2,313,387.70	2,814,846.10	778,354.5
2006	6,307,859.30	714,205.70	4,027,901.70	745,654.9
2007	7,266,512.10	2,710,898.60	5,832,488.50	892,420.1
2008	8,550,430.30	4,951,860.30	9,166,838.30	746,229.3
2009	30,229,125.70	40,745,686.50	49,747,295.30	736,652.6
2010	26,694,973.42	35,032,523.00	44,619,131.18	1,882,421.7
2011	27,250,207.30	40,745,686.50	49,747,295.30	2,784,511.5

Source: Reserves are the DMBs Balances in CBN Statistical Bulletin