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Money Supply and Stock Prices – A Case Study of Nigeria

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ABSTRACT: This study examined the relationship between money supply and stock prices, using E-view version 10. The empirical results of the Augmented Dickey Fuller (ADF) unit root test at 5 percent critical levels indicates that all the variables (M2 and MCAP) were not stationary at levels. However, all the variables became stationary after first differencing. Hence, the variables are of the same order of integration I (1). A cointegration test tells us that there exists a long run relationship between or among the variables and that they will not wander far apart away even though on the short run they exhibit random walk behavior. The Vector Error Correction test shows that Money supply (M2) has a significant relationship with market capitalization of the Nigerian stock exchange. The value of the Adjusted R-Squared of 0.726710 implies that Money supply (M2) explained about 72.67% systematic variations in the dependent variable (MCAP) over the observed years while the remaining 27.33% variations are explained by other determining variables outside the model. In order to further establish the relationship between money supply and stock market price, a granger causality test was carried out and it was established that there is a bi-directional causality between money supply and stock prices. The researcher therefore recommends that there should be collaboration among agencies of government in charge of money supply and stock exchange in order to make sure that sound policies are made to achieve the objective of government. Furthermore, that there should be a deliberate and concerted policy and effort to improve the Nigerian stock exchange market in line with other stock exchanges of the world, since stock prices cause money supply and vice versa.

KEY WORDS: Stock prices, money supply, VECM

1. INTRODUCTION

The Stock market of any economy responds to changes in the economy of that country, particularly the monetary policy which is used in ensuring the stability of such economy. The Monetary authority of any country determines whether to engage in expansionary or contractionary policy depending on the objective of the authorities. In times of expansionary policies of the country, it is expected that stock prices will increase because of the lowering of interest rates used in discounting cash flows which will in turn increase economic activity. A contractionary period will cause increase in interest rate and consequently bringing downprices of stock and the activity in the economy.

The stock market has been a source of income to many. Some trade in the stock market as steady source of income i.e.to make capital gains, some to earn dividends while some use the stock market aa means of saving for retirement, as such the importance of the stock market need not be over emphasized. A collapse of the stock market will definitely affect a lot of people directly or indirectly. Central Bank of a country is usually the monetary authority of that country that uses monetary policy as a tool to stabilize the economy. Central Bank of any country can cause a change in the economic landscape in many ways which is believed to have an important effect on the stock market.In this study the researcher has chosen to xray the relationship between money supply and stock prices, using Nigeria as a case study.

Some scholars have studied the relationship between money supply and stock market prices. The works of Sprinkel(1964), Homa and Jaffe(1971), Hamburger and Kochin(1972) indicated a relationship between Money supply and stock prices, while Pesando(1974), Gupta(1974),Kraft and Kraft(1977), Pierce and Roll(1985) in their findings concluded that there is no relationship between Money supply and stock market price. It becomes imperative therefore, to do an in-depth research on this topic so as to bridge the gap between the two different schools of thought.

2. LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Quantity Theory of Money

This study is hinged on the quantity theory of money. Value of Money is defined by many financial analysts and economists as the quantity of what you can buy with a unit of the legal tender. The value of money when related to price as seen as being related inversely. This means that the more the price, the lower the value of money. The story of Quantity Theory of Money started in 16th century where a French economist Jean Boldin related the increase in the demand for French goods to the increase in gold and silver (which served as value for money at that time). Locke (1692) did more work on the Quantity theory of money when he examined the effects of money on trade, the role of interest rate and demand for money in the economy. It was at that time that the role of money as a medium of exchange was established. Similarly, the relationship between demand and supply of money, the velocity of money in circulation and quantity of money needed for transactions was propounded. It was concluded at that time that the amount of money needed for a transaction depends on the velocity of money in circulation in the sense that the excess demand and supply of money, brings about brings about increase in interest rate and vice versa.

