



BANK LOAN, DEPOSIT CREATION AND MONEY ENDOGENEITY

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Abstract

In the management and control of Money supply in many countries including Nigeria, the role of the Central Bank or monetary authority(s) is/are rated high (the exogeneity of money supply) especially during the initial stage of development. However, as the economy develops and becomes sophisticated much dependent on the use of monetary instruments may be constrained by economic activities. Considering this assertion, this work examined the endogeneity of the Money supply in Nigeria by analyzing the impact of some economic activities on deposits of commercial banks using time series data from 1980 – 2019, Ordinary Least Square (OLS) technique, error correction mechanism, etc. Some variables in the model were

significant and rightly signed. Loans/Advances to the Private sector (LAP) and Non Agricultural Products (NAP) are the major variables that cause changes in the Money supply. Consumer Price Index (CPI), though not significant in the model, was a major factor that granger cause the Money supply process. The conclusion and policy implication drawn from our results are that, the Money supply is driven more by economic activities (Money endogeneity) that are not under the control of the monetary authorities, and therefore much dependence on the use of monetary policy may continue to weaken stability in the economy. Thus we recommend that the monetary authorities consider a policy mix as an option. This policy mix means managing monetary instruments with greater attention to economic activities that are market driven to direct the course of the money supply.

Keywords: Deposit creation, Money supply, Money endogeneity, Post- Keynesians, Money exogeneity

INTRODUCTION

In most of the orthodox monetary macroeconomics, the determination of the money supply is widely regarded as unproblematic. Money supply has been traditionally regarded as exogenous. The post Keynesian (PK) economists have seriously questioned the validity of the above general perception. (Ashima and Dash, 2000).

However, on the basis of historical events and empirical evidence, resent researchers have strongly maintained that money supply is determined endogenously. This has been regarded as post Keynesian invention. Money has always been endogenous, irrespective of the historical period, the central bank, the specific stage of development of the banking sector, financial innovations or other institutional changes. (Rochon and Rossi 2006).

The design and implementation of monetary policy globally in the past three decades have witnessed significant changes, apparently reflecting the challenges in establishing the appropriate link of monetary policy to price and output. For instance, as stated by Mordi e'tal (2012), the transition from a strictly monetary targeting to inflation targeting framework of monetary policy showed the underlying instability in the demand for money function in the wake of recession. Several countries have implemented different variants of monetary policy regimes, either combining monetary policy with output targeting or adopting a modified inflation targeting regime that also targets interest rate.

Similarly, Nigeria's monetary policy management strategy underwent significant changes, from predominantly direct controls to a relatively liberalized environment of indirect controls. The major objectives of monetary policy however, have remained unchanged; that is,

price stability and sustainable growth of the economy. In recent times however, the task of monetary management has come under severe pressure from developments in the global financial system and financial innovations sustained by the influence of globalization. Considering these developments, the post Keynesian economists argue for re-focusing of attention away from the money multiplier towards the role of bank lending in the money supply process.

The objective of this paper is to investigate the impact of lending (or bank loans) on deposit creation that affects money supply stock.

Forms of money endogeneity

The post Keynesian monetary theory rejects the notion of exogenous money, and maintains that the claim of both neo-Keynesians and classical macroeconomics that money supply is exogenous is overstatement. However, the post Keynesian innovation is not the distinction between exogenous and endogenous money, but rather the construction of endogenous money in terms of bank lending (Palley, 2001).

Evolutionary (Mergerian) endogenous money

Neo-classical competitive general equilibrium (GE) theory is frequently represented as paradigmatic of the exogenous money approach. However, GE theory has its own theory of endogenous money. Within the GE perspective, money endogeneity can be approached in two different ways. The first concerns the selection of money, the focus here being money as a medium of exchange and money's ability to reduce transaction cost associated with exchange. This approach begins with Merger's (1892) examination of the origins of money whereby the adoption of a particular commodity as money is explained by the characteristic of 'saleability'. A commodity gets adopted as money because it economizes on resources used in effecting exchange, thereby making agents better off. Another is extension of the neo-classical choice theoretic approach to a dynamic context as depicted by Selgin and White (1987), which shows how money endogenously evolves from commodity money to fiat money and inside money. The force behind this evolution is the profit motive, which sets up incentives to economize on the amount of money sitting in idle stores. Money therefore, evolves endogenously, and the adoption of commodity money is just the first step in an on-going process of financial innovation.

