Stock Market Development Indicators and Economic Growth in Nigeria (1990-2009): Empirical Investigations

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Stock market provides the bridge through which the savings of surplus units may be transformed into medium and long-term investments in the deficits units. It is reputed to perform critical functions, which promote economic growth and prospects of the economy. Empirical evidence linking stock market development to economic growth has been inconclusive even though the balance of evidence is in favor of a positive relationship between stock market development and economic growth. This paper explores the hypothesis that stock market development promotes economic growth in Nigeria and attempts to confirm its validity or otherwise, using quarterly data from 1990:1 to 2009:4 for Nigeria by employing vector error correction model (VECM) technique on the commonly used stock market development indicators. From the result, the model for the total value of shares traded ratio (vr) has the best fit followed by the market capitalization ratio (mcr) model while the model for the turnover ratio (tr) lagged behind. The results for mcr and vr are analysed in this paper, as they performed better than the model for tr.

From the result, it was revealed that the coefficient of the error correction term ECM (-1) carries the expected negative sign and is highly significant at 1.0 pe cent level. The model validates the hypothesis that the stock market promotes economic growth in Nigeria during the period of analysis. The F-test statistic of 10.88 shows the overall model fit is significant at 1.0 per cent. Similarly, the vr model shows that the ECM (-1) has the expected negative sign and significant at 1.0 per cent. The model favours the proposed direct relationship between stock market indicators and economic growth in Nigeria during the period of analysis. The F-test statistic of 13.39 shows that the overall model fit is significant at 1.0 per cent.

Keywords: Stock Market Development Indicators, Economic Growth, Vector Error Correction Model, Nigeria

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I. Introduction

Stock markets may affect economic activity through the creation of liquidity. It contributes to economic development by enhancing the liquidity of capital investments. Many profitable investments require a long-term commitment of capital, but investors are often reluctant to relinquish control of their savings for long periods. Liquid equity markets make investment less risky--and more attractive--because they allow savers to acquire an asset--equity--and to sell it quickly and cheaply if they need access to their savings or want to alter their portfolios. At the same time, companies enjoy permanent access to capital raised through equity issues. The Nigerian capital market needs to play the role of

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an enabler for the transformation of the Nigerian economy, by becoming the first port of call for domestic savings and for international investors (Oteh, 2010).

Until recently, the literature has focused mainly on the role of financial intermediation in the process of economic growth and capital accumulation. Indeed, many studies have analyzed the channels through which banks and other financial intermediaries may help to increase, for example, the saving rate or the average productivity of capital and, in turn, growth. However, a new wave of interest on the role played by stock market development in the process of economic growth has occupied economists' investigative activity. Since the seminal contributions by Goldsmith (1969) and McKinnon (1973), economists have devoted considerable attention to the study of the role played by financial intermediation in the process of real resource allocation and capital accumulation. Only very recently have economists specifically focused their attention on the role of stock markets in the process of economic development. Interestingly, these recent studies have not only revealed novel theoretical and empirical aspects of the channels of interaction between real and financial variables, they have also been able to shed light on individual firms' optimal financial choice in connection with economic development.

Recent studies suggest that, over the past two decades, stock market liquidity has been a catalyst for long-run growth in developing countries. Without a liquid stock market, many profitable long-term investments would not be undertaken because savers would be reluctant to tie up their investments for long periods of time. In contrast, a liquid equity market allows savers to sell their shares easily, thereby permitting firms to raise equity capital on favorable terms. The empirical evidence, however, strongly supports the belief that greater stock market liquidity boosts--or at least precedes--economic growth.

Some theories suggest that large, liquid and internationally-integrated stock markets boost economic growth. Alternative theories, however, suggest that well-developed stock markets are relatively unimportant for aggregate economic activity. Furthermore, some research predicts that larger, more liquid, and internationally-integrated markets hurt economic performance. Empirical evidence linking stock market development indicators to economic growth has been inconclusive even though the balance of evidence is in favor of a positive relationship between stock market development indicators and economic growth. Using quarterly data for Nigeria and employing vector error correction model (VECM) technique, which makes this paper different from some of the previous works which used annual series Osinubi (2002) and Nyong (1997), this

paper examines what relationship exists for Nigeria and also contributes to the historical debate on the role of the financial system by empirically investigating the link between stock market development indicators, such as market capitalization, turnover and total value of shares traded ratios and economic growth.

Following the introduction, the paper is organized as follows. Part two discusses the developments in the domestic economic activity and Nigeria's stock market from 1981 to 2009. Part three examines related literature, conceptual and theoretical framework on the functioning of stock markets and economic growth. Part four describes the data used, source, econometric methodology and the model while empirical investigations and results are reported in part five. The analysis of findings and policy implications are covered in part six while the paper ends with conclusion in part seven.

II. Developments in Nigeria's Stock Market and the Domestic Economic Activity (1981 – 2009)

The stock market is a place for medium-to long-term securities and it comprises the primary market for the issue of new securities and the secondary market where existing shares are traded. The activities and trading in this market is managed by the Nigerian Stock Exchange (NSE) which evolved in 1977 from the Lagos Stock Exchange, established on June 5, 1961. As at end-2007, there were ten trading floors of the NSE in Lagos, which serves as the Head office of the exchange, Enugu, Ibadan, Onitsha, Kaduna, Kano, Port Harcourt, Yola, Benin and Abuja. Each branch has a trading floor, which creates opportunities for buying and selling of securities. Other than these, there are institutions such as the Securities and Exchange Commision (SEC), which is the regulatory authority established in 1979, issuing houses, Investment Advisers, Portfolio Managers, Investment and Securities Tribunal (IST), the stock broking firms, registrars and other operators. The interactions among these players influence the width and depth of the market. The evolution, reforms/legislations, structure, transaction cost and efficiency are aptly covered in CBN (2007).

The major indicators of activity in the stock market show that it has demonstrated remarkable growth since the 1980s. Prior to this period, trading in the market was weak, attributable mainly to the low level of information dissemination and awareness. However, with the level of computerization and availability of corporate information, the market became more efficient. From table 1, since the 1980's, most market indicators including all-share value index, number of deals, market capitalization, total value of shares traded and turnover ratio have

recorded significant growth. The improvements could be attributed to the establishment of the second-tier securities market (SSM) in 1985, the deregulation of interest rates in 1987, the privatization programme of government-owned companies, enhancement in market infrastructure and requirements, innovations, as well as the banking sector reform. These developments have culminated in an unprecedented growth of both the primary and secondary markets.

Some of the major securities traded on the Exchange during the period under review included, government development stocks, industrial loans/preference shares and equities. From 100.00 in 1984, the all-share value index on the exchange rose to 57,990.22 in 2007, but declined by -64.1 per cent to 20,827.17 in 2009 due to the effect of the global and economic crisis during the period. The impact of the global financial crisis also affected the Exchange performance. In the same vein, the number of deals increased from 10,199 in 1981 to peak at 49,029 in 1992, before falling to 40,398 in 1993. It later rose significantly to 3,535,631 in 2008, and declined by -50.8 per cent to 1,739,365 in 2009. The growth in the market also manifested in the phenomenal increase in market capitalization, from ₦5.0 billion to ₦7, 030.8 billion in 2009, over ten-fold jump. The phenomenal growth notwithstanding, the market capitalization represents only 28.0 per cent of the GDP, compared with 167.1 per cent for South Africa, 50.7 per cent for Zimbabwe and 130.0 per cent for Malaysia (CBN, 2007). This shows that the potentials and prospects for further growth in the Nigerian market are bright.

Domestic output growth has shown mixed developments between 1981 and 2009. During this period, the economy registered declines in the real GDP (at 1990 constant basic prices) in five years (1982, 1983, 1984, 1987 and 1991) ranging from -7.1 per cent in 1983 to -0.6 per cent in 1987. For the rest of the period, the annual real GDP growth was positive. The economy witnessed high growth rates of 10.2 and 10.5 per cent in 2003 and 2004 before declining to 6.0 per cent in 2008, followed by a mild recovery to 6.7 per cent in 2009. A key factor responsible for the negative growth rates of the 1982-84 periods was the low performance of the oil sector in 1981-83 owing to the glut in the international oil market. Other reasons included the sluggish performance of the agricultural sector and the manufacturing subsector while the reversal of the negative growth rates of the early 1980s and 1987 was attributable to the recovery in the oil and agricultural sectors of the economy.