Having stated the background to the Quantity theory of Money, it is important the look at the three approaches usually used in monetary analyses in a country:

2.1.2 Quantity Velocity/Cash Transaction/Freidman's Restatement Approach

This approach believes that there is a direct proportional relationship between quantity of money (demanded and supplied) and price level of commodities. This approach believes that changes in the quantity of money, influences the price level of commodities, hence quantity of money is made up of cash (M) and the velocity of the use of the money (V). The frequency or rate of use of money (velocity) depends on trade volume, type of business condition, borrowing and lending policies, price level, and frequency of transactions. All things being equal, it was concluded that while keeping some other conditions constant that the price level of a commodity is directly proportional to the demand and supply of money. It was however inferred that in utmost conditions, an increase in the supply of quantity of money, there will be a proportional reduction in the value of money and vice versa.

However, in extreme conditions, an increase in the quantity of money would lead to a proportional decrease in the value of money, while keeping other factors at constant and vice versa.

Fisher(1930) suggested a formula for the quantity theory of money as stated below:

$P = MV + M'V'/T$

Where, P = Price level/Value of money

M = Metallic money

M' = Credit money

V = Velocity of metallic money

V = Velocity of credit money

T = Transactions performed by money

2.1.3 Cash Balances Approach/Cambridge Equation

This approach is the modification of the quantity velocity approach as stated above. This approach believes that the demand and supply of money is dependent not only on the amount of goods and services but also on the period of time of the transaction. This approach looks at it that instead of an individual making purchases once in a year, they do that as the need arises say monthly thereby holding cash for such needs. If the case of individuals holding cash is true, then there will be demand for cash needed while the little cash will be held remaining will be available for investments, as holding too much cash will endanger the life of the holder. This approach postulates that an individual should hold cash for transactions and uncertainties as shown below:

$M = kpR$

Where, M = quantity of money

R = real national income (total of final goods and services that are directly consumed)

P = average price-level of real national income (average of price of clothes, food, shelter, and services)

Note: pR represents the monetary national income.

The implication of the above is that when there is circulation of money once, then the quantity of money required will be the monetary national income while twice of it will lead to half of the monetary national income.

2.1.4 Income – Expenditure Approach

This approach is called the modern quantity theory of money. It was propounded by Kynes who agreed that changes in money supply influences changes in price. However, he disagreed that it is easy to determine the relationship between price level and the quantity of money. In his own view, it is the changes in national income that brings about changes in price. Demand for goods rises as a result of rises in expenditure and if expenditure rises and supply remains fairly elastic, then there not be any increase in price level. By implication the change in the quantity of money depends on the following:

a. Effect of change in money supply on level of aggregate expenditure and volume of production

b. Type of relation between aggregate expenditure and volume of production

Hence, it is difficult to establish a relationship between changes in money supply and changes in price level. This is because they are indirectly related to each other and depend on aggregate expenditure and elasticity of supply of output.

2.2 Empirical Framework

Future cash flows have a role to play in the determination of the price of any stock. This is because the future cash flows are discounted in order to get the present value which in turn determines the price of a stock, yet money supply has a relationship with the discount rate that is used in determining the present value of the future cash flow. Sellin (2001) in a study revealed that money supply has an effect on stock market prices. In their argument they posit that increase in money supply brings about an increased economic activity which in turn brings about more and higher expectations by investors, hence increase in stock prices. Consequently, the study of the Sellin(2001) affirms that there is a positive relationship between stock prices and money supply. Similarly, Sellin(2001) suggests that higher money higher money demand is as a result of unexpected money supply which should have a supporting monetary policy. This situation culminates in higher money demand which brings in the issue of risk. The higher the risk, the more demand for risk premium from investors for holding stocks which now reduces the attractiveness of stock and consequently bringing the price of the stock down.

Bernanke and Kuttner (2005) says that stock price and money supply maintains a positive relationship, this position is in line with Sellin(2001) and the real activity hypothesis. However, they disagreed with the risk premium postulation supported by Sellin. They believe that the attractiveness of a stock is dependent on possibility of getting returns that are high. On the other hand, they posit that the higher the risk of a stock the unattractive the stock and hence fall in prices.

Kings (1966) discovered that macroeconomic variables influence stock markets by 50%.Musilek (1997) on the contrary suggests that the success of an investor depends on his focus on macroeconomic factors that shape price.

Flannery and Protopapadakis (2002) opines that the most significant influencer of the stock returns is macroeconomic factors. Similarly Bilson et al(2000) is of the same view that macroeconomic factors also impacts on the stock market prices more than the global macroeconomic factors.

