Everant.org/AFMJ

Research Article

Account and Financial Management Journal ISSN: 2456-3374

Domestic Debt and Liquidity in Nigeria

Irekponor, Abraham[1], Kurotamunobaraomi, Tamunosiki[2]

[1,2]Department of Accountancy, Port Harcourt Polytechnic, Port Harcourt.

ARTICLE INFO

corresponding Author:

Irekponor Abraham
Dept. Of Accountancy, Port Harcourt Polytechnic Rumuola, Port Harcourt

ABSTRACT

This study empirically appraised the association between domestic debt and liquidity in Nigeria, with the use of quarterly data from 2006 to 2015. The work utilized Federal Government of Nigeria Bonds, Nigeria Treasury Bills and Nigeria Treasury Bonds as proxies for domestic debt; and Liquidity proxied by Broad Money Supply (M_2). In order to analyze relevant data, descriptive and econometric tools that include mean, Ordinary Least Square, Unit root test, Johansen Cointegration, Granger causality test and diagnostic tests were applied. Empirical outcomes indicate that there exists a significant positive short run relationship between Federal Government of Nigeria Bonds and Liquidity. Also, the Nigeria Treasury Bills and Nigeria Treasury Bonds show a short run negative albeit, insignificant relationship with liquidity respectively. While in the long run, all endogenous variables exhibit a significant relationship with the exogenous variable. The principal implication of this research is that short and medium term debt instruments impede liquidity in Nigeria. Consequently, it is recommended that treasury bills issuance should be confined to monetary policy attainment rather than a deficit financing avenue, treasury bonds should be gradually phased out, other long term financing options should be explored; among others.

KEY WORDS: ***Domestic Debt, Liquidity, Money Supply.***

INTRODUCTION

Every government has the responsibility of providing a good health care system, sound education, reliable power supply, portable water, good road networks, security and other forms of social and physical infrastructure. The provision of these is however almost always inhibited by resource constraints, as well as mismanagement and outright corruption; hence the existence of deficits.

Deficit financing is rife and practiced by both developed and developing countries alike. For instance, data show that the United Kingdom, United States and Russia had deficits of $439billion, £49Billion and $14.4 respectively; while a deficit of ₦2.2trillion is proposed to finance Nigeria's 2016 public sector expenditure. In fact, evidence show that the Nigerian government has consistently had deficit budgets, ultimately culminating in the acquisition and accumulation of sovereign debt which upon comparison with GDP is reported to be: 2006 – 11.8%; 2007 – 12.8%; 2008 – 11.6%; 2009 – 15.2%; 2010 – 18%; 2011 – 17.8%; 2012 – 19%; 2013 – 11%; and 2014 – 10.5% (CBN, 2016). No

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

gain-saying, debt constitutes about 36% of 2016 national budget (CBN, 2016).

The Nigerian government is currently facing monumental federal and state debts/deficit as the price of oil, the nation's principal budget factor fluctuates endlessly from the stipulated price and output. Consequently, in addition to the public debt of ₦1.84trn to augment revenue for the implementation of the 2016 budget, the government which had an "explorative talk" for a foreign loan of $3.5bln from the China Exim Bank and African Development Bank is now shopping for $29.9bln to finance infrastructure in 2017. Indeed, upon debt rescheduling and relief in 2006, the country's debt base shifted from global to local creditors (CBN, 2010). And though, the present state of debt is within acceptable limits thereby posing no immediate threat to the solvency of the economy, its trajectory is worrying as it could snowball into unsustainable proportions with concomitant consequences of catastrophic proportions on liquidity in particular and the economy in general.

The public debt discourse has raged amongst scholars for decades if not centuries, with yet an inconclusive stance as to its context and import on socio-economic dynamics. Generally, a strand of theoretical and empirical evidence suggests negative relationship between public debt and growth (Meade, 1958; Adam & Bevan, 2005; Aizenman, et al. 2007); while others contend that sovereign debt supports economic growth (Moki, 2012; Alshara, et al. 1991; Abbas & Christensen, 2010).

Contextually, related studies have been overwhelmingly focused on the developed countries (Checherita & Rother, 2010; Eggertson & Krugman, 2011, Mallucci, 2015, etc.), and grossly aimed at external debt (Bua, et al. 2014; Izedonmi & Iladoya, 2012; Clements, et al. 2003; Angeletos, et al. 2013). However, domestic debt constitute the larger proportion of public debt, and influences liquidity more especially given its higher default frequency in comparison with external debt (Mallucci, 2015). Unfortunately, studies on domestic debt are quite scanty (Asogwa & Ezema, 2005), and seldom have time series data in studies that pertain to them (Reinhart & Rogoff, 2010).

Another observed contextual gap pertains to the variables adduced to proxy domestic debt. Most scholars apply variables that are theoretically admissible; e.g. exchange rate, indirect taxes and government expenditure (Ahmad, et al., 2012); fiscal deficit and public sector credit (Charles, 2012) as well as domestic debt outstanding, domestic credit and interest rate (Adofu & Abula, 2010) but realistically alienated from the elements that constitute domestic debt. Precisely, only Asogwa& Ezema (2005) and Maana, et al. (2008) have considered the constituents of local public debt; however, while the former work is related to market risks and structure in Nigeria, the latter relates to liquidity dwelt on the Kenyan economy.

As regards the import of public debt, scholars have given appreciable attention to several socio-economic phenomena. These include interest rates (Bua, et al. 2014; Eggertson & Krugman, 2011; Checherita & Rother,2010), Inflation (Ahmed, et al. 2012; Eggertson & Krugman, 2011; Aizenman & Marion, 2009); Exchange rate (te Velde, 2014); savings (Ijeoma,2013;Checherita & Rother, 2010); Investment (Clements, et al. 2003); and quite a plethora on growth, with little attention on liquidity. This is an obvious lacuna. Hence this study focuses on domestic public debt and liquidity in Nigeria from the perspective of the elements that constitute domestic debt.

REVIEW OF RELATED LITERATURE

Conceptual Review

Public Debt: In Context

Conceptualizing public debt is simply complex due to the latitude of definitions proffered by different scholars (Silva & Meideros, 2010; Saviou, *et al*. 2015). This position is alluded to by

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

Bhatia (2008) who posits that the concept has diverse definitions which range from "all liabilities of government" to "some items of government liability." Given this definitional deficiency, the Portuguese Public Finance Council (2013) unravelled a plethora of sovereign debt concepts which differ in terms of financial instruments and valuation criteria. Consequently, public debt is seen in whole perspective, institutional perspective or dimension of specific instruments it is composed of.

Public debt can be presented as either gross or net debt (Silva & Meideros, 2010). Gross public debt constitutes the aggregate indebtedness of government, thus the total liability of the state as opposed to net public debt which is the difference between the gross debt and government's assets (IMF, 2012). The institutional perspective dwells on the specific organs or agents of government whose debt is considered public liability. Hence, debt in this context is composed of liabilities of the three tiers of government (given the government levels in Nigeria), organs of government, agencies and parastatals, ministries and departments, as well as public corporations. In fact, all debts guaranteed by government constitute sovereign debt (Asogwa & Ezema, 2005). Matiti (2013) posited that it is the aggregation of a country's debt which includes debt of local, state and central governments indicating the extent to which public spending is financed by borrowing. Further, some scholars simply define public debt according to its instruments such as bank loans, securities, loans from foreign governments and international organisations, accounts payable, taxation repayable, issue of national currency, guarantees to third parties, public savings schemes, (ISSAI, 1994; IMF, 2012). There is sufficient clarity from these notions that public debt is the aggregate liability of the state to creditors.