Table 1: Number of Deals, Market Capitalisation Ratio, Value Traded Ratio, Number of Deals and Turnover Ratio (1981-2009)

Year	All-Share Value Index (1984=100)	Number of Deals	Market Capitalisation (MC)	Gross Domestic Product (GDP) at 1990 Constant Basic Prices	GDP Growth Rate	MC Ratio	Total value of Shares Traded (TVST)	TVST Ratio= Stock Market Liquidity	Turnover Ratio
			N'Billion	N'Billion	%	%	N'Billion	%	%
	(1)	(2)	(3)	(4)	(5)	(6)=(3)÷(4)	(7)	(8)=(7)÷(4)	(9)=(7)÷(3)
1981	-	10,199	5.0	205.22		2.44	0.30	0.15	6.00
1982	-	10,014	5.0	199.69	-2.69	2.50	0.22	0.11	4.40
1983	-	11,925	5.7	185.60	-7.06	3.07	0.40	0.22	7.02
1984	100.0	17,444	5.5	183.56	-1.10	3.00	0.26	0.14	4.73
1985	127.3	23,571	6.6	201.04	9.52	3.28	0.32	0.16	4.85
1986	163.8	27,718	6.8	205.97	2.45	3.30	0.50	0.24	7.35
1987	190.9	20,525	8.2	204.81	-0.56	4.00	0.38	0.19	4.63
1988	233.6	21,560	10.0	219.88	7.36	4.55	0.85	0.39	8.50
1989	325.3	33,444	12.8	236.73	7.66	5.41	0.61	0.26	4.77
1990	513.8	39,270	16.3	267.55	13.02	6.09	0.23	0.09	1.41
1991	783.0	41,770	23.1	265.38	-0.81	8.70	0.24	0.09	1.04
1992	1,107.6	49,029	31.2	271.37	2.26	11.50	0.49	0.18	1.57
1993	1,543.8	40,398	47.5	274.83	1.28	17.28	0.80	0.29	1.68
1994	2,205.0	42,074	66.3	275.45	0.23	24.07	0.99	0.36	1.49
1995	5,092.0	49,564	180.4	281.41	2.16	64.11	1.84	0.65	1.02
1996	6,992.0	49,515	285.8	293.75	4.39	97.29	6.98	2.38	2.44
1997	6,440.5	78,089	281.9	302.02	2.82	93.34	10.33	3.42	3.66
1998	5,672.7	84,935	262.6	310.89	2.94	84.47	13.57	4.36	5.17
1999	5,266.4	123,509	300.0	312.18	0.41	96.10	14.07	4.51	4.69
2000	8,111.0	256,523	472.3	329.18	5.45	143.48	28.15	8.55	5.96
2001	10,963.1	426,163	662.5	356.99	8.45	185.58	57.68	16.16	8.71
2002	12,137.70	451,850	764.9	433.20	21.35	176.57	59.41	13.71	7.77
2003	20,128.90	621,717	1,359.3	477.53	10.23	284.65	120.40	25.21	8.86
2004	23,844.50	973,526	1,925.9	527.58	10.48	365.04	225.82	42.80	11.73
2005	24,085.80	1,021,967	2,900.1	561.93	6.51	516.10	262.94	46.79	9.07
2006	33,358.30	4,021,780	5,120.9	595.82	6.03	859.47	470.31	78.93	9.18
2007	57,990.22	2,615,020	13,294.6	634.25	6.45	2,096.11	2,100.00	331.10	15.80
2008	31,450.78	3,535,631	9,563.0	672.2	5.98	1,423.07	1,679.14	249.80	17.56
2009	20,827.17	1,739,365	7,030.8	716.9	6.66	980.72	685.72	95.65	9.75

Sources: Nigerian Stock Exchange Annual Reports and Accounts (various years), Central Bank of Nigeria (CBN) Statistical Bulletin, Golden Jubilee Edition, December, 2008 and CBN Annual Reports and Statement of Accounts (various years).

III. Conceptual, Theoretical Framework and Literature Review

III.1 Conceptual Issues

Stock markets support resource allocation and spur growth through different channels. By reducing transaction costs and liquidity costs, stock markets can positively affect the average productivity of capital (Levine 1991; Bencivenga, et al. 1996). By pooling resources on larger projects which would otherwise have difficulty accessing finance, stock markets can mobilize savings and spur the rate of investment (Greenwood and Smith 1997). Through the promotion of the acquisition of information about firms, stock markets may promote and improve resource allocation and the average productivity of capital (Kyle 1984; Holmstrom and Tirole 1993). In addition, by exerting a continuous and strict control

over the management of firms, stock markets positively affect firms' investment decisions and the average return on investments (Jensen and Murphy 1990; Laffont and Tirole 1988; Scharfstein 1988). Improving risk diversification through internationally-integrated stock markets and increasing the array of possible investments, stock markets can augment the rate of saving and the rate of investment (Saint- Paul 1992; Devereux and Smith 1994; Obstfeld 1994).

The duration of investment projects—in conjunction with the expected rate of return and the relevant risk—is a very important variable for investors. Investors, who strictly prefer shorter-term assets, might find investments with particularly long maturities unattractive. Moreover, disrupting an investment project before it has reached maturity can be very costly in terms of missed profit and lower rates of return. Following this line of arguments, Levine (1991) builds a theoretical model which shows that by reducing these liquidation costs, and increasing the average productivity of capital and the rate of savings, stock markets can foster capital accumulation and growth. In fact, by their nature, equity markets make it possible to transfer the ownership of investment projects that are already running before their final realization and without disrupting physical production. This feature of stock markets has two effects: (a) it attracts more resources into long-term investments from investors who would not have committed their finances for long periods of time; (b) it reduces the loss of resources which would have occurred with disruption of physical production. Both these effects will spur growth. The first does this by increasing the savings rate, the second by reducing actual resources lost by the premature liquidation of investments.

III.2 Theoretical Framework

In terms of theory, a growing literature argues that stock markets provide services that boost economic growth. Specifically, Greenwood and Smith (1997) show that large stock markets can lower the cost of mobilizing savings and thereby facilitate investment in the most productive technologies. Bencivenga, et al. (1996) and Levine (1991) argue that stock market liquidity -- the ability to trade equity easily -- is important for growth. Specifically, although many profitable investments require a long-run commitment of capital, savers do not like to relinquish control of their savings for long periods. Liquid equity markets ease this tension by providing an asset to savers that they can quickly and inexpensively sell. Simultaneously, firms have permanent access to capital raised through equity issues. Moreover, Kyle (1984) and Holmstrom and Tirole (1993) argue that liquid stock markets can increase incentives to get information about firms and improve corporate governance. Finally, Obstfeld (1994) shows that international risk

sharing through internationally-integrated stock markets improves resource allocation and can accelerate the rate of economic growth.

Stock market development may also influence corporate control. Jensen and Murphy (1990) show that efficient stock markets help mitigate the principal-agent problem. Efficient stock markets make it easier to tie manager compensation to stock peiforinance. This helps align the interests of managers and owners. Furthermore, Laffont and Tirole (1988) and Scharfstein (1988) argue that takeover threats induce managers to maximize the firm's equity price. Thus, well-functioning stock markets that ease corporate takeovers can mitigate the principal-agent problem and promote efficient resource allocation and growth. Opinion differs on this issue too. Stiglitz (1985) argues that outsiders will be reluctant to takeover firms because outsiders generally have worse information about firms than existing owners. Thus, the takeover threat will not be a useful mechanism for exerting corporate control; stock market development, therefore, will not importantly improve corporate control [Stiglitz (1985)]. Moreover, Shleifer and Vishny (1986), and Bhide (1993) argue that greater stock market development encourages more diffuse ownership and this diffusion of ownership impedes effective corporate governance. Finally, Shleifer and Summers (1988) note that by simplifying takeovers, stock market development can stimulate welfare-reducing changes in ownership and management.

In terms of raising capital, Greenwood and Smith (1997) show that large, liquid, and efficient stock markets can ease savings mobilization. By agglomerating savings, stock markets enlarge the set of feasible investment projects. Since some worthy projects require large capital injections and some enjoy economies of scale, stock markets that ease resource mobilization can boost economic efficiency and accelerate long-run growth. Disagreement exists, however, over the importance of stock markets for raising capital. Mayer (1988), for example, argues that new equity issues account for a very small fraction of corporate investment. Thus, some theories provide a conceptual basis for believing that larger, more liquid, and more efficient stock markets boost economic growth. Other theoretical models, however, have a more pessimistic opinion about the importance of stock markets.

III.3 Literature Review

III.3.1 Stock Market Development and Economic Growth: Channels/Linkages

Stock markets are places where corporate control mechanism is at work. As the economic performance of corporations is reflected in, and measured by, stock prices, corporate managers would try hard to minimize agency problems and to

maximize shareholders' wealth. In a market economy, the link between corporate profits and economic growth is quite obvious.

Capasso (2008) uses an optimal capital structure model to provide a link between components of stock market and long-term economic growth. He indicates a strong relationship between stock market and economic growth with firms showing greater preference towards issuing equity than debt as capital continues to accumulate. That is, as the economy continues to grow, information costs continue to decrease as well so does the cost of equity relative to debt financing which promote the development of stock market.

By studying a relatively large set of 40 countries for the period 1979-88, and focusing on the dynamics of market size, Atje and Jovanovich (1993), find a strong positive correlation between the level of financial development and stock market development and economic growth. In a more recent study, Levine and Zervos (1998) obtain similar results on a larger set of observations. They sample 47 countries from 1976 to 1993, and find that stock market liquidity measured as the value of stock traded relative to the size of the market and the size of the economy is strongly and positively correlated with the rate of economic growth. They also observe that the level of banking development, measured as the ratio of bank loans to the private sector to GDP, is positively correlated with the level of economic growth. The significance of stock market development in the process of economic growth is also confirmed by Beck and Levine (2004) who, by applying novel econometric procedures, test for the independent impact of banks and stock markets on growth. Again, Beck and Levine find that the expansion of both banks and stock markets significantly affects growth.