Vesela(2010), says that it is interest rate, GDP, money supply, inflation, international capital changes movementin foreign exchange rates, political and economic environment that impacts on stock prices. Kohout (2010) on the other hand says that the only variable that impacts on stock prices is the money supply in an economy at the long run.

Maskay (2007), Poire (2000) and Shostack(2003) from their studies, see the supply of money in any economy as the most significant macroeconomic tool that affects the prices of stocks. This opinion they said is germane as excess money not needed in the system is channeled into investments. However, according to them more investment is attracted when interest rates are reduced dovetailing into demand for investments (in this case shares). On the other hand, Rapach et al (2005) in the study of 12 countries, opined that the most dependable variable that predicts the development of stock market is the interest rate.

Pearce and Roley (1985) in a study of anticipative money supply discovered that investors are mostly risk averse and will go for less risky assets. Their study observed that there is a relationship between stock prices and non-anticipative stock prices which ultimately influences the rate of interest response by central bank. Bernanke (2005) on the contrary observed in his study that the anticipatory change in money supply does not in any way affect or influence prices of equity, since the future cash flows which determines prices of stocks were discounted ab initio. By implication, the effect of the anticipatory money supply has been taken care of. Bernanke (2005) however, agreed that the non-anticipatory money supply change may influence stock prices.

Maysami and Koh (2000) in the bid to investigate whether the postulation of the relationship between Money supply and prices of stocks inferred that there was a positive relationship between money supply and the development of Singapore stock exchange. This finding was in line with Fama (1981) who observed that an increase in money supply will bring trigger inflation, growth in future cash flow and prices of stocks. On knowing the causality of the variables, Brahmasrene and Jiranyakul (2007), they discovered that in the Thai stock exchange market (1992 – 2003) that there was a positive relationship between prices and money supply.

Cagli et al (2010) investigated the relationship between money supply and stock prices in the Turkey stock exchange and discovered that there was no co-integration between stock prices and money supply.

Shaoping (2008) did a study on the effect of the changes in macroeconomic factors (including money supply) on the development of stock prices (2005 – 2007) and found out that the effect of money supply on the development of stocks prices was very strong as there was a long term relationship between monetary aggregates and stock prices. Similarly, Habibullah and Baharumshah (1996) examined the relationship between money supply and stock prices and observed weak efficiency and non-existent co-integration between the two variables at the Malaysia stock exchange. Habibullah (1998) in a later study discovered a causal relationship between money supply and stock prices.

Kimura and Koruzomi(2003) investigated the Japanese Stock Exchange Market in the area of relationship between money supply and the development of stock prices. The result of their study shows no relationship between the change in money supply and the development of stock prices. In the same vein Husain and Mahmood (1999) investigated the long term relationship between money supply and stock prices and discovered a long term co-integration between money aggregates M1 and M2 and stock prices in the Pakistan stock market.

Hanousek and Filler (2000) analyzed the relationship between Macroeconomic indicator (which includes money supply) and stock prices in Central Europe in 1993 to 1996. The result of the study indicated an existence of positive relationship between money supply and stock prices. In the United States of America stock exchange, there was a causal relationship and positive correlation between stock prices and money supply as indicated in the studies of Maskay(2007), Flannery and Protopapadakis (2001) and Poire (2000)

2.3 Research Gap

A review of the theoretical and empirical framework, it is clear that there is no agreement among researchers on this topic. There are different schools of thought on the theory while researchers obtain different results on the same subject. This study therefore will bridge the gaps and come up with a latest view on this matter using a modern tool in the analysis.

3.0 METHODOLOGY

An ex-post facto research design was adopted in this study. The Vector Error Correction Model (VECM) was used for the model estimation on the time-series data. Market capitalization is taken as a proxy for stock market price while Money Supply constitute the independent variable. This is captured in the model below:

$$MCAP = f(M2) \text{ ---------- (i)}$$

Transforming the data into a log form, the econometric model becomes;

$$MCAP = \beta 0 + \beta 1 \log M2 + \mu t \text{ ---------- (ii)}$$

Where:

MCAP = Market capitalization; a proxy for stock market price

M2 = Money Supply

μ = Error term

βo = Intercept of the regression.

$\beta 1$= Beta coefficients of the independent variable.