Domestic Debt in Nigeria

Domestic public debt in Nigeria is considered as centrally issued local currency denominated public debt instruments (Asogwa & Ezema, 2005). Domestic debt in Nigeria therefore, is the exclusive reserve of the federal government and excludes contractual liabilities and credit by government's suppliers. These include Nigerian Treasury Certificates, Treasury Bills, Federal Government Development Stocks, Nigerian Treasury Bonds, and Ways and Means Advances. However, as presently constituted, Nigeria's domestic debt stock is composed of Federal Government of Nigeria Bonds, Nigerian Treasury Bills and Nigerian Treasury Bonds.

Different reasons have been adduced for this rising trend of Nigeria's domestic (and indeed, public) debt. These range from concluded that plummeting oil price and deficient planning (Ajayi, 1989), government financing lapses such as short/long term project financing mismatch (Sanusi, 1988; and Bua, et al., 2014). Alison (2003) added that domestic public debt is anchored on three reasons: need for financing budget deficits, implementation of monetary policy and the quest to deepen the local financial market.

Liquidity

The concept of liquidity is rife, albeit elusive among scholars, as there seem to be a generalised conceptualization that is not subject to scholarly disputes (Nikolaou, 2009; Chatterjee & Kim, 2010; Molteni, 2014). For instance, Nikolaou (2009) views it as the *exchangeability* of wealth for commodities or of one asset for another; while Molteni (2014) considered the works of Keynes (1936) and Hicks (1967) to capture liquidity as the *store-of-value* capacity of an asset. However, the conceptualization of liquidity will be severely tainted if time and price impacts of transactions are not emphasized therein; therefore, liquidity is the ease of converting an asset for another at an inelastic price impact. This implies the absence of

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

price impact and zero cost, hence tenable in infinitely perfect market – which of course is idealistic; but an efficient market is considered where the price/cost impact is inelastic in relation its information content.

Frontiers of Liquidity

There is a myriad of frontiers for liquidity as enunciated by different generations of scholars. These are central bank liquidity, funding liquidity and market liquidity (Nikolaou, 2009), private and public liquidity Landau,2014), monetary liquidity and market liquidity (Chatterjee & Kim, 2010). An intuitive implication of these classifications is the existence of regulator induced (official) liquidity; participants induced (market) liquidity and (funding) liquidity that is a direct consequence of regulator-participant interactions.

(a) OFFICIAL LIQUIDITY

Also referred to as central bank/monetary liquidity, is the capacity of the central bank to provide requisite liquidity for the economy through the instrumentality of its monetary policy. Nikolaou (2009) sees it as the ability of the central bank to supply the money and capital markets with needed liquidity, which suggests that monetary policy tools are imperative for manipulating official liquidity (Friedman, 1969). Similarly, CGFS (2011) in Landau (2014) considers it as funds unconditionally made available by the central banks to settle claims and facilitate transactions. In this context, liquidity is a function of Central Bank's intervention by altering the monetary base, especially when friction pervades the financial market and by extension the economy.

In fact, liquidity is seen as being equivalent to aggregate supply of money as liquidity only differs from aggregate supply of money in terms of (degree or) definition (Jinghan, 2010); precisely, "monetary liquidity is associated with macro variables such as ... money supply", therefore "gauged for instance by supply of money (Becker, 2009). In same vein, Palley (2008) argues that M_3 is an appropriate measure of broad liquidity; a view corroborated by Adrian & Shin (2009) as they posit that official liquidity means money supply. Asogwa & Ezema (2005) allude that money supply and (by implication) liquidity can be influenced by tinkering with the cash reserve and liquidity ratio. Afolabi (1999) equates official liquidity to supply of money by stating that supply of money implies available money in liquid and spendable form.

This liquid form of money range from the narrow (M_1) perspective of Keynes (1930) that supply of money consists of currency in circulation (CC) and demand deposits (DD), to the position of Friedman (1968) that beyond M_1, it is composed of time deposits (TD) to form M_2. An addition is M_3 which views supply of money as M_1 in addition to savings deposits (SD). However, the Central Bank of Nigeria conceptualizes supply of money to be composed of narrow money (M_1) and broad money (M_2). While M_1 is composed of currency in circulation (CC) and Demand Deposit (DD), broad money (M_2) consists of M_1 and Quasi Money. Quasi money is a combination of time deposits, Savings deposits and marketable short term instruments.

(b) MARKET LIQUIDITY

Market liquidity encompassed many concepts that are intricately linked, resulting in a conundrum of definitions that are (at best) complementary, but not comprehensive (Mares, 2002). Black (1971) views it as a market where quotation of bid-ask price exists, with minimal spreads and price impact of small transactions. Muranaga & Shimizu (1997) posit "a liquid market is one where voluminous transactions can be speedily made with relatively insignificant price impact. In the context of the financial market, liquidity is seen as the product of financial intermediaries in the secondary market (Mares, 2002). Ideally, in a liquid market, there exists no cost implication of executing transactions (Flemming, 2001).

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

Therefore, liquidity is adjudged, among many others, on the grounds of its ability to facilitate transactions. The other feature pertains to ease of such transactions in terms of time, volume and transaction costs (Fernandez, 1999). It defines the extent to which a market is deep, tight and resilient. These are also considered as trading quantity, speed, cost and price impact (Liu, 2006).

(c) FUNDING LIQUIDITY

Funding liquidity is the ease with which maturing financial obligations can be met. It typifies the ease of obtaining funding for investment opportunities (Molteni, 2014). Molteni (2014) that the basic characteristic of funding liquidity is its *pledgeability*, implying that the funding quality of a liquid asset is its capacity to be used as a security in the financial market. It is also the economic agents' capacity to discharge liabilities, or offset financial obligations upon maturity (BIS, 2008).

Theoretical Review

There are different theoretical perspectives on the public debt discourse, basically, the Classical and Keynesian theoretical foundations are at the different ends of this theoretical spectrum, while a few other positions are advocated to synthesize the extreme arguments.

The Classical (Crowding-Out) Perspective of Public Debt

This theoretical position built on the postulation of Smith (1937), who in the third chapter of the "*wealth of nations,"* espoused the economic implications of public debt. He criticized the practice of running deficit budgets as the accumulation of public debt is *deleterious* even if it is composed solely of domestic debt. Smith (1937:879) commented that debt servicing which is like "the right hand which pays the left … (is an) apology founded altogether on the sophistry of the mercantile system." He (1937:674) added that domestic debt diverts "natural progress of a nation towards wealth and prosperity" thereby inflicting economic hardship on domestic producers. Ricardo (1951) essentially agreed with Smith's theoretical arguments; buttressing that the inefficient characteristic of public borrowing as it diminishes the economy's wealth accumulation and credit formation capacity. Also, the fundamental difference between private borrowing and public borrowing is the productive efficiency of such funds as well as the transfer of debt burden to future generations (Say, 1964). Mill (1976) added that external debt is really beneficial to the economy where it is part of an integrated economic plan that bolsters aggregate savings; however, domestic borrowing is inimical to the economy and constraints domestic savings and tends towards less-productive or unproductive local investments or siphoned abroad.

