



The Causal Effect of Stock Market Development, Financial Sector Reforms and Economic Growth: The Application of Vector Autoregressive and Error Correction Model

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ABSTRACT

The study examined the causal relationship between stock market development, financial sector reform and economic growth in Nigeria, using Vector autoregressive and error correction model for the analysis. We observed bidirectional causality between stock market development and economic growth, along with financial sector reform and economic growth. This implies that stock market development and economic growth and; financial sector development and economic growth promote each other. More so, the findings reveal a unidirectional causality running from financial sector reform to stock market development. Hence, there is an evidence of positive long-run relationship between the variables of cointegrating equations. Furthermore, more inquiries on the relationship between business environment, legal framework and stock market development, show a positive long run relationship between the variables of the cointegrating vectors, suggesting that good business environment and quality legal framework could be a prerequisite for stock market development through confidence building and investors protection.

Keywords: Economic Growth, Stock Market Development, Financial Sector Reform

JEL Classifications: G10, E02, E44

1. INTRODUCTION

It is a clear fact that an organized, developed and efficient stock markets increases domestic savings, and also provide individuals and corporate investors with an additional financial instrument which stimulate the quality of transactions, investments and economic growth of a country. There is no doubt that development of every economy is partly dependent on the development to fits financial sector, and apparently the stockmarket in particular. The acceleration of high level of confidence amongst market players or investors, as the off sprin of market development, to a greater extent, provides opportunities for domestic savings mobilization and allocation from surplus spending units and diversification of risk associated with investment portfolios, reducing the crunch of over dependency of firms, government and corporate bodies on

banks funding vis-à-vis causing increase in business activities, through the increase in stock market indicators such as, number of companies listed, volume and values of shares traded alongside the overall market capitalization.

The role of financial sector reforms in strengthening the development of stock market is insurmountable. This is mostly aimed at consolidating macroeconomic stability and property right of the investors or shareholders, creating a friendly and competitive business environment for increase business activities to improve financial soundness and stock markets, thus, integrating domestic financial system into world financial market (De la Torre et al., 2007 and Jbili et al., 1997). However, this suggests that the pursuit of reforms geared towards rapid development of stock market and financial market in general, would enable private and

public companies, even corporate organizations generate more funds to expand their business horizon instead of over reliance on bank credit.

In the Nigerian financial sector, different phases of reforms have been launched in order to promote efficiency and development of the Stock Market and other financial institutions. The reforms includes; interest rate liberalization and banking sector deregulation of 1986, consolidation of 2004, 2006 post consolidation and 2009 blue print policy reforms. These policy reforms were launched to address the issues of over-dependency on public sector deposits, neglect of small and medium class savers, inadequate disclosure and transparency about the financial position of banks and other financial institutions, shareholder protection, gross insider abuses resulting in huge non-performing insider related credits, weak regulatory and supervisory framework and macroeconomic volatility (Ogujiuba and Obiechina 2011). Hence, the aim is to build a formidable, transparent, and efficient develop stock market that could supports the investment process through the mobilization of household and foreign savings for investment purposes. This savings are allocated to the most productive ways which thus, promote growth and development. Indeed, considering the enormous policy reforms in the Nigerian financial sector, it is expected that stock market should have done relatively well in terms of market capitalisation and number of domestic companies listed when compared to other countries like South Africa and Egypt stock market. For example, from 1990 to 2011, Nigerian Stock Exchange on average listed only 189.090 domestic companies with 14.323 market capitalization (% of gross domestic product [GDP]) while South Africa and Egypt Stock Exchange on average listed 535.682 and 689.591 domestic companies with 181.159 and 34.918 recorded market capitalization (% of GDP) respectively.

In view of the above discussion, the ability of the stock market to play its role of accelerating economic growth has been punctuated by its vulnerability to systemic distress, inherent security problems, macro-economic volatility, and weak institutional framework (Kama, 2006). The ugly trend of inaptitude behaviour of authorities, high level of corruptions and massive pursuit of individual interest have always question the relevance of the reforms as a veritable tool to promote stock market development, financial sector development and economic growth despite the fact that these policy reforms cut across the entire policy requirement needed for the development of the market. This situation is threatened by the vulnerability of business environment caused by the rampage of militants and insurgent, which is evidenced in the World Bank ease of doing business rating. Recently, Nigeria was ranked 133rd out of 183 countries in the latest ease of doing business (World Bank/IFC, 2012) as at the time of the study. This has affected the performance of the market recently because of fear of the unknown. These have been highlighted as a major drawback of growth and development of the market. Be that as it may, despite the market upheavals, the current resurgence of the Nigerian economy and financial sector, particularly the stock market in recent time has been a source of interest and inspiration. This could be as a result of recent effort by the authorities to revitalize the sector through the adoption of new practices and introduction of new policy reforms in the Nigerian

Stock Market, not just to restore investor's confidence but to meet G-30 recommended standard for emerging economies. Some of these reforms include the introductions of automated trading system, Desk for phone-in-service, the central securities clearing system (CSCS), trade alert introduced by CSCS, a day transaction clearance (T+1) as against T + 14, introduction of the capital trade point by investment securities Act (ISA), the establishment of investment security tribunal, introduction of market makers, the establishment of Real Estate Investment Schemes, and the ongoing electronic dividend payment that would be launched soon (NSE fact book, various years), supported with the introduction of entrepreneurship development, skilled acquisition and amnesty programme with the aim of empowering the youth and to arrest the environmental restiveness caused by youth unemployment. In view of the above, it is therefore imperative to investigate the relationship between stock market development, financial sector reform and economic growth.

Given the enormous body of evidence shown in the literature, no single research had constituted an in-depth study on the causal relationship between stock market development, financial sector reforms and economic growth in Nigeria. Therefore, there is the need to further extend the already existing knowledge on the causal link between stock market development, financial sector reforms and economic growth. Hence, earlier studies focus more on stock market development and macroeconomic determinants but following the works of Manasseh (2007), Pagano (1993) and North (1990), institutional quality and other business environmental factors play a significant role in stock market development and thus were considered important in this study. However, this paper is divided into five sections. Section two is a review of literature, Section three outlines the methodology, and Section four discusses the empirical findings while section five is the conclusion and policy suggestions.

2. REVIEW OF LITERATURE

2.1. Theoretical Literature

There has been a serious debate on the link between stock market development and economic growth among different schools of thought. The first "school—supply leading" is of the view that financial development may lead to growth in that a well-developed financial system performs several critical functions to enhance the efficiency of intermediation namely by reducing information, transaction, and monitoring costs (McKinnon, 1973; King and Levine 1993; Schumpeter (1912) and Shaw, 1973). Studies such as Creane et al. (2003) argued that a modern and efficient financial system mobilizes savings for investment through funding business opportunities. They further argued that an efficient financial system monitors the performance of managers, enables and facilitates the exchange of goods and services. Other studies like, Bencivenga et al. (1996) and Levine (1991) pointed that stock market liquidity plays a key role in economic growth through the provision of assets to savers.