INeo-Classical Quantitative Endogenous Money

The selection of the form of money is one source of endogeneity in the competitive general equilibrium model. The determination of the quantity of money is a second source of

endogeneity. This can be illustrated by reference to a gold standard economy in which the total stock of gold is given at any moment in time, but its allocation between monetary and non-monetary uses is endogenously determined by balancing the opportunity cost of having gold tied up as money against the interest rate that can be earned by placing gold on deposit with bank. This process of endogenously determining the allocation of gold stock can be described according to Palley (2001), thus,

$$G = GN(i,y,1/p) + GM(i,y,1/p)$$

where: G = total stock of gold.
 GN = non-monetary demand for gold
 GM = gold deposits with banking system
 i = interest rate
 y = level of income
 $1/p$ = value of money (p = general price level).

Central bank endogeneity

The behaviors of central banks in response to economic developments generate a completely different form of endogeneity within macro models. This form of endogeneity is captured in the central banks' policy response function. The core question is whether the monetary authority should target interest rates, the money supply, or some combination of the two. Poole's (1970) model has the monetary authority directly controlling the money supply. In more sophisticated models such as Friedman (1974), the monetary authority lacks direct control over the money supply, and instead influences it indirectly through control of the monetary base.

However, in the analysis presented by Palley (2001), central bank reactions fuse concerns of 'endogeneity' with those of 'controllability'. The money supply may be endogenous through the central banks response function and perfectly controllable. Alternatively, it may be endogenous and imperfectly controllable. As part of his illustration, in the former case; endogeneity is exclusively the product of the central bank's response function. In the latter case, endogeneity is partly autonomous, reflecting money supply disturbances generated from within the economy and outside of central bank control. From the points of Palley, money supply is endogenous in nature. This is because even when the central bank perfectly controls the money supply through its response function, money supply may still be endogenous depending on 'what' and 'how' it is responding.

Commercial bank endogeneity

This is in the spirit of the post Keynesian economists. In this model money supply is endogenously determined by the level of bank lending. The equations of the model as derived from Rousseas (1985), Moore (1988) and Yong (2010) are:

$$L_d = L(i_L, \dots) \dots\dots\dots (1)$$

$$i_L = (1 + m)i_F \dots\dots\dots (2)$$

$$L_s = R_d + E_d = D + T_d \dots\dots\dots (3)$$

$$T_d = t_d \dots\dots\dots (4)$$

$$R_d = K_1 D + K_2 T_d \dots\dots\dots (5)$$

$$E_d = eD \dots\dots\dots (6)$$

$$C_d = cD \dots\dots\dots (7)$$

$$H_d = C_d + R_d + E_d \dots\dots\dots (8)$$

$$L_s = L_d \dots\dots\dots (9)$$

$$C_d + D_d = f(L_d) \dots\dots\dots (10)$$

$$M = C_d + D_d = f(L_d) \dots\dots\dots (11)$$

Where:

L_d = bank loan demand

i_L = bank loan interest rate

m = bank mark-up

L_s = bank loan supply

i_F = federal funds rate (monetary policy rate in Nigeria)

R_d = required reserves

E_d = demand for excess reserve

D_d = demand for checkable deposits

T_d = demand for time deposits

C_d = demand for currency

H_d = demand for base money

M = money supply

K_1 = required reserve ratio for demand deposits

K_2 = required reserve ratio for time deposits

t = time deposit ratio

c = currency demand ratio

e = excess reserve ratio

Equation (1) is the loan demand schedule. Equation (11) is the loan pricing equation, according to which the loan rate is a fixed mark-up over the federal fund rate which is exogenously set by the monetary authority. Equations 3, 6, and 7 describe the demand for currency, time deposits, and excess reserves as fixed proportion of the demand for checkable deposits. Using equations 1-6 and 9 yield $D = L(1+m)^i F / (1+t-k_1 -k_2 t-e)$ (12).