III.3.2 Impact of Stock Market Development and Economic Growth: Empirical Studies

Adjasi and Biekpe (2006) study the effect of stock market development on economic growth in 14 countries in a dynamic panel data modeling setting. The results indicate a positive relationship between stock market development and economic growth. Further investigations, based on the level of economic development and stock market capitalization reveal that the positive influence of stock market development on economic growth is significant for countries classified as upper middle income economies. The general trend in results shows that low income African countries and less developed stock markets need to grow more and develop their markets to achieve economic gains from stock markets. According to N'zué (2006), the relationship between the development of the Ivorian stock market and the country's economic performance is positive.

The result also reveal that gross domestic product and stock market development are cointegrated when the control variables are included in the analysis. Moreover, there is a unidirectional causality running from stock market development to economic growth.

In principle a well-developed stock market should increase savings and efficiently allocate capital to productive investments, which leads to an increase in the rate of economic growth. Stock markets contribute to the mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios. Hence, they provide an important source of investment capital at relatively low cost (Dailami and Aktin, 1990). From a monetary growth perspective, a well-developed stock market provides a means for the exercise of monetary policy through the issue and repurchase of government securities in a liquid market. Also, well-developed and active stock markets alter the pattern of demand for money, and booming stock markets create liquidity and, hence, spur economic growth.

Garcia and Liu (1999) examined the macroeconomic determinants of stock market development in a sample of Latin American and Asian countries. The results show that GDP growth, domestic investment, and financial intermediary sector development are important factors. Yartey (2007) finds that a percentage point increase in financial intermediary sector development tends to increase stock market development in Africa by 0.6 point controlling for macroeconomic stability, economic development, and the quality of legal and political institutions. El-Wassal (2005) investigates the relationship between stock market growth and economic growth, financial liberalization, and foreign portfolio investment in 40 emerging markets between 1980 and 2000. The result shows that economic growth, financial liberalization policies, and foreign portfolio investments were the leading factors of the emerging stock markets growth.

Levine (1991) and Benchivenga, et al. (1996) emphasize the positive role of liquidity provided by stock exchanges on the size of new real asset investments through common stock financing. Investors are more easily persuaded to invest in common stocks, when there is little doubt on their marketability in stock exchanges. This, in turn, motivates corporations to go to the public when they need more finance to invest in capital goods. Although some contrary opinions do exist regarding the impact of liquidity on the volume of savings, arguing that the desire for a higher level of liquidity works against propensity to save (Benchivenga and Smith, 1991; Japelli and Pagano, 1994), such arguments are not well supported by empirical evidence.

The second important contribution of stock exchanges to economic growth is through global risk diversification opportunities they offer. Saint-Paul (1992), Deveraux and Smith (1994) and Obstfeld (1994) argue quite plausibly that opportunities for risk reduction through global diversification make high-risk-high-return domestic and international projects viable and, consequently, allocate savings between investment opportunities more efficiently. Deveraux and Smith (1994) note that whether global diversification will reduce the rate of domestic savings seems to be a weak argument as it is not very obvious.

Capasso (2006) using a sample of 24 advanced OECD and some emerging economies investigates the linkage between stock market development and economic growth covering the period 1988-2002. The finding shows a strong and positive correlation between stock market development and economic growth and later concludes that stock markets tend to emerge and develop only when economies reach a reasonable size and with high level of capital accumulation. Carporale, et al. (2005) based on the endogenous growth model study the linkage between stock market, investment and economic growth using vector autoregression (VAR) framework. It uses quarterly data covering the period 1971q1 - 1998q4 for four countries: Chile, South Korea Malaysia and Philippines. The stock market variables are measured through the ratio of market capitalization to GDP and ratio of value-traded to GDP. The overall findings indicate that the causality between stock market components, investment and economic growth is significant and in line with endogenous growth model. It shows also that the level of investment is the channel through which stock markets enhance economic growth in the long-run.

III.3.3 Measures of Stock Market Development and Economic Growth

The empirical evidence by Levine (1996) shows support for the belief that greater stock market liquidity boosts--or at least precedes--economic growth. Three measures of market liquidity and three indicators of how easy it is to buy and sell equities could be identified.

One commonly used measure is the total value of shares traded on a country's stock exchange as a share of GDP. This indicator complements the market capitalization ratio and signals whether market size is matched by trading activity. In other words, if it is very costly or risky to trade, there will not be much trading. Second, another measure is the value of traded shares as a percentage of total market capitalization (the value of stocks listed on the exchange). This turnover ratio measures trading relative to the size of the stock market (market capitalization). The third measure is the value-traded-ratio divided by stock price

volatility. Markets that are liquid should be able to handle heavy trading without large price swings. Empirically, it is not the size or volatility of the stock market that matters for growth but the ease with which shares can be traded (Levine and Zervos, 1996).

Levine and Zervos (1996) applied regression analysis to the data compiled from 41 countries for the years 1976 through 1993 to see the relationships between financial deepening and economic growth. One of the financial deepening indicators used in the analysis was the level of development of stock exchange measured by a composite index combining volume, liquidity and diversification indicators. Economic growth indicator selected, on the other hand, was the real growth rate in per capita GDP. Their findings report a very strong positive correlation between stock market development and economic growth. The most interesting aspect of this study was the decrease in the statistical significance of other financial deepening variables after stock market development index was included in the regression equation. According to the authors this was a proof that stock market development was more influential than other financial deepening indicators on the growth of the economy.

IV. The Model, Data Sources, Measurement and Econometric Methodology

IV.1 The Model

From the previous theoretical discussions, and following Dritsaki and Dritsaki-Bargiota (2005), the multivariate model is specified as follows with some modifications to capture the peculiarities of the Nigerian economy, and proceed to test the long-run relationships among the variables in the model. The explanatory variables [(tr), (vr) and (mcr)] in equation (1) below will enter the model each at a time as earlier explained.

$$yr = \beta_0 + \beta_1\pi + \beta_2 ir + \beta_3 sr + \beta_4(tr) + \beta_5(vr) + \beta_6(mc) + \beta_7 cf + \beta_8 cpr + \varepsilon_t \quad (1)$$

The a-priori expectations of the explanatory variables are as expressed below:

$$\beta_1 < 0; \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8 > 0$$

IV.2 Data Sources, Definitions and Measurement of Variables

Quarterly data with a sample period from 1990:q1 to 2009:q4 is adopted. This is to ensure enough data points for the econometric analysis in order to cater for the loss of degree of freedom. The data are obtained from the Central Bank of Nigeria and Nigeria Stock Exchange (NSE) official reports and publications.

Economic Growth (yr): It is measured by the rate of change of real GDP. According to demand- driven hypothesis, the expansion of an economy will create new demand for financial services. Such increase in demand will exert pressure to establish larger and more sophisticated financial institutions to satisfy the new demand for their services.

Macroeconomic Stability (π): Macroeconomic stability is an important factor for the attainment of higher economic growth. An improved macroeconomic stability would lead to more incentive for firms and investors to invest and grow the economy. A measure of macroeconomic stability that is employed is the price level, CPI (inflation) mainly because of its importance in previous studies (for instance, Garcia and Liu, 1999). With a low inflation, there is higher likelihood for more investors showing interest in growing the economy.

Investment Ratio (ir): This is calculated as gross fixed capital formation divided by nominal GDP. According to the endogenous economic theory, investment provides a positive link to economic growth. Ndikumana (2000), Yartey and Adjasi (2007) and Xu (2000) all used this measurement in their works.

Savings Ratio (sr): Usually the larger the savings, the higher the availability of capital that could flow through the stock market. However, savings and investment have been found not to be correlated with income in the model estimated for forty two emerging economies, South Africa inclusive (Yartey, 2008). Thus, we expect savings and investment to be important in the model. The ratio is calculated as gross domestic savings as a percentage of GDP.

Turnover Ratio (tr): Liquidity is the ease and speed with which economic agents can buy and sell securities. With a liquid market, the initial investors do not lose access to their savings for the duration of the investment project because they can easily, quickly, and cheaply, sell their stake in the company. Thus, more liquid markets could ease investment in long term, potentially more profitable projects, thereby improving the allocation of capital and enhancing prospects for long term growth. The ratio measures the market liquidity which is usually given as total value of shares traded divided by total value of listed shares or market capitalization. Beck and Levine (2004) prefer this measurement to other measurement of stock market variables. This is because unlike other measures, the numerator and denominator of turnover ratio contain prices.

Total Value of Shares Traded Ratio (vr): Rousseau and Wachtel (2000) and Beck and Levine (2004), used this measurement and it is given as the ratio of total value of shares traded to GDP. It measures the degree of trading relative to the

size of the economy. Therefore, it reflects stock market liquidity on an economy-wide basis.

