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Money Supply and Asset Prices in Nigeria (2008-2013): An Empirical Review

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Abstract
This paper examined the impact of Broad Money supply (M_2) on Asset prices in Nigeria. Monthly data, in logarithmic form, was used for the period 2008M1-2013M_{12}. The Eview7 Statistical Software was employed to conduct more robust tests in order to empirically analyze the data. The Unit root test show that the variables were stationary after being first differenced; at the 5% significance level. The Johansen Cointegration test gave evidence of one cointegrating equation which explains that a long-run equilibrium relationship exist between LogSMC and LogBMS. The Vector Error Correction Model was used to analyze short-run adjustment dynamics and showed -0.08% speed of adjustment of prior deviations from equilibrium. Thus, about 8% of disequilibrium is corrected monthly. The Granger Causality test demonstrate a Uni-directional causality from LogBMS→LogSMC supporting the views of Flannery and Protopapadakis (2002), Raymond (2009), Maku and Atanda (2010), Kohout (2010), Veselá (2010), Eze (2011), Ahmed and Suliman (2011), Ossisanwo and Atanda (2012), Chude and Chude (2013), Mirza and Hashem (2013), and Haruna et al (2013); that the supply of money has a significant impact on Asset prices. Furthermore, the Impulse Response and Variance Decomposition test indicate both positive and negative shocks which are in consistent with our findings from the VECM and Granger causality analysis. Overall, all the results obtained are in line with apriori expectation. A policy direction is that the CBN can use Money supply as a monetary policy tool to effect changes in growth levels in the stock markets in Nigeria.
Keywords: Broad Money Supply, Asset Prices, Unit Root Test, Vector Error Correction Model, Granger Causality Test, Impulse Response and Variance Decomposition Test

1. Introduction

The Efficient Market Hypothesis postulate that if Capital markets are efficient, security prices adjust rapidly to the arrival of new information; and current prices of securities reflect all information about the security (French, 1989). Market participants are assumed to act in a rational, self-motivating manner and to assess and act upon available information about share prices when formulating their buy or sell decisions. If some available information about a specific share is not acted upon, the opportunity will arise for at least some market participants to use that information to their advantage by buying or selling the asset. Thus, as market individuals or organizations act upon this information the price of assets will adjust accordingly until there are no further profit opportunities. This has been referred to as "information arbitrage" efficiency (Tobin, 1958). In another development, the macroeconomic school of thought is of the view that stock prices are sensitive to changes in macroeconomic variables such as money supply, interest rate, inflation and other macroeconomic indicators. Thus, this school opine that the supply of money in a given economy affect stock returns as the stock market will rapidly digest and incorporate all news emanating from the economy.

Money supply is a measure that includes cash and checking deposits (M1) as well as near money. "Near money" in M2 includes savings deposits, money market mutual funds and other time deposits, which are less liquid and not as suitable as exchange mediums but can be quickly converted into cash or checking deposits. M2 is a broader money classification than M1, because it includes assets that are highly liquid but not cash. A consumer or business typically won't use savings deposits and other non-M1 components of M2 when making purchases or paying bills, but it could convert them to cash in a relatively short time. Hunkar (2014) in an article on the relationship between money supply and stock prices define money supply as one of the most basic parameters in an economy and measures the abundance or scarcity of money. He opines that money consists of far more than the bills and coins circulating. In fact, the physical money makes up less than one-tenth of all the money in a typical, developed economy. The rest of the money in the economy is fundamental and includes the unused line of credit in your credit card account or that of a large firm's commercial bank account since these can be used just as willingly as bills and coins to buy goods and services.

When the central bank, based on its monetary policy, injects monies' into the economy, it benefits other sectors of the economy but most importantly the financial markets thereby pushing asset prices up. Stock prices tend to move higher when the money supply in an economy is high. Plenty of money circulating in the economy both makes more money available to invest in stocks and also makes alternative investment instruments, such as