Substituting 7 and 12 into 10 yields:

$H_d = (c+kL+tk_2+e)L((1+m)^i F \dots) / (1+t-k_1-k_2 t-e)$ 13. While substituting 7 and 12 into 10 yields: $M = (1+c)L((1+m)^i F \dots) / (1+t-k_1-k_2 t-e)$; Palley, 1993 used this approach to support the post Keynesian – Structuralist Money endogeniety.

Logical pattern of the deposit and money-creation process

This process is guided by the following assumptions according to Andrew and Ben, (2005).

- Each bank desires to rid itself of all excess reserves. That is each bank will acquire earning assets (loans and securities) until it runs up against the reserve requirement constraint.
- The public’s demand for currency is independent of the volume of demand deposits held. Therefore, changes in aggregate demand deposits induce no change in demand for currency.
- The public’s demand for time and savings demand is independent of the volume of demand deposits held. Therefore, changes in aggregate demand deposits induce no changes in demand for time and savings account.
- Legal reserve requirements applicable to all demand deposits are 10 percent for all banks.

If these assumptions hold, one can logically show the process of deposits and money creation as on Table 1.

Table 1 Creation of Deposits and Disposition of legal Reserves

Commercial banks	Amount deposited in banks (change in deposits)	Disposition of reserves (Amount kept as reserve)
ABC	#5,000,000 (original deposit)	#500,000
BCD	#4,500,000	#450,000
CDE	#4,050,000	#405,000
DEF	#3,645,000	#364,500
EFG	#3,280,500	#328,050
xxxxx	xxxxxx	xxxxx
xxxxx	xxxxxx	Xxxxx
Total	#50,000,000	#5,000,000

Source - Constructed from Andrew and Ben (2005)

The #5 million increase in reserves resulting from the deposits of currency is associated with a #45 million expansion of demand deposits in addition to the #5 million demand deposits directly produced by the initial deposit of currency. The total expansion of deposits in this instance is ten times the initial #5 million increments of reserves. Note that the #5million of deposit initially placed in ABC bank end up being scattered throughout the banking system. Each bank along the line rids itself of all excess reserves and thus ends up with an increase in actual reserves equivalent to 10 percent of the increase in deposits in the bank. Lumping all banks together, the effects of the entire operation are summarized in table 2.

Table 2 All commercial Banks

Currency and coins -----	#5m	Demand deposits -----	#50m
Loans and investments -----	#45m	---	

Source: Summary of Table 1

Recall that in algebra (or geometric series), the sum may be expressed as $\sum D = A((1/1-r))$, or $A/(1-r)$. Where A is the initial item in the column and r is the ratio of any number in the column to the one preceding it. In this instance r is one (1) minus the percentage reserve requirement applicable to demand deposit. That is $r = 1.0-0.10 = 0.9$. Therefore the $\sum D = A/(1-r) = #5m/(1-0.9) = #5/(0.1) = #50m$, and $\sum R = A/(1-r) = #0.5m/(0.1) = #5m$. Where $\sum D =$ summation of deposits and $\sum R =$ summation of reserves.

EMPIRICAL INVESTIGATION

The work of Zatul, Ahamed and Mohamed (2009) explicitly focused on the money supply implication of the banking system’s response to expansionary shifts of loan demand. They adopted the ‘new view’ model which emphasized asset substitutability and focused on changes in asset prices. The choice of this approach according to them is because it explicitly specifies the mechanism through which the interaction of the public’s demand for assets, the Bank’s behaviour and the Central bank actions determine the stocks of money. To test their model, they employed co- integration and causality tests for the period 1971-2005 and concluded that money supply is endogenous through shifts in loan demand in five economies, namely China, the Crèche Republic, India, Malaysia and Turkey while exogenous in Mexico.

Nell (1999), supported the structurelist argument that commercial banks respond to an increase in credit demand with structural changes of their portfolio on the asset and liability sides. Using the ordinary least square (OLS) method to test his model, Nell found that

irrespective of the monetary system at any time, the money supply process in South Africa has been endogenously determined.

