

The Role of Capital Market Operations in Capital Formation

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Abstract

In this study, we examined the issue of the magnitude and direction of relationship between capital market performance indicators and gross fixed capital formation in Nigeria from 1980 to 2011. This examination was predicated on the need to know which of the variables predict the other and the level of influence. It is aimed at educating the public on the importance of the various reforms and emphasis placed on the operations of the capital market, especially the stock market, on the economy in a third world country like Nigeria. The Augmented Dickey-Fuller test results indicated that the data used achieved stationarity after a first differencing at the order 1(1). The analysis revealed the existence of positive and significant long run relationship between capital market activities and gross fixed capital formation in Nigeria. The Granger Causality Test results reveal that there is a unidirectional causality flowing from Gross Fixed Capital Formation (GFCF) to market capitalization. This suggests that growth in GFCF could raise the value of listed securities, boost the value of the firms, increase the prices of listed equities and enlarge the size of the country's capital market. The lack of causality flowing from capital market activities to Gross Fixed Capital Formation may be attributed to the low level of capital market development. This paper recommends that the managers of the Nigeria economy should evolve policies and action programmes that would develop and grow the capital market by encouraging both the private individual and institutional investors to take greater initiatives in participating in the capital market, increase productive activities and promote a more private sector driven economy.

JEL classification numbers: E22, H54, G31

Keywords: Capital Market Performance Indicators, Gross Fixed Capital Formation, cointegration.

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1 Introduction

The broad objective of this research is to investigate the dynamic linkage between capital formation and stock market operations in Nigeria. The key questions this study addresses are:

- i) Do the operations in the Nigerian Stock market affect capital formation in the Nigerian economy?
- ii) Do changes in Stock market activities forecast changes in capital formation?

These questions are of great interest to financial analysts, economists, investors and policy makers especially as it concerns changes in the acquisition of new fixed assets that are invested in the economy. Frequently, the answer to the above questions have triggered up varying financial debate globally. It is often argued that capital market activities synchronize the divergent preferences of portfolio managers and financial institutions and those of savers by mobilizing long-term funds for portfolio managers and financial institutions while providing avenue for savers to divest through the secondary market and converting perpetual investment into liquid assets for investment purposes; which have a contagion effect on the output level of goods and services in the economy that are consumed.

An alternative view is that the capital market activities in Nigeria merely promote investment in consumer goods and not the acquisition of new fixed assets that are invested rather than consumed. While there are numerous strongly held views as to the impact of the capital market activities on the level of the Gross Domestic Product (GDP), there is surprisingly little documentation on the behavior of Nigerian Stock market activities and their relation to gross fixed capital formation in Nigeria.

Capital market is a segment of the financial system that accommodates certain institutions for the creation, custodianship, distribution and exchange of financial assets and management of long-term liabilities and gross fixed capital formation (Osaze, 2007). It is a market where governments, large companies and public enterprises raise long-term funds. Formal capital market activities are representatively measured by the performance of the Stock market such as Market Capitalization (Mktcap), All Shares Index (ASI), Volume of Transactions (VOT), Value of Transactions (VAT) and New Issue of Securities (NIS) of the Nigerian Stock Exchange.

Capital formation, on the other hand, can be defined as the difference between the total value of investment between two succeeding time horizon, and could be measured in terms of gross or net fixed capital. For our purpose, Gross Fixed Capital Formation (GFCF) is conceptualized as the value of acquisition of new fixed assets or improvement in existing fixed assets by the business sector, governments and households which are add value to the economy more through invested than consumption.

The Nigerian Capital market activities have been growing at a healthy rate in relation to its role in stimulating economic growth. The Volume and Value of traded securities between 2007 and 2010 grew in excess of 6.3% and 3.9% respectively. Securities listed in the exchange rose from 288 in 2005 to 294 in 2010 while the total market capitalization for the period declined by about 11.4%. The fall in Market Capitalization was attributed to the price losses and the global economic crisis. Infact, on annual basis, the market grew by 74% in 2007, dipped by 45% and 33.7% in 2008 and 2009 respectively, grew by 18.9% in 2010, dipped again in 2011 by 16.3% before recovering by an estimated 33% in 2012 (Egene, 2012). The All Share Index also demonstrated a decline of about 29.8% within the period (Central Bank of Nigeria Economic Report, 2010).

Nigerian's Stock market growth and improving indices have led to increase in fund flow to various investments in the economy. This increase in market indices and fund flow has emerged as an important policy issue for capital formation in the country. Though this is of great concern, adequate attention has not been giving to analyzing the effect and understanding the key relationship between these Capital market variables and Gross Fixed Capital formation.