McKinnon (1973) and Shaw (1973) contend that the financial sector development can be the major driver of economic growth if it can only be relieved of its own fetters. They argued that when

a financial sector is repressed then it can only respond passively to the real-sector needs. Also, studies by Argrawal and Tuteji (2007), Azam et al. (2016), Levine and Zervos (1998), N'zue (2006), Ozturk, 2008, Deb and Mukherjee (2008), Acaravci et al., 2009, Nowbutsing (2009), Caporale et al. (2004), Acaravci et al. (2011), Naceur et al. (2007), Schumpeter (1912), Rahman and Salahuddin (2010) conformed to this school. They demonstrated that stock market development is a prerequisite condition for growth even though, Shleifer and Summers (1988), Mayer (1988) and Stiglitz (1993) pointed out strongly that the development of stock exchange markets can be detrimental to economic growth by encouraging counter productive corporate takeovers and promote short-term profits which donotaccord corporate managers a chancet of ocus on the long-term prospects of investment. However, this school of thought was subdivided into Structuralists and Repressionists. The structuralists are of the view that the quantity and the composition of financial variables induce economic growth by directly increasing savings in the form of financial assets, thereby spawning capital formation and economic growth, while the Repressionists on the other hand contend that financial liberalisation in the form of an appropriate positive real rate of return on real cash balances is a vehicle for promoting economic growth. Hence, a liberalized financial system causes an increase in saving and investment.

The second school of thought "the demand-following" argued that financial development follows economic growth. They are of the view that as the economy expands, the demand for certain financial instruments increases and this in turn lead to financial market development. The school was supported by the findings of Gurley and Shaw (1960) and Gelb (1989) which argued that growth promotes financial deepening, and that the demand for financial services increases with economic development. In addition, Singh (1997) also maintain that stock markets do not in any way lead to long run economic growth due to macroeconomic instability, volatility and arbitrariness of pricing process. But added Charkravarty (2005) added that stock exchange prices are highly sensitive to some fundamental macroeconomic indicators. He pointed that as the economy expands, the demand for certain financial instruments increases, leading to the growth of these services and the end result is that the developments in macroeconomic activity influences on the stock market development.

The third school of thought contends that there is bi-directional causality between financial market development and economic growth. The school opines that a country with a well-developed financial system could promote high economic expansion through technological changes, products and services innovation, which in turn create a high demand for the financial institutions. Furthermore, as the financial institutions effectively respond to this demand, the changes will stimulate higher economic achievement. Therefore, order than separating the role of financial market development and economic growth, Majid (2007), Dawson (2008) and Hongbin (2007) findings suggest that both are interdependent, suggesting that there exists a two-way causality between stock market development and economic growth. Thus, this would in turn create a high demand for the financial institutions, and as the financial institutions effectively respond to this demand,

these changes will stimulate higher economic achievement. However, Demirguc-Kunt and Levine (2008), Odhiambo (2005), Enison and Olufisayo (2009), Puryan (2017), and Shahbaz et al. (2008) respective studies on the causal link between stock market development and economic growth also conforms to the idea of this school of thought. The fourth school of thought supported by Mazur and Alexander (2001) referred to as the independent hypothesis, argued that financial market development and economic growth is not causally related. This school was supported by Mulambo (2010) findings.

2.2. Review of Related Empirical Literature

Studies such as Levine and Zervos (1996a, b); Hansson and Jonung (1997); Levine (1997, 2002); Khan and Senhadji (2000); M'Rad and Wyeme (2000); Blackburn et al. (2001); Arestis et al. (2001); Wachtel (2002); Trabelsi (2002); Rioja and Valev (2003); Levine et al. (2000); Beck et al. (2001); Quartey and Prah (2008); Demirguc-Kunt and Levine (1996) and Levine and Zervos (1999) in developed countries shows that predetermined component of stock market development was positively and robustly associated with long-run growth. Further inquiries also show that the level of stock market development is positively correlated with the development of financial intermediaries and consequently economic growth, and that stock market development induces the substitution of equity finance for debt finance. In addition, Agarwal (2001), Odhiambo (2005), Zivengwa et al. (2011), Deb and Majid (2008), Hossain et al. (2010) and Olweny and Danson (2011) studies on financial development and economic growth, using time series data shows that financial viability promotes economic growth. Also, McKinnon (1973), King and Levine (1993), Schumpeter (1912) and Shaw (1973) are of the view that the development of financial system is a prerequisite for economic growth. The findings of the aforementioned studies contradict the works of Odhiambo (2005) and Mulambo (2010) which concluded that financial development and economic growth interdependent.

From review of studies in Africa, Akinlo et al. (2010) examines the long run and causal relationship between financial development and economic growth for ten countries in sub-Saharan Africa. With the help of vector error correction model (VECM), their findings show that financial development cointegrated with economic growth. The results show that financial development granger causes economic growth in Central African Republic, Congo Republic, Gabon, and Nigeria while economic growth Granger causes financial development in Zambia. Egbetunde and Mobolaji (2010) examine the long run and causal relationship between financial development and economic growth for ten countries in sub-Sahara Africa, using VECM. Their findings suggest that financial development cointegrated with economic growth in all selected ten countries in the region. In addition, further inquiry on granger causality using multivariate vector error correction shows that financial development granger causes economic growth in Nigeria, Burundi, Cameroon and Mali while economic growth granger causes financial development in Benin, Bukina Faso, Madagascar and Malawi. The evidence also shows bidirectional causality between financial development and economic growth in Cote D'ivoire and Ghana. Based on these result, the study argues that financial development promote economic growth in Nigeria,

Burundi, Cameroon and Mali while economic growth promote financial development in Benin, Bukina Faso, Madagascar and Malawi. From the two remaining countries the result indicates bidirectional causality between financial development and economic growth.

In addition, examining the relationship between stock market developments and economic growth, Nurudeen (2009) find that the development of stock market promotes economic growth. He concluded that the removal of impediments such as tax, legal, and regulatory barriers as well as the poor development of infrastructure could create an enabling business environment and employment of policies may increase productivity and efficiency of firms and as well, encourage forms to access capital on the stock market. Other studies such as Odeniran and Udejaja (2010), Riman et al. (2008) and, Alajekwu and Achugbu (2012) also show that financial development play a significant role in promoting output growth. Furthermore, their findings suggest a long run relationship between stock market and economic growth. Though, Olofin and Afangideh (2008) argued that a developed financial structure has no independent effect on output growth through bank credit and investment activities. They believed that financial sector development merely allows these activities to positively respond to growth in output. In like manner, Osinubi (2001), Akinlo et al. (2009), Ezeoha et al. (2009), Ewah et al. (2009) and Tachiwou (2010) studies in Africa on stock markets and economic growth reveal a positive relationship between stock market development and economic growth. Further investigation also shows a strong cointegration between stock market development and economic growth in Egypt and South Africa. But the findings in Nigeria show a weak evidence of growth-led finance. Based on the findings, they suggest the pursuit of policies geared towards rapid development of the stock market.

