# Empirical Analysis of the Nexus Between Capital and Money Markets in Nigeria

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***Abstract*—** This paper examined the relationship between money and capital markets in Nigeria from 1981 to 2019. Thus, correlation and pairwise Granger causality analytical techniques were applied to the annual times series data obtained from the Central Bank of Nigeria's statistical bulletin. Empirical findings indicate the existence of a strong positive correlation between money and capital markets in Nigeria. The study also established evidence of a long-run relationship between money and capital markets in Nigeria. Furthermore, there is a bidirectional causality between money and capital markets in Nigeria in the study period. The study concludes that there is a complementary (positive) causal relationship between money market and capital market in Nigeria. Therefore, the need to encourage the formulation and implementation of policies geared towards greater synergy between the two markets in Nigeria.

***Keywords*—** Capital market, Correlation, Granger causality, Money market, Stock market.

## I. INTRODUCTION

A financial system is a set of interconnected, interrelated and interdependent sub-units of financial firms, institutions, instruments, markets, frameworks, etc which direct the flow of funds within the macro-economy. Financial markets consist basically of the capital and money markets. The former deals in long term securities while short term securities are traded in the latter. The money market deals with short-term lending, borrowing, buying and selling of securities with original maturities of one year or less (Afiemo, 2013). Money market instruments in Nigeria include treasury bills, treasury certificates, certificates of deposits, commercial papers, banker's acceptances, and Federal Government of Nigeria (FGN) bonds. On the other hands, transactions carried out in the Nigerian capital market include trading in government stocks, industrial loans, second tier securities, ETF, bonds and equities. Capital market has been described as a catalyst to the economic growth of the country (Babarinde et al., 2020; Khetsi & Mongale, 2015; Ologunwa & Sadibo, 2016). In the same, studies have established the positive role of money market in the economy (Etale & Ayunku, 2017; Uruakpa, 2019).

To ensure financial development, financial markets (money and capital) as well as other elements of the financial system are expected to work together. Empirical findings show evidence of a strong and significant inverse causal relationship between money market interest and stock market returns (Kganyago & Gumbo, 2015). Jasienė and Paškevičius (2009) have also confirmed the evidence of a competition between the capital and money markets, such that both market move in opposite direction. However, the nexus between total market value of listed securities in the capital market (that is, market capitalization) and total market values of instruments traded in the money market still remains largely unexplored in Nigeria, where both markets are considered engines of economic growth. Hence, the motivation for this current study.

The main aim of this study is determine the relationship between money market and capital market in Nigeria from 1981-2019 using correlation and causality techniques. The specific objectives are to assess the causal relationship between money and capital markets in Nigeria; and to investigate the correlation between money market and capital markets in Nigeria.

The rest of this paper is organized as follows. After this introduction, description of the methodology of the study follows. Thereafter, the results of data analysis are presented and discussed. Finally, the conclusion of the paper is reported.

## II. METHODOLOGY

This research is a cause-effect study employing annual time series data obtained from the Central Bank of Nigeria[CBN]'s statistical bulletin (2019). Correlation and pairwise Granger causality tests were applied to determine the relationship and direction of causality between money and capital markets in Nigeria over a period of 39 years (1981-2019). Descriptive statistics and unit root tests were also carried out on the data before the application of cointegration test. Cointegration of the two variables is a condition for the application of causality test. Thus, Johansen cointegration test was used to assess the existence of a long-run relationship between the variables.

In the same vein, correlation analysis was carried out to determine the relationship between the two variables. The pairwise Granger causality test equations of money and capital markets nexus in Nigeria are stated in equations (1) and (2):

$$MCAP_t = \sum_{t=1} MMI_t + U_{t1} \qquad (1)$$

$$MMI_t = \sum_{t=1}^{n} MCAP_t + U_{t2} \qquad (2)$$

Where;

MCAP=Nigeria capital market capitalization defined as total market values of all listed securities in the Nigerian capital market, denominated in billion Naira.

MMI=Nigerian money market defined as the total value of money market instruments outstanding as the end period, denominated in billion Naira.

It is expected that MCAP and MMI should be positively correlated and bi-directional in causality.

## III. RESULTS AND DISCUSSION

### *A. Descriptive Statistics*

Both summary statistics and trend analysis of the variables of study are carried in order to get a preliminary understanding of the statistical behavior of the variables.