3.1 Explanation / Justification of the Chosen Variables.

In this study we intend to use one (1) dependent and one (1) independent variable to ascertain relationship.

Market Capitalization

This refers to the total value of a company's share of stock. It is calculated by multiplying the price of a stock by its total number of outstanding shares. Market capitalization allows investors to understand the relative size of one company versus another. Market capitalization measures what a company is worth on the open market as well as the market perception of its future prospects, because it reflects what investors are willing to pay for its stock. Any exercise of warrants on a company's stock will increase the number of outstanding shares, thereby diluting its existing value.

Money Supply

This refers to all the currency and other liquid instruments in a country's economy on the date measured. The money supply roughly includes both cash and deposits that can be used almost as easily as cash. The total stock of money circulating in an economy is the money supply. The circulating money involves the currency, printed notes, money in the deposit accounts and in the form of other liquid assets.

3.2. Expected or Apriori Expectations

This is hinged on the theoretical linkage about the signs and magnitude of the parameters of the specified functions. They are determined by the principles of financial and economic theory guiding the relationship among the variables under study. It is expected that b1>0. The expected positive signs rest on the theoretical postulation that the above variables have a direct and positive effect on stock prices of Nigeria in the long run.

DATA PRESENTATION AND ANALYSIS

Table 1: Descriptive Statistics

	M2	MCAP
Mean	6940.577	6221.907
Median	1599.490	764.9000
Maximum	29137.80	25890.22
Minimum	26.28000	6.600000
Std. Dev.	9175.105	8083.427
Skewness	1.121595	0.976828
Kurtosis	2.861457	2.527315
Jarque-Bera	7.366186	5.891963
Probability	0.025145	0.052550
Sum	242920.2	217766.8
Sum Sq. Dev.	2.86E+09	2.22E+09
Observations	35	35

Source: Researcher's computation using E-views 10

The descriptive statistics in table 1 shows that the mean values of Money Supply (M2) and Market Capitalization (MCAP) are ₦6940.577 and ₦6221.907 respectively. Skewness is a measure of asymmetry of the distribution of series around its mean. The skewness of Money Supply (M2) and Market Capitalization (MCAP) are above zero indicating a positive skewness. Thus, there is a right long-tailed distribution for Money Supply (M2) and Market Capitalization (MCAP). The JaqueBera statistics shows that Market Capitalization (MCAP) is normally distributed since its JarqueBera p-value is greater than 0.05 while Money Supply (M2) is not normally distributed.

Unit Root Test

In determining the characteristics of time series variables, a preliminary analysis is to test whether the series are stationary or not. In other words, this preliminary analysis is conducted to test for the presence of a unit root in the series. The Augmented Dickey Fuller (ADF) unit root test was applied and the results are shown in table 2.

Table 2: Summary of Augmented Dickey Fuller Unit Root Test of the Variables

Variable	ADF Stats.	5 % Critical Level	Remarks
M2	-2.281469	-2.954021	Non-stationary
MCAP	-1.367243	-2.951125	Non-stationary
ΔM2	-3.792320	-2.954021	Stationary
ΔMCAP	-4.497198	-2.954021	Stationary

Source: Researcher's computation using E-views 10

The empirical results of the Augmented Dickey Fuller (ADF) unit root test at 5 percent critical levels in table 2 indicates that all the variables (M2 and MCAP) were not stationary at levels. However, all the variables became stationary after first differencing. Hence, the variables are of the same order of integration I (1). This conclusion is based on comparison of the Augmented Dickey Fuller statistics and the critical values provided by Mackinnon (1996). Since the variables are I(1) series, this permits us to conduct the Johansen cointegration test to know if a long run relationship exists among the variables.

Cointegration Test

A cointegration test can only be performed after we have established the fact that our variables of interest have first differenced stationarity. A cointegration test tells us that there exists a long run relationship between or among the variables and that they will not wander far apart away even though on the short run they exhibit random walk behavior. Table 3 below shows the two types of test statistics, the trace and the maximum eigenvalue statistics, which indicate that there are two (2) cointegrating equations. We can now move on and estimate our vector error correction regression model.