However, the best collection of classical arguments was advanced at the twilight of the nineteenth century by Adams (1833) who argue that loans meet the needs of borrowers thereby satisfying all participants; Bastable (1903), who opined that both domestic and external public debts are governed by the same set of principles, hence two sides of a coin; and Leroy-Beaulieu (1883) who contended that public debt is neither good nor evil in itself but as a consequence of its deployment.

It therefore implies that from the vantage point of the classicists, domestic public debt culminates in currency depreciation (possibly through institutional inflation); public debt is expensive in terms of amortization and interest charges; sovereign debt complicates future financing, given the huge amount needed for servicing such debt; deficit budgets attract sovereign irresponsibility; and, government domestic debt stifles private sector productivity and investment.

Keynesian ("We owe no one else") Theoretical Proposition

The Keynesian revolution challenged the dominant economic narrative with a thesis that was hitherto alien in the economic discourse. The

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

General Theory of Employment, Interest and Money; Keynes's (1936) masterpiece provides the empirical foundation for modern public debt theory. The theory alludes that the aggregate quantum of a country's debt is immaterial, and irrespective of the debt servicing costs, it does not constitute a burden. Lerner (1955:475) elucidates, "the absolute size of the national debt does not matter..."

The Keynesians used the analogy of a family to view the economy as a unit and the country as a family, positing that like the indebtedness of a family to another, it is the indebtedness of a country to another that is burdensome; inferring that domestic debt does not confer any burden on the country.

The New Orthodoxy

Beyond the dispensation of the Keynesians, Buchanan (1968) advanced the *new orthodoxy* which tried to examine the following theoretical premises of the Classicists and Keynesians:

(i) The individual/private and public debt analogy is delusionary;
(ii) There is a sharp difference between domestic and external debt; and,
(iii) Public debt does not imply intergenerational transfer of debt burden.

Upon publishing the *Public Principles of Public Debt (1968),* the debate on national debt burden exacerbated and put the Keynesian arguments that debt is no economic burden and intergenerational effect of debt are unrealistic on the back foot. Noting that taxation is burdensome; and since citizens have been mandated to pay taxes, they cannot be asked to bear the burden of public debt; hence taxation delays levy of tax, hence, the burden of tax is transferred to future generations. He further argued that taxes are mandatory, while domestic debt is voluntary, but the acquisition of external public debt co-opts the entire citizenry into a social contract, which poses a burden on all. Thus, he proved that:

(i) The individual/private and public debt analogy is fundamentally valid;
(ii) Domestic and external debt are basically equivalent; and,
(iii)The inter-generational transfer of public debt burden is valid.

Empirical Review

Public debt has undergone intense empirical scrutiny; with most focusing on its relationship with growth (Reinhart & Rogoff, 2010; Choong, et al., 2010; Hassan & Akhter, 2014). Nevertheless, others have explored the bond between public debt and investment (Apere, 2014), interest rate (Checherita & Rother, 2010), inflation (Ahmad, et al., 2012), financial market (Christensen (2005), and a remarkable scanty quantum of findings that relate to liquidity (Majumder, 2007; Allen & Moessner, 2013). For instance, Calderon & Fuentes (2013) examined government debt's affiliation with economic growth in 136 countries from 1970 to 2010 using the OLS technique. The work finds that growth is positively related to fiscal balance and inversely associated with public debt. Also, the work shows an adverse effect of public debt on growth that is higher in developing climes than in the developed world. In same vein, Kumar & Woo (2010) investigated public debt's affinity to growth by using Between Estimates (BE) and GMM to analyze (Population, GDP, investment and government size as) data obtained from emerging countries from 1970 to 2007, using the multiple linear regression model. The results indicate that a converse relationship exists between debt and growth. Precisely, the results prove that one percent (1%) increase in public debt leads to 0.2% contraction of the economy.

Still on the public debt – growth study, Reinhart & Rogoff (2010) on a cross-sectional data of twenty countries from 1990 to 2009 used a simple correlation statistics to investigate growth in the time of public debt to show that public debt relates with growth in a weak manner. This is

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

corroborated by Choong, et al. (2010) who investigated public debt's effect on Malaysia's economic performance from 1970 – 2006, with the application of Co-integration test; with results suggesting that every element of debt has a negative effect on the economy in the long-run. Pakistan's economy was also subjected to similar investigation by Quareshi & Ali (2010) from 1981 – 2008 with the finding that public debt impacts negatively on the economy. Hassan & Akhter (2014) conducted a thirty-three (33) years (1990 - 2012) study of the Bangladeshi economy as regards the impact of public debt. The authors used the regression model for analysis that shows no significant relationship exists between growth, domestic debt and external debt in Bangladesh. It also found a one dimensional causal relationship that emanates from domestic debt to growth at a 10% significant level. The work affirms the existence of negative effect of public debt on economic growth. In contrast, Checherita & Rother (2010) examined how high and growing sovereign debt affect economic growth using the regression equation to reveal that a basis point increase in public debt culminates in seven (7) and eleven (11) basis points increase in real and nominal interest rates respectively. The work also concludes that the impact of public debt on growth is non-linear.

Some scholars tried to subject theoretical positions to empirical scrutiny. For example Wheeler (1999) investigated the economic implications of domestic public debt as regards price levels, interest rates and output using variance decomposition and impulse-response functions on data obtained from the US from 1980 to 1990. The findings show a statistically significant negative impact of domestic public debt on interest rate, productivity and inflation. Tsoulfidis (2011) also used data from the United Kingdom from 1756 to 1815 to analyze Mill's conjecture on domestic public debt, interest rate, rate of profit and real wage. The study employed correlation analysis to affirm that Mill's postulations are valid. Reinhart & Rogoff (2011) used two centuries of data in 70 countries to prove the contingent liability theory (Velasco, 1987). The duo find that public debt increases by 86% in the first three years after any financial crisis, establishing a two-dimensional causal relationship between domestic public debt and banking crisis – by extension, liquidity. And recently, Saviou, et al. (2015) investigated the perspective of German's classicists as regards public debt in ex-socialist European countries with descriptive statistics and correlation matrices to find a considerable affirmative relationship between public debt and economic growth.

Other studies dwelt on domestic debt – liquidity prognosis. Majumder (2007) investigated the crowding out of private investors by public borrowing in Bangladesh by analyzing appropriate data with the co-integration model. The study did not affirm the crowding-out hypothesis within the Bangladeshi economic context. Grobety (2012) examined the part of local public debt in moderating between liquidity and output using an 18-year cross-sectional data from 130 countries to derive result that suggests that governmental agencies that depend on liquidity develop at a faster rate in countries with higher public debt, if and only if this debt triggers higher liquidity. Allen & Moessner (2013) used descriptive statistics to show a dual faceted causal relationship between liquidity and the European debt crisis between 2007 and 2015. Ahmad, et al. (2012) investigated domestic debt and inflationary effect in Pakistan by applying regression analysis technique on available data from 1992 – 2009. The study reveals that domestic debt is positively and significantly related to liquidity and inflation. The work categorically points out that a unit increase in domestic debt a nearly 300% increase in liquidity and inflation.