Market Capitalization Ratio (mcr): Beck and Levine (2004) have shown that with market capitalization, there is no theory suggesting that mere listing of shares will influence resource allocation and economic growth. Levine and Zervos (1998) also indicate that market capitalization is not a good predictor of economic growth. However, Yartey (2008) differs on this issue and opined that the assumption behind this measure is that overall market size is positively correlated with the ability to mobilize capital and diversify risk on an economy-wide basis. For these unsettled discussions, we shall use market capitalization as a ratio of GDP, total value of shares traded ratio and turnover ratio, each at a time to determine the performance of each of them, and avoid multicollinearity in the model since Demiguc-Kunt and Levine (1996) has observed that different measures of stock market development are highly correlated.

Capital Flows (cf): Errunza and Miller (2000) argued that the long term impact of foreign capital inflows on the economy is broader than the benefits from initial flows. Foreign investment is associated with institutional and regulatory reform, adequate disclosure and listing requirements and fair trading practices. The increase in informational and operational efficiency is expected to inspire greater confidence in domestic markets. This increases the investor's base and participation and leads to more capital flows into the stock market. Capital flows is measured using foreign direct investment as a percentage of GDP.

Banking Sector Development (cpr): The value of domestic credit provided by the banking system to the private sector relative to GDP is used as a measure of banking sector development. Private credit is the most comprehensive indicator of the activity of deposit money banks (DMBs). It captures the amount of external resources channeled through the banking sector to private firms. This measure isolate credit issued to the private sector as opposed to credit issued to governments and public enterprises. In addition, it measures the activity of the banking system in one of its main function: channeling savings to investors. It represents more accurately the role of DMBs in channeling funds to private market participants.

IV.3 Econometric Methodology

Considering the conflicting theoretical perspectives on the importance of well-functioning stock markets for economic growth, this paper uses econometric methodology, cointegration and error correction framework to examine the

association between stock market development and economic growth in Nigeria. This is with a view to contributing empirically to the debate on the relationship between stock market development and economic growth, so as to proffer appropriate policy recommendations to the authorities.

The paper employs the vector error correction model (VECM) framework after cointegration has been established among the variables. The VECM is adopted to estimate the effects of stock market development indicators on economic growth. The use of this methodology predicts the cumulative effects taking into account the dynamic response among stock market development indicators and other examined variables. According to Ang and McKibbin (2007), once the variables are cointegrated; it becomes easy to distinguish between the short-run dynamics and long-run relationship. Therefore, to capture both the long-run and the short-run dynamics of stock market development indicators and economic growth in Nigeria, an error correction model (ECM) using the Johansen and Juselius (1990) multivariate cointegration techniques was employed. The ECM is therefore characterized by both differenced and long-run equilibrium models, thereby allowing for the estimates of short-run dynamics as well as long-run equilibrium adjustments process. The estimation was conducted using the econometric computer software package, EViews 6.0.

V. Empirical Investigation and Results

The empirical investigations start with summary statistics and correlation matrix of the variables. This is followed by the unit root test which is conducted to examine the order of integration of each of the variables in the model. Consequently, a multivariate cointegration analysis, using maximum likelihood procedure of Johansen and Juselius (1990) is undertaken. The next stage is the examination of the short-run and long-run dynamics among stock market development, economic growth and other control variables.

V.1 Results of Summary Statistics, Correlation Matrix and Unit root Tests

V.1.1 Summary Statistics

The summary statistics for the variables: capital flows, consumer price index, banking sector development, investment ratio, market capitalization ratio, savings ratio and turnover ratio are as shown in Table 1 below. The mean for capital flows, consumer price index, banking sector development, investment ratio, market capitalization ratio, savings ratio and turnover ratio variables is 3.04, 1472.41, 61.10, 9.50, 52.72, 9.50 and 6.89, respectively. This indicates that the variables exhibit significant variation in terms of magnitude, suggesting that estimation in levels may introduce some bias in the results. The Jarque-Bera

statistic for all the variables, except for capital flows is significant; hence we reject the null hypothesis that the series are normally distributed.

Table 1: Summary Statistics of the Variables

	CF	CPI	CPR	IR
Mean	3.044561	1472.412	61.09918	9.497927
Median	3.038221	1168.116	53.22763	8.613846
Maximum	4.738318	3803.880	152.2048	16.09496
Minimum	0.653889	97.69460	30.95421	5.236553
Std. Dev.	0.903584	1082.116	26.87985	2.788152
Skewness	-0.101418	0.492049	2.126622	0.862857
Kurtosis	2.426113	2.122703	7.000835	2.724884
Jarque-Bera	1.234961	5.793668	113.6559	10.17925
Probability	0.539301	0.055198	0.000000	0.006160
Sum	243.5648	117793.0	4887.934	759.8341
Sum Sq. Dev.	64.50069	92506987	57079.57	614.1293
Observations	80	80	80	80

Table 1 Continued

	MCR	SR	TR	VR	YR
Mean	52.72170	9.497927	6.894750	5.069250	7.086512
Median	40.01981	8.613846	5.705000	1.855000	2.333768
Maximum	228.0603	16.09496	30.91000	26.47000	102.1282
Minimum	13.74149	5.236553	1.050000	0.230000	-17.83721
Std. Dev.	42.91236	2.788152	5.583893	6.758770	15.90644
Skewness	2.144596	0.862857	1.534834	1.814032	3.625486
Kurtosis	7.558182	2.724884	6.522521	5.365508	19.70283
Jarque-Bera	130.5806	10.17925	72.77003	62.52826	1105.204
Probability	0.000000	0.006160	0.000000	0.000000	0.000000
Sum	4217.736	759.8341	551.5800	405.5400	566.9210
Sum Sq. Dev.	145476.2	614.1293	2463.209	3608.797	19988.16
Observations	80	80	80	80	80

V.1.2 Correlation Matrix

The correlation matrix of the variables is shown in Table 2 below. The results show that there is an inverse relationship between capital flows and consumer price index, banking sector development, investment, market capitalization, savings, turnover and total value of shares traded ratios, respectively. The results also indicate a positive relationship between market capitalization ratio and

consumer price index, banking sector development, turnover and total value of shares traded ratios.

Table 2: Correlation Matrix

	CF	CPI	CPR	IR	MCR	SR	TR	VR	YR
CF	1.000	-0.023	-0.288	-0.253	-0.071	-0.253	-0.150	-0.176	-0.115
CPI	-0.023	1.000	0.633	-0.520	0.788	-0.520	0.891	0.861	-0.136
CPR	-0.288	0.633	1.000	0.081	0.583	0.081	0.700	0.775	-0.209
IR	-0.253	-0.520	0.081	1.000	-0.278	1.000	-0.358	-0.231	-0.139
MCR	-0.071	0.788	0.583	-0.278	1.000	-0.278	0.606	0.891	-0.155
SR	-0.253	-0.520	0.081	1.000	-0.278	1.000	-0.358	-0.231	-0.139
TR	-0.150	0.891	0.700	-0.358	0.606	-0.358	1.000	0.853	-0.169
VR	-0.176	0.861	0.775	-0.231	0.891	-0.231	0.853	1.000	-0.150
YR	-0.115	-0.136	-0.209	-0.139	-0.155	-0.139	-0.169	-0.150	1.000

V.1.3 Unit Root Test Results

To examine the existence of stochastic non-stationarity in the series, the paper tests for the order of integration of the individual time series through the unit root tests using the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP), which are stated in their generic form as follows:

Augmented Dickey Fuller (ADF) Specification for Unit Root

It involves the estimation of one of the following three equations respectively, (Seddighi et al, 2000):

$$\Delta X_t = \beta X_{t-1} + \sum_{j=1}^{p} \delta_j \Delta X_{t-j} + \varepsilon_t ...(2)$$

$$\Delta X_t = \alpha_0 + \beta X_{t-1} + \sum_{j=1}^{p} \delta_j \Delta X_{t-j} + \varepsilon_t ...(3)$$

$$\Delta X_t = \alpha_0 + \alpha_1 t + \beta X_{t-1} + \sum_{j=1}^{p} \delta_j \Delta X_{t-j} + \varepsilon_t ...(4)$$

The additional lagged terms are included to ensure that the errors are uncorrelated. The maximum lag length begins with 4 lags and proceeds down to the appropriate lag by examining the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). The null hypothesis is that the variable X_t is a non-stationary series (H_0: $\beta = 0$) and is rejected when β is significantly negative (H_a:

$\beta<0$). If the calculated ADF statistic is higher than McKinnon's critical values, then the null hypothesis (H_0) is rejected and the series is stationary or integrated of order zero I(0). Alternatively, non-rejection of the null hypothesis implies non-stationarity leading to the conduct of the test on the difference of the series until stationarity is reached and the null hypothesis is rejected.

Phillips-Perron (PP) Specification for Unit Root

Phillips and Perron (1988) use a nonparametric method to correct for the serial correlation of the disturbances. The test is based on the estimate of the long run variance of residuals. Their modification of the Dickey and Fuller Γ test is called Z(Γ) test. The critical values for ΓΓ and Z(ΓΓ) are the same if the residuals are generated by an independent and identical process. Although the Phillips and Perron tests and the Dickey and Fuller tests provide identical results, the power of the (Augmented) Dickey and Fuller tests is more than the Phillips and Perron tests in the presence of negative moving average components.