bonds less attractive (Hunkar, 2014). We can therefore infer that an increase in money supply causes stock prices to increase as well. Veselá (2010) opined that the macroeconomic variables that are responsible for stock price development are money supply, interest rate, inflation, GDP, changes in exchange rate, as well as economic and political shocks. In another study, Sam (2012) explained that stock prices are somehow addicted to money supply. An expansion in money supply will result in an upward movement of equity prices and a contraction in money supply will tend to depress equity prices. The ERSTE group in a similar article on money supply and equity prices reveals that when money supply changes, then there is an indication that equity prices will move too. Historical data have shown that increasing money supply helps to elevate prices and decreasing money supply dampen equity prices. Hence, to drive equity prices higher, monetary authorities need a consistent increment in money supply. This according to them means that the market is addicted to consistently new supply of money without which it will lose its momentum. Flannery and Protopapadakis (2002) stated that money supply is one of the most important indicators that influence stock returns due to its impact on the company's future cash flow and discount rate. Kohout (2010) found that of all the macroeconomic variables, money supply is the most significant in the long-run in influencing the development of stock prices. This is also in line with other studies like Keran (1971), Gupta (1974), Musilek (1997), Poiré (2000), Shostak (2003) Ioannidis and Kontonikas (2006) and Maskay (2007)

The objectives of this study therefore are to ascertain if a long-run equilibrium relationship exists between money supply and Asset prices in the Nigerian economy; and to establish the direction of causality. Also, to improve on current literature on the link between money supply and asset prices.

The remaining parts of this paper are as follows: section 2 elucidate on empirical literatures on Money supply and Stock returns. Section 3 gives further details on sources of data and methods employed. Section 4 illustrates on the empirical results and evaluates them and section 5 closes with a summary and recommendations.

2. Empirical Literature

Various empirical arguments exist on the link between stock returns and money supply. The upshots of these studies have been quite contradictory and with differing conclusions, largely contingent on the methodology, environment and the macroeconomic variables chosen. A review of some of the literature are: Abdullah and Hayworth (1993) observed that the US stock returns are positively related to inflation and growth in money supply, yet negatively to budget and trade deficits, and also to short and long term interest rates. Mukherjee and Naka (1995) used vector error correction approach to model the relationship between Japanese stock returns and macroeconomic variables. Cointegration relation is detected among stock prices and the core macroeconomic variables, namely exchange rate, inflation rate, money supply, real economic activity, long-term government bond rate and call money rate. Habibullah and Baharumshah (1996) determined whether money supply (M1 and M2) and output are important in predicting stock prices in Malaysia from January 1978 – September 1992; making 177 monthly observations. Their result suggests that the Malaysian stock market is informationally efficient. Thus current stock prices already incorporate all past and current information of money supply and output. Mookerjee and Yu (1997) investigated the effect of macroeconomic variables on Singapore stock market. The result suggests that stock prices are cointegrated with both measures of money supply (M1 and M2) and aggregate foreign exchange reserves. Kwon and Shin (1999) examined the role of macroeconomic variables in estimating Korean stock prices. Stock indices seem to be cointegrated with the combination of four macroeconomic variables namely; money supply, trade balance, foreign exchange rate, and industrial production. Maysami and Koh (2000) analyzed the relationship between money supply and the Singapore stock exchange and found that a positive relationship exist between them. Brahmasrene and Jiranyakul (2007) used annual data from 1992-2003 to prove that a positive relationship exist between money supply and the Thai stock market returns. Maskay (2007) investigated the relationship between money supply and the S&P 500 Index, the direction of the relationship; and the difference in the relationship between anticipated and unanticipated changes in money supply with stock market prices. Using quarterly data and a two-stage regression model, he found a positive relationship between changes in money supply and stock prices, as the coefficient for the actual change in M2 is positive. Second, anticipated changes in money supply matter more than unanticipated changes as both unanticipated components are insignificant at 0.1 percent level whereas the anticipated change is highly significant at the 0.01 percent level. So, the results support the critics of the Efficient Market Hypothesis and signify that anticipated change in money supply matters too. Raymond (2009) researched on the long-run relationship between stock prices and monetary variables on the Jamaican Stock Exchange; using the VECM framework. Monetary indicators employed in the analysis include 180- day Government of Jamaica (GOJ) Treasury bill yields, the value of the Jamaica Dollar vis-à-vis the US dollar, inflation rate and the money supply (measured by M2 aggregate which was seasonally adjusted). The monthly lag of each series was utilized and the data employed spanned the period January 1990 to March 2009 (231 observations). Coefficients from the co-integrating vector, normalized on the stock price, suggest that the JSE Main Index is positively influenced by the