#### *(i). Summary Statistics*

The summary statistics in Table 1 show the average value of outstanding money market instruments in Nigeria (MMI) and capital market at the Nigerian Stock Exchange (MCAP) to be N2693.197billion and N5584.306billion respectively. Both variables (MMI and MCAP) have their standard deviation exceeding their mean, thus are widely dispersed from their mean values. MMI is not normally distributed while MCAP only attains normality at 1% level of significance. MCAP ranges between N5billion and N25890.22billion while MMI has a minimum and maximum of N11.7035billion and N12748.12billion respectively.

*Table 1. Summary statistics*

| | MCAP | MMI |
|---|---|---|
| Mean | 5584.306 | 2693.197 |
| Max. | 25890.22 | 12748.12 |
| Min. | 5.0000 | 11.7035 |
| Std. Dev. | 7881.274 | 3981.126 |
| Skewness | 1.1356 | 1.4508 |
| Kurtosis | 2.8686 | 3.7482 |
| Jarque-Bera | 8.4113 | 14.5919 |
| Prob. | 0.0149 | 0.0006 |

*Source: Author's computation.*

*Note: MCAP=Market capitalization in the Nigerian Stock Exchange between 1981-2019;*

*MMI=Money market instruments in Nigeria between 1981-2019.*

#### *(ii). Trend Analysis*

Further description of the variables in the form of line graph depicted in Figure 1 indicates the trends of the two variables of study (MCAP and MMI). Specific of note is the post-2000 sudden jump in both money market and capital market. This upward trends have continued to be exhibited by the two variables even up till year 2019. Does this upward trending nature display of money and capital markets in the graph have any empirical significance? This study is an attempt to empirically examine the connection between the two variables.

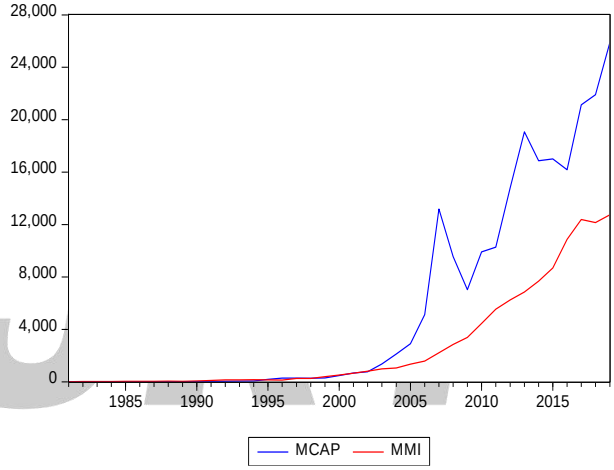


*Figure 1. Capital market capitalization and value of money market instruments in Nigeria (1981-2019).*
*Source: Author's design.*

### *B. Unit Root Test*

The results of the Phillips-Perron (PP) unit root test (in Table 2) indicate that money market (MMI) and capital market (MCAP) are not stationary at level but attain stationarity after first difference. This implies that the variables are integrated of order one.

*Table 2. Phillips-Perron (PP) unit root test*

| *Test for unit root in level* | | | |
|---|---|---|---|
| Variables | T-statistic | p-value | Result |
| MMI | 4.1860 | 1.0000 | Not stationary |
| MCAP | 2.8820 | 1.0000 | Not stationary |
| *Test for unit root in fist difference* | | | |
| MMI | -2.6917 | 0.0850*** | Stationary |
| MCAP | -5.9975 | 0.0000* | Stationary |

*Note: * and *** denotes the rejection of hypothesis of unit root at 1 percent and 10 percent respectively.*

### *C. Cointegration Tests*

The Johansen cointegration tests were applied to the time series to determine if they would co-move in the long run. Johansen Cointegration tests results in Table 3 based on Trace and Max-eigenvalue tests indicate two cointegrating equations at the 0.05 level. These suggest the existence of a long-run relationship between money and capital markets in Nigeria in the period under investigation.