The variables tested are: yr, π, ir, sr, tr, vr, mcr, cf and cpr. The results presented in Table 3 below indicate that yr, π, tr, cf and cpr are stationary at levels while ir, sr, vr and mcr are non-stationary at levels. However, these second group of variables ir, sr, vr, and mcr became stationary after first difference, which implies that they are I(1) series. Given the unit-root properties of the variables, we proceeded to establish whether or not there is a long-run cointegrating relationship among the variables in equation (1) by using the Johansen full information maximum likelihood method[4].

Table 3: ADF and PP Unit Root Tests

Variable	ADF			Phillips-Perron		Remarks
	Level	1st Difference	Remarks	Level	1st Difference	
Yr	-3.8431**		I(0)	-9.8785***		I(0)
π	-3.5161**		I(0)	-3.0568**		I(0)
Ir	-2.3640	-3.2443***	I(1)	-2.0954	-10.8301***	I(1)
Sr	-2.3640	-3.2443***	I(1)	-2.0954	-10.5270	I(1)
Tr	-3.8373**		I(0)	-3.7879**		I(0)
Vr	2.9991	-3.3568***	I(1)	-0.7953	-3.5818***	I(1)

1 The Johansen/Juselius approach produces asymptotically optimal estimates because it incorporates a parametric correction for serial correlation (which comes from the underlying vector autoregression (VAR)) and the system nature of the estimator means that the estimates are robust to simultaneity bias. Moreover, the Johansen method is capable of detecting multiple cointegrating relationships (if they exist) and it does not suffer from problems associated with normalization.

Mcr	-2.7981	-6.5718***	I(1)	-0.8325	-7.2247***	I(1)
Cf	-3.3176**		I(0)	-3.3710**		I(0)
Cpr	-0.6502	-9.7794***	I(0)	-0.4986	-9.7794***	I(1)

Note: *** and ** indicates that the variables are significant at 1 per cent and 5 per cent levels, respectively.

V.2 Cointegration Test using Johansen-Juselius Technique

The cointegration tests are undertaken based on the Johansen and Juselius (1990) maximum likelihood framework. The essence is to establish whether long-run relationships exist among the variables of interest. Before conducting the cointegration test, the appropriate optimal lag-length that would give standard normal error terms that do not suffer from non-normality, autocorrelation and heteroskedasticity was determined. Eight (8) lags (since the study uses quarterly data and there are large numbers of observations) were allowed at the beginning. The Schwarz information criterion (SIC) was favoured in line with the literature because it takes into consideration the parsimoniousness of the model and has a more stringent theoretical backing (Mordi, 2008). At the end, a lag order of one was chosen after testing the residuals for normality and autocorrelation and is found to be satisfactory.

The results of the tests for the three models (the first is when ***mcr*** was included, the second is when ***tr*** was used and the third is when ***vr*** was adopted) are as presented in Tables 4a, 4b and 4c. Starting with the null hypothesis that there are no cointegrating vectors ($r = 0$) in the models, the result show that there exists at least one cointegrating relation in the models as both the trace ($\lambda - trace$) and maximum eigen ($\lambda - \max$) statistics reject the null of $r \leq 0$ against the alternative of $r \geq 1$ at the 5 per cent level of significance. This is indicative of at least one cointegrating vector in the models 1, 2 and 3, which drives the relationship toward equilibrium in the long-run (see the Tables below). Even though the result of the Johansen cointegration test, when mcr is used revealed that the trace statistic indicates 3 cointegrating equations while the maximum-eigenvalue statistic indicates 2 cointegrating equations, which is a conflict (Table 4a below); this is recognized in the literature and the argument is that since the trace statistics takes into account, all of the smallest eigenvalues, it possesses more power than the maximal eigenvalue statistic. Furthermore, Johansen and Juselius (1990) recommend the use of the trace statistics when there is a conflict between the two statistics.

The conclusion drawn from tables 4a, 4b and 4c below shows that there exists a unique long-run relationship between yr, (mcr), (tr), (vr), cf, cpi, cpr and ir. The economic interpretation of the long-run economic growth function can be obtained by normalizing the estimates of the unconstrained cointegrating vector on economic growth. The parameters/long-run elasticities of the cointegrating vector for the long-run economic growth are presented in equations (5), (7) and (9). The normalised cointegrating vector with the highest log likelihood was used as an error-correction term (ecm) in the overparameterised error correction model, which was refined to derive the parsimonious model. The error correction term (as indicated in equations (6), (8) and (10)), *akin* to the residual generated from the static regression when the Engle-Granger (E-G) two-step approach is adopted.

Table 4a: Unrestricted Cointegration Rank Test Results (When mcr is used)

Null Hypothesis	Trace Statistic	Critical value at 5 per cent	Null Hypothesis	Maximum-Eigen statistic	Critical value at 5 per cent
$r=0^*$	156.7628	103.8373	$r=0^*$	53.4811	40.9568
$r\leq 1^*$	103.2817	76.9728	$r\leq 1^*$	43.9811	34.8059
$r\leq 2^*$	59.3005	54.0790	$r\leq 2$	25.9559	28.5881
$r\leq 3$	33.3446	35.1928	$r\leq 3$	17.3868	22.2996
$r\leq 4$	15.9578	20.2618	$r\leq 4$	11.2017	15.8921
$r\leq 5$	4.7561	9.1645	$r\leq 5$	4.7561	9.1645

Note: r represents number of cointegrating vectors. Trace test indicates 3 cointegrating equations at the 0.05 level while max-eigenvalue test indicates 2 cointegrating equations. *Denotes rejection of the hypothesis at the 0.05 level.

The normalized cointegrating vector with the highest log likelihood is expressed as:

$$yr - 0.241372mcr - 4.019661cf + 0.002828lcpi - 0.120031cpr - 0.815571ir + 21.18406 \ldots\ldots\ldots (5)$$

and the ecm can be written as:

$$ecm1 = yr + 0.241372mcr + 4.019661cf - 0.002828lcpi + 0.120031cpr + 0.815571ir - 21.18406 \ldots\ldots\ldots (6)$$

Table 4b: Unrestricted Cointegration Test (When tr is adopted)

Null Hypothesis	Trace Statistic	Critical value at 5 per cent	Null Hypothesis	Maximum-Eigen statistic	Critical value at 5 per cent
$r = 0^*$	176.1997	103.8473	$r = 0^*$	65.8345	40.9568
$r \leq 1^*$	110.3651	76.9728	$r \leq 1^*$	42.1942	34.8059
$r \leq 2^*$	68.1710	54.0790	$r \leq 2^*$	31.4031	28.5881
$r \leq 3^*$	36.7679	35.1928	$r \leq 3^*$	23.6606	22.2996
$r \leq 4$	13.1073	20.2618	$r \leq 4$	8.4102	15.8921
$r \leq 5$	4.6971	9.1645	$r \leq 5$	4.6971	9.1645

Note: r represents number of cointegrating vectors. Trace and max-eigenvalue tests indicates 4 cointegrating equations at the 0.05 level. *Denotes rejection of the hypothesis at the 0.05 level.

The normalized cointegrating vector with the highest log likelihood is expressed as:

$$yr + 4.569886tr + 2.055230cf - 0.019068lcpi - 0.265823cpr - 0.707272ir + 5.404391 \ldots\ldots\ldots (7)$$

and the ecm can be written as:

$$ecm2 = yr - 4.569886tr - 2.055230cf + 0.019068lcpi + 0.265823cpr + 0.707272ir - 5.404391 \ldots\ldots\ldots (8)$$

Table 4c: Unrestricted Cointegration Test (When vr is used)

Null Hypothesis	Trace Statistic	Critical value at 5 per cent	Null Hypothesis	Maximum-Eigen statistic	Critical value at 5 per cent
$r = 0^*$	166.5895	103.8373	$r = 0^*$	52.4570	40.9568
$r \leq 1^*$	114.1325	76.9728	$r \leq 1^*$	38.2654	34.8059
$r \leq 2^*$	75.8671	54.0790	$r \leq 2^*$	32.8174	28.5881
$r \leq 3^*$	43.0496	35.1928	$r \leq 3^*$	23.3187	22.2996
$r \leq 4$	19.7310	20.2618	$r \leq 4$	13.3212	15.8921
$r \leq 5$	6.40978	9.1645	$r \leq 5$	6.4098	9.1645

Note: r represents number of cointegrating vectors. Trace and max-eigenvalue tests indicates 4 cointegrating equations at the 0.05 level.*Denotes rejection of the hypothesis at the 0.05 level.

The normalized cointegrating vector with the highest log likelihood is expressed as:

$$yr - 1.579614vr - 3.461122cf + 0.006923lcpi - 0.092952cpr + 0.113854ir + 1.687621 ... (9)$$

and the ecm can be written as:

$$ecm3 = yr + 1.579614vr + 3.461122cf - 0.006923lcpi + 0.092952cpr - 0.113854ir - 1.687621 ... (10)$$

V.3 Vector Error Correction Model (VEC) Framework

The results indicate that the variables in the economic growth model in equation (1) tend to move together in the long-run as predicted by economic theory. In the short-run, deviations from this relationship could occur due to shocks to any of the variables. In addition, the dynamics governing the short-run behavior of economic growth are different from those in the long-run. Due to this difference, the short-run interactions and the adjustments to long-run equilibrium are important because of the policy implications. According to Engle and Granger (1987), if cointegration exists between nonstationary variables, then an error-correction representation of the type specified by equation (11) below exists for these variables. Given the fact that the variables of the economic growth equation are cointegrated, the next step is the estimation of the short-run dynamics within a vector error correction model (VECM) in order to capture the speed of adjustment to equilibrium in the case of any shock to any of the independent variables.