inflation rate and M3 and negatively by the exchange rate, interest rate and M2. Furthermore, the Granger-causality tests show that only M2 is a predictor of stock prices. This suggests that equity investors show greater responsiveness to M2, as changes in this variable are indicative of underlying liquidity conditions and growth in economic activity. As such, regulators have greater impact on the stock market through the money supply channel. Maku and Atanda (2010) explored on the determinants of stock market performance in Nigeria using the ADF, Cointegration and Error Correction Model. They show that in the long-run, the stock market is more responsive to changes in money supply, exchange rate, inflation rate, and real output. Eze (2011) looked into the effect of monetary policy on stock market performance in Nigeria. Employing Cointegration and Error Correction Model, they find that both in the short-run and long-run, Broad money supply, Exchange rate and Consumer Price Index are responsible for stock market performance. Ahmed and Suliman (2011) revealed a uniform directional causation between the supply of money and price movements. The causation runs from money supply to stock prices. This they regard as a piece of evidence supporting the monetarists claim, to the extent that monetary expansion is not promptly followed by a response from the production sector of the economy, the supply of money will have a direct effect on prices. Ogbulu and Uruakpa (2011) investigated the link between monetary policy and stock prices in Nigeria; using quarterly data from 1986:2 to 2011:4. They found cointegration among the variables under study; and their ECM indicates that money supply has a positive and significant impact on stock prices. In addition, uni-directional causality exists from stock prices to money supply with a p-value of 9.5E-06. They conclude that the Nigerian monetary authorities should always design and implement on appropriate monetary policy mix with preference to money supply in order to project the capital market towards optimal growth. Ogiji (2011) examined the impact of monetary policy management on economic growth in Nigeria and found that the due to nonstationarity of the variables, supply of money has no significant impact on stock prices in the long-run.

Further empirical findings in more recent studies are: Ossisanwo and Atanda (2012) researched on the determinants of stock market returns in Nigeria and find that money supply, interest rate, previous stock returns levels and exchange rate are the variables that actually impact on stock market returns in Nigeria. Širůček (2012) investigated the effect of money supply on the Dow Jones Industrial Average stock index. Money supply was measured by M_2 and MZM aggregates (money with zero maturity). The Granger causality test was applied on initial differences of variables with an incremental time delay of one, two, three and six months. The study shows that where a one-month delay is applied, money supply has no effect on the DJIA index. However, with a longer time delay, correlation between money supply and the DJIA index was significant at the 5% level. Thus, a period of two (2) months or approximately 40 trading days is required for the stock market to respond to changes in money supply. Chude and Chude (2013) examined the effect of money supply on stock returns in Nigeria using annual data from 1980 – 2012. They find a long-run relationship between broad money supply and stock market returns. Broad money supply has been relatively high over the years and has significant positive impact on stock market returns. Mirza and Hashem (2013) explored on the long-term equilibrium relationship between four macroeconomic variables and the Sharia index in Malaysia from the period 2006 M9 – 2012M9; giving a total of 72 observations. Their VECM show that the sharia index is statistically significant with money supply, interest rate and exchange rate. However, once the index deviates from its equilibrium, it will positively affect money supply and negatively affect interest rate and exchange rate. Haruna et al (2013) examine the existence of causality between macroeconomic variables and stock returns in Ghana; using monthly time series data from January 1995 – December 2010. Various tests were employed in the study which includes the ADF and PP unit root test, VECM, Impulse Response and Error Variance Decomposition test as well as Granger causality test. They find that in the short-run, a significant relationship exist between stock returns and money supply. In addition, it takes about 20 months for the stock market to fully adjust to equilibrium if a macroeconomic shock occurs. In furtherance, a causal relationship runs from stock returns to money supply with a p-value of 0.0003. They conclude that arbitrage profit opportunities exist in the Ghana stock market.

Previous studies have established that money supply as a macroeconomic variable; do influence the activities of the stock market. However, results obtained could be misleading in view of the fact that the period under study may perhaps be too short for annual data and could not allow for enough degrees of freedom in the analysis. This paper therefore extends the literature by considering an up-to-date monthly time series data in analyzing both the short-run and long-run effects as well as the direction of influence between Money supply and Asset prices in Nigeria.

