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Information on manuscript submission is provided on the last and inside back cover of the Review.

Contents

The Asymmetric Effects of Oil Price Shocks on Output and Prices in Nigeria using a Structural VAR Model

***Charles N.O. Mordi and Michael A. Adebiyi, Ph.D** **[*]*

This paper develops a structural VAR model in which the asymmetric impact of oil shocks on output and price is analyzed in a unifying model. The model is applied to Nigeria using monthly data spanning 1999:01 to 2008:12 and the empirical results show that the impact of oil price shocks on output and prices is asymmetric in nature; with the impact of oil price decrease significantly greater than oil price increase. Also, from the variance decompositions, oil price changes play a significant role in determining the variance decompositions of output and prices. The implication is that any policy that is aimed at moving the economy forward must focus on price stability in which changes in oil price play a significant role.

Keywords: Oil prices Shocks, Asymmetry and Structural VAR, Nigeria
JEL Classification: C22, E37, E47
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I. Introduction

Questions regarding the relationship between the price of oil and economic activity are fundamental empirical issues in macroeconomics. Hamilton (1983) shows that oil prices have significant impact on real economic activity in the United States prior to 1972 while Hooker (1996) is of the view that the estimated linear relations between oil prices and economic activity appear much weaker after 1973. In the debate that followed, several authors have suggested that the apparent weakening of the relationship between oil prices and economic activity is illusory, arguing instead that the true relationship between oil prices and real economic activity is asymmetric, with the correlation between oil price decreases and output significantly different from the correlation between oil price increases and output (Mork 1989; and Hamilton, 2003). However, Edelstein and Kilian (2007, 2008) evaluate alternative hypotheses and argue that the evidence of asymmetry cited in the literature is driven by a combination of ignoring the effects of the 1986 Tax Reform Act on fixed investment and the aggregation of energy and non-energy related investment.

Theoretically, the immediate effect of positive oil price shocks is to increase the cost of production for oil-importing countries. This is likely to decrease output, and its magnitude depends on the shape of the aggregate demand curve. Higher oil prices lower disposable income and this decreases consumption. Once the oil

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price increases are perceived as permanent, private investments also decrease. Moreover, if the shocks are perceived as persistent, oil is used less in production, capital and labor productivity both decrease and potential