The rest of the paper is organized as follows: Section two presents a survey of the literature on theoretical and empirical issues relating to Capital market and Capital formation. Section three discusses the method employed in the study. Section four analyzes the empirical results while Section five contains the concluding remarks.

2 Theoretical Issues and Empirical Literature

2.1 Theoretical Issues

It has been shown in financial theory that there is a relationship between the functions of the Nigerian Stock Market and capital formation. This is because the functions of the stock market which include provision of long-term debt and equity financing through the issuance of bonds, debentures and shares for investment in long-term productive assets, the efficient allocation of capital through competitive price mechanism, encouragement of a broader ownership of productive asset, and the mobilization of savings and channeling same to productive investments; are aimed at promoting capital formation (Ngerebo, 2006). These listed functions, among others, can be discussed under the theories of financial intermediation and portfolio management.

FINANCIAL INTERMEDIATION THEORY

This theory advocates that capital market should provide a mechanism for the mobilization and transfer of savings from the fund-owners to investments that promise better and higher returns on investment. Since regulation and quantification of direct the capital market activities of borrowing is difficult, it is expected that financial institutions should mediate between owners and users of funds in the impersonal but formal way like the marketable securities created and traded on the Nigerian Stock Exchange (Gorton and Winton, 2002).

Financial intermediation entails arrangements covering the activities of capital market with respect to providing mechanism for organizing and managing the payment system, mechanism for the collection and transfer of savings, mechanism covering the investment in long-term financial securities and arrangements covering the activities of financial market complementary to the money and capital markets such as the foreign exchange markets and the futures markets (Nzotta, 2004).

Financial intermediation refers to a financial framework that provide a medium of exchange necessary for specialization, mobilization and transfer of savings from those who generated the funds to those who use the funds for investment in the economic system where the funds will yield the highest return. This arrangement enhances productive activities and positively influences aggregate capital formation in the economy.

PORTFOLIO MANAGEMENT THEORY

The Capital market has an almost infinite set of financial securities or assets into which investors can commit funds, in order to enhance the value of their investment, earn stable

returns, and absorb or maintain associated risks at their barest minimal level. In order to realize these three basic attributes, most investors will prefer to invest in a combination of financial securities and/or physical assets. This combination of securities, investments and assets which an investors hold to satisfy defined risk-return objectives, is what is called a Portfolio. (Ngerebo-a, 2012; Osaze, 2007). Rationally, every investor would be interested in investments high returns with low risks. Any combination of securities that has high returns but with low risks is considered to be efficient, according to the Capital Asset Pricing Theory (CAPT), and therefore should be preferred. Hence, portfolio management is defined as the careful selection, acquisition and monitoring of the performance of a combination of securities on the Capital market held by an investor to ensure that securities achieve the nominated investment objectives over a given holding period and increases the productive capacity of the economy through increasing values over successive holding periods (gross fixed capital formation) (Lipsey and Crystal, 2007). The portfolio behaviour of the Nigeria Capital Market is targeted at creating optimum amount and variety of assets and hence optimum return on investment at minimal level of risk in conformity with the theories of diversification and efficient market.

THE LINKAGE BETWEEN THE CAPITAL MARKET AND CAPITAL FORMATION

Pagano (1993), employing the endogenous growth model posit that financial intermediation of the Capital market could affect economic growth through three channels:

- Changing the proportion of savings funneled to investment,
- Changing the marginal productivity of capital otherwise called Capital formation, and
- Changing the rate of savings in the economy.

By this process, Capital market lowers transaction cost, achieves diversification and lowers risk; provides liquidity and lowers information asymmetry by which it contributes to capital formation through channels of marginal productivity of capital. Consequently, Capital market allows entrepreneurs to concentrate their efforts, attention and resources on their core business of creating new values or utility, pursuing innovations for future purposes and engaging in real and financial investment that could result in capital formation.

The Capital market activities in relation to capital formation are captured by some indices such as:

- The ratio of new issues to total investment in fixed assets,
- The ratio of market capitalization to total investment in fixed assets,
- All share index,
- Rate of change in the volume of transaction, and
- Rate of changing the value of transaction

According to the World Bank (2013), Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. It is therefore the total investment in fixed assets in the economy. It is the total investment in fixed assets financed by new issues of financial securities in the Capital market. Osaze (2007) theorized that these new issues contribute to the stock of capital in an economy and hence capital formation.

Market capitalization is the total value of all equity securities listed on a Stock Exchange. It is a function of the prevailing market price of quoted equities and the size of their issued and paid-up capital. Market capitalization is the most important measure for assessing the size of a Capital market. The ratio of market capitalization to total investment in fixed assets reveal the total amount of investment in fixed assets financed by equity fund on the Capital market. It also indicates the amount of GFCF represented in the Nigeria Stock Exchange.