3. Data Presentation and Methods

Table 3.1 Data for the variables of LogSMC and LogBMS

MONTHS	SMC (ASP)	BMS
1	10692.74	6527673.015
2	12503.2	7016468.508
3	12125.9	7998232.822
4	11491.25	7805093.549
5	11614.46	7546333.69
6	10920.32	7948368.848
7	10640.65	8067591.227
8	9744.46	8335290.509
9	9836.91	8960287.728
10	7969.05	8339115.475
11	7305.86	8387156.724
12	6957.45	9166835.305
13	4879.1	9294035.944
14	5231.9	9087966.974
15	4483.5	8997817.254
16	4883.3	9001008.091
17	6759.64	8720581.424
18	5986.3	9077026.531
19	5796.5	8889358.823
20	5274.42	9475324.866
21	5130.25	9458490.246
22	5144	9911551.336
23	4998.12	10239558.36
24	4989.39	10780627.14
25	5441.59	10446373.94
26	5535.75	10792645.17
27	6280.6	11023312.97
28	6398.38	10972487.61
29	6368.78	10759314.65
30	6174.42	10845498.1
31	6320.56	10941435.3
32	5946.77	11520644.68
33	5648.28	11224789.77
34	7982.47	11224607.28
35	7908.3	11142651.36
36	7913.75	11525530.34
37	8744.2	11561525.95
38	8315.6	11595668.3
39	7866.7	11653623.81
40	8009.9	11898956.66
41	8270.5	11986234.87
42	7987.1	12172096.71
43	7626.1	12389274.84
44	6876.7	12508014.99
45	6496.7	12618080.33
46	6626.8	12172500.07
47	6294.9	12210412.37
48	6532.6	13303494.5
49	6579.10591	13755293.22
50	6348.089	13153787.49
51	6549.8421	13270973.81
52	7030.6177	13304783.81
53	7037.232	13603139.34

54	6895.294442	13483059.41
55	7340.06	13392426.38
56	7560.06	13770062.26
57	8282.28	14065267.13
58	8422.743986	14399299.17
59	8465.595	15060613.43
60	8974.44852	15483847.53
61	10191.3156	15308392.82
62	10583.80641	15547624.71
63	10733.28629	15669169.15
64	10691.68979	15634382.05
65	12075.22569	15424052.62
66	11426.2525	15593172.51
67	12007.16616	14811429.8
68	11496.60768	14619449.23
69	11652.87404	14362451.07
70	12020.861	14529508
71	12448.878	14734882.8
72	13226	15668952.29

Source: CBN Statistical Bulletin, 2013.
Note: SMC=Stock Market Capitalization,
BMS=Broad Money Supply

The objective of the study is to determine the relationship between Money Supply and Asset prices in the Nigerian economy. Data is obtained from the Central Bank of Nigeria statistical bulletin which proves that it is free of measurement errors. The period of study is $2008M_1$: $2013M_{12}$ giving a total of 72 monthly observations; and the Eviews7 statistical software was employed to empirically evaluate our data. One way to improve an empirical work would be to use monthly or even weekly data instead of quarterly data. As stock market prices are fairly quick in adjusting to changes in information, using a smaller time frame would be more effective in capturing the behaviour of the stock prices (Maskay, 2007).

Broad money supply is what monetary authorities use in their policies and it has a closer correlation with the stock market. It is the total amount of monetary assets available in an economy at a specific time and includes quasi money, currency outside banks, currency in circulation and demand deposits at both commercial and non-interest banks (CBN, 2013)

The Stock market capitalization is an objective measure of the performance of the market, and leading indicator of a stock's present and future price movements. Vesela (2007) opined that market capitalization and trading volumes are the measures that actually represent the significance, size and position of different stock exchanges all over the world.

In order to eliminate the interference of heteroscedasticity, we took the logarithm of the original data for both the dependent (Stock market capitalization) and independent (Broad money supply) variables which resulted to logSMC and logBMS (Yijun, 2012).

We proceed further to determine the Stationarity of the variables applying the PP and ADF test with automatic lag length selection using the Akaike Information Criterion (AIC) to ascertain if the mean and autocovariances of the series do not depend on time. The ADF test brings into play the lagged dependent variable as explanatory variables to approximate for autocorrelation. It is the most widely used test and has proven to be highly efficient among other tests in testing for integration of variables (Charemza and Deadman, 1997). The ADF test statistic is

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{k} \delta_i \Delta Y_{t-i} + \mu_t \quad \text{.....eqn.1}$$

where; δ is the student's t-ratio.