Table 3: Johansen's Cointegration Test

Date: 09/17/21 Time: 09:39
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: LOG(M2) LOG(MCAP)
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 *	0.292868	16.84156	15.49471	0.0312
At most 1 *	0.151098	5.405791	3.841466	0.0201

Trace test indicates 2 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	0.292868	11.43576	14.26460	0.1337
At most 1 *	0.151098	5.405791	3.841466	0.0201

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Researcher's computation using E-views 10

Regression Result

In an attempt to determine the effect of money supply on stock prices in Nigeria, the variables were tested using the Vector Error Correction Model (VECM) through the use of E-views version 10.0 to determine the extent to which the independent variable (Money supply) influences the dependent variable (Market Capitalization) in this study.

Table 4: Vector Error Correction Estimates

Vector Error Correction Estimates
Date: 09/17/21 Time: 10:52
Sample (adjusted): 1987 2019
Included observations: 33 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	
LOG(MCAP(-1))	1.000000	
LOG(M2(-1))	-1.277458	
	(0.04144)	
	[-30.8247]	
C	2.564931	
Error Correction:	D(LOG(MCAP))	D(LOG(M2))
CointEq1	-0.331256	0.136756
	(0.15623)	(0.05985)
	[-2.12031]	[2.28509]
D(LOG(MCAP(-1)))	0.397314	0.032395
	(0.19473)	(0.07459)
	[2.04037]	[0.43428]
D(LOG(M2(-1)))	0.470342	0.323428
	(0.39484)	(0.15125)
	[1.19121]	[2.13832]
C	0.053352	0.135250
	(0.10116)	(0.03875)
	[0.52738]	[3.49002]
R-squared	0.808581	0.343845
Adj. R-squared	0.726710	0.275967
Sum sq. resids	2.126405	0.312038
S.E. equation	0.270785	0.103730
F-statistic	9.547680	5.065636
Log likelihood	-1.580737	-30.08378
Akaike AIC	0.438227	1.580835
Schwarz SC	0.519621	1.399441
Mean dependent	0.249839	0.211200
S.D. dependent	0.289764	0.121906
Determinant resid covariance (dof adj.)		0.000760
Determinant resid covariance		0.000587
Log likelihood		-29.11825
Akaike information criterion		1.158682
Schwarz criterion		0.705195
Number of coefficients		10

Source: Researcher's computation using E-views 10

The VECM output in Table 4 reports the variables (M2 and MCAP). In reading a regression result, a variable is considered significant when the value of the t-statistic is greater than +2 or is less than -2 or the p-value is less than 0.05. In Table 4 above, M2 has a positive coefficient of 0.470342 in the short run which is statistically insignificant with a t-statistic of 1.19121. However, in the long run, M2 was found to have a negative coefficient of -1.277458 which is significant with a t-statistic of -30.8247. This implies that Money supply (M2) has a negative and significant relationship with market capitalization of the

Nigerian stock exchange at 5% significance level. For the variable coefficient, a 1% change in M2 leads to a 1.277% decrease in MCAP, all things being equal.

Since the T-statistic value (-30.8247) of M2 is greater than 2, the null hypothesis is hereby rejected and we conclude that Money supply (M2) has a significant relationship with market capitalization of the Nigerian stock exchange. The value of the Adjusted R-Squared of 0.726710 implies that Money supply (M2) explained about 72.67% systematic variations in the dependent variable (MCAP) over the observed years while the remaining 27.33% variations are explained by other determining variables outside the model.

The F-statistic shows a significant value of 9.547680. This means that the effect of the independent variable (M2) on the dependent variable (MCAP) did not happen by chance.

Serial Correlation Test

Serial autocorrelation test was conducted to make sure that the estimated results are reliable.

VEC Residual Serial Correlation LM Test

VEC Residual Serial Correlation LM Tests
Date: 09/17/21 Time: 10:02
Sample: 1985 2019
Included observations: 32

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	2.260092	4	0.6880	0.566513	(4, 46.0)	0.6882
2	8.094403	4	0.0882	2.161319	(4, 46.0)	0.0883

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	2.260092	4	0.6880	0.566513	(4, 46.0)	0.6882
2	8.367658	8	0.3984	1.072888	(8, 42.0)	0.4002

*Edgeworth expansion corrected likelihood ratio statistic.