V.3.1 Over-parameterised Error-Correction Model

The generalized specification framework of the over-parameterised VEC model is expressed below and extended for the *three models (with mcr, tr and vr introduced in the equation, each at a time, during estimation)* and incorporating other variables:

$$\Delta yr = \beta_0 + \sum_{i=1}^{k-1} \beta_i \Delta yr_{t-i} + \sum_{i=0}^{k-1} \alpha_i \Delta \pi_{t-i} + \sum_{i=0}^{k-1} \chi_i \Delta ir_{t-i} + \sum_{i=0}^{k-1} \delta_i \Delta sr_{t-i} + \sum_{i=0}^{k-1} \phi_i \Delta (mcr)_{t-i} +$$

$$\sum_{i=0}^{k-1} \varphi_i \Delta (tr)_{t-i} + \sum_{i=0}^{k-1} \gamma_i \Delta (vr)_{t-i} + \sum_{i=0}^{k-1} \eta_i \Delta cf_{t-i} + \sum_{i=0}^{k-1} \kappa_i \Delta cpr_{t-i} + \Omega ecm_{t-1} + \varepsilon_t ..... (11)$$

where:

Δ indicates the first difference of a series.

$\beta_0, \beta_i, \alpha_i, \chi_i, \delta_i, \phi_i, \varphi_i, \gamma_i, \eta_i, \kappa_i$ and Ω are the parameters of the model to be estimated.

"i" is the number of lags included for the first difference of both the dependent and independent variables. In the estimations, the optimal lag-length for the dependent and explanatory variables in the models was four.

ecm_{t-1} is the lagged error correction term and t represent time period. The error term, ε_t of equation (11) has the same explanations as that in equation (1) as earlier discussed while Ω is expected to be less than one, negative and statistically significant. The negative sign of the ecm_{t-1} term indicate long-run convergence of the model to equilibrium as well as explaining the proportion and the time it takes for the disequilibrium to be corrected during each period in order to return the disturbed system to equilibrium.

The results of the over-parameterised error correction models for economic growth are presented in the appendix as Tables 5a, 5b and 5c, for mcr, tr and vr, respectively. Although the models seem fairly well estimated, they cannot be interpreted in their present forms.

As is the tradition, the over-parameterised models were reduced to achieve parsimonious models, which are data admissible, theory-consistent and interpretable. Parsimony maximizes the goodness of fit of the model with a minimum number of explanatory variables. The reduction process is mostly guided by statistical considerations, economic theory and interpretability of the estimates (Adam, 1992). Thus, our parsimonious reduction process made use of a stepwise regression procedure (*through the elimination of those variables and their lags that are not significant*), before finally arriving at interpretable models. Tables 6 presents the results of the parsimonious error-correction models of mcr, tr and vr and the parameter estimates would be discussed to determine their policy implications.

Table 6: Parsimonious Error-Correction models of mcr (model a), tr (model b) and vr (model c)

Variable/Dependent-YR	Model A (mcr)	Model B (tr)	Model C (vr)
Constant	13.201***	-11.239***	13.461***
	(4.376)	(3.486)	(4.406)
D(YR(-4))			0.272***
			(0.095)
D(MCR(-1))	0.267**		
	(0.138)		
D(MCR(-3))	0.273**		
	(0.148)		
D(TR(-1))		3.253***	
		(1.180)	
D(TR(-3))		4.759***	
		(1.573)	
D(VR(-3))			6.153**
			(2.879)
D(CF(-1))	9.406***		5.568**
	(3.406)		(3.078)
D(CF(-2))	4.688*		6.230**
	(3.184)		(3.173)
D(LCPI(-1))		-1.406**	
		(42.745)	
D(CPR(-3))	0.471**		
	(0.226)		
D(CPR(-4))	0.443**	0.638**	0.530**
	(0.245)	(0.295)	(0.257)
D(IR(-1))	7.353***		6.369***
	(2.057)		(2.048)
D(IR(-2))	4.210**		3.100**
	(1.696)		(1.605)
D(IR(-4))		11.141***	
		(2.028)	
ECM1(-1)	-0.534***	-0.508***	-0.588***
	(0.158)	(0.088)	(0.173)
R^2	0.601	0.478	0.619
Adj-R^2	0.546	0.432	0.573

DW	2.052	2.051	2.158
F-Test	10.875***	10.369***	13.392***
AIC	8.546	8.735	8.474
SIC	8.855	8.951	8.752

Note:*, **, * represents 1%, 5% and 10% level of significance, figures in parenthesis are the standard errors.

VI. Analysis of Findings and Policy Implications

VI.1 Analysis of Findings

By examining the overall fit of each of the models, it can be observed that the parsimonious models have better fit compared with the over-parameterised models, as indicated by a higher value of the F-statistic (***10.875*** (10.511)) for mcr, (***10.369*** (9.714)) for tr and (***13.392*** (9.474)) for vr, all of which are significant at the 1.0 per cent level of significance. From the result, the model for the total value of shares traded ratio (vr) has the best fit followed by the market capitalization ratio model while the model for the turnover ratio lagged behind. This is not surprising as the ratio captures the degree of trading relative to the size of the economy, indicating stock market liquidity on an economy-wide basis. Another important finding is that the three indicators used to capture stock market developments in Nigeria are positively related to economic growth and significant, meaning that each of them conforms to economic theory, using Nigerian data. However, the discussion on the policy implications in the results will be based on the findings from mcr and vr models.

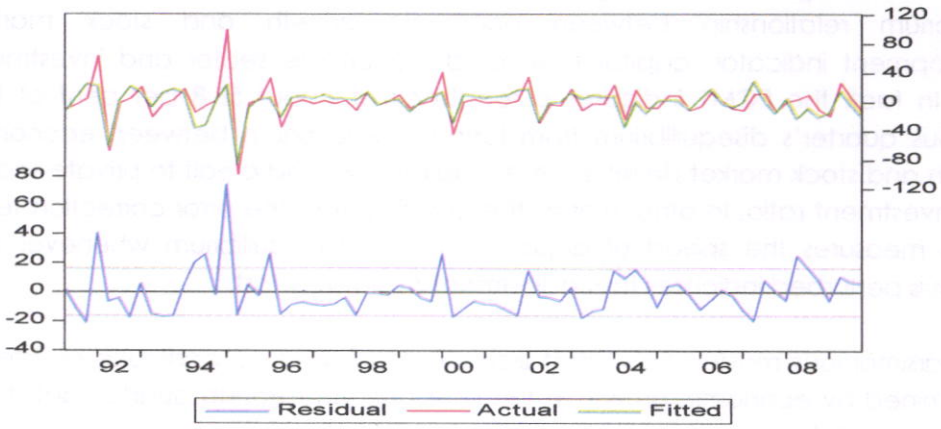
The ECM1 for Model A with mcr as a measure of stock market development indicates that 53.4 per cent of the previous quarter's disequilibrium from long-run equilibrium is corrected for within a quarter. In other words, the coefficient of the error correction term which measures the speed of adjustment back to equilibrium whenever the system is out of equilibrium indicates that adjustment is relatively fast.

The parsimonious model indicates that economic growth in a particular quarter is determined by the first and third quarter lags of market capitalisation ratio, first and second quarter lags of capital flows, third and fourth quarter lag of banking sector development, the first and second quarter lags of investment ratio and the error correction term lagged by one. The R^2 of 0.60 indicates that about 60 per cent of the variation in economic growth is explained by the final variables that entered the parsimonious model. The F-test statistic of 10.88 shows that the overall model fit is significant at 1.0 per cent.

The results suggest that the market capitalization ratio (mcr) has the correct sign and is significant at 5.0 per cent. A unit change in the first quarter lag of mcr will culminate to an increase of 0.3 unit change in economic growth in the short-run. In the same vein, one unit change in the third quarter lag of mcr will lead to a rise of 0.3 unit change in economic growth in the short-run and the coefficients are rightly signed and significant at the 5.0 per cent level. The first and second quarter lags of cf have the correct sign and are significant at 1.0 and 10.0 per cent levels. An increase in the third and fourth quarter lags of cpr by one unit causes 0.5 and 0.4 unit change in economic growth. The result further shows that in the short run, a unit change in the first and second lags of investment ratio will induce 7.4 and 4.2 units change in economic growth in the current period and they both have the correct sign and significant at the 1.0 and 5.0 per cent levels of significance.