Ching (2011) developed a structural monetary base model and the technique of vector auto regression (VAR) to test the model. An important feature of this approach is that it combines three parts of the determinants of the monetary base. These three parts are the Commercial banks, the public and the Central bank. He argued that, commercial banks' behavior relies on an explicit specification of a maximum profit-seeking and risk adverse model which describes the determinants of the supply of deposits by banks as well as their demand for earning assets and free reserves. The behaviours of the public and the central bank are set- up exogenously. In analyzing the behaviour of these three parts, he concluded that in a modern economy with sophisticated profit- maximizing banking system, a non-banking financial sector, dynamic currency in circulation affecting the supply of banks' reserves, and rapid international capital flow; it is at least questionable whether money is exogenous.

Nayan and Chik (2010), examined the endogeneity of money supply in Malaysia, using co-integration test and vector error correction model. They concluded that their result enabled them to claim convincingly that lending is an essential determinant of money supply in Malaysia. Corporel and Howells (1999), tested the nature of the relationship between loans and deposits through the process of drawing causal inference along with gross domestic product (GPD) in order to avoid incorrect regression for the United Kingdom (UK). Their findings showed that loans granger cause deposits which supports the pure loan demand theory, confirming that money supply is endogenously determined. Cerqueir (2009) examined the extent of the exogeneity of money supply in Brazil using monthly data spanning from 1964.04 to 1986.02 which was analyzed through Kalman filter procedures. He argued that the real rate of interest did cause, in the granger sense, the bond stock supporting the claim of the Keynesians that the monetary authority is able to perform indirect monetary controls through interest rate management. He concluded that the money supply was exogenous with respect to the inflation rate and that the monetary authorities had enough independence to execute an active monetary policy. Omanukwue (2010) used the Engle-granger two stage test for co integration to examine the long-run relationship between money supply, price, output, interest rate and ratio of demand deposits to time deposits. He found evidence of a long-run relationship in line with the quantity theory of money. The study established the existence of weak unidirectional causality from money supply to core consumer prices in Nigeria. In all, the result indicated that monetary aggregates still contain significant, albeit weakening information about developments in core prices in Nigeria. He therefore argued that inflationary pressures are dampened by improvements in real output and financial sector development. The study carried out by Bakara

(2011), on 'An empirical study on the determinants of money supply growth and its effects on inflation rate in Nigeria for the period 1981-2006', employed quasi-experimental research design approach for the data analysis. The result of the regression showed that credit expansion to the private sector determines money supply growth by the highest magnitude in Nigeria, supporting endogeneity of money supply. Other works in support of money endogeneity are the works of Kaplan and Gungor (2015) who wrote on 'the relationship between money supply, interest rate and inflation rate in Turkey after the 2008 financial crisis', and Nayan et al (2015) who examined the 'Post Keynesian theory and evidence of money supply endogeneity'.

EMPIRICAL MODEL

Annual series data were used for this analysis. The data were sourced from central Bank of Nigeria statistical bulletin (2017). The study covered the period 1980-2019. The rationale for selecting our time frame is to cover different monetary regimes or monetary transitions (ie from controlled to liberalized monetary regime, and the transition from monetary targeting to inflation targeting that is in operation recently) in Nigeria. Following the objective of the study, ordinary least square (OLS) techniques were employed to investigate whether 'Bank Lending' creates deposits. The functional form is stated as:

$$TDC = f(LAP, ITR, CPI, NAP) \dots\dots\dots(1)$$

Where:

- TDC = Total Deposits to the commercial banks.
- LAP = Loans and advances to the private sector.
- IRT = Interest rate.
- CPI = Consumer price index.
- NAP = Non agricultural products.

In order to estimate equation 1, we specify it in econometric form as:

$$\text{Log}(TDC)_t = a_0 + a_1 \text{Log}(LAP)_t + a_2 \text{IRT}_t + a_3 \text{Log}(CPI)_t + a_4 \text{Log}(NAP)_t + U_t \dots(2)$$

Where a_0 = intercept; a_1 - a_4 = parameters to be estimated; and U = iid stochastic error term. (ie the disturbance term which is presumed to satisfy the least square assumption of homoscedasticity, serial independence and normal distribution).