Maana, *et al*. (2008) investigated local debt's impact on the economy, using time series data from Kenya using Barro's growth regression

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

model. Money supply (M_3) was used to proxy liquidity and the constituents of domestic public debt portfolio. They uncovered positivity in the connection between domestic sovereign debt and liquidity; specifically, 1% change in domestic public debt, attracts a 0.16% change in liquidity. The work further shows that domestic debt impacts positively on growth; noting that, a unit change in domestic debt, culminates in 0.24 units change in economic growth. This finding negates the classical proposition of domestic public debt.

In Nigeria, Charles (2012) undertook a seemingly comprehensive quest to study Nigeria's domestic debt and economic growth; applying OLS in a 15-year quarterly data to find that 80% of variables (except growth) significantly influence domestic debt. It specifically reveals an inverse relationship between growth and domestic debt that a percent growth, results in 0.38% decline in domestic debt; also a unit increase in privately credit, declines domestic debt by 0.18%. Perhaps, more crucial is the observation that money supply (liquidity) relates positively with domestic debt by the ratio 1:0.2. Izedonmi & Iladoya (2012) used Schclarek (2004) regression model which reveal that continuous rise in debt burden and debt servicing has a negative impact on liquidity (which was proxied by M_3). Finally, Ebi, *et al*. (2013) examined the comparative effectiveness of foreign and local debts on the economy by employing linear regression model to reveal external debt as having comparatively higher and significant impact on economic growth than domestic debt. The analysis also reveal that domestic debt impacts positively and significantly on gross domestic investment; while on the other hand, foreign debt is significantly inimical to gross domestic investment.

METHODOLOGY

Essentially, secondary time series based quarterly data from 2006 to 2015 were used for the study. The employed data reflect all elements that constitute domestic public debt in Nigeria, which are Federal government of Nigeria bonds, Nigerian Treasury bills and Nigerian treasury bonds; while broad money supply (M_2) is considered an appropriate variable for (official) liquidity in Nigeria (Asogwa & Ezema, 2005; Charles, 2012). Subsequently, descriptive and econometric tools were used to analyse the data. These range from Multiple Linear Regression Model to establish short run relationships, Unit root test, Cointegration test, Error Correction Test and the Granger Causality Test.

Model Specification

The study applied a Multiple Linear Regression Model (MLRM) which conforms to those of Maana, *et al*. (2008) and Charles (2012).

Liquidity = f(Domestic debt) (1)

Liquidity = Money Supply (*Jinghan, 2010; Becker, 2009; & Afolabi, 1999*) (2)

Money Supply = M_2 (3)

From equations 2 & 3 it can be inferred that:

Liquidity = M_2 (4)

Domestic Debt = f(FGBND, NTBLL, NTBND) (5)

Equations 4 & 5 imply that:

M_2 = f (FGBND, NTBLL, NTBND) (6)

In a deterministic model, we have:

$M_2 = FGBND_t + NTBLL_t + NTBND$ (7)

Equation 7 is converted to a probabilistic form to engender econometric analysis, we have:

$M_{2t} = \alpha_0 + \beta_1 FGBND_t + \beta_2 NTBLL_t + \beta_3 NTBND_t + \mu$ (8)

Where:

M_{2t} = Broad Money

FGBND = Federal Government of Nigeria Bonds

NTBLL = Nigerian Treasury Bills

NTBND = Nigerian Treasury Bonds

α_0 = Constant Term

$\beta_1 - \beta_3$ = Coefficients of Predictors

μ = Stochastic term

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

RESULTS AND DISCUSSION

Descriptive Statistics

In order to evaluate the underlying trend, univariate examination is conducted with the use of descriptive statistics. The output of the analysis is shown below:

Table 1: Descriptive Statistics Output

	M_2	FGBND	NTBLL	NTBND
Mean	11692.12	2850.562	1527.467	361.8827
Median	11589.58	2979.066	1358.346	372.9005
Maximum	20029.83	5808.141	2865.524	419.2682
Minimum	3307.668	339.8785	471.9294	255.9880
Std. Dev.	4836.032	1602.522	892.4995	47.04550
Skewness	-0.073995	0.074097	0.291407	-0.675722
Kurtosis	1.989892	1.798219	1.427628	2.355000
Jarque-Bera	1.737031	2.443733	4.686709	3.737380
Probability	0.419574	0.294680	0.096005	0.154326
Sum	467684.7	114022.5	61098.69	14475.31
Sum Sq. Dev.	9.12E+08	1.00E+08	31065660	86317.87
Observations	40	40	40	40

Source: *Eviews-9 Output.*

It is obvious that Federal Government Bond (FGBND) has a mean of ₦2,850.562 billion, closely marked by the Nigerian Treasury Bills (NTBLL) which hosts an average of ₦1,527.467 billion annually, while Nigerian Treasury Bonds (NTBND) shows the least amount of ₦361.8827 bln as annual average. M_2 has an annual mean of ₦11,692.12 bln indicating the average annual level of liquidity. As regards standard deviation which portrays the riskiness of the variables, FGBND has the greatest level of risk given its standard deviation of ₦1,602.522 bln portraying the latitude of its riskiness; this is succeeded by NTBLL with a standard deviation of ₦892.4995 bln. The next is NTBND whose risk level as shown by the standard deviation is ₦47.04550 bln. In all, M_2 has a standard deviation of ₦4,836.032 bln which shows that liquidity has a potential variability of ₦4,836.032; by implication, M_2 can be reduced or increased to the extent of the standard deviation. The skewness which can indicates the movement of variables whether they are more or below the mean. As regards the variables in the study, the output shows that liquidity (M_2) and Nigerian Treasury Bonds (NTBND) are both negatively skewed showing the downward or dwindling movement of these series, while Federal Government Bond and Nigerian Treasury Bills (NTBLL) skew positively. Considering Kurtosis which shows the level of sharpness or flatness of the data, the variables were moderately flat as the possess very low Kurtosis coefficient which portrays progression of the employed variables have been gradual during the period of interest, although relatively Nigerian Treasury Bonds (NTBND) had the sharpest movement as its movement was relatively steeper than that of the other variables. The Jarque-Bera is indicative of the normality of all variables given that they posses probability level that is higher than 0.05 significance threshold.

Graphical Representation

The Figure (5) below shows a combined visual evaluation of all (predictor and criterion) variables. Liquidity (M_2) is atop the table as it rose steeply, albeit in a fluctuating manner over time presumably steering inflation and interest rates, while Federal Government Bond (FGBND) and Nigerian Treasury Bill (NTBLL) exhibit a rhythmic upwards but slow progression while Nigeria Treasury Bonds are seen to possess a gradual fall.

Multiple Regressions (Ordinary Least Square)

It can be adjudged from the output in Table 2 below that the coefficient of determination (R-squared) has a value of 0.963913 which is a portrayal that the endogenous variables constitute about 96.4% of the elements that that predict the exogenous variable, implying that the stochastic (unobserved) features in the model constitute about 3.6%. The adjusted R-squared hovers around 96.1%, which proves that the model is a

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

good fit. The *Durbin-Watson* is 1.87 shows a tolerable absence of serial correlation. The F-statistic shows a probability of 0.0000, which is below the 0.05 significance level shows that the probability is significant and the model successful. With respect to the coefficients, the constant (C) has a value of 7,762.941, whose implication is that if all the explanatory variables are held constant or pegged at zero (0), the explained variable – liquidity will surge by 7,762.941 units. This shows that regardless of change on the explanatory variables, liquidity will be elevated. The variable – Federal Government of Nigeria Bonds (FGBND) shows a positive coefficient of 3.076477, being the only variable with a positive direction shows that where other predictor variables are held constant, a 1 unit change in the FGBND will precipitate a 3.08 unit appreciation of liquidity.