The All share index or Stock market index is an average of the prices of equity and the number of securities in a Stock market at a given period of time. It is an important measure of Stock market performance. The other performance indicators are the Volume and Value of transactions. While the volume of transactions refers to the quantity of securities traded on a market per time. The value of transaction is the quantity of the securities multiplied by the prevailing market prices of each security per day on which business was transacted.

Capital formation will feel the effect of the Capital market activities more positively when the ratio of new issues to total investment in fixed assets, the ratio of market capitalization to total investment in fixed asset, all share index, volume and value of all deals are on the increase. These increases will drive both direct and portfolio investment in fixed productive asset which will in turn translate into high productive capacity (capital formation) and increase output level of goods and services in the economy.

2.2 Empirical Review

The commonest studies on Gross Fixed Capital Formation (GFCF) available to the authors centred on the relationship between GFCF and Gross Domestic Product (GDP). Even these studies conducted between 2008 and 2012 are short of World Bank standard as there is no World Bank measure of the ratio of GFCF to GDP (World Bank, 2013).

For instance, Jim (2008) traced the impact of the capital market on economic growth through the provision of investable funds to the real sector and the subsequent transmission of the funds into various investments hence transforming the real sector of the economy. As such, the capital market acts as catalyst or engine of capital formation.

Pat and James (2010) investigated the effect of the Nigerian capital market on her socio-economic development. Socio-economic development was proxied by Gross Domestic Product while the capital market variables included market capitalization, total new issues, volume of deals and total listed stocks. Employing the ordinary least square regression method, they reported that capital market indicators do not significantly correlate with the output level of Gross Domestic Product in Nigeria. The study recommended that government should formulate and implement policy measures that can increase investors confidence and boost activities in the market. Sule and Monoh (2009) studied the influence of stock market earnings on per capital income in Nigeria. Applying the co-integration technique and error correction mechanism they found that stock market earnings positively and significantly impact on per capital income both from the primary and secondary markets.

Osaze (2007) tested whether the stock market activities promote economic growth for the period 1980 to 2000 in Nigeria using the ordinary least square regression method. The result reveals that economic growth indicators in Nigeria are adequately explained by changes in the stock market variables. Ndi-Okereke (2006) in the review of the stock market activities in 2006, suggested that the market could improve in performance and

propel the desired level of economic growth in Nigeria if it is increasingly patronized and information flow enhanced. Similarly, Aga and Kocaman (2008) adopting the efficient market hypothesis approach, advocates a market where information is not truncated and operational performance is optimal for meaningful growth.

Ezirim et al (2009) examined the capital market growth supporting effects of information technology utilizing the modified Gompertz diffusion model in Nigeria. The study reported that growth in total volume and value of shares traded is significantly affected by communication technology. The number of listed securities on the stock exchange and growth in federal and state government bonds does not appear to have any significant correlation with the adoption of information and communication technology. The study concluded that information and communication technology has contributed significantly to the growth of the Nigeria capital market. Okunlola (2012) regressed Gross Domestic Product against yearly stock market performance variables adopting a multi-linear approach on Nigerian data. The result shows a positive and significant relationship between total market capitalization, total stock exchange and economic growth indicator respectively. Woon and David (2005) studied stock market liquidity and macroeconomic variables in Japan. They reported that liquidity stock is persistently and statistically significant on real balances in the economy. The variance decomposition test result shows that capital market liquid stocks explain more than 16% of the variation in real balances at a frequency of about 18 months. The study also revealed that capital market liquid stock has effects on macroeconomic variables which are consistent with persistent money demand stocks. It was also found that stock market liquidity is significantly affected by stocks output and capital formation but not by stocks to money market variables – call rates. Stocks to macroeconomic activities also have significant impacts on stock market liquidity.

3 Method of the Study

This study is designed to synchronize with the hypothetico-deductive research method which employs the impact model to capture the relative effects of the correlates, ie the absolute values to ratios and index and rate of change on yearly basis of gross fixed capital formation (dependent variable), market capitalization volume of transaction, value of transaction, new issue securities and all share index (independent variables). The study sampled all the companies listed on the Nigeria Stock Exchange (NSE) whose data summary are published in the Central Bank of Nigeria statistical bulletin various issues. E-view 3.1 and 7.0 are used.