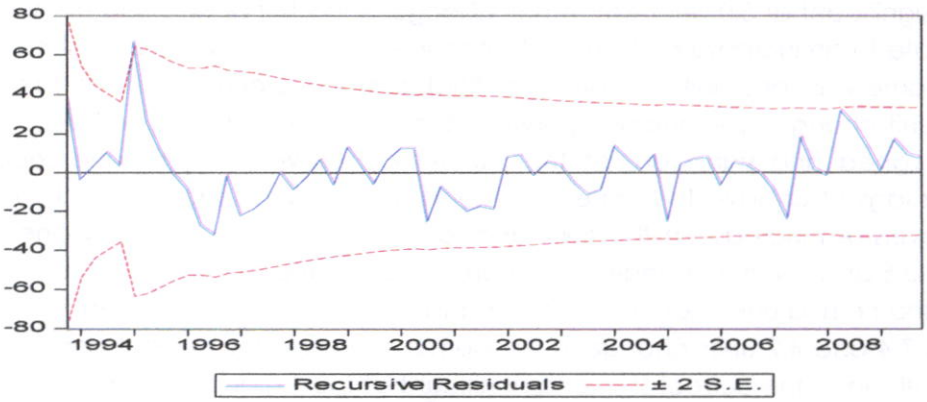
The residual graph, which shows the actual and fitted observations, is depicted below in Fig. 1. It shows that the fitted observations are as close as possible to their observed value.

Figure 1: Residual Graph of Parsimonious Model for mcr



The recursive residual also falls within the $\pm 2S.E.$ as indicated below in Figure 2:

Figure 2: Recursive Residual of the Parsimonious Model for mcr



It can be observed from the results in Model C with vr as the measure of stock market development that the coefficient of the error correction term ECM1 (-1) has the expected negative sign and it is highly significant at the 1.0 per cent level of significance. The significance of the error correction mechanism (ECM1) supports cointegration and suggests the existence of a long-run steady-state equilibrium relationship between economic growth and stock market development indicator, capital flow, credit to private sector and investment ratio. In fact, the ECM1 indicates a feedback of about 58.8 per cent of the previous quarter's disequilibrium from long-run equilibrium between economic growth and stock market development, capital flow, and credit to private sector and investment ratio. In other words, the coefficient of the error correction term which measures the speed of adjustment back to equilibrium whenever the system is perturbed indicates that adjustment is relatively fast.

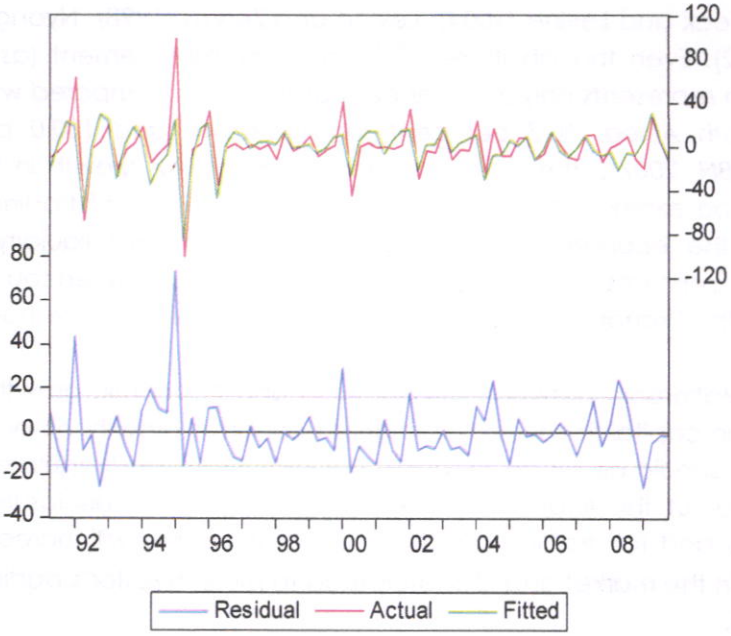
The parsimonious model shows that economic growth in a particular quarter is determined by economic growth in the past one year (fourth quarter lag), third quarter lag of the total value of shares traded ratio, first and second quarter lags of capital flows, fourth quarter lag (past one year) of banking sector development, the first and second quarter lags of investment ratio and the error correction term. The R^2 of 0.62 indicates that about 62 per cent of the variation in economic growth is explained by the final variables that entered the parsimonious model. The F-test statistic of 13.39 shows that the overall model fit is significant at 1.0 per cent.

The findings suggest that in the short run, a unit change in economic growth in the past one year will induce 0.3 unit change in economic growth in the current

period and it conforms to economic theory and significant at the 1.0 per cent level of significance. The total value of shares traded ratio (vr) has the correct sign and is significant at 5.0 per cent. One unit change in the third quarter lag of vr will lead to a rise of 6.2 units change in economic growth in the short-run and the coefficient is rightly signed and significant at the 5.0 per cent level of significance. The first and second quarter lags of cf have the correct sign and are significant at 5.0 per cent. A unit change in the first and second lags of cf induces 5.6 and 6.2 units change in economic growth. An increase in the fourth quarter lag of cpr by one unit causes 0.5 unit change in economic growth. The result further shows that in the short run, a unit change in the first and second lags of investment ratio will induce 6.4 and 1.6 units change in economic growth in the current period and they both have the correct sign and significant at the 1.0 per cent level of significance for IR(-1) and 5.0 per cent for IR(-2).

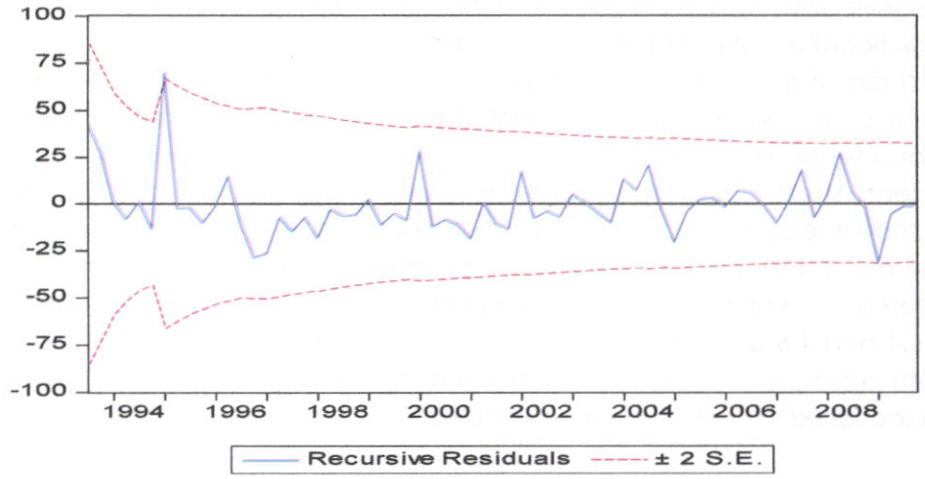
The residual graph, which shows the actual and fitted observations, is depicted below in Fig. 3. It indicates that the fitted observations are as close as possible to their observed value.

Figure 3: Residual Graph of Parsimonious model for vr



The recursive residual also falls within the $\pm 2S.E.$ as indicated below in Figure 4:

Figure 4: Recursive Residual of the Parsimonious model for vr



VI.2 Policy Implications

The economic implications of the above findings are as follows:

With the positive relationship between the market capitalization ratio (mcr) and economic growth, it follows that stock market development indicator promotes/supports economic growth in Nigeria. This result is in tandem with the findings of (Beck and Levine (2004), Levine and Zervos (1998), Nyong (1997) and Osinubi (2002). Even though there is still room for improvement (*as the market capitalization represents only 28.0 per cent of the GDP, compared with 167.1 per cent for South Africa, 50.7 per cent for Zimbabwe and 130.0 per cent for Malaysia, (CBN, 2007)*), the potentials and prospects for growth in the Nigerian market can be explored further by increasing the degree of trading relative to the size of the economy. This reflects the stock market liquidity within the economy. It indicates, therefore, the need to continuously encourage trading activities on the Exchange by ensuring that all impediments are removed.

The direct relationship between capital flows and economic growth shows that an increase in capital flows leads to higher economic growth, other things being equal. Efforts should be made to sustain the institutional and regulatory reforms in this sub-sector of the financial market, ensure adequate disclosure and listing requirements and fair trading practices. These measures will increase investor's confidence in the market and ultimately lead to more investor's participation and capital flows.

From the findings, domestic credit to private sector by the DMBs relative to GDP only effects a marginal increase in growth. This is an indication that the lending activities of the banks have not really impacted on the economic progress of the country. Meanwhile, banks are expected to channel mobilized savings to investors in form of loans. Hence, the pointer is to identify those constraints and bottlenecks that are making it difficult for banks to make loans available to private market participants. The issue of high interest rate with hidden transactions costs must be vigorously addressed by the monetary authorities. The evidence further suggests that it was investment undertaken three to six months ago that actually positively affect economic growth in Nigeria. There will be need to address the inadequate infrastructure and improve on the macroeconomic environment through the harmonization of monetary and fiscal policies in order to ensure stability of the economic aggregates. Addressing these issues will be critical for the development of the market. The would-be-investors in our stock market will be provided with clear signals about the direction of economic development and returns in the market.

When the economy grows through increase in output, this will lead to higher demand for more financial services which could exert pressure for the expansion of financial institutions to satisfy the new demand. With the direct relationship between the total value of shares traded ratio and economic growth, it follows that stock market development promotes/supports economic growth in Nigeria. This result is also in tandem with the results obtained by (Beck and Levine (2004), Levine and Zervos (1998), Nyong (1997) and Osinubi (2002). The potentials and prospects for growth in the Nigerian stock market can be explored further by increasing the degree of trading relative to the size of the economy. This will effect a positive change in the stock market liquidity.