Theoretically, there is no exact consensus on the relationship that might exist between checkable deposits plus time deposits (total deposits) and bank loans. The post Keynesian (PK) theory of endogenous money provides a critical link connecting the financial and the real sector; and emphasized that this linkage runs predominantly from credit to money. This contrasts with conventional representations that placed money first, as reflected in the standard textbook money multiplier story where bank deposits are said to create loans.

Prior to testing for the direction of causality between the time series data, the first step is to check the stationarity of the variables used. The purpose of this test is to establish whether the time series data have a stationary trend, and if non-stationary, to show the order of integration. The Augmented Dickey Fuller (ADF) unit root is used to test for the stationarity of all the time series data that was used in this study. The ADF equation could be stated thus:

$$\Delta Y_t = \alpha Y_{t-1} + X_t^\delta + \beta_1 \Delta Y_{t-2} + \beta_2 \Delta Y_{t-2} \dots + \beta_p \Delta Y_{t-p} + V_t.$$

Where x_t is the exogenous regressor, such as intercept and time trend, while α and β are the parameters to be estimated and V_t is the error term that is assumed to be the white noise. The null hypothesis for the unit root test is that $H_0: \alpha = 1$ and the alternative hypothesis is $H_1: \alpha \neq 1$. (Kereen, 2009). However other tests, such as cointegration test and the error correction model (ECM) should be conducted to see whether these time series can be used together to give meaningful result in the long run and to tie the short run behaviour of $\text{Log}(\text{TDP})$ to long run value.

EMPIRICAL RESULTS AND INTERPRETATION

We begin the empirical analysis by showing the association between economic activities (as measured by Loans and Advances to the private sector(LAP), Interest rate (ITR), Consumer price index (CPI), Non Agricultural products and total deposits of the commercial banks (TDC) through the multiple regression analysis. Table 1 depicts the result of model 1. It shows that, statistically, significant positive relationship exist between total deposits of the commercial banks (TDC) and Loans and advances to the private sector (LAP) as well as Non – Agricultural products (NAP). This means that Loans creates deposits. That is as economic activities increase the private sector demands for more loans which in turn creates more deposits for commercial banks. It has been also observed that since late 1980s economic activities have been on the increase which has led to the production of more non-agricultural products. This increase in non-agricultural products motivated business men to seek for more loans which also created more deposits. We also observed from our result that a negative relationship exist between interest rate (IRT), consumer price index (CIP) and total deposits of the commercial banks (TDC) though

these independent variables are not significant. This means that the increase in interest rates through liberalization policy will reduce loan demand thereby deterring the creation of deposits. Also the increase in price of goods and services will reduce economic activities through reduction in demand of goods and services and consequently affect deposits negatively.

Table 3 Multiple Regression Result (E-View output)

Dependent variable Log(TDC)

Variable	Coefficient	t-statistic	probability
C	-0.794184	0.494894	0.6241
Log(LAP)	0.343958	2.526656	0.0167
ITR	-0.017726	-1.042741	0.3049
Log(CPI)	-0.041822	-0.206685	0.8376
Log(NAP)	0.686502	2.835124	0.0079

R2 – Square = 0.973898; R2 Adjusted = 0.970636; F- stat = 298.4941;

Prob(f-stat) = 0.00000; Durbin-watson stat = 1.345207.

From the above table (table 3) the degree of responsiveness of deposits of commercial banks to loans and advances of the banks as well as non- agricultural products are 0,3439 and 0,6865 respectively. This is such that for every 1 unit increase in loans and advances, there will be about 0.34 units of deposit creation, and also for every 1 unit increase in non- agricultural product, there will be about 0.69 units rise in the level of deposit creation. However the responsiveness of deposits of commercial banks to 1 unit increase in interest rate is a reduction in the level of deposit creation though it is statistically insignificant in the regression result. Furthermore, for every 1 unit increase in the price of consumer goods there will be a reduction in the level of deposit creation; though this variable (CPI) is also insignificant at 5 percent level of significance.