Nelson and Plosser (1982) have pointed out that many macroeconomic variables are non-stationary in levels and contain in themselves a unit root (stochastic trend). Hence, it is very necessary to have a unit root test to avoid spurious results (Granger and Newbold, 1974). Furthermore, it has been observed that most time series data are stationary after being differenced to exclude seasonal influences but this can also get rid of valuable long-run information which is quite unique to the features of the variables. For this reason, we put to use the Co-integration technique to integrate short-run dynamics with long-run equilibrium. Following previous studies by Mukherjee and Naka (1995), Raymond (2009), Maku and Atanda (2010), Eze (2011), Mirza and Hashem (2013) and Haruna et al (2013); we empirically analyze our data with the Vector Error Correction (VEC) Model. A

vector error correction (VEC) model is a restricted VAR designed for use with nonstationary series that are known to be cointegrated. The VEC has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments (Eviews, 2013). Our VEC model is:

$\Delta y_1, t = \alpha_1 (y_2, t\text{-}1 - \beta y_1, t\text{-}1) + \varepsilon_1, t$……eqn.2

$\Delta y_2, t = \alpha_2 (y_2, t\text{-}1 - \beta y_1, t\text{-}1) + \varepsilon_2, t$……eqn.3

The right-hand side variable is the error correction term; and is zero in the long run. But a deviation of y_1 and y_2 from equilibrium makes the error correction term to be nonzero and each will have to adjust to equilibrium. The coefficient α_1 measures the speed of adjustment of the i-th endogenous variable towards the equilibrium.

In addition, we intend to understand better, the direction of influence of one variable on another, hence, the Granger causality test. The Granger (1969) approach to the question of whether X causes Y is to see how much of the current Y can be explained by past values of Y and then to see whether adding lagged values of X can improve the explanation. Vesela (2010) document that the Granger test assumes that all information for predicting chosen variables are included in the very past values of the variables. Y is said to be Granger-caused by X if X helps in the prediction of Y, or equivalently if the coefficients on the lagged X's are statistically significant. If we say "X Granger causes Y", this does not mean that Y is the effect or the result of X. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term. For this study, our bivariate regression is:

$y_t = \alpha_0 + \_ \alpha_1 y_{t-1} + \ldots + \alpha_t y_{t-1} + \beta_1 x_{t\,1} + \ldots + \beta_t x_{-t} + \varepsilon_t$……..eqn.4

$x_t = \alpha_0 + \_ \alpha_1 x_{t-1} + \ldots + \alpha_t x_{t-1} + \beta_1 y_{t\,1} + \ldots + \beta_t y_{-t} + \mu_t$……..eqn.5

for all possible pairs of (x, y) series in the group. The reported F-statistic is the Wald statistic for the joint hypothesis:

$\beta_1 = \beta_2 = \ldots. = \beta_t = 0$

for each equation. The null hypothesis is that x does not Granger-cause y in equation 4 and that y does not Granger-cause x in equation 5 (Eviews, 2013).

We also employed the Impulse response and variance decomposition test to assess how shocks to economic variables echo via a system. The impulse response function traces the effect of a one-time shock to innovations on current and future values of the endogenous variables; while the variance decomposition separates the variation in an endogenous variable into the component shocks to the VAR. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR.

So, our functional model is specified thus:

$SMC_t = f(BMS_t)$……eqn.6

Specifically, the econometric log linear form is given as:

$\log SMC_t = \alpha + \beta_1 \log BMSt + \varepsilon_t$……..eqn.7

where;

$\log SMC_t$ = logarithm of Stock Market Capitalization (proxy for Asset prices)

$\log BMS_t$ = logarithm of Broad Money Supply i.e. M_2

α is the intercept

β_1 is the parameter estimate

ε_t is an uncorrelated stochastic error term at time t

It is therefore expected "apriori" that the coefficient of the models will follow thus: $b_1>0$; which signifies a significant relationship among the variables.