Source: Researcher's computation using E-views 10

The VEC residual Serial Correlation LM Test shows that there is no serial correlation since the probability statistics of the F Statistics is greater than the 5% level of significance.

Granger Causality Test

Table 5

Pairwise Granger Causality Tests
Date: 10/03/21 Time: 08:38
Sample: 1985 2019
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MCAP does not Granger Cause M2	34	33.9736	2.E-06
M2 does not Granger Cause MCAP		12.0648	0.0015

In order to further establish the relationship between money supply and stock market price, from table 5 above it was established that there is a bi-directional causality, however the prices of stock causes money supply at about almost 3 times more than money supply causes stock prices.

DISCUSSION OF FINDINGS

Firstly, the dynamic approach to the empirical analysis shows that money supply is highly linked to market capitalization in Nigeria. In the short run, an insignificant relationship exists between Money Supply (M2) and market capitalization in Nigeria. On the contrary, it is observed from the empirical results that in the long run, Money Supply (M2) significantly influences and is strongly linked to market capitalization in Nigeria. Furthermore, the empirical findings indicate that the coefficient of Money Supply (M2) in Nigeria in the short run, positively influences market capitalization in Nigeria, which is in line with the apriori expectation. The result is in consonance with the findings in previous studies conducted by Sellin (2001), Bernanke and Kuttner (2005), Maysami and Koh (2000), Vesela (2010), Maskay (2007), Poire (2000) and Shostack (2003). However, the coefficient of Money Supply (M2) in Nigeria in the long run negatively impact market capitalization of the stock exchange in Nigeria. Furthermore, the pairwise granger causality test shows a bi-directional causality between stock prices and money supply

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

This study examined the relationship between money supply and stock price a case study of Nigeria. The analysis reveals an insignificant shortrun relationship between money supply and stock prices in Nigeria. However, in the long run it is observed that money supply is strongly related to stock prices (which was proxied by market capitalization) in Nigeria.

5.2 Conclusion

Based on the result of this study, we hereby conclude that Money Supply (M2) significantly influences and is strongly linked to market capitalization in Nigeria. Furthermore, the empirical findings indicate that the coefficient of Money Supply (M2) in Nigeria in the short run, positively influences market capitalization in Nigeria. The coefficient of Money Supply (M2) in Nigeria in the long run negatively impact market capitalization of the stock exchange in Nigeria. Furthermore, the pairwise granger causality test shows a bi-directional causality between stock prices and money supply.

5.3 Recommendation

The researcher hereby makes the following recommendations:

1. Money supply policy must take cognizance of the effect it will have on the stock prices and vice versa
2. There should be a deliberate and concerted policy and effort to improve the Nigerian stock exchange market in line with other stock exchanges of the world.
3. There should be collaboration among agencies of government in charge of money supply and stock exchange in order to make sure that sound policies are made to achieve the objective of government.

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APPENDIX

Presentation of Data

YEAR	M2 ₦'billions	MCAP ₦'billions
1985	26.28	6.60
1986	27.39	6.80
1987	33.67	8.20
1988	45.45	10.00
1989	47.06	12.80
1990	68.66	16.30
1991	87.5	23.10
1992	129.09	31.20
1993	198.48	47.50
1994	266.94	66.30
1995	318.76	180.40
1996	370.33	285.80
1997	429.73	281.90
1998	525.64	262.60
1999	699.73	300.00
2000	1036.08	472.30
2001	1315.87	662.50
2002	1599.49	764.90
2003	1985.19	1359.30
2004	2263.59	2112.50
2005	2814.85	2900.06
2006	4027.9	5120.90
2007	5809.83	13181.69
2008	9166.84	9562.97
2009	10780.6	7030.84
2010	11525.5	9918.21
2011	13303.5	10275.34
2012	15480.9	14800.94
2013	15681.3	19077.42
2014	18885.5	16875.10
2015	20029.8	17003.39
2016	23591.7	16185.73
2017	24140.6	21128.90
2018	27068.6	21904.04
2019	29137.8	25890.22

Unit Root Tests

Null Hypothesis: LOG(MCAP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.367243	0.5865
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOG(MCAP)) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.497198	0.0011
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LOG(M2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.281469	0.1836
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOG(M2)) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.792320	0.0069
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.