On the other hand, Nigerian Treasury Bills (NTBLL) and Nigeria Treasury Bonds (NTBND) show a negative direction as they posses coefficients of -0.768492 and -10.13219 respectively; indicating that where other variables are held at zero, a unit increase in NTBLL will contract liquidity by 0.77 units while a unit increase in NTBND will culminate in a 10.13219 stifling of liquidity where other variables are held constant.

A consideration of the strength of relationships, using the t-statistic shows that only FGBND relates significantly with liquidity in the short run considering the 0.0000 probability which is below the 0.0500 significant margin, while other explanatory variables show statistically insignificant short run relationship with the predictor variable – liquidity. Also, there is an overall significant relationship between domestic debt and liquidity given the F-Probability.

The Augmented Dickey Fuller is employed for the unit root test. The output in Table 3 below shows that at critical values of 1%, 5% and 10% significance level, the stationarity of all variables is established at first (1^{st}) differencing i.e. 1(1). The variables can thus be said to possess a good level of cointegration. Consequently, cointegration was considered which shows in Table 4 below that at "None", "At most One" and "At most Two" the equations are signed. This indicates that a statistically significant long run relationship exists between the endogenous variables and liquidity, given that their probability is less than the 0.05 significant level. Therefore, it is apt to consider error correction subsequently as the Max.-Eigen value has similar results. The output from the parsimonious error correction model is -0.525270 as seen in Table 6. This negative 0.5252 indicates the adjustment necessary to equate the short run distortions to the long run equilibrium; therefore to attain the short-run relationship in the long run, an annual 52.5% alignment is desired.

The granger causality test in Table 5 below clarifies that there is neither a one dimensional nor a two dimensional causal relationship among employed variables. Precisely, the pair of FGBND and M_2 show probabilities of 0.5997 and 0.9067 in both directions which are higher than the 0.0500 significant threshold, hence no causality is established either way. Same is seen in the NTBLL - M_2 with probabilities of 0.1970 and 0.1655 in both directions, also indicating the absence of causality between the pair. Also, a pair between the third variable - NTBND and M_2 show probabilities that are obviously higher than the 0.05 significant level, therefore they do not possess mutual causality. The endogenous - exogenous variables as well as inter-endogenous variables results show that no variable is influenced by another variable, but react to own shocks.

The utilised diagnostic tools show that the model portrayed normal and homoskedastic characteristics.

Discussion of Findings and Recommendations

Startling findings are observed from the study. First, the descriptive investigations reveal that

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

FGBND provide highest return, but also an astronomical level of risk. This affirms the position of Asogwa & Ezema (2005) that long term domestic debt instruments in are bedevilled with roll over risks, which negates the situation in other (especially developed) climes where only short term public debt instruments suffer rollover risk (Perez & Prieto, 2014; Venceslau, 2011).

Also clearly observed from the analysis above, only Federal Government of Nigeria bond displays a positive and significant influence on liquidity in the short run; while the other predictor variables Nigeria Treasury Bills and Nigeria Treasury Bonds exhibit negative and insignificant short term link with liquidity. This discovery contradicts anecdotal knowledge that given the short term nature of Treasury bills they should support liquidity; however the study's findings can be justified on the grounds that institutional investors like banks, hold a substantial proportion of short term instruments basically for profiteering reasons. Such institutional investor technically convert short term investments in public debt instruments to long term investments by rolling over such investments, as opportunity for further subscriptions arise whilst to attract increased profit. Hence, the short term contraction caused by investment in short-term public debt instruments is not abated upon maturity of such instruments, due to rollover investments.

It is also obvious (from the regression output) that the negative influence of NTBND on liquidity is substantial, besides, the NTBND also has a very high risk factor. This twin evil probably accounts for its gradual reduction in Nigeria. The constant in the output imply that the unobserved variables have the capacity of supporting liquidity substantially where domestic public debt instruments are not considered.

The study finds that all the predictor variables have significant long-run relationship with the criterion variable. So it can be inferred that although in the short run only FGBND shows a significant relationship, all variables significantly influence liquidity. This is attributable to the fact that short-term instruments are basically rolled over to possess features of long-term domestic public debt instruments, hence, in the long run their overall significance on liquidity is akin to the FGBND

Unlike the bi-dimensional causal relationship between domestic debt and liquidity as espoused by the work of Allen & Moessner (2013), this investigation clearly proves the inexistence of such relationship between the variables that constitute domestic debt and liquidity in Nigeria. This shows that none of FGBND, NTBLL and NTBND causes liquidity neither does liquidity in any way promote any or all of them. A further introspection also exposes that the predictor variables do not have any causality among one another.

Conclusively, the study establishes a significant relationship between domestic public debt and liquidity in Nigeria. This is in abeyance with the Classicists' position of crowding out which suggests that increased domestic debt will ultimately shut the private sector out of funds by shrinking liquidity; also affirming the position of Schclarek (2004). It conversely affirms the positions of PES (2013) and Majunder (2007) that internal debt stimulates liquidity. It is also in concordance with the works of Ahmad, et al. (2013), and Maana, et al. (2008) that establish positive and significant affinity between domestic debt and liquidity.

This study employed the very constituents of internal public debt to unveil astonishing findings from which we deduce that short-medium term debt instruments hamper liquidity in Nigeria. This negates anecdotal evidence but possible rationale is not farfetched: short term debt instruments (except interest) are a mere conversion of one form of liquid assets to another, thereby stagnating the aggregate volume of liquid assets, besides, the rollover of short term instruments is rife and

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

technically transforms short term instruments to long term thereby causing liquidity contraction. Also the fact that funds mopped up by government via issue of debt instruments are more often than not spent on recurrent channels depletes liquidity stock.

It can be further inferred that given the negative relationship between short term instruments and liquidity, there is high level of currency mismatch, rollover risks and liquidity risks inherent in the issue of Nigeria Treasury Bills and Nigeria Treasury Bonds. Also, deduced is the fact that the Federal Government Bonds is more sustainable and beneficial in promoting liquidity.

Recommendations

Sequel to the discovered relationships, the following recommendations are made:

(i) First, the financial regulatory authorities should direct Treasury bills policy towards liquidity control rather than a mechanism for financing budget deficits. This is intended to forestall concomitant risks and mismatch. However, given its importance in providing a near risk free investment prospect to private sector agents, and diversification of the public debt portfolio, it should still be maintained.

(ii) Second, issuance of the Nigeria Treasury bonds should be discontinued, except there exist qualitative and strategic motivations geared towards the attainment of a set long-run economic goal.

(iii) Third, given the tremendous positive impact of Government bonds on liquidity in Nigeria, the monetary authorities should seek an increased quantum of government bonds and other long term instruments in the public debt portfolio.

(iv) Fourth, fiscal discipline should be promoted by appropriate funding – investment match. Hence, funding from federal government bonds should be invested in physical and human infrastructure.

(v) Fiscal gaps should be narrowed by installing efficient taxation policy to improve internally generated revenue in order to fast track the implementation of the first recommendation.

