

Does Capital Market Development Predict Investment Behaviors in a Developing Country? --- Evidence from Nigeria

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Abstract: In principle, the capital market is the hub of investment and capital formation in a market oriented economy. This paper therefore examines empirically whether the Nigerian capital market has the ability to predict investment behavior in Nigeria, using the vector auto regression framework. The findings show that even though there exists a long run relationship between the Nigerian capital market and gross domestic investment, the market lacks the predictive power of investment behavior in Nigeria. Consequently, the paper recommends that policies should be targeted towards increasing the size of the market by increasing the supply of securities to the market and the regulatory authorities should ensure that operations and activities in the market conform to World Stock exchanges best practices with a view to instilling investors' confidence in the market. This will go a long way in making the market well equipped to predict investment behavior in the economy.

JEL Classifications: G00, G10, G11, G15, G17

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1. Introduction

The capital market is basically an aggregation of institutions and mechanisms through which long term funds are mobilized for investment purposes. Around the world, economists recognize the fact that a well developed capital market is crucial for the mobilization of financial resources, both domestic and foreign for long term investment. It is this growing importance of capital markets that has necessitated many developing countries to carry out reforms in their emerging markets in recent times with a view to making them active efficient and dynamic, thus repositioning them to perform the all important role of resources mobilization for investment. The existence of market intermediaries, a well developed accounting, auditing and financial disclosure standards, in conjunction with enforced legal and regulatory framework for investors' protection are cardinal to the effective development of the capital market.

In Nigeria, the establishment of a formal capital market is dated back to 1961. Since its inception, the Nigeria capital market has witnessed some phenomenal growth as evidenced in the expansion in the volume of transactions, number of quoted companies, market capitalization, market participants and a good enabling environment, thus facilitating the mobilization of domestic funds for investment (Edo, 2009). Consequently, the international finance corporation (1991) listed the market as one of the emerging markets in the world.

In view of its impressive growth performance, the Nigerian capital market has been the subject of research and investigation by many analysts in recent times. However, what appears not to have been given adequate attention by previous studies is the issue of the predictability of investment behavior by the market in Nigeria. The primary objective of this paper therefore, is to examine whether the Nigerian capital market has the ability to predict investment behavior in Nigeria.

The rest of the paper is structured as follows: Section 2 provides a review of related literature and theoretical framework, section 3 presents the analytical methodology. This is closely followed by empirical results and analysis in section 4, while section 5 provides concluding remarks.

2. Literature Review and Theoretical Framework

The literature is replete on the nexus of capital market development and investment. Recent empirical investigations suggest a positive and significant relationship between capital market development and gross domestic investment (Olomola, 1997; Obadan and Odusola, 1999).

Goldsmith (1969) maintains that both the money market and the capital market complement each other in the economic development process of economies. But the full development of the money market precedes the capital market. He argues that as economies develop, self – financed capital investment first give way to bank intermediated debt finance and later to the emergence of equity markets as an additional source of external funds. Thus long term investment funding is more pro-equity as the economy advances.

Commenting on the linkage between the capital market and economic growth, Saint – Paul (1992); Devereux and Smith (1994) and Obstfeld (1994) are of the view that capital market promotes economic growth through risk diversification and international integration of stock markets. They argue that through greater diversification capital markets influence growth by shifting investment into higher return projects.

Greenwood and Smith (1997) concentrate on technological innovation. They maintain that large capital market may reduce the cost of savings mobilization and therefore promote investment in the most productive technologies. By making investment less risky and more lucrative, capital market liquidity may also lead to more savings and investment.

Again, Mohtadi and Agarwal (2001) examine the relationship between stock market development and economic growth for 21 emerging markets over 21 years, using a dynamic panel method. Results suggest a positive relationship between several indicators of the stock market performance and economic growth both directly and indirectly by boosting private investment behavior.

Beckett and Sellon (1989) look at the behavior of demand in the stock market and conclude that the behavior of demand is a response to stock price volatility. Investors may perceive stock price fluctuation as increasing the risk of equity investment. Against this background, they may shift their investment to less risky securities of large and well known firms to the detriment of smaller and newly established firms.

Adeyemi (1998) identifies among others, low public awareness of facilities available in the capital market and infrastructural deficiencies as the bane of the Nigerian capital market which in turn adversely affect the level of investment in the market and by extension the economy. Alile (1984) is of the view that the Nigerian Stock exchange contributes poorly to gross fixed capital formation, fluctuating between 2.9 percent and 15.3 percent between 1971 and 1980.