*Table 3. Johansen cointegration tests*

| *Cointegration rank test (Trace)* | | | |
|---|---|---|---|
| Hypothesized | Eigenvalue | Test | 0.05 Critical |
| No. of CE(s) | | Statistic | Value |
| None * | 0.4144 | 24.8877 | 15.4947 |
| At most 1* | 0.1283 | 5.0843 | 3.8414 |
| *Cointegration rank test (Maximum eigenvalue)* | | | |
| Hypothesized | Eigenvalue | Test | 0.05 Critical |
| No. of CE(s) | | Statistic | Value |
| None * | 0.4144 | 19.8034 | 14.2646 |
| At most 1* | 0.1283 | 5.0843 | 3.8414 |

*Source: Author's computation.*

*Note:*denotes rejection of the hypothesis of no cointegration at the 0.05 level since the MacKinnon-Haug-Michelis (1999) p-values are less than 0.05.*

### *D. Correlation Analysis*

To determine the nature of relationship between money and capital markets in Nigeria, this study employed Pearson correlation test and the results are presented in Table 4. With a correlation coefficient of 0.9613, it can be said that there exists a positive and strong relationship between money and capital markets in Nigeria. This implies improvement in one market is related or associated with 96 percent changes in the other market.

*Table 4. Correlation coefficients*

| Variables | MMI | MCAP |
|---|---|---|
| MMI | 1.0000 | 0.9613 |
| | [----] | [0.0000] * |
| MCAP | 0.9613 | 1.0000 |
| | [0.0000]* | [----] |

*Source: Author's computation.*

*Note: Probability values are in []; * significant at 1 percent level.*

### *E. Causality Analysis*

The causal relationship (direction of causality) between money and capital markets in Nigeria was investigated using pairwise Granger causality test. The results of the test presented in Table 5 reveal a mutual directional causality between money and capital markets in Nigeria, with a stronger causality flow from money market to the capital market.

This suggest that there is a complete feed-back effect between money and capital markets in Nigeria in the study period.

*Table 5. Pairwise granger causality test*

| Hypothesis | MMI does not Granger Cause MCAP | MCAP does not Granger Cause MMI |
|---|---|---|
| F-Statistic | 4.1611 | 6.6192 |
| Prob. | 0.0248** | 0.0039* |
| Decision | Reject | Reject |
| Feedback Effect | Complete | Complete |

*Source: Author's computation.*

*Note: * and ** signifies statistical significance of the variable at one percent and five percent levels attained when the p-value<0.01 and p-value< 0.05 levels respectively.*

### *F. Discussion*

In investigating the nexus between money and capital markets in Nigeria, this study found evidence of cointegration between the two markets in Nigeria, which implies that there is a long run relationship between money and capital markets in Nigeria. This suggests the existence of a long-run policy implication between value of money market instruments and market value of all listed securities on the Nigerian Stock Exchange. Activities in money market co-move with activities in the capital market in Nigeria.

Moreover, it is empirically established that a positive and strong correlation exists between money and capital markets in Nigeria and this relationship is statistically significant at one percent. In Nigeria, rather than competing, both money and capital market are positively reinforcing each other, that is they grow in parallel and not substitutional.

Finally, it is also established in this research that a bi-directional causality exists between money and capital markets in Nigeria. Hence, a complete feedback hypothesis on capital and money markets nexus in Nigeria could be proposed in this study. This study therefore argues that the rate at which the money market expands tells positively on capital market in Nigeria and vice versa, increase in the number of listed companies on the Nigerian capital market tends to spur the value of money market instruments in Nigeria. Capital market, however, have a stronger causal effect on money market in Nigeria. This may not be unconnected with the medium to long term maturities of securities traded in the capital market hence its perceived ability to provide incentives for money market operations.

With the above findings, this study is of the view that the expansion of money market operations does not deter the increase in size of the Nigerian capital market.

The Nigerian capital and money markets develop in parallel, such that the development of one market facilitates the expansion of the other. This finding is not consonance with that of Jasienė and Paškevičius (2009) who posited a negative connection between money and capital markets.

## IV. CONCLUSION

Empirically, this paper examined the relationship between money and capital markets in Nigeria from 1981 to 2019. Thus, correlation and pairwise Granger causality analytical techniques were applied to the annual times series obtained from CBN's statistical bulletin. Empirical findings indicate the existence of a strong positive relationship (correlation) between money and capital markets in Nigeria. There is also the existence of a long-run relationship between money and capital markets in Nigeria and the two variables attain stationarity at first difference. Furthermore, the paper confirms a bidirectional causality between money market and capital market in Nigeria. The study therefore concludes that there is a complementary (positive) causal relationship between money and capital markets in Nigeria.

It is therefore recommended that policies aimed at ensuring greater synergy between money and capital markets be encouraged in Nigeria. Financial interlinkage programmes, public awareness campaigns on the various opportunities available in both markets should be vigorously promoted in Nigeria. It is also suggested that future studies interact other money and capital markets indicators and observe their interrelations.

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