3. RESEARCH METHODOLOGY

3.1. Model, Data and Methodological Framework

Based on the theoretical underpinnings which assert that stock market development cause economic growth (McKinnon, 1973; King and Levine 1993; Schumpeter (1912) and Shaw, 1973), the study is therefore designed to investigate the causal link between stock market development, financial sector reform and economic growth in Nigeria. The study employed vector autoregressive (VAR) model of Sims (1980), which is transformed into the VECM – that is if the variables are cointegrated. This will aid the estimation of the short-run dynamic relationship and account for the speed of adjustment in the short and long run. The study used quarterly time series data which cover the period between 1981Q1-2010Q4. The data for study was extracted from world development indicator database and Central Bank of Nigeria (CBN) Statistical bulletin.

Model 1: Financial sector reforms and stock market development

$$Smd_t = \alpha_0 + \alpha_1 Fsr_t + \alpha_2 Fintg_t + \varepsilon_t \quad (1)$$

Model 2: Business environment, institutional framework and stock

market development

$$Smd_t = \beta_0 + \beta_1 Benv_t + \beta_2 Legfrwk_t + \mu_t \quad (2)$$

Model 3: Stock market development, financial sector reforms and economic growth

$$Growth_t = \lambda_0 + \lambda_1 Smd_t + \lambda_2 Fsr_t + v_t \quad (3)$$

Where; Smd_t , Fsr_t and $Fintg_t$ in eq.1 are vectors of stock market development, financial sector reforms and financial integration respectively. Smd_t is captured with market capitalisation while we measure Fsr_t with domestic credit to the private sector, domestic credit from banking sector and capital flow is proxied with foreign direct investment. Hence, $Fintg_t$ is thus, proxied with private capital flow. In addition, Smd_t , $Benv_t$ and $Legfrwk_t$ in eq.2 are vectors of stock market development, business environment and legal framework/institutional quality respectively. While Smd_t remain as defined in eq.1, $Benv_t$ is measured with gross domestic private investment which is capture with gross fixed capital formation. Hence, $Legfrwk_t$ captures the effect of poor legal system/institution and macroeconomic instability measured with inflation and interest rate. Thus, we measured legal framework using country rating indices of freedom house indicators (FH 2001) as suggested by work of Lee (1992), Sala-i-Martin (1997) and de Melo et al. (1997). According to Rajasalu (2002), in FH country ratings, the indices between 1 and 2.5 are given to countries that are considered to be free; indices between 3 and 5.5 indicate — partly free countries, while indices between 5.5 and 7 describe countries that are —not free. These indices were interpreted as proxies for institutional/legal framework. Therefore, the smaller the value of index, the more freedom the country enjoy property rights (legally granted and protected private property), commercial code defining contracts, government expropriation of property and reduction in government influence on judicial system and delays in receiving judicial decisions within judiciary. However, considering the fact that Nigeria was ranked 133rd out of 183 countries in the latest ease of doing business report of the World Bank/IFC (2012) and 4th (i.e., partly free) in the freedom of world country rating report associated with her political right and civil liberties, the study therefore regarded the Nigerian legal framework as partly developed which assume the indices of 3 and 5.5.

In eq.3, Fsr_t remain as defined above while Smd_t is measured with market capitalization and market liquidity. Thus, in this case, market liquidity is captured with total values of shares traded and percentage turnover ratio. Hence, $growth_t$ is measured with GDP at 1990 constant basic price.

The Mathematical form of VAR

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + B X_t + \varepsilon_t \quad (4)$$

where Y_t is a K vector endogenous variable, X_t is a d vector of exogenous variables $A_1 \dots, A_p$ and B are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated with other but are uncorrelated with their own lagged values and uncorrelated with exogenous

variables.

VAR form of Model 1

$$\begin{aligned}
 Mc_t = & \alpha_{10} + \sum_{i=1}^n \alpha_{i1} DctpsPGDP_{t-1} + \sum_{i=1}^n \alpha_{i2} Fdi_{t-1} \\
 & + \sum_{i=1}^n \alpha_{i3} PcfloPGDP_{t-1} + \sum_{i=1}^n \alpha_{i4} BsdcpGDP_{t-1} + \varepsilon_{1t}
 \end{aligned} \tag{5}$$

$$\begin{aligned}
 BsdcpGDP_t = & \alpha_{20} + \sum_{i=1}^n \alpha_{i21} DctpsPGDP_{t-1} + \sum_{i=1}^n \alpha_{i22} Fdi_{t-1} \\
 & + \sum_{i=1}^n \alpha_{i23} Mc_{t-1} + \sum_{i=1}^n \alpha_{i24} PcfloPGDP_{t-1} + \varepsilon_{2t}
 \end{aligned} \tag{6}$$

VAR form of Model 2

$$\begin{aligned}
 Mc_t = & \beta_{10} + \sum_{i=1}^n \beta_{i1} Gfcf_{t-1} + \sum_{i=1}^n \beta_{i2} CrpIndx_{t-1} + \sum_{i=1}^n \beta_{i3} Inf_{t-1} \\
 & + \sum_{i=1}^n \beta_{i4} Rintr_{t-1} + \sum_{i=1}^n \beta_{i5} LegFrwk_{t-1} + \mu_{1t}
 \end{aligned} \tag{7}$$

$$\begin{aligned}
 Gfcf_t = & \beta_{10} + \sum_{i=1}^n \beta_{i1} Mc_{t-1} + \sum_{i=1}^n \beta_{i2} CrpIndx_{t-1} + \sum_{i=1}^n \beta_{i3} Inf_{t-1} \\
 & + \sum_{i=1}^n \beta_{i4} Rintr_{t-1} + \sum_{i=1}^n \beta_{i5} LegFrwk_{t-1} + \mu_{1t}
 \end{aligned} \tag{8}$$

VAR form of Model 3

$$\begin{aligned}
 GDP_t = & \lambda_{10} + \sum_{i=1}^n \lambda_{i1} Mc_{t-1} + \sum_{i=1}^n \lambda_{i2} ToR_{t-1} \\
 & + \sum_{i=1}^n \lambda_{i3} Tvst_{t-1} + \sum_{i=1}^n \lambda_{i4} DctpspGDP_{t-1} \\
 & + \sum_{i=1}^n \lambda_{i5} BsdcpGDP_{t-1} + \sum_{i=1}^n \lambda_{i6} Fdi_{t-1} + v_{1t}
 \end{aligned} \tag{9}$$

$$\begin{aligned}
 Fdi_t = & \lambda_{10} + \sum_{i=1}^n \lambda_{i1} Mc_{t-1} + \sum_{i=1}^n \lambda_{i2} ToR_{t-1} \\
 & + \sum_{i=1}^n \lambda_{i3} Tvst_{t-1} + \sum_{i=1}^n \lambda_{i4} DctpspGDP_{t-1} \\
 & + \sum_{i=1}^n \lambda_{i5} BsdcpGDP_{t-1} + \sum_{i=1}^n \lambda_{i6} GDP_{t-1} + v_{1t}
 \end{aligned} \tag{10}$$