Theoretically, the finance – led growth hypothesis provides a veritable framework for the nexus between the financial sector and the real sector. The hypothesis postulates that the existence of

financial sector as well functioning financial intermediation mechanism, provides avenues for channeling scarce and limited resources from the surplus spending units to the deficit units, thus boosting investment which in turn stimulates growth. A lot of studies have argued in favor of the finance – led growth (supply leading) hypothesis (see for example Schumpeter 1912; Patrick, 1966; and Levine, 1997).

In contrast, others argue in favor of growth – led finance hypothesis. According to these theorists, there exists a “demand following” relationship between the financial sector and the real sector, such that the growth of the economy generates additional and new demands for financial services, “which brings about a supply response in the growth of the financial system” (Robinson, 1952; Patrick, 1966 and Romer, 1990).

In principle and in consonance with the foregoing literature, a well developed capital market is expected to boost and predict investment behavior in an economy. Would this, however, be the case in a developing economy with an emerging market like Nigeria? From the literature explored above, previous studies mostly emphasized on the link between capital market development and investment, the issue of the ability of the market to predict or forecast investment behavior is treated passively, thus creating a research gap which this paper attempts to fill.

3. Analytical Methodology

The paper uses the vector auto-regression (VAR) models to investigate whether the Nigerian capital market is a good predictor of investment behavior in Nigeria. The choice of VAR which has gained widespread acceptability in recent times for analyzing relationships among macroeconomic variables is informed by its ability to capture feedback and dynamic relationships among macroeconomic variables. Most importantly where appropriate structural and functional relationship cannot be consensually established, the VAR presents a distinct advantage over other techniques as only a minimal restriction is placed on how the variables relate. Essentially, it is used to estimate the response over time of any variable to either its own disturbance or a disturbance to any other variable in the system (Oyaromade, 2002; Udoh 2009).

The data series used in the analysis are basically high frequency (quarterly) time series data sourced mainly from the Central Bank of Nigeria (CBN) Statistical Bulletin (Various issues) spanning 1980-2009. The data series are first subjected to unit root test to ascertain the order of integration of the variables used. After which cointegration test is conducted to find out whether the variables are cointegrated and whether there is the existence of a long – run relationship among the variables.

Three indicators of capital market development as provided in the literature are used as proxies for the capital market, namely, the ratio of market capitalization to GDP, the ratio of the total value of shares traded to GDP and turnover ratio. While gross domestic investment is used as a proxy for investment.

The Model

From theory, it is believed that a well developed capital market leads to increase in investment which in turn stimulates growth. This notion is in line with the well known theoretical study of Levine (1991) who proposes that investing in the capital market alleviates both the liquidity shock and the productivity shock that firms would have otherwise faced. If firms do not face liquidity shocks, they will have a higher level of investment which in turn leads to higher growth rate (Mohtadi and Agarwal, 2001). So to test this theoretical hypothesis, the following VAR model is specified, capturing the dynamic interactions among the various indicators of the capital market and gross domestic investment.

$$GDI_t = \beta_0 + \beta_1 GDI_{t-1} + \beta_2 MCR_{t-1} + \beta_3 STR_{t-1} + \beta_4 TRO_{t-1} + U_{1t} \quad (1)$$

$$MCR_t = \beta_0 + \beta_1 GDI_{t-1} + \beta_2 MCR_{t-1} + \beta_3 STR_{t-1} + \beta_4 TRO_{t-1} + U_{2t} \quad (2)$$

$$STR_t = \beta_0 + \beta_1 GDI_{t-1} + \beta_2 MCR_{t-1} + \beta_3 STR_{t-1} + \beta_4 TRO_{t-1} + U_{3t} \quad (3)$$

$$TRO_t = \beta_0 + \beta_1 GDI_{t-1} + \beta_2 MCR_{t-1} + \beta_3 STR_{t-1} + \beta_4 TRO_{t-1} + U_{4t} \quad (4)$$

Where, GDI = Gross Domestic investment;

MCR = Index of market capitalization – GDP ratio used to capture capital market size;

STR = the ratio of total value of shares traded in the capital market to GDP. It measures the organized trading of firms' equity as a share of national output and hence captures liquidity in the capital market.

TRO = Turnover ratio quantified as the value of total shares traded divided by market capitalization. It reflects transaction costs which in turn indicate market liquidity.

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients of the model or parameters to be estimated;

t and t-1 = time period and one period lag length respectively

$U_1, U_2, U_3,$ and U_4 are uncorrelated white noise error terms.

4. Empirical Results and Analysis

Table 1 ADF unit root test results

To avoid producing spurious regression results, a unit root test is conducted for the variables used in the models. The results indicate that apart from Gross Domestic Investment (GDI) and MCR that are found to be stationary at level, all the other variables are stationary at their first differences. The Augmented Dickey – Fuller (ADF) unit root test results are presented in Table 1.