(vi) Relevant authorities should intermittently restrict institutional investors from investing in short term domestic debt instruments to enable such investors channel dormant funds as credit to private economic agents.

REFERENCES

1. Abbas, A. & Christensen, J. (2010). The role of domestic debt markets in economic growth: An emerging empirical investigation for low-income countries and emerging markets. *IMF Staff Papers*; 57(1):209 – 255.
2. Adam, C. S. & Bevan, D. L. (2005). Fiscal deficits and growth in developing countries. *Journal of Public Economics*; (4): 571 – 597.
3. Adams, H. C. (1958). *Public debts* 1833. In J.M .Buchanan (Ed) Public principles of the public debt. Illinois: Homewood.
4. Adofu, I. & Abula, M. (2009). Domestic debt and the Nigerian economy. *Current Research Journal of Economic Theory;* 2(1): 22-26.
5. Adrian, T. & Shin, H. S. (2009). Money, liquidity and monetary policy. *Federal Reserve Bank of New York Staff Reports*, No 360.
6. Afolabi, L. (1999). *Monetary economics*. Ibadan: Heinemann Educational Books Nigeria Plc.
7. Ahmad, M. J., Sheikh, M. R. & Tariq, K. (2012). Domestic debt and inflationary effects: An evidence from *Pakistan. International Journal of Humanities and Social Science*; 2(18): 256 – 263.

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

8. Aizenman, J & Marion, N. (2009). Using inflation to erode the US public debt.
9. Aizenman, J., Kletzer, K. & Pinto, B. (2007). Economic growth with constraints on tax revenues and public debt: Implications for fiscal policy and cross-country differences. *NBER Working Paper* No 12750.
10. Alison, J. (2003). *Key issues for analyzing domestic debt sustainability*. Debt Relief International Publication, ISBN: 1-903971-07-1
11. Alshara, M., Khateeb, F. & Majd, M. (1991). External debt and its impact on the Jordanian economy: An econometrical study.*Abhath Al-Yarmouk*; 7(4):231 – 253.
12. Angeletos, G. M., Collard, F., Dellas, H. & Diba, B. (2013). Optimal public debt management and liquidity provision. *NBER Working Paper Series* No. 18800.
13. Apere, T. O. (2014). The impact of public debt on private investment in Nigeria: Evidence from a nonlinear model. *International Journal of Research in Social Sciences*; 4 (2): 130-138.
14. Bastable, G. F. (1903). *Public finance.* London*:* Macmillan.
15. Becker, S. (2009). Is the next global liquidity glut on its way? *Deutsche Bank Research.*
16. Bhatia, H. L. (2008). *Public finance*. New Delhi: Vikas Publishing House.
17. BIS (2008).Liquidity Risk: Management and Supervisory Challenges. *Basel Committee on Banking Supervision.*
18. Bua, G., Pradelli, J., & Presbitero, A. F. (2014). Domestic public debt in low-income countries: Trends and structure. *Review of Development Finance* (4): 1-19.
19. Buchanan, J. M. (1968). *Public debt in international encyclopedia of social sciences*. London: The Macmillan company and The Free Press.
20. Calderon, C. & Fuentes, J. R. (2013). Government debt and economic growth. *The World Bank/Inter-American Development Bank.*
21. CBN (2010). Overview of the Nigerian economy.
22. CBN (2016). Annual statistical reports, (various issues).
23. CGFS (2011). Global liquidity: Concept, measurement and policy implications. *Committee on the Global Financial System Working Paper No* 45.
24. Charles, O. (2012). Domestic debt and the growth of Nigerian economy. *Research Jounal of Finance and Accounting;* 3(5): 45-56.
25. Chatterjee, U. & Kim, Y. C. (2010). *Monetary liquidity, market liquidity and financial intermediation*. Milwaukee; University of Wisconsin.
26. Checherita, C. & Rother, P. (2010). The impact of high and growing government debt on economic growth: An empirical investigation for the euro area. *European Central Bank, Working Paper Series No* 1237.
27. Choong, C., Lau, E., Liew, V. K., & Puah, C. (2010). Does debt foster economic growth? The experience of Malaysia. *African Journal of Business Management;* 4(8):1564 – 1575.
28. Christensen, J. (2005). Domestic debt markets in Sub-Saharan Africa. *IMF Staff Papers*; 52(3):518- 538.
29. Clements, B., Bhattacharya, R. & Nguyen, T. Q. (2003). External debt, public investment and growth in low-income countries. *International Monetary Fund Working Paper* WP/03/249.
30. Eggertson, G. B. & Krugman, P. (2011). Debt, deleveraging and the liquidity trap: A Fisher – Minskey – Koo approach. *New York: Federal Reserves Bank.*

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

31. Flemming, M. J. (2001). *Measuring treasury market liquidity*. Federal Reserve Bank of New York.
32. Fernandez, F. A. (1999). Liquidity risk: New approaches to measurement and monitoring. *Securities Industry Association, Working Paper.*
33. Friedman, M. (1968). *The optimum quantity of money*, (in the optimum quantity of money and other essays); Chicago: Adline.
34. Friedman, M. (1969). Factors affecting the level of interest rates. *Proceedings of Conference on Saving and Residential Financing;* 11-27.
35. Grobety, M. (2005). *Liquidity and growth: The role of government deb*t. Faculty of Business and Economics; University of Lausanne.
36. Hassan, M. H. & Akhter, T. (2014). Impact of public debt on economic growth: Evidence from Bangladesh. Retrieved from http://srn.com/abstract=2577214.
37. Hicks, J. (1967). *The hayek story.* (In critical essays in monetary theory); Oxford: Clarendon Press, 203-215.
38. Ijeoma, N. B. (2013). An empirical analysis of the impact of debt on the Nigerian economy. *An International Journal of Arts and Humanities;* 2(3): 165-191.
39. International Monetary Fund (2001). *Government finance statistics manual* (2nd ed.). Washington: International Monetary Fund.
40. International Monetary Fund (2007). *Regional economic outlook for sub-saharan Africa.* Washington: International Monetary Fund.
41. International Monetary Fund (2012). What lies beneath: The statistical definition of public sector debt. *Staff Discussion Note.*
42. INTOSAI (2003). Public debt management and fiscal vulnerability: Potential roles for SAIs. *INTOSAI Public Debt Committee.*
43. ISSAI (2008). Guidance on definition and disclosure of public debt. International Organisation of Supreme Audit Institutions.
44. Izedonmi, F. I. O. & Iladoya, O. J. (2012). Public debt- growth dynamics: The Nigerian experience. *Jorind*; 10(3): 252-260.
45. Jinghan, M. L. (2010). *Macro economic theory*. Delhi: Vrinda Publications Ltd.
46. Keynes, J. M. (1936). The general theory of employment. *The Quarterly Journal of Economics*, 51, 209–223. Retrieved from http://www.jstor.org/stable/1882087?seq=1#page_scan_tab_contents
47. Kumar, M. S. & Woo, J. (2010). Public debt and growth. *IMF Working Paper* No 174.
48. Landau, J. P. (2014). Global liquidity: Public and private. Retrieved from ebrary database.
49. Lerner, A. P. (1955). *Functional finance and the federal debt social research*, Feb, 1943 reprinted in Readings in Fiscal Policy; London: George Allen and Unwin.
50. Leroy-Beaulieu, *P. (*1883*). Trait e' dela science de finances,* Paris: cited in J. M. Buchanan, *Public Principles of public debt*.
51. Liu, W. (2006). A liquidity – Augmented capital pricing model. *Journal of Financial Economics*, 631 – 671.
52. Maana, I., Owino, R. & Mutai, N. (2008). Domestic debt and its impact on the economy – The case study of Kenya. *Paper presented during the 13th Annual African Econometric Society Conference in Pretoria, South Africa;* 9th - 11th July.
53. Mallucci, E. (2015). Domestic debt and sovereign defaults. International Finance. *Discussion Paper, No* 1153.