The error term such as ε_{1t} , ε_{2t} , μ_{1t} , μ_{2t} , v_{1t} and v_{2t} are white noise

with standard deviation $\sigma_{\varepsilon_{1t}}$, $\sigma_{\varepsilon_{2t}}$, $\sigma_{\mu_{1t}}$, $\sigma_{\mu_{2t}}$, $\sigma_{v_{1t}}$ and $\sigma_{v_{2t}}$ while α_i , β_i and λ_i are the intercepts and the coefficients of the variables respectively. To test for the existence of a long-run cointegrating relationship between stock market development, financial sector development and economic growth proxies, equations (5), (6), (7), (8), (9) and (10) were transformed into *VECM* model as shown in equations (11), (12), (13), (14), (15) and (16). Hence, the error correction term measures the speed of adjustment to restore equilibrium in the dynamic model.

$$\begin{aligned}
 \Delta Mc_t = & \alpha_{10} + \sum_{i=1}^n \Delta \alpha_{i1} DctpsPGDP_{t-1} + \sum_{i=1}^n \alpha_{i2} \Delta Fdi_{t-1} \\
 & + \sum_{i=1}^n \Delta \alpha_{i3} PcfloPGDP_{t-1} + \sum_{i=1}^n \Delta \alpha_{i4} BsdcpGDP_{t-1} \\
 & + \alpha_{15} Ec_{t-1} + \varepsilon_{1t}
 \end{aligned} \tag{11}$$

$$\begin{aligned}
 \Delta BsdcpGDP_t = & \alpha_{20} + \sum_{i=1}^n \Delta \alpha_{i21} DctpsPGDP_{t-1} + \sum_{i=1}^n \Delta \alpha_{i22} Fdi_{t-1} \\
 & + \sum_{i=1}^n \Delta \alpha_{i23} Mc_{t-1} + \sum_{i=1}^n \Delta \alpha_{i24} PcfloPGDP_{t-1} \\
 & + \alpha_{25} Ec_{t-1} + \varepsilon_{2t}
 \end{aligned} \tag{12}$$

$$\begin{aligned}
 \Delta Mc_t = & \beta_{10} + \sum_{i=1}^n \Delta \beta_{i1} Gfcf_{t-1} + \sum_{i=1}^n \Delta \beta_{i2} CrpIndx_{t-1} \\
 & + \sum_{i=1}^n \Delta \beta_{i3} Inf_{t-1} + \sum_{i=1}^n \Delta \beta_{i4} Rintr_{t-1} \\
 & + \sum_{i=1}^n \Delta \beta_{i5} LegFrwk_{t-1} + \beta_{16} Ec_{t-1} + \mu_{1t}
 \end{aligned} \tag{13}$$

$$\begin{aligned}
 \Delta Gfcf_t = & \beta_{10} + \sum_{i=1}^n \Delta \beta_{i1} Mc_{t-1} + \sum_{i=1}^n \Delta \beta_{i2} CrpIndx_{t-1} \\
 & + \sum_{i=1}^n \Delta \beta_{i3} Inf_{t-1} + \sum_{i=1}^n \Delta \beta_{i4} Rintr_{t-1} \\
 & + \sum_{i=1}^n \Delta \beta_{i5} LegFrwk_{t-1} + \beta_{16} Ec_{t-1} + \mu_{1t}
 \end{aligned} \tag{14}$$

$$\begin{aligned}
 \Delta GDP_t = & \lambda_{10} + \sum_{i=1}^n \Delta \lambda_{i1} Mc_{t-1} + \sum_{i=1}^n \Delta \lambda_{i2} ToR_{t-1} + \sum_{i=1}^n \Delta \lambda_{i3} Tvst_{t-1} \\
 & + \sum_{i=1}^n \Delta \lambda_{i4} DctpspGDP_{t-1} + \sum_{i=1}^n \Delta \lambda_{i5} BsdcpGDP_{t-1} \\
 & + \sum_{i=1}^n \Delta \lambda_{i6} Fdi_{t-1} + \lambda_{17} Ec_{t-1} + v_{1t}
 \end{aligned} \tag{15}$$

$$\begin{aligned} \Delta Fdi_t = & \lambda_{10} + \sum_{i=1}^n \Delta\lambda_{11}Mc_{t-1} + \sum_{i=1}^n \Delta\lambda_{12}ToR_{t-1} + \sum_{i=1}^n \Delta\lambda_{13}Tvst_{t-1} \\ & + \sum_{i=1}^n \Delta\lambda_{14}DctpspGDP_{t-1} + \sum_{i=1}^n \Delta\lambda_{15}BsdcpgDP_{t-1} \\ & + \sum_{i=1}^n \Delta\lambda_{16}GDP_{t-1} + \lambda_{17}Ec_{t-1} + u_{1t} \end{aligned} \tag{16}$$

The choice of a VAR model is made on the basis of its superiority to other models that are highly vulnerable to simultaneity bias. It has the ability to test for weak exogeneity and parameter restrictions. It also assumes that there is no apriori direction of causality among the variables. VAR models offer a way of analyzing the dynamic relationship between choice variables of the study. It helps to account for the delayed response with parsimonious lag structure (Agenor et al., 2005). When a direct interpretation of the estimated individual variables is difficult, a joint F-test on the lagged variables could be used to provide the information regarding the impact of the anticipated portion of the independent variables. Thus an important feature of VAR model is its use in estimating residuals called VAR innovations and it obviates a decision as to what contemporaneous variables are exogenous with only lagged variables on the right hand side. It therefore recognizes all variables as dependent variable Greenwood and Jovanovic (1990).

3.2. Testing for Causality

Following Deb et al. (2008), to establish the causation between the variables, Granger Causality test was adopted.

$$y_t = \beta_0 + \sum_{k=1}^m \beta_k y_{t-k} + \sum_{l=1}^n \alpha_l x_{t-l} + \mu_t$$

$$x_t = \gamma_0 + \sum_{k=1}^m \delta_k x_{t-k} + \sum_{l=1}^n \gamma_l y_{t-l} + v_t$$

μ_t and v_t are mutually uncorrelated error terms while “ k ” and “ l ” are the number of lags. Granger causality assume $\alpha_l=0$ and $\delta_k=0$ for all l 's and k 's for null hypothesis. When the coefficient α_l 's is statistically significant while δ_k 's is not, then x granger causes y . If otherwise, y granger causes x . But in a situation where α_l and δ_k are significant, the causality run both direction.