4. Empirical Results and Discussions

Table 4.1 is a simple linear regression analysis of the series. From the estimated equation, BMS has a positive and significant relationship with SMC at the 5% level (t=2.273240, p<0.0261). However, the D-W statistic of 0.093286 signifies the presence of serial autocorrelation between the variables; hence, we shall employ more robust econometric techniques to test if the characteristics of the variables under study depend on time.

Table 4.1: Equation Estimation of Linear Series

Dependent Variable: SMC
Method: Least Squares
Date: 08/04/14 Time: 02:17
Sample: 1 72
Included observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5208.202	1287.789	4.044299	0.0001
BMS	0.000246	0.000108	2.273240	0.0261

R-squared	0.068748	Mean dependent var	8068.965
Adjusted R-squared	0.055444	S.D. dependent var	2386.221
S.E. of regression	2319.126	Akaike info criterion	18.36315
Sum squared resid	3.76E+08	Schwarz criterion	18.42639
Log likelihood	-659.0735	Hannan-Quinn criter.	18.38833
F-statistic	5.167620	Durbin-Watson stat	0.093286
Prob(F-statistic)	0.026083		

From table 4.2, stationarity was detected in the first differences by the subjective assessment of the Augmented Dickey Fuller and Phillips-Perron test. **Širůček** (2012) argued that the first differences of input variables are made to eliminate autocorrelation and thus achieve a stationary nature. Also, Habibullah and Baharumshah (1996) argue that the Phillips-Perron test is robust to a wide variety of serial correlation and time dependent heteroskedasticity.

Table 4.2: Unit Root Test of Stationarity

Variables	ADF-statistic	PP-statistic	Order of Integration
LogSMC	-8.566572	-8.580768	1(1)
LogBMS	-3.821852	-8.937984	1(1)

Source: Author's computation extracted from E-views7 computation
***Note*: SMC=Stock Market Capitalization, BMS=Broad Money Supply.**

Given that the VECM specification only applies to cointegrated series, we will first of all estimate the Johansen cointegration test to determine the number of cointegrating relations (E-views, 2103).

Table 4.3: JOHANSEN TEST OF COINTEGRATION

VARIABLES	EIGEN VALUE	TRACE STATISTIC	0.05 CRITICAL VALUE	P-VALUES
LogSMC	0.205199	16.42783	15.49471	0.0361
LogBMS	0.019059	1.270020	3.841466	0.2598

Source: Author's computation extracted from E-views7 computation

The Johansen co-integration trace test indicates one co-integrating equations at the 0.05 level. Consequently, we can say that a long- run equilibrium relationship exist between LogSMC and LogBMS. This is because the trace statistic of 16.42783 is evidently more than the 5 percent critical level of 15.49471. With the presence of at least one cointegrating vector, we can proceed to estimating the short-run relationship using the Vector Error Correction Model.

Table 4.4 Vector Error Correction Estimates

Vector Error Correction Estimates
Date: 08/04/14 Time: 02:39
Sample (adjusted): 4 72
Included observations: 69 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	
LOGSMC(-1)	1.000000	
LOGBMS(-1)	-2.027644 (0.68415) [-2.96375]	
C	24.02118	
Error Correction:	**D(LOGSMC)**	**D(LOGBMS)**
CointEq1	-0.079269 (0.02593) [-3.05718]	0.009118 (0.00869) [1.04948]
D(LOGSMC(-1))	-0.082797 (0.11864) [-0.69789]	0.009123 (0.03975) [0.22949]
D(LOGSMC(-2))	0.077944 (0.11521) [0.67656]	-0.020922 (0.03860) [-0.54195]
D(LOGBMS(-1))	-0.423690 (0.33409) [-1.26819]	-0.131527 (0.11195) [-1.17486]
D(LOGBMS(-2))	-0.005208 (0.32737) [-0.01591]	-0.235746 (0.10970) [-2.14906]
C	0.005737 (0.01219) [0.47079]	0.013930 (0.00408) [3.41110]
R-squared	0.164939	0.101173
Adj. R-squared	0.098665	0.029837
Sum sq. resids	0.521399	0.058545
S.E. equation	0.090973	0.030484
F-statistic	2.488726	1.418269
Log likelihood	70.63770	146.0793
Akaike AIC	-1.873556	-4.060270
Schwarz SC	-1.679286	-3.866000
Mean dependent	0.001259	0.009746
S.D. dependent	0.095823	0.030950
Determinant resid covariance (dof adj.)		7.65E-06
Determinant resid covariance		6.38E-06
Log likelihood		216.8832
Akaike information criterion		-5.880673
Schwarz criterion		-5.427376

In Table 4.4, we used the VECM to determine short run equilibrium dynamics between LogSMC and LogBMS. Our result shows a -0.079269 speed of adjustment of prior deviations from equilibrium. Hence, about 8% of disequilibrium is corrected every month. This further indicate that a long-run equilibrium relationship exist between asset prices and money supply in the Nigerian economy.