Variable	Unit root coefficient	Decision
LGDI	-3.622748**	I(0)
MCR	-4.244013***	I(0)
D(STR)	-6.132093***	I(1)
D(TRO)	-4.490158***	I(1)
Critical Value:		
1%	-4.041280	
5%	-3.450073	
10%	-3.150336	

Note: (i) D before the bracket represents the first difference operator

(ii) LGDI represents logarithm of GDI

(iii) ** and *** indicate significant at 5% and 1% respectively

Next, cointegration test is conducted to examine whether or not there exists a long – run relationship between gross domestic investment and the capital market development indicators. From the empirical results, the Trace statistic and the maximum Eigen value test indicate one cointegrating vector at the 5 percent level. This shows that the variables are cointegrated and there is the existence of a long run relationship among them (table 2). With this, the variables possess the desirable qualities to be included in a VAR model.

In the VAR model, analysis is concentrated on the impulse response (IR) and the forecast error variance decomposition (FEVD). These two procedures are useful for evaluating the explanatory and predictive power of each variable in the model. Because of the complicated dynamics in the VAR, statistics from these procedures are more informative than the estimated VAR regression coefficients or R^2 statistics which typically go unreported (Stock and Watson, 2001).

Table 2 Johansen cointegration test results of series LGDI, MCR, STR and TRO

Lags interval (in first difference) 1 to 2			
Null Hypothesis: Number of CE(S)	Eigen Value	Trace Statistic	Max. Eigen Value
r = 0	0.221114	54.20633 (47.21)**	28.23762 (27.07)**
r = 1	0.142852	25.96870 (29.68)	17.41831 (20.97)
r = 2	0.065889	8.550390 (15.41)	7.702069 (14.07)
r = 3	0.007479	0.848322 (3.75)	0.848322 (3.76)

Note: (i) ** denotes rejection of the hypothesis at the 5% level.

(ii) The critical values are in parenthesis

4.1 Impulse Response

The impulse responses of gross domestic investment to capital market shocks for a ten quarter time horizon are reported in table 3 and figure 1. Apart from the values of gross domestic investment (LGDI), none of the capital market development indicators is statistically significant. The coefficients of LGDI are positive and are all statistically significant, indicating that gross domestic investment only respond to own shock innovations within the 10 quarter time horizon.

Table 3 Impulse responses of LGDI to MCR, STR and TRO

Period	LGDI	MCR	STR	TRO
1	0.592186 (0.03957)	0.000000 (0.00000)	0.000000 (0.00000)	0.000000 (0.00000)
2	0.201430 (0.06032)	-1.70E-14 (2.0E-14)	-3.83E-14 (4.1E-14)	-3.25E-14 (4.4E-14)
3	0.126462 (0.05768)	8.02E-15 (1.689E-15)	-5.94E-15 (3.5E-14)	-8.53E-17 (3.7E-14)
4	0.249848 (0.05691)	-6.89E-15 (1.5E-14)	2.80E-14 (3.3E-14)	1.81E-14 (4.5E-14)
5	0.307926 (0.04189)	-1.56E-16 (1.0E-14)	-2.29E-14 (3.3E-14)	-1.56E-14 (3.5E-14)
6	0.219121 (0.05012)	-2.42E-15 (6.9E-15)	-1.64E-14 (1.5E-14)	-1.16E-14 (1.6E-14)
7	0.214987 (0.05499)	-1.03E-15 (3.7E-15)	-4.71E-16 (8.2E-14)	2.19E-16 (8.7E-15)
8	0.253854 (0.05010)	-2.34E-15 (4.0E-15)	-2.07E-15 (9.2E-15)	-1.51E-15 (1.0E-14)
9	0.253018 (0.05304)	-1.70E-15 (5.3E-15)	-1.16E-14 (1.1E-14)	-8.05E-15 (1.2E-14)
10	0.233199 (0.06041)	-173E-15 (4.4E-15)	-8.39E-15 (9.5E-15)	-5.70E-15 (1.0E-14)

Note: (i) Cholesky ordering

(ii) Standard Error analytic

(iii) Standard Errors are in parenthesis

However, this own shock does not appear to be persistent. It declines from about 59 percent in the first quarter to about 12.6 percent in the 3rd quarter and rises again up to about 30.8 percent in the 5th quarter before declining to a little above 23 percent in the 10 quarter (see figure 1). The non significance of all the capital market development indicators within the 10 quarter time horizon implies that the capital market in Nigeria does not significantly influence gross domestic investment.