4. DISCUSSION OF THE EMPIRICAL FINDINGS

This section presents the findings on the causal effect of stock market development, financial sector reforms and economic growth and the results were discussed as follows. First, we discussed the findings on causal relationship between financial sector reforms and stock market development. Second is the discussion on the causal relationship between business environment, institutional framework and stock market development. Third, we discussed the findings on causal relationship between economic growth and stock market development. But before that it should be noted that during the estimation we discovered that all the VAR

residuals fail the normality test and for this, we account for the influence of structural break by the introduction of dummies. For example, *SAPDUM*, *ERRDUM* and *BCODUM* represent the structural adjustment programme, exchange rate regime and bank consolidation period to normalize the residuals. After this we proceeded to discuss the number of cointegrating vectors presented in Table 1, under the assumption that the series have a linear deterministic trend (Table 1). Its critical values were derived assuming no exogenous series. The Eigen value statistics indicates two cointegrating equations at 95% confidence level, suggesting rejection of the hypothesis at 5% critical value. However, the existence of co-integration indicates a long run relationship between variables of financial sector reforms and market capitalisation.

4.1. Financial Sector Reforms and Stock Market Development in Nigeria

This section present and discussed the results on the causal relationship between stock market development, financial sector reforms and financial market integration as shown on Table 2:

The results of Granger causality test between the variables of financial sector reforms (% of GDP) and stock market development reveals that unidirectional causality running from financial sector reform. The breakdown of the analyses shows that two out of three proxies of financial sector reforms such as domestic credit to the private sector (*DCTPSPGDP*) as % of GDP and banking sector domestic credit (*BSDCPGDP*) as % GDP granger causes stock market development (proxy; market capitalisation – *MC*). This implies that banking sector development and increase in private sector credit induces stock market development. This means that the development of the Nigeria stock market is linked to the development of the banking sector and the private sector vis-à-vis promoting private investment. Further inquiry also shows no granger causality between stock market development and financial market integration (proxied with private capital flow - *PCFLOPGDP*) as a percentage of GDP. These findings reflect the recorded performance of the market after 2004 banking consolidation reform in Nigeria. Prior to the reform, there are total of 89 banks and thereafter the reform, it reduced to 24. During the post consolidation in 2006, the number of banks further reduced to 16 and since then, there has been a tremendous improvement in the stock market because of its bank-based nature. For example, the market made an impressive record of US\$32,819.36 million market capitalisation with more than double of the record which stood at US\$86,346.84 and made deep and favourable impression to the investors before world economic meltdown crisis late 2007. Though, in 2008 (US\$49,802.82), 2009 (US\$33,324.90) and 2010 (US\$50,882.97) respectively, the market performed below expectation. Thus, our findings are consistent with De la Torre et al. (2007) and Jbili et al. (1997).

In addition, the results of impulse response of measures of the financial sector reform, market capitalisation and financial integration as presented in Table 3 trace the long run responses of each endogenous variable over time to innovations in the model spanning over the ten quarters. The results show each variable responding insignificantly to its' own shock. The results indicated

Table 1: Cointegration test results

Eigen value	Likelihood ratio	5% critical value	1% critical value	Hypothesized No. of CE (s)
0.358103	98.21428	68.52	76.07	None**
0.155778	47.23159	47.21	54.46	At most 1*
0.113403	27.75753	29.68	35.65	At most 2
0.099753	13.91559	15.41	20.04	At most 3
0.015794	1.830749	3.76	6.65	At most 4

*(**) denotes rejection of the hypothesis at 5%(1%) significance level. L.R. test indicates 2 cointegrating equation (s) at 5% significance level

Table 2: Granger causality test results

Null hypothesis	Obs	F-Stat	P
LOG_FDI does not Granger Cause	118	0.89092	0.41314
LOG_MC			
LOG_MC does not Granger Cause		0.90608	0.40702
LOG_FDI			
LOG_DCTPSPGDP does not Granger Cause	118	5.03118	0.00807*
Cause LOG_MC			
LOG_MC does not Granger Cause		10.4029	7.1E-05
LOG_DCTPSPGDP			
LOG_BSDCPGDP does not Granger Cause	118	5.14889	0.00724*
Cause LOG_MC			
LOG_MC does not Granger Cause		2.28808	0.10614
LOG_BSDCPGDP			
LOG_PCFLOPGDP does not Granger Cause	118	0.13082	0.87751
Cause LOG_MC			
LOG_MC does not Granger Cause		0.81775	0.44402
LOG_PCFLOPGDP			

that market capitalization (*Mc*) positively and permanently respond to itself in the first quarter of the first period but with the tendency of transiting to zero in the long run. Also, *Mc* response to innovation on domestic credit to the private sector (*DCTPSPGDP*) as % of GDP and foreign direct investment (*FDI*) was negative but the responses of *MC* to shock on *DCTPSPGDP* was permanent while *MC* response to innovation on *FDI* was temporal in the short run then after a while it becomes negative. Hence, *MC* response to shock on banking sector domestic credit (*BSDCPGDP*) as % of GDP was positive in the short run but after the third quarter of the third period, its responses was negative to shock on *BSDCPGDP*. The results suggests that banking sector domestic credit as % of GDP has positive influence on market capitalisation (*MC*) in the short run while *FDI* and *DCTPSPGDP* has negative influence on market capitalisation over the long run. It also show that private capital flow (*PCFLOPGDP*) as % of GDP, both in the short and long run, have positive influence on market capitalization (*MC*). See the impulse response graph below as indicated in Figure 1.

To determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables; we discuss the results of variance decomposition as presented.

The result in Table 4 shows that market capitalisation (*MC*) is largely driven by itself. It account for 100% of its forecast error in the first period but the error reduces over time indicating the relevance of other variables in predicting *MC*. Thus, as time increases domestic credit to the private sector (*DCTPSPGDP*) as % of GDP, banking sector domestic credit (*BSDCPGDP*) as % of GDP and foreign direct investment (*FDI*) account for 28%, 2.3%

and 2.2% of *MC* forecast error respectively but in the long run, say the tenth quarter of the tenth period, *DCTPSPGDP* account for nearly 40% forecast error suggesting strong long run effect on *MC*. The importance of *MC* predicting itself is highly significant in the short run while the importance *DCTPSPGDP* in predicting *MC* is also significant in the long run.

4.2. Business Environment, Institutional Framework and Stock Market Development

Under this section, we discussed the relationship between business environment, legal framework and stock market development. From our results as shown on Table 5, null hypothesis assumption of the absence of cointegrating equations among the variables is rejected because, there are three cointegrating equations at 5% significant level in the model suggesting a long run relationship between the variables of business environment, legal framework and stock market development.

In addition, the results on Table 6 shows no causality running from the measures of business environment, legal framework/ institutional quality to market capitalization rather, we observed unidirectional causation running from *Mc* to gross fixed capital formation (*GFCF*), *Mc* to corruption index (*CrpIndx*) and gross fixed capital formation (*GFCF*) to *CrpIndx*.