Furthermore, D(LogSMC) at lags 1 is negative and insignificant while at lag 2 it is positive but insignificant. Similarly, D(LogBMS) at lag 1 is negative and insignificant and at lag 2, it is negative but significant. The significant nature of the results proves that the market is inefficient thus negating the Efficient Market Hypothesis. Hence, arbitrage profit opportunities exist as market participants can use past values in the stock market to predict returns on their portfolio of investment and help make better buy or sell decision. This is consistent with the view of Haruna et al (2013) that arbitrage profit opportunities exist on the Ghana Stock market.

Adjusted R2 is 0.098665 which means that 9% of variations in the Nigerian stock market activities are explained by the supply of money. Overall, the model is fit for forecast and policy (F-statistic=2.488726).

Table 4.5 Causality Test

Pairwise Granger Causality Tests
Date: 08/08/14 Time: 21:21
Sample: 1 72
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LOGBMS does not Granger Cause LOGSMC	70	4.44894	0.0155
LOGSMC does not Granger Cause LOGBMS		1.45627	0.2406

The test of causality is presented in Table 4.5. The null hypothesis that LogBMS does not Granger cause LogSMC is strongly rejected at the 5% significance level (F=4.44894, P<0.0155); hence, there is a uni-directional causality from LogBMS → LogSMC. It is the supply of money that actually influences asset prices in Nigeria. This is consistent with the findings of Flannery and Protopapadakis (2002), Raymond (2009), Maku and Atanda (2010), Kohout (2010), Veselá (2010), Eze (2011), Ahmed and Suliman (2011), Ossisanwo and Atanda (2012), Chude and Chude (2013), Mirza and Hashem (2013), and Haruna et al (2013).

Table 4.6 Impulse Response Test

Response of LOGSMC:		
Period	**LOGSMC**	**LOGBMS**
1	0.090973	0.000000
2	0.076786	-0.007997
3	0.078116	-0.000772
4	0.070963	0.004138
5	0.065652	0.006502
6	0.060054	0.009206
7	0.055261	0.012159
8	0.050846	0.014582
9	0.046862	0.016693
10	0.043266	0.018667
11	0.040028	0.020455
12	0.037103	0.022051
13	0.034463	0.023491
14	0.032083	0.024795
15	0.029935	0.025971
16	0.027996	0.027031
17	0.026248	0.027987
18	0.024670	0.028851
19	0.023247	0.029629
20	0.021963	0.030332
21	0.020804	0.030966
22	0.019758	0.031537
23	0.018815	0.032053
24	0.017964	0.032519

Source: Author's computation extracted from E-views7 computation

Table 4.6 shows response of LogSMC to one standard deviation innovation in LogBMS for a 24 period. The response of LogSMC to its own shocks in the first period is a positive 0.09%, 0.07% for the second, third and fourth periods; and declined gradually to 0.01% in the 24th period. The response of LogSMC to shocks from LogBMS became evident but negative at periods 2-3 and is -0.007% and -0.0007%. Thereafter it became positive but stable at 0.02% from period 11-19; and grew slowly to 0.03% in the 24th period. Negative shocks may seem to be that the CBN considers restricting its monetary policy due to more money in the economy leading to inflation. On the other hand, investors who anticipate higher interest rate due to tight monetary policy and a subsequent fall in stock prices will want to rebalance their portfolios. Additionally, they can review their portfolios upwards when there is more supply of money resulting to high liquidity in the economy. Gan *et al* (2006) found a negative impact of a shock to money supply on the New Zealand stock index and described it to be driven by foreign investors. They claim that high interest rate relative to other countries will prompt investors to put their money in the bank instead of investing in the stock market. Furthermore, if interest rate is too low then they may prefer investing in other markets.