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

54. Mares, A. (2002). Market liquidity and the role of public policy. *BIS paper No* 12.
55. Matiti, C. (2013). The relationship between public debt and economic growth in Kenya. *International Journal of Social Sciences and Project Planning Management;* 1(1):1-21.
56. Meade, J. E. (1958). Is the national debt a burden? *Oxford Economic Papers, New Series* 10(2):163 – 183.
57. Mill, J. S. (1976). *Principles of political economy*. Fairfield, New Jersey: Augustus M. Kelley, [1848].
58. Moki, M. (2012). *The relationship between public debt and economic growth in Africa*. Unpublished M. BA Project, University of Nairobi, Kenya.
59. Muranaga, J. & Shimizu, T. (1999). *Market microstructure and market liquidity*. Bank of Japan.
60. Nikolaou, K. (2009). Liquidity (risk) concepts: definitions and interactions. *Working Paper Series No 1008.*
61. Palley, T. (2008). Endogenous money: Implications for the money supply process, interest rates and macro economics. *PER Working Paper No* 178.
62. Perez, D. J. (2015). Sovereign debt, domestic banks and the provision of public liquidity. *Stanford Institute for Economic Policy Research, Discussion Paper No. 15-016.*
63. Portuguese Public Finance Council (2013). Public debt. *Council No* 1
64. Reinhart, O. M. & Rogoff, R. S. (2010). Growth in a time of debt. *NBER Working Paper No 15639.*
65. Reinhart, C. M. & Rogoff, K. S. (2011). From financial crash to debt crisis. *American Economic Review,* (101): 1676 – 1706.
66. Ricardo, D. (1951). *The works and correspondence of David Ricardo*, vol. VIII. In P. Sraffa, (ed.), with the collaboration of M. Dobb, Cambridge: Cambridge University Press, [1819-1821].
67. Saviou, G., Dinu, V. & Taicu, M. (2015). A classical German view of public debt and investment in Romania and other ex-socialist economies. *Economic Research;* 28(1): 907-923.
68. Say, J. B. (1964). *A treatise on political economy.* New York: Augustus M. Kelly.
69. Schclarek, A. (2004). Debt and economic growth in developing industrial countries. Mimeo.
70. Silva, A. D. B. & Meideros, O. L. (2010). Public debt concept and statistics. Retrieved from: http://www.tesouro.fazenda.gov.br/documents/10180/375692/Part1_Chapter_4.pdf/43242a17-18d7-456f-9f06-95cd70e32460.
71. Smith, A. (1937). *The wealth of nations*; in E. Cannan, ed., New York: Random House, [1776].
72. te Velde, D. W. (2014). Sovereign bonds in Sub-Saharan Africa: Good for growth or ahead of time? ODI Briefing, 87. Retrieved from http://www.odi.org.
73. Velasco, A. (1987). Financial crises and balance of payments crises: A simple model of the southern cone experience." *Journal of Development Economics*, 27(1–2): 263–83.
74. Venceslau, H. M. (2007). Federal public securities: Following liquidity on secondary market. *Institute of Brazilian and Public Management Issues.*
75. Wheeler, M. (1999). The macro-economic impacts of government debt: An empirical analysis of the 1980s and 1990s. *Atlantic Economic Journal;* 27(3): 273 -284.

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

APPENDICES

Figure 1: Broad Money-Supply (M_2)

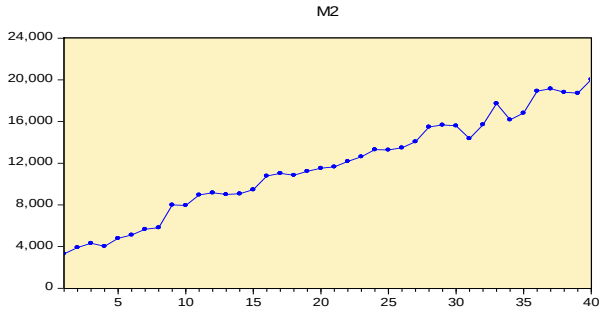

Figure 2: FGBND

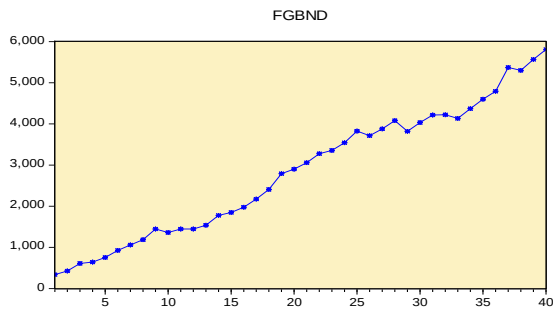

Figure 3: NTBLL

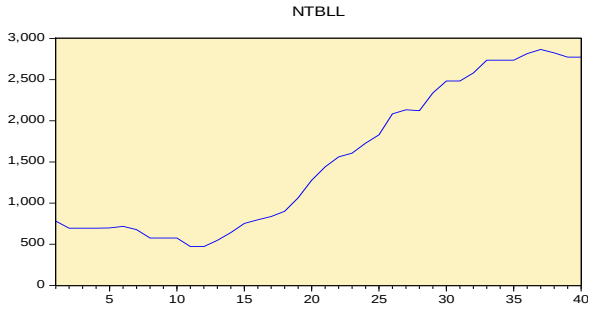

Figure 4: NTBND

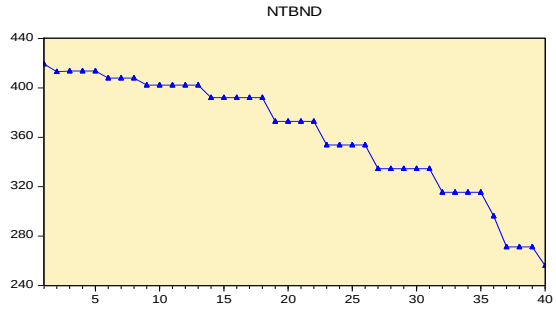

Figure 5: FGBND, NTBLL, NTBND and M_2

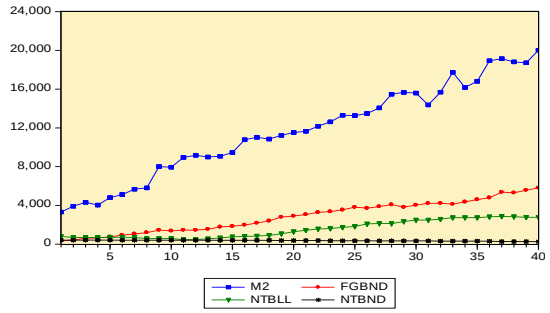

Figure 6 : Normality (Jarque-Bera)