Results show no causation running from business environment and legal framework measures to stock market development rather, we observed the opposite. Hence, the findings suggest that stock market development causes business environment especial the improvement in infrastructures and social amenities accounted by gross fixed capital formation (*GFCF*). We also discovered that development in the market granger causes corruption. This finding may be inconsistent with theory. But the implication may be traced through the improvement in ICT such as the situation where investors can trade at the comfort of their office and receive their share certificate immediately through e-transaction. Furthermore, Table 7 shows the response of market capitalisation to one standard deviation innovation in the model. Moreso, in second quarter of the second period, market capitalisation respond negatively and insignificantly to innovations on *GFCF*, *legfrwk*, *Inf*, *Crpindx* and *Rintr* while positively and permanently respond to innovation on itself both in the short and long run. From the fourth quarter of the fourth period, *MC* response to shock on *Inf* was positive and temporal.

Results on variance decomposition as shown in Table 8 apportion the total fluctuations in a particular variable to the constituent innovations in the system. The results show that market capitalization (*MC*) is largely driven by itself. For example, about

Figure 1: Impulse response graph

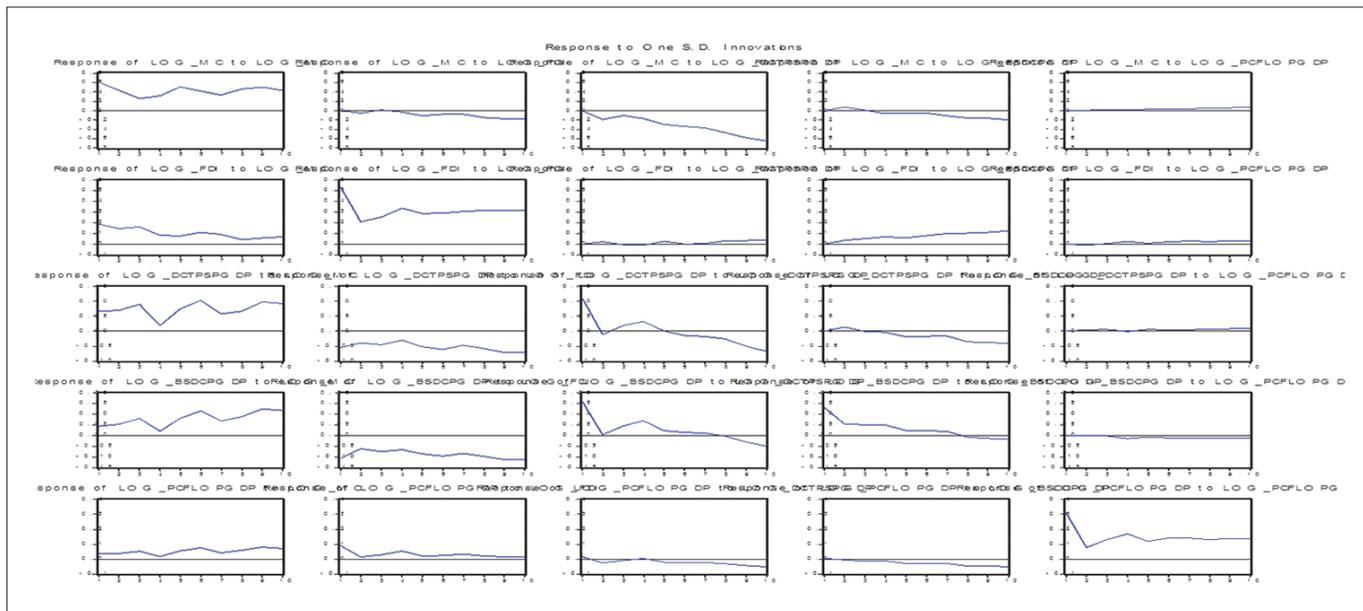


Table 3: Impulse response table

Period	LOG_MC	LOG_FDI	LOG_DCTPSPGDP	LOG_BSDCPGDP	LOG_PCFLOPGDP
1	0.608319	0.000000	0.000000	0.000000	0.000000
2	0.437131	-0.048964	-0.189085	0.076168	0.009689
3	0.256256	0.010706	-0.106269	0.005987	0.014618
4	0.318390	-0.029410	-0.165361	-0.058943	0.012174
5	0.511901	-0.108764	-0.297600	-0.053322	0.029057
6	0.419205	-0.077414	-0.337801	-0.052384	0.035214
7	0.333013	-0.079019	-0.372278	-0.108687	0.039088
8	0.459879	-0.147781	-0.473741	-0.156712	0.050553
9	0.505875	-0.171468	-0.581282	-0.161174	0.063715
10	0.436899	-0.171149	-0.648962	-0.196387	0.073300

Table 4: Variance decomposition table

Period	S.E.	LOG_MC	LOG_FDI	LOG_DCTPSPGDP	LOG_BSDCPGDP	LOG_PCFLOPGDP
1	0.608319	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.777934	92.72183	0.396161	5.907859	0.958643	0.015512
3	0.826139	91.83840	0.368072	6.893175	0.855286	0.045062
4	0.903167	89.26884	0.414001	9.119746	1.141543	0.055872
5	1.087122	83.78639	1.286696	13.78843	1.028476	0.110003
6	1.217232	78.69241	1.430798	18.69979	1.005563	0.171436
7	1.323151	72.93237	1.567546	23.74197	1.525757	0.232358
8	1.495193	66.57432	2.204447	28.63159	2.293369	0.296277
9	1.699658	60.37882	2.723720	33.85364	2.674010	0.369809
10	1.890530	54.14299	3.021061	39.14630	3.240415	0.449235

Table 5: Cointegration tests results

Eigen value	Likelihood ratio	5% critical value	1% critical value	Hypothesized No. of CE (s)
0.363961	143.8123	94.15	103.18	None**
0.318634	91.77543	68.52	76.07	At most 1**
0.189396	47.65505	47.21	54.46	At most 2*
0.143642	23.50791	29.68	35.65	At most 3
0.037444	5.675275	15.41	20.04	At most 4
0.011125	1.286530	3.76	6.65	At most 5

(**) denotes rejection of the hypothesis at 5%(1%) significance level. L.R. test indicates 3 cointegrating equation (s) at 5% significance level

100 per cent of the variations in MC are due to its own innovations during the first quarter of the forecast error. Meanwhile, as the time

progresses, the forecast error reduces and the importance of MC predicting itself becomes highly significant between the first and

fifth quarter of the periods. The contribution of *Rintr* and *legfrwk* to variation in *MC* becomes significant in the third and seventh quarters of the periods when it reaches 2.7% and 2.0% respectively. Hence, the total contribution of the remaining three variables to variation in *MC* in the tenth quarter of the period is <4%. Thus, these results suggest that in the tenth quarter of the tenth period, *GFCF*, *LEGFRWK*, *INF*, *CRPINDEX* and *RINTR* account for about 23% of *MC* forecast error which shows weak long run effect.