THE MODEL

Building on the theories and empirical reviews earlier made in this paper, we can hypothesize that Gross Fixed Capital Formation (GCFC) is a positive function of capital market performance measures. Given the above consideration, we can specify a five predictor model of capital formation – stock market activities in linear function as:

$$\text{GCFC} = f(\text{NI}, \text{MKC}, \text{ASI}, \text{VOT}, \text{VAT}) \quad (1)$$

Where

GCFC = changes in Gross Fixed Capital Formation

NI = Ratio of new issue to total investment in fixed assets

MKC = Ratio of market capitalization to total investment in fixed assets
 ASI = All Share Index
 VOT = Changes in the volume of transaction
 VAT = Changes in the value of transaction

Transforming equation (1) into an econometric model gives:

$$GCFC = \beta_0 + \beta_1NI_t + \beta_2MKC_t + \beta_3ASI_t + \beta_4VOT + \beta_5VAT_t + \mu_t \quad (2)$$

Where μ_t is the error term, β_i are parameters. Other variables are as previously defined. Converting equation (2) into the log – linear form, we have:

$$\ln GCFC = \ln \beta_0 + \ln \beta_1 NI_t + \ln \beta_2 MKC_t + \ln \beta_3 ASI_t + \ln \beta_4 VOT_t + \ln \beta_5 VAT_t + \mu_t \quad (3)$$

Where Ln is the logarithm

The causal (Feedback Effect) relationship between GCFC and capital market performance variables can be expressed as:

$$GCFC = \sum a_j GCFC_{tj} + \sum b_j CMF_{tj} + \mu_t \quad (4)$$

With expression (4) we can determine the causal implications of the relationships between gross fixed capital and the performance measures of the capital market (Capital Market Factors (CMF)).

This paper utilizes causality model patterned after Granger formation to express the causation hypothesis for Nigeria. Granger causality test regresses GCFC, on lagged values of itself and on lagged values of other capital market variables or factors (CMF). If the CMF are significant, it means that they explain some of the variance in GCFC that are not explained by lagged values of GCFC itself. This indicates that capital market variables are causally prior to GCFC.

For dual causation hypothesis, the following two equations apply:

$$GCFC_t = a_0 + a_1CMF_t + a_2GCFC_{t-1} + \mu_t \quad (5)$$

$$a_{1j} > 0$$

$$CMF_t = b_0 + b_1GCFC_t + b_2CMF_{t-1} + \Sigma_t \quad (6)$$

The above were estimated using the ordinary least square and Granger causality methods. As specified by Granger (1969) causality test, F-statistics and probability was computed for the models to determine the direction of causality while the t-statistics were equally computed to determine the relative effects of the explanatory variables.

Stationary And Cointegration Analysis

The study utilizes the Augmented Dickey-Fuller (ADF) regressions to perform the unit root tests for the variables. The test conducted included an intercept and a linear trend. The unit root regression is given by

$$\Delta w_t = \beta_0 + \beta_{it} + a_0w_{t-1} + \sum y_t \Delta w_{t-1} + \Sigma_t; t=1, 2 \dots T \quad (7)$$

Where Σ_t is the error term and denotes the first difference operator, $t=1, 2, \dots, T$ represent a particular time series under consideration and that the series is integrated of order, d , denoted $I(d)$ if it attains stationarity after differencing d times. It follows that if the series is $I(1)$, it is considered to have a unit root. Expression (7) incorporates both a constant term (β_0) and a time trend variable t . The observed ADF statistics were tested against the 95% critical value for each variable in the series.

Table 4.1: ADF Unit Root Test Result

Variable of Integration	ADF Stat.@ level	ADF Stat.@ 1st Diff.	Order
GFCF	-3.964	-6.252	1(1)
MKC	-2.188	-4.432	1(1)
ASI	-1.492	-4.251	1(1)
VOT	5.717	-7.072	1(1)
VAT	-2.181	-4.431	1(1)
NIS	-5.238	-6.921	1(1)

Critical Value: 1% = -3.661, 5% = -2.960, 10% = -2.619.

Source: Authors' computation

At first differencing, the absolute values of the ADF test statistic are greater than the absolute values of the critical value at 5% level of probability. Thus all the variables can be said to be stationary. Given this situation, we have no reason not to analyse to determine if a long-run relationship exist between the regressand and the regressors. Table 4.2 summarizes the results of the Cointegration Test.

Vector Error Correction Estimate

From the Vector Error Correction estimation result, the adjustment coefficient representing the speed of adjustment is found to be $6.75E+25$. This means that in an event of short distortion, the system can be adjusted or restored to equilibrium position at a speed of about $6.75E+25$ percent which is significant. Therefore, the system has significant adjustment coefficient.