Table 4.7 Variance Decomposition Test

Variance Decomposition of LOGSMC:			
Period	**S.E**	**LOGSMC**	**LOGBMS**
1	0.090973	100.0000	0.000000
2	0.119315	99.55079	0.449210
3	0.142614	99.68265	0.317352
4	0.159348	99.67837	0.321631
5	0.172465	99.58329	0.416705
6	0.182853	99.37582	0.624178
7	0.191408	99.02684	0.973163
8	0.198582	98.55668	1.443323
9	0.204718	97.97698	2.023023
10	0.210072	97.28916	2.710842
11	0.214827	96.50120	3.498797
12	0.219120	95.62424	4.375762
13	0.223054	94.66806	5.331944
14	0.226710	93.64241	6.357590
15	0.230147	92.55752	7.442483
16	0.233414	91.42329	8.576705
17	0.236547	90.24909	9.750912
18	0.239574	89.04369	10.95631
19	0.242516	87.81524	12.18476
20	0.245390	86.57116	13.42884
21	0.248209	85.31810	14.68190
22	0.250984	84.06198	15.93802
23	0.253721	82.80798	17.19202
24	0.256426	81.56061	18.43939

Source: Author's computation extracted from E-views7 computation

The empirical result of the variance decomposition test is given in table 4.7. As earlier mentioned, the variance decomposition test explains the proportion of forecast errors that is as a result of own innovations and innovations in the other variables in the model. In the first period, LogSMC accounts for 100% variation in its own shock. From the 2nd to 7th period, LogSMC accounts for 99% from its own shock while LogBMS accounts for 0.44%, 0.31%, 0.32%, 0.41%, 0.62% and 0.97% in the same period. In the 12th period, LogSMC accounts for 95.6% variation in its own shock while LogBMS accounts for 4.37%. Taking a cursory look at the results for LogBMS, we observed an increasing trend in variations from period 3. This goes to support our VECM and Granger causality test that Money supply impacts on Asset prices in the Nigerian economy.

5. Summary and Recommendation

When the CBN supplies money in the economy either through credit to the private sector or government, it gives a signaling effect in trading activities in the stock market; as low interest rates faced by investors will compel them to prefer trading stocks. The signal in trading activities in the stock market gives rise to inefficiencies by way of speculators and arbitrageurs seeing an opportunity to make abnormal profits. This however, negates the Efficient Market Hypothesis seeing that stock prices do not rapidly adjust to the release of new information.

The aim of this study is to provide empirical evidence on the relationship between Money supply and Asset prices; using monthly data obtained from the Central Bank Statistical Bulletin for the period $2008M_1$:

$2013M_{12}$ giving a total of 72 observations. In addition, the E-view7 statistical software was employed to conduct more robust tests of the variables under study.

First, the Unit root test detected stationarity of the variables in their first differences by the objective assessment of the Augmented Dickey Fuller and Phillips-Perron test. Second, the Johansen cointegration test indicate one co-integrating equations at the 0.05 level. Consequently, we can say that a long- run equilibrium relationship exist between LogSMC and LogBMS. Third, our Vector Error Correction Model shows a -0.079269 speed of adjustment of prior deviations from equilibrium. Hence, about 8% of disequilibrium is corrected every month. This further supports the long-run equilibrium relationship that exists between the variables. Furthermore, we employed the Granger causality test to know which of the variables is leading or following. Our result indicates uni-directional causality from LogBMS → LogSMC ($F=4.44894$, $P<0.0155$). It is the supply of money that actually influences asset prices in the Nigerian economy. In addition, the response of LogSMC to its own shocks in all the 24 periods is positive while the response of LogSMC to LogBMS is both positive and negative. The negative shocks observed may not be unconnected with investors rebalancing their portfolios due to tight monetary policy in the face of inflation; and a perceived high interest rate. For the Variance Decomposition test, the proportion of forecast errors of LogSMC to its own innovation is 100% in the first period but gradually declines overtime. Whereas, that of LogBMS tends to undergo an upward trend which goes to support our findings from the VECM and Granger causality test that Money supply actually impacts on Asset prices in the Nigerian economy. Overall, all the results obtained are in line with apriori expectation. A policy direction is that the CBN can use Money supply as a monetary policy tool to effect changes in growth levels in the stock market.

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