4.3. Stock Market Development, Financial Sector Reforms and Economic Growth

In this section, we present the results on the relationship between stock market development, financial sector reforms and economic growth. The proxy for stock market development defers from that

of model 1 and 2. For in-depth inquiry, stock market development is captured with captured with *MC* and market liquidity. In this regard, market liquidity is proxied with total values of shares traded (*TVST*) and percentage of turnover ratio (*TOR*) while others variables remain as defined above.

From the estimates of the cointegration test, Eigen value and likelihood ratio presented in Table 8 indicates three cointegrating equations suggesting the rejection of null hypothesis at 5% significance level. The result suggests a positive co-integration between some variables of the cointegrating vectors. Therefore, there is existence of long run relationship between the variables in the variables in the model.

The causality results as indicated in Table 9 shows bidirectional causality between measures of stock market development (*MC*, *TVST* and *TOR*) and economic growth (*GDP*). This implies that stock market development and economic growth granger causes each other. These findings support the third school of thought which contends that a country with a well developed financial system could promote high economic expansion through technological changes, products and services innovation, creating high demand for the financial institutions in turn. It is also consistent with the findings of Hongbin (2007), Majid (2007), Dawson (2008), Akinlo (2009 and 2010), Odeniran, S.O and Udeaja, E. A (2010), Odhiambo (2005), Enisan and Olufisayo (2009), Shahbaz et al. (2008) and Demirguc-Kunt and Levine (2008). In addition, we also noticed bidirectional causation between *BSDCPGDP* as % of *GDP* and economic growth. This could beas a result of pre and post consolidation policy reforms in 2004 and 2006 in Nigeria which centered mostly on Banking sector. However, since the Nigerian financial sector is dominated by Banks, any policy reforms targeted on banks could promote growth. In view of the above, we conclude that there exist a bidirectional causal effect between financial sector reform and economic growth. Furthermore, there exists a unidirectional causality running from foreign direct investment

Table 6: Granger causality test results

Null hypothesis	Obs	F-stat	P
LOG_GFCF does not Granger Cause LOG_MC	118	0.04214	0.95875
LOG_MC does not Granger Cause LOG_GFCF		3.31262	0.03999*
LOG_LEGFRWK does not Granger Cause LOG_MC	118	0.36277	0.69656
LOG_MC does not Granger Cause LOG_LEGFRWK		0.99289	0.37371
LOG_INF does not Granger Cause LOG_MC	118	0.03786	0.96286
LOG_MC does not Granger Cause LOG_INF		1.48449	0.23100
CRPINDEX does not Granger Cause LOG_MC	118	0.28440	0.75300
LOG_MC does not Granger Cause CRPINDEX		6.30872	0.00253*
RINTR does not Granger Cause LOG_MC	118	1.64778	0.19707
LOG_MC does not Granger Cause RINTR		1.86358	0.15985

Table 7: Impulse response table

Period	LOG_MC	LOG_GFCF	LOG_LEGFRWK	LOG_INF	CRPINDEX	RINTR
1	0.662258	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.581896	-0.030878	-0.029904	-0.009005	-0.020882	-0.104030
3	0.425882	0.005242	-0.071183	-0.014209	-0.032700	-0.126995
4	0.465712	-0.053140	-0.109528	0.020685	-0.065286	-0.179359
5	0.507846	-0.070561	-0.094915	0.025916	-0.073619	-0.225887
6	0.475593	-0.057985	-0.089777	0.032202	-0.081523	-0.248042
7	0.492757	-0.082729	-0.102430	0.045273	-0.094805	-0.278717
8	0.521064	-0.098180	-0.098577	0.054306	-0.103392	-0.312026
9	0.516970	-0.098680	-0.094786	0.061868	-0.110540	-0.335200
10	0.525962	-0.112131	-0.098981	0.071063	-0.118902	-0.359184

Table 8: Cointegration test results

Eigen value	Likelihood ratio	5% critical value	1% critical value	Hypothesized No. of CE (s)
0.599781	225.3871	124.24	133.57	None **
0.352561	120.0767	94.15	103.18	At most 1 **
0.224494	70.08256	68.52	76.07	At most 2 *
0.176594	40.84504	47.21	54.46	At most 3
0.086204	18.49983	29.68	35.65	At most 4
0.065318	8.132777	15.41	20.04	At most 5
0.003166	0.364625	3.76	6.65	At most 6

*(**) denotes rejection of the hypothesis at 5%(1%) significance level. L.R. test indicates 3 cointegrating equation (s) at 5% significance level

(FDI) to GDP and from GDP to domestic credit to private sector (DCTPSPGDP), suggest that government should focus more on reforms that encourages capital flow in order to promote growth. On the other hand, we check the causal direction between SMD and FSR and discovered a unidirectional causality that runs from BSDCPGDP to MC, DCTPSPGDP to TVST and from BSDCPGDP to TVST while DCTPSPGDP and MC causes each other. The evidence shows that financial sector reforms play significant role in promoting stock market development.

The impulse response reported in Table 10 and Figure 2 below shows that each of the variables respond differently to its own shock. For instance, GDP response to innovation on itself was positive from first to third quarter of the period then became negative in the fourth and fifth quarter of the period but drifted after and transited. However, it responses to one standard deviation innovation on other variables of both SMD and FSR were insignificantly negative (e.g. FDI & DCTPSPGDP) and positive BSDCPGDP respectively both in short and long

run. Meanwhile, GDP response to shocks on MC is positive in the first quarter of the period then became negative from the third quarter to sixth quarter, from the seventh quarter of the period it became positive while its response to shock on TVST in the second quarter of the period is negative but temporarily return to zero in the long run and thereafter, it became positive. In addition, GDP responded to innovation on turnover ratiopositively in the second quarter of the period and temporarily tend to zero, after the third quarter of the period it became permanently positive but in log run, that is, period nine and ten, the influence on GDP became negative.

The variance decomposition, as shown in Table 11 in the appendix 3, indicated that GDP largely and significantly driven by itself in the first quarter of the period. GDP, account for about 99.9% of its forecast error. In the second, fifth and tenth quarter of the period, all the variables of stock market development and financial sector reforms on average account for about 18%, 37.1% and 42% of GDP forecast error.