Table 4.2: Cointegration Test Results

Date: 07/10/13 Time: 09:55

Sample (adjusted): 1982 to 2012

Included observations: 31 after adjustments

Trend assumption: Linear deterministic trend

Series: GCFC MKC ASI VOT VAT NIS

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 *	0.811716	127.2215	95.75366	0.0001
At most 1 *	0.628541	75.45769	69.81889	0.0165
At most 2	0.564183	44.75783	47.85613	0.0949
At most 3	0.309497	19.01130	29.79707	0.4921
At most 4	0.181429	7.530913	15.49471	0.5168
At most 5	0.041837	1.324857	3.841466	0.2497

Trace test indicates 2 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

As can be seen in table 4.2, the first hypothesis of no cointegrating vector is rejected and the alternative accepted at 95% confidence level. The second null hypothesis of one cointegrating vectors or less can equally be rejected against the alternative hypothesis of 2 cointegrating vectors at 5% level of significance. The trace statistic of 75.45769 is greater than the critical value 69.81889 at a probability of 0.0165, we see that at 95% level of confidence, the alternative hypothesis of 2 cointegrating equation cannot be rejected. Hence, the trace test indicates 2 cointegrating equation at the 0.05 level of significance. This shows that there exist a long run equilibrium relationship between GCFC and the fundamentals of capital market performance indicators used in the model. We are inclined to select vector 2 which supports a priori expectation of a positive and significant relationship between gross fixed capital formation and capital market performance indicators in the country under study. The result suggests that the country's gross fixed capital formation grows with capital market performance/activities increase. As the capital market activities and performance increases, the tendency of improved financial intermediation and efficient portfolio management pressures drive the capital market to increase capital/productive investment in fixed assets in general term thereby boosting the productive capacity of the economy, hence, increasingly fixed capital formation and the output level of goods and services in the entire economy. As seen in table 4.2 we can infer that capital market activities tend to cause growth in capital formation. The veracity of this inference can be clocked using the causality test suggested by Granger (1969).

Table 4.3: Pairwise Granger Causality Test Result

Pairwise Granger Causality Tests

Date: 07/10/13 Time: 09:56

Sample: 1980 -2012

Lags: 2

Null hypothesis:	Obs	f-statistic	Prob.
MKC does not Granger Cause GCFC	31	0.484960.6212	
GCFC does not Granger Cause MKC		5.135970.0132	
ASI does not Granger cause GCFC	31	1.423230.2591	
GCFC does not Granger cause ASI		1.089040.3514	
VOT does not Granger Cause GCFC	31	0.004020.9960	
GCFC does not Granger Cause VOT		0.850090.4372	
VAT does not Granger Cause GCFC	31	0.069390.9331	
GCFC does not Granger Cause VAT		0.854260.4372	
NIS does not Granger Cause GCFC	31	0.009890.9902	
GCFC does not Granger Cause NIS		1.337000.2801	

Source: Authors' computation

The causality test result indicates that growth in gross fixed capital formation precedes increase in the market capitalization of the stock market. This suggest that a rapid growth in the level of capital formation in an economy could trigger up a boost in the value of all equity securities listed on a stock exchange through the window of raising the value of the firms, the market price of their issued equity and their paid up capital and finally enlarging the size of the country's capital market.

The capital market variables do not granger-cause Gross Fixed Capital Formation in Nigeria. This may be as a result of the low level of development of the stock market.

5 Concluding Remarks

This study addressed the issue of the magnitude and direction of relationship between capital market performance indicators and gross fixed capital formation in a typical emerging economy using Nigeria as a test case. The Augmented Dickey-Fuller test results

indicates that the data series achieved stationarity after a first differencing at the order 1 (1). Gross Fixed Capital Formation growth and capital market performance indicators were found to be cointegrated indicating the existence of long-run equilibrium relationship between the Nigeria capital market and Gross Fixed Capital Formation. The analysis revealed the existence of positive and significant long run relationship between capital market activities and gross fixed capital formation in Nigeria. The granger causality test results reveal that there is a unidirectional causality flowing from Gross Fixed Capital Formation to market capitalization. This suggest that growth in GCFC could raise the value of listed securities, boost the value of the firms, increase the prices of issued equities and enlarge the size of the country's capital market.

The lack of causality flowing from capital market activities to gross fixed capital formation may be attributed to the low level of capital formation to grow optimally, the managers of the Nigeria economy need to invoke policies and action programmes that would develop and grow the capital market by encouraging both the private and institutional investors to take greater initiative in participating in the capital market, increase productive activities and promote a more private sector driven economy. These will go on to enlarge and develop the capital market, boost capital formation and increase the pace of economic growth.

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