The coefficient of determination (R^2) indicates that about 97% of the changes in deposits of the commercial banks in Nigeria are explained by the level of economic activities captured by Loans and Advances to the private sector, Consumer Price Index, Interest Rate and Non – Agricultural products. The joint significance of the model (F- statistic), which is 298.40, shows that the model is statistically significant and can really explain changes in the level of total deposits of commercial banks in Nigeria. But the Durbin-watson statistic is low (1.3452) which suggests the presence of serial auto-correlation in the model.

Given the above result, it is necessary to test its reliability; that is, whether it is not a spurious regression. This we have to do by carrying out another regression after testing for the stationarity of the variables using the Augmented Dickey-fuller (ADF) test.

Table 4 Unit root test result (E-View output)

Variables	At level		At first level		Order of integration
	ADF Start.	Prob	ADF Start.	Prob	
--					--
TAC	2.755452	1.0000	-16.75467	0.0001	1(1)
LAR	-3.834262	0.0093	--	--	1(0)
ITR	-3.255188	0.0248	--	--	1(0)
CPI	-0.607072	0.8567	-6.828301	0.0000	1(1)
NAP	1.855462	0.9997	-5.343529	0.0001	1(1)

Note: The Mackinnon Critical value (at 5%) in level and first level are -2,967767 and -2.948404 respectively.

The result of the unit root test shows that some variables are stationary at their level and some are at their first difference, that is, some are integrated of order zero 1(0) and others of order one 1(1). Given the fact that the variables are 1(0) and 1(1) variables, we need to know whether using them together in the model would yield reliable result by subjecting them (the variables) to co- integration test.

According to Akpan (2008), the presence of 1(0) and 1(1) variables do not constitute any hindrance as it is not necessary for all the variables in a multi-variable regression to have the same order of integrateability.

Table 5 Johansen's co-integration test (E-View output)

Hypothesized No. of CE(s)	Eigen value	Trace statistic	5% critical value	Probability **
None*	0.815660	126.0073	69.81889	0.0000
At most 1*	0,642136	66.82327	47.85613	0.0003
At most 2*	0.503683	30.85722	29.79707	0.0376
At most 3	0.159506	6.338324	15.49471	0.6555
At most 4	0.007303	0.256535	3.841466	0.6125

Trace test indicates 3 co -integration equ(s) at the 0.05 level.

*denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Hang-Michelis (1999) p-value

Table 5 above shows the result of Johansson co-integration test. It shows that the value of the trace statistic is more than the critical value at 5% in three of the five null hypotheses, which indicates three co-integrating vectors. Since the variables are co-integrated there will be no loss of information, implying that there exist a long run relationship between Deposits of the commercial banks and economic activities. Consequently we apply the parsimonious error correction model (ECM) representing the long run analysis of the model.

Table 6 Parsimonious ECM Result (E-View output)

Dependent Variable D(Log(TDC))			
Variables	Coefficient	T. Statistic	Probability
C	0.530526	0.853269	0.4003
Log(LAP)	0.948662	20.09531	0.0000
ITR	-0.016298	-0.637615	0.5286
D(Log(CPI))	0.084048	0.151990	0.8802
D(Log(NAP))	0.200198	2.523955	0.0193
ECM(-)	-0.596325	-4.958228	0.0000

R-Squared=0.953544; Adjusted R-Squared = 0.945801;

F-Statistic = 123.1538; Prob(F-Statistic)= 0.0000;

Durbin-Watson Statistic = 1.558455.

The parsimonious error correction model relates the change in Log (TDC) to changes in Log (LAP), Log (CPI) Log (NAP) and IRT as well as the equilibrating error in the previous period. The ECM (-1) captures the degree of adjustment towards the long-run equilibrium. As the coefficient of the ECM (-1) is statistically significant, the disequilibrium in the Log (TDC) in each period is adjusted in the next period. This parsimonious result confirms what we got in the multiple regression result that in the short run changes in Log (LAP) and Log (NAP) had significant positive effect on Log (TDC), while ITR and Log (CPI) have non-significant negative effect on Log (TDC). Thus, the speed of adjustment from the short run disequilibrium to equilibrium in the present period is about 60 percent and it is statistically significant which justifies the use of the error correction model in the study.