Table 9: Causality test results

Null hypothesis	Obs	F-stat	P
LOG_MC does not Granger Cause LOG_GDP	118	25.9140	5.5E-10
LOG_GDP does not Granger Cause LOG_MC		6.23447	0.00270
LOG_TVST does not Granger Cause LOG_GDP	118	12.4604	0.00013
LOG_GDP does not Granger Cause LOG_TVST		5.23609	0.0669
LOG_TOR does not Granger Cause LOG_GDP	118	0.64487	0.2665
LOG_GDP does not Granger Cause LOG_TOR		8.57138	0.00034
LOG_FDI does not Granger Cause LOG_GDP	118	3.63850	0.02942
LOG_GDP does not Granger Cause LOG_FDI		2.59799	0.07886
LOG_DCTPSPGDP does not Granger Cause LOG_GDP	118	1.24700	0.29129
LOG_GDP does not Granger Cause LOG_DCTPSPGDP		32.5088	7.0E-12
LOG_BSDCPGDP does not Granger Cause LOG_GDP	118	4.28440	0.01609
LOG_GDP does not Granger Cause LOG_BSDCPGDP		11.1347	3.9E-05

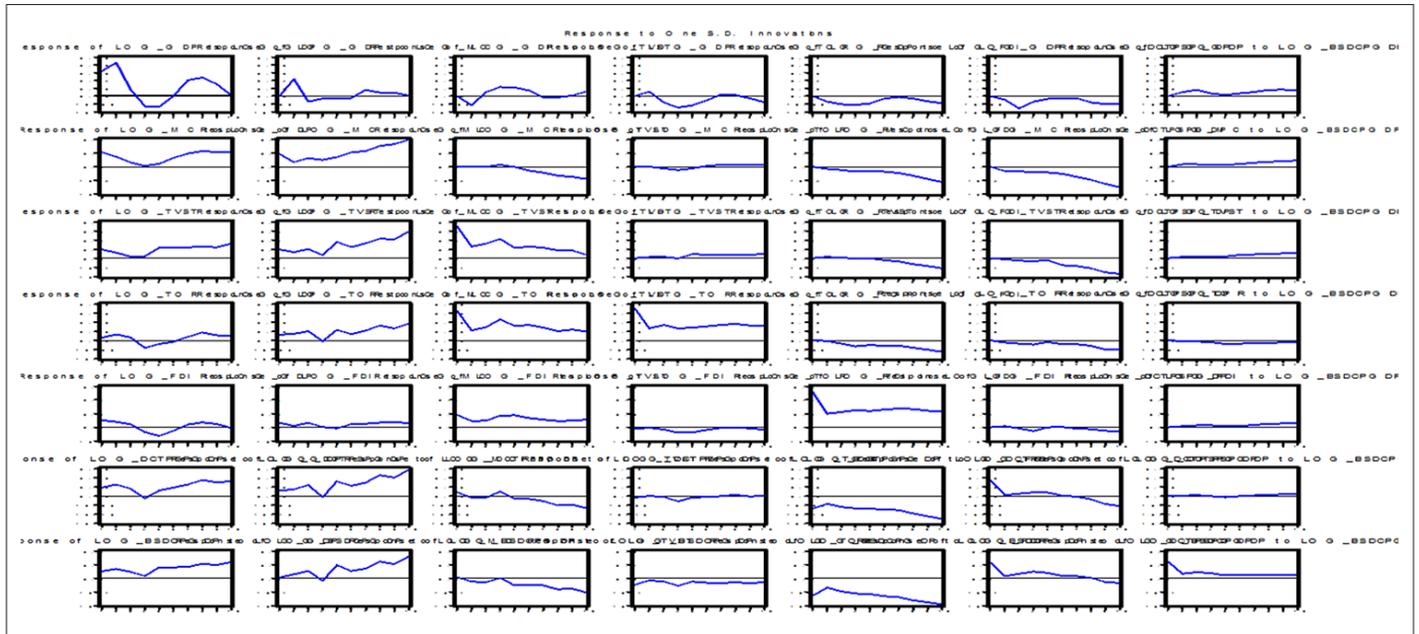
Table 10: Impulse response table

Period	LOG_GDP	LOG_MC	LOG_TVST	LOG_TOR	LOG_FDI	LOG_DCTPSPGDP	LOG_BSDCPGDP
1	0.064273	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.085502	0.043970	-0.023378	0.011701	-0.013744	-0.008864	0.010481
3	0.017138	-0.014171	0.010371	-0.016389	-0.020971	-0.031422	0.016041
4	-0.025977	-0.006667	0.023752	-0.029503	-0.022604	-0.015036	0.007041
5	-0.027415	-0.005179	0.021852	-0.023403	-0.019081	-0.007344	0.002807
6	0.000843	-0.004669	0.014195	-0.010896	-0.006069	-0.007274	0.006611
7	0.040772	0.016108	-0.003734	0.003910	-0.002186	-0.004718	0.010197
8	0.047593	0.008764	-0.003712	0.002575	-0.006711	-0.015744	0.015689
9	0.030734	0.009111	0.001585	-0.005930	-0.013444	-0.020198	0.016799
10	0.003198	0.000894	0.011332	-0.015234	-0.018424	-0.020367	0.014365

Table 11: Variance decomposition

Period	S.E.	LOG_GDP	LOG_MC	LOG_TVST	LOG_TOR	LOG_FDI	LOG_DCTPSPGDP	LOG_BSDCPGDP
1	0.064273	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.120149	79.25876	13.39314	3.785905	0.948460	1.308530	0.544287	0.760915
3	0.130349	69.06848	12.56099	3.849555	2.386677	3.699994	6.273429	2.160880
4	0.141178	62.26453	10.93088	6.112056	6.401822	5.717566	6.482302	2.090841
5	0.148865	59.39184	9.952190	7.651909	8.229216	6.785306	6.073484	1.916051
6	0.150456	58.14558	9.839138	8.381130	8.580600	6.805266	6.179469	2.068817
7	0.157223	59.97306	10.06005	7.731585	7.919705	6.251386	5.749011	2.315209
8	0.166194	61.87413	9.281393	6.969306	7.111783	5.757770	6.042479	2.963136
9	0.171920	61.01668	8.954274	6.521261	6.764900	5.992118	7.026887	3.723882
10	0.175752	58.41835	8.570697	6.655720	7.224469	6.832597	8.066834	4.231328

Figure 2: Impulse response graph



5. CONCLUSION AND POLICY SUGGESTIONS

The empirical results suggest that stock market development and economic growth is positively co-integrated indicating a long-run equilibrium relationship. The findings also suggest that there is a bidirectional causality between stock market development and economic. This means that development of the Nigerian stock market would lead to economic growth vis-à-vis, high sustainable economic growth also promote stock market development. Also, bidirectional causality existed between financial sector reform and economic growth. This suggests that financial sector reforms, other thing being equal, lead to sustainable economic growth in Nigeria. Therefore, sound policy reform influences growth in the economy as well as economic activities.

The pre and post consolidation policy reforms of the Nigerian banking sector in 2004 and 2006 championed by CBN remains a hand writing on the wall. The results also shows that business environment and institutional or legal framework play a significant role in promoting stock market development. Therefore, strong property right protection with friendly business environment would increase the confidence level of the market players thereby increasing market activities in the country. Hence, authorities in the government should design good policies reforms that could enhance the efficiency of the stock market and the economy at large.

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