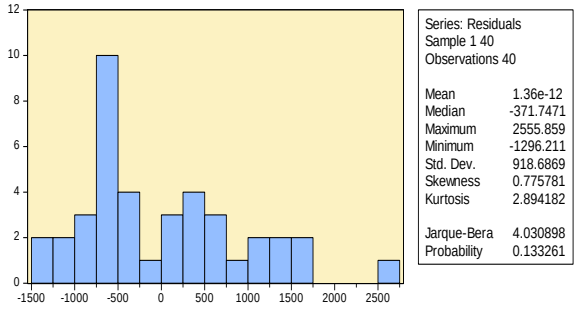

Table 2: Ordinary Least Square Output

Dependent Variable: M_2
Method: Least Squares
Date: 03/27/16 Time: 10:05
Sample: 1 40
Included observations: 40

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	*7762.941*	*6542.567*	*1.186528*	*0.2432*
FGBND	*3.076477*	*0.404924*	*7.597658*	*0.0000*
NTBLL	*-0.768492*	*0.588153*	*-1.306619*	*0.1996*
NTBND	*-10.13219*	*14.73695*	*-0.687537*	*0.4962*

R-squared	*0.963913*	*Mean dependent var*	*11692.12*
Adjusted R-squared	*0.960905*	*S.D. dependent var*	*4836.032*
S.E. of regression	*956.1997*	*Akaike info criterion*	*16.65845*

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

Sum squared resid	*32915443*	*Schwarz criterion*	*16.82734*
Log likelihood	*-329.1690*	*Hannan-Quinn criter.*	*16.71951*
F-statistic	*320.5251*	*Durbin-Watson stat*	*1.868552*
Prob(F-statistic)	*0.000000*		

Table 3: Unit Root Output (Augmented Dickey Fuller)

Variable	ADF t-statistics	Critical Value 5%			Order of Integration	Prob.
		1%	5%	10%		
D(M_2)	-7.781337	-3.621023	-2.943427	-2.610263	I(1)	0.0000
D(FGBND)	-7.258889	-3.615588	-2.941145	-2.609066	I(1)	0.0000
D(NTBLL)	-3.788161	-3.615588	-2.941145	-2.609066	I(1)	0.0064
D(NTBND)	-6.227947	-3.615588	-2.941145	-2.609066	I(1)	0.0000

Table 4: Cointegration Test (Johansen Cointegration)

Sample (adjusted): 4 40
Included observations: 37 after adjustments
Trend assumption: Linear deterministic trend
Series: D(M2) D(FGBND) D(NTBLL) D(NTBND)
Lags interval (in first differences): 1 to 1
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	*Eigenvalue*	*Trace Statistic*	*0.05 Critical Value*	*Prob.***
*None **	*0.760251*	*101.2204*	*47.85613*	*0.0000*
*At most 1 **	*0.443361*	*48.37832*	*29.79707*	*0.0001*
*At most 2 **	*0.399816*	*26.70228*	*15.49471*	*0.0007*
At most 3	*0.190360*	*7.813106*	*3.841466*	*0.0652*

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	*Eigenvalue*	*Max-Eigen Statistic*	*0.05 Critical Value*	*Prob.***
*None **	*0.760251*	*52.84206*	*27.58434*	*0.0000*
*At most 1 **	*0.443361*	*21.67604*	*21.13162*	*0.0419*
*At most 2 **	*0.399816*	*18.88917*	*14.26460*	*0.0086*
At most 3	*0.190360*	*7.813106*	*3.841466*	*0.0752*

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

Table 5: Pairwise Granger Causality Test

Pairwise Granger Causality Tests
Date: 03/27/16 Time: 10:10
Sample: 1 40
Lags: 2

Null Hypothesis:	*Obs*	*F-Statistic*	*Prob.*
D(FGBND) does not Granger Cause D(M_2)	*37*	*0.51959*	*0.5997*
D(M_2) does not Granger Cause D(FGBND)		*0.09829*	*0.9067*
D(NTBLL) does not Granger Cause D(M_2)	*37*	*1.85420*	*0.1730*
D(M_2) does not Granger Cause D(NTBLL)		*1.90403*	*0.1655*
D(NTBND) does not Granger Cause D(M_2)	*37*	*1.84069*	*0.1751*
D(M_2) does not Granger Cause D(NTBND)		*1.61895*	*0.2139*
D(NTBLL) does not Granger Cause D(FGBND)	*37*	*0.22634*	*0.7987*
D(FGBND) does not Granger Cause D(NTBLL)		*1.49662*	*0.2391*
D(NTBND) does not Granger Cause D(FGBND)	*37*	*0.22207*	*0.8021*
D(FGBND) does not Granger Cause D(NTBND)		*2.26805*	*0.1199*
D(NTBND) does not Granger Cause D(NTBLL)	*37*	*0.29179*	*0.7489*
D(NTBLL) does not Granger Cause D(NTBND)		*0.12633*	*0.8818*

Table 6: Parsimonious Error Correction Model Output.

Dependent Variable: M2
Method: Least Squares
Date: 03/27/16 Time: 10:22
Sample (adjusted): 2 40
Included observations: 39 after adjustments

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	*9290.211*	*5736.742*	*1.619423*	*0.1146*
FGBND	*2.807147*	*0.377168*	*7.442694*	*0.0000*
NTBLL	*-0.512060*	*0.535016*	*-0.957093*	*0.3453*
NTBND	*-13.27822*	*12.90637*	*-1.028812*	*0.3108*
ECM(-1)	*-0.525270*	*0.148542*	*3.536175*	*0.0012*

R-squared	*0.971810*	*Mean dependent var*	*11907.10*
Adjusted R-squared	*0.968493*	*S.D. dependent var*	*4701.622*
S.E. of regression	*834.5444*	*Akaike info criterion*	*16.41086*
Sum squared resid	*23679787*	*Schwarz criterion*	*16.62414*
Log likelihood	*-315.0117*	*Hannan-Quinn criter.*	*16.48738*
F-statistic	*293.0228*	*Durbin-Watson stat*	*2.509446*
Prob(F-statistic)	*0.000000*		

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717

Table 7: Heteroscedasticity Output

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	*0.538423*	*Prob. F(3,36)*	*0.6590*
*Obs*R-squared*	*1.717674*	*Prob. Chi-Square(3)*	*0.6330*
Scaled explained SS	*1.317703*	*Prob. Chi-Square(3)*	*0.7249*

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/27/16 Time: 10:27
Sample: 1 40
Included observations: 40

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	*2254174.*	*7990944.*	*0.282091*	*0.7795*
FGBND	*-336.2337*	*494.5655*	*-0.679857*	*0.5009*
NTBLL	*591.8014*	*718.3573*	*0.823826*	*0.4155*
NTBND	*-3804.520*	*17999.38*	*-0.211369*	*0.8338*

R-squared	*0.042942*	*Mean dependent var*	*822886.1*
Adjusted R-squared	*-0.036813*	*S.D. dependent var*	*1146960.*
S.E. of regression	*1167881.*	*Akaike info criterion*	*30.87392*
Sum squared resid	*4.91E+13*	*Schwarz criterion*	*31.04281*
Log likelihood	*-613.4784*	*Hannan-Quinn criter.*	*30.93498*
F-statistic	*0.538423*	*Durbin-Watson stat*	*2.448628*
Prob(F-statistic)	*0.659005*		

Volume 2 Issue 5 May 2017
DOI: 10.18535/afmj/v2i5.02
Page : 699-717