Furthermore, it is appropriate to know the direction of causality between the TDC and the explanatory variables. The granger causality test result shed light on this.

Table 7 Paiwise Granger Causality Test

V	Null Hypothesis	Obs	F=Start	Prob	Decision	Direction
Log(LAP)	does not granger cause Log(TDC)	35	24.7093	5E-07	Reject	Causality
Log(TDC)	does not granger cause Log(LAP)	-	15.1944	3E-05	Reject	Causality
ITR	does not granger cause Log(TDC)	35	0.12840	0.8800	Accept	No causality
Log(TDC)	does not granger cause ITR	-	0.02686	0.9735	Accept	No causality
Log(CPI)	does not granger cause Log(TDC)	35	5.29925	0.0107	Reject	Causality
Log(TDC)	does not granger cause Log(CPI)	-	1.64688	0.2096	Accept	No causality
Log(NAP)	does not granger cause Log(TDC)	35	5.49293	0.0093	Reject	Causality
Log(TDC)	does not granger cause Log(NAP)	-	0.13311	0.8759	Accept	No causality

From table 7 above, the result shows that there is bidirectional causality between Log (TDC) and Log (LAP), the causality runs from Log (TDC) to Log (LAP) and from Log (LAP) to



Log(TDC), symbolically; Log (TDC LogLAD. The granger causality between Log CPI, NAP, and Log TDC indicate that there is unidirectional causality from Log CPI to Log TDC, and from Log NAP to Log TDC; that is, Log CPI Log TDC, and Log NAP Log TDC. This means that Consumer Price Index (CPI), and Non-Agricultural Products (NAP) granger cause Total Deposits of commercial Banks. At the same time, between Log(TDC) and ITR, we found that there is independent causality among them. This indicates that as TDC does not granger cause ITR, so also ITR does not granger cause TDC.

The interesting thing to note from these results is that all the explanatory variables that have positive relationship with Log (TDC) granger cause it, including Log(CPI) that has no significant relationship with it. This shows how important economic activities are, in influencing changes in Total deposits of commercial banks in Nigeria which is the main components of money supply.

CONCLUSION AND POLICY IMPLICATIONS

This paper examined the endogeneity of the money supply in Nigeria by analyzing the impart of economic activities on Deposits of Commercial Banks which forms a major components of the money supply. From literature, there are different views on the issue of endogeneity or exogeneity of the money supply. Some believe that money stock and the monetary base are endogenous, resulting from the optimizing behavior of commercial banks and the public (Hottem'oller 2002). Others argue that money is conceptually exogenous and that effective regulatory policies to stabilize market and control interest rates directly will increase the degree of money supply (pollin 2008).

Econometric techniques have been applied in this work to determine the degree of endogeneity of the money stock in the Nigerian economy. Based on the econometric analysis, we found that economic activities, such as loans/advances to the private sector and changes in non-agricultural products are major variables that cause the money supply endogeneity. It was also observed that, the consumer price index which was not significant at 5% (in determining changes in the money supply) is a major factor that does granger cause the money supply. This result conforms with Mordi e'tal (2012), and the post Keynesians (PK) endogenous money theory (Fontana, 2003).

Thus, this study concluded that economic activities exert much pressure on money stock. And this economic activities are market –driven and beyond the control of monetary authorities. Therefore, the monetary authorities should exercise caution with respect to how they make monetary policies, in order to achieve effective control over price instability.

The policy implication of our results is that much dependence on the use of monetary policies may continue to weaken the stability of the Nigerian economy. This is informed by the fact that, with the steady and fast growing economy, the evolving financial system, and the process of financial deepening which have fundamentally contributed to changes in the money supply aggregates in Nigeria; the monetary policies may not be effective or meaningful without following or recognizing the money growth part required by the market forces. Thus, we recommend that the monetary authorities consider a policy mix as an option. This policy mix entails using monetary instruments without neglecting the market forces, the Nigerian economic growth model and the evolving financial system.

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