VII. Conclusion

The paper examined stock market development and economic growth in Nigeria from 1990:q1 to 2009:q4 using cointegration and vector error correction approach. The specific objectives were to estimate the short and long-run elasticities as well as the error-correction mechanism of market capitalization ratio, total value of shares traded ratio and turnover ratio, capital flows, macroeconomic stability, banking sector development and investment ratio on economic growth. In the process of doing this, the hypothesis that stock market development promotes economic growth in Nigeria was validated. The three indicators used to capture stock market developments in Nigeria were all positively related to economic growth and significant. The error-correction term in the mcr equation indicates a feedback of 53.4 per cent of the previous quarter's

disequilibrium with the speed of adjustment to equilibrium fairly moderate. Also, the error-correction term indicates a feedback of about 58.8 per cent of the previous quarter's disequilibrium in the vr equation with the speed of adjustment to equilibrium relatively moderate.

The institutional and regulatory reforms in this sub-sector of the financial market should be sustained while increased awareness that will enhance investor's confidence in the market, and ultimately lead to more participation is pursued in order to increase the performance of stock market in Nigeria. The Nigerian stock market has a bright prospect given the measures taken by SEC, which included the approval of a new minimum capital base for all capital market operators to strengthen and reposition the market; issuance of new guidelines for operators. Existing operators were to comply with the new capital requirements either through capital increases or mergers/acquisitions. It also approved market dealers in addition to primary dealers and other capital market operators in existence.

While much work remains to be done to better understand the relationship between stock market development indicators and economic growth, a growing body of evidence suggests that stock markets are not merely casinos where players come to place bets. Stock markets provide services to the non-financial economy that are crucial for long-term economic development. The ability to trade securities easily may facilitate investment, promote the efficient allocation of capital, and stimulate long-term economic growth. Furthermore, the evidence suggests that stock market liquidity encourages economic growth. Policymakers should consider reducing impediments to liquidity in the stock market. Easing restrictions on international capital flows and creating a conducive and an enabling environment would be a good way to start. The on-going reform in the capital market should be intensified.

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APPENDIX 1

Table 5a: Estimates of Over-parameterised error correction models for mcr

Dependent Variable: D(YR)
Method: Least Squares
Sample (adjusted): 1991:2 2009:4
Included observations: 75 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.185996	4.185911	1.716710	0.0925
D(YR(-1))	-0.287314	0.237036	-1.212115	0.2314
D(YR(-2))	-0.027563	0.243769	-0.113072	0.9104
D(YR(-3))	0.084293	0.252858	0.333361	0.7403
D(YR(-4))	-0.036757	0.120069	-0.306132	0.7608
D(MCR)	0.010346	0.127913	0.080882	0.9359
D(MCR(-1))	0.328170	0.118326	2.773430	0.0079
D(MCR(-2))	0.292019	0.116019	2.516988	0.0152
D(MCR(-3))	0.135438	0.124910	1.084280	0.2837
D(MCR(-4))	-0.071049	0.127980	-0.555159	0.5814
D(CF(-1))	4.697668	3.240645	1.449609	0.1537
D(CF(-2))	3.760242	2.866362	1.311852	0.1958
D(CF(-3))	-8.136104	2.828587	-2.876385	0.0060
D(CF(-4))	-7.751086	2.930861	-2.644644	0.0110
D(LCPI(-1))	53.14256	36.23415	1.466643	0.1490
D(LCPI(-2))	-3.138840	35.23167	-0.089091	0.9294
D(LCPI(-3))	9.209207	34.68533	0.265507	0.7918
D(LCPI(-4))	11.67408	35.68722	0.327122	0.7450
D(CPR(-1))	0.003460	0.229113	0.015100	0.9880
D(CPR(-2))	0.176991	0.251081	0.704915	0.4843
D(CPR(-3))	0.357210	0.231312	1.544280	0.1291
D(CPR(-4))	1.226881	0.267714	4.582804	0.0000
D(IR(-1))	4.300515	2.384716	1.803366	0.0776
D(IR(-2))	3.322004	2.444175	1.359152	0.1805
D(IR(-3))	1.747016	2.492474	0.700917	0.4867
D(IR(-4))	-11.48738	2.630428	-4.367113	0.0001
ECM1(-1)	-0.509166	0.159092	-3.200450	0.0024

R-squared	0.850600	Mean dependent var	-0.147377
Adjusted R-squared	0.769675	S.D. dependent var	24.21130
S.E. of regression	11.61953	Akaike info criterion	8.016964
Sum squared resid	6480.643	Schwarz criterion	8.851260
Log likelihood	-273.6361	Hannan-Quinn criter.	8.350089
F-statistic	10.51098	Durbin-Watson stat	1.857206
Prob(F-statistic)	0.000000		

Table 5b: Estimates of Over-parameterised error correction models for tr

Dependent Variable: D(YR)
Sample (adjusted): 1991:2 2009:4
Included observations: 75 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.550171	3.754522	-0.412881	0.6815
D(YR(-1))	-0.736310	0.214568	-3.431588	0.0012
D(YR(-2))	-0.429770	0.227445	-1.889560	0.0649
D(YR(-3))	-0.203639	0.241010	-0.844938	0.4023
D(YR(-4))	-0.158338	0.116618	-1.357755	0.1809
D(TR)	-2.397867	1.031326	-2.325034	0.0243
D(TR(-1))	-3.059855	1.038847	-2.945434	0.0050
D(TR(-2))	-2.293760	0.949443	-2.415900	0.0196
D(TR(-3))	-2.640995	1.336269	-1.976394	0.0539
D(TR(-4))	-1.882580	1.656753	-1.136307	0.2615
D(CF(-1))	4.642993	3.461119	1.341472	0.1861
D(CF(-2))	1.474027	3.074846	0.479382	0.6338
D(CF(-3))	-9.646624	3.342462	-2.886083	0.0058
D(CF(-4))	-9.804845	3.377705	-2.902813	0.0056
D(CPR(-1))	-0.057325	0.222064	-0.258147	0.7974
D(CPR(-2))	0.072454	0.240383	0.301411	0.7644
D(CPR(-3))	0.316389	0.243583	1.298894	0.2002
D(CPR(-4))	1.254515	0.285146	4.399559	0.0001
D(IR(-1))	3.483228	2.487303	1.400403	0.1678
D(IR(-2))	2.895475	2.616770	1.106507	0.2740
D(IR(-3))	1.693700	2.550572	0.664047	0.5098
D(IR(-4))	-11.07218	2.508530	-4.413814	0.0001
ECM2(-1)	-0.043155	0.108130	-0.399108	0.6916

R-squared	0.840301	Akaike info criterion	8.083632
Adjusted R-squared	0.753797	Schwarz criterion	8.917927
F-statistic	9.714024	Durbin-Watson stat	1.781905
Prob(F-statistic)	0.000000		

Table 5c: Estimates of Over-parameterised error correction models for vr

Dependent Variable: D(YR)
Sample (adjusted): 1991:2 2009:4
Included observations: 75 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.12051	5.222881	3.277982	0.0019
D(YR(-1))	0.023435	0.279844	0.083743	0.9336
D(YR(-2))	0.117567	0.265254	0.443223	0.6596
D(YR(-3))	0.254202	0.257619	0.986733	0.3287
D(YR(-4))	0.059469	0.125580	0.473557	0.6380
D(VR)	-1.301846	1.997869	-0.651617	0.5178
D(VR(-1))	-0.296109	2.745731	-0.107843	0.9146
D(VR(-2))	2.311775	2.753033	0.839719	0.4052
D(VR(-3))	4.846971	3.640545	1.331386	0.1894
D(VR(-4))	5.754161	3.818526	1.506906	0.1384
D(CF(-1))	4.535944	3.696401	1.227125	0.2258
D(CF(-2))	5.845559	3.076305	1.900188	0.0634
D(CF(-3))	-3.769152	3.476115	-1.084300	0.2836
D(CF(-4))	-5.697363	3.201574	-1.779551	0.0815
D(CPR(-1))	-0.051563	0.257709	-0.200082	0.8423
D(CPR(-2))	-0.023376	0.283355	-0.082496	0.9346
D(CPR(-3))	0.007115	0.259459	0.027421	0.9782
D(CPR(-4))	0.729452	0.301776	2.417197	0.0195
D(IR(-1))	5.982125	2.661849	2.247357	0.0292
D(IR(-2))	3.861282	2.620536	1.473470	0.1472
D(IR(-3))	3.924192	2.669266	1.470139	0.1480
D(IR(-4))	-10.26925	2.455571	-4.182022	0.0001
ECM3(-1)	-0.880922	0.205728	-4.281984	0.0001

R-squared	0.836911	Akaike info criterion	8.104637
Adjusted R-squared	0.748571	Schwarz criterion	8.938932
F-statistic	9.473735	Durbin-Watson stat	1.558157
Prob(F-statistic)	0.000000		