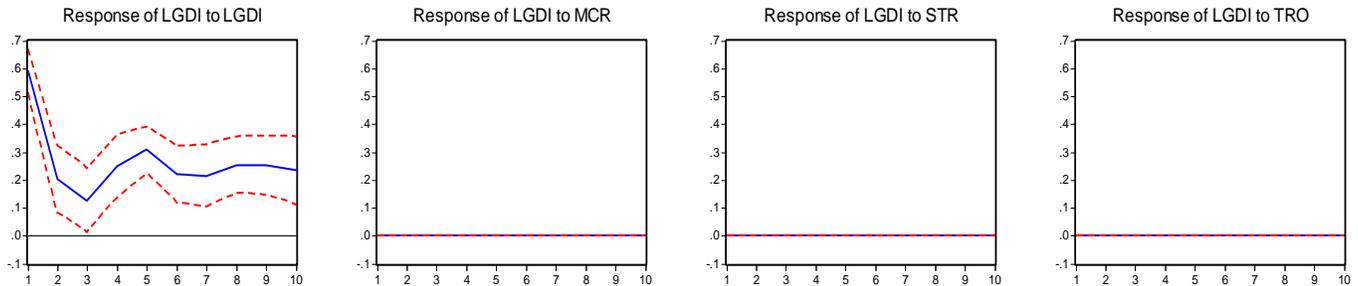


Figure 1 Impulse response Graph (response to Cholesky one s.d innovations, ± 2 S.E.)

4.2 Variance Decomposition

In order to further capture the robustness of the LGDI VAR model, the forecast error variance decomposition is computed. The essence is to ascertain the strength of predictability of gross domestic investment (LGDI) either by the lagged values of itself or the lagged values of other indicators of capital market development.

The economic importance of a variable in a VAR model is measured by considering the size of the sum of the estimated coefficients, by means of forecast error variance decomposition and by impulse response functions. If most of the variation in the dependent variable can be explained by the lagged values of the dependent variable itself, then it can be concluded that the lagged values of other variables are not important in explaining the variations in the dependent variable (Adebiyi, 2009).

Table 4 Variance decomposition for the VAR model of LGDI, MCR, STR and TRO

Period	s.e.	LGDI	MCR	STR	TRO
1	0.592186	100.00	0.000000	0.000000	0.000000
2	0.625507	100.00	7.42E-26	3.76E-25	2.70E-25
3	0.638162	100.00	8.70E-26	3.69E-25	2.59E-25
4	0.685329	100.00	8.56E-26	4.87E-25	2.96E-25
5	0.751328	100.00	7.12E-26	4.98E-25	2.89E-25
6	0.782629	100.00	6.66E-26	5.04E-25	2.88E-25
7	0.811620	100.00	6.21E-26	4.68E-25	2.68E-25
8	0.850394	100.00	5.73E-26	4.27E-25	2.44E-25
9	0.887236	100.00	5.30E-26	4.09E-25	2.33E-25
10	0.917371	100.00	4.99E-26	3.91E-25	2.22E-25

The results of the forecast error variance decomposition are presented in table4. From the results, lagged values of gross domestic investment are solely responsible for explaining variation in itself for the 10-quarter time horizon ahead. 100 percent of changes in gross domestic investment

are entirely attributed to own shocks while MCR, STR and TRO accounted for zero percent in forecasting or predicting gross domestic investment in the VAR model. This means that MCR, STR and TRO (capital market development indicators) are not importance variables in forecasting or predicting gross domestic investment in Nigeria (table 4 above).

5. Concluding Remarks

The capital market is the hub of investment and capital formation, and therefore very crucial to the process of economic growth and development. The paper has attempted to empirically assess the ability of the Nigerian capital market in predicting or forecasting investment behavior in Nigeria. The findings reveal that the Nigerian capital market is not a good predictor of investment behavior in Nigeria. This perhaps may be attributed to the relative small size of the market. Since investment opportunities in the capital market to a large extent depend on the size of the market.

As a matter of fact, the organized formal capital market in Nigeria is shallow, the volume of shares traded and market capitalizations are relatively low. The narrow nature of the market only allows for limited quoted securities in the market. These ugly traits of the Nigerian capital market diminish the liquidity creating ability of the market with adverse consequences on investment. These findings are in tandem with earlier submission made by Alile (1984) who emphasized the poor contribution of the Nigerian stock exchange to gross fixed capital formation. The paper therefore recommends that policies should be directed towards increasing the supply of securities in the market. Also, the regulatory authorities should ensure that operations and activities in the market conform to World Stock Exchanges best practices, with a view to instilling investors' confidence in the market. If investors are confident in the market, they will invest more in it. Given the fact that the capital market is the hub of investment in an economy, it will be able to serve as a good predictor of investment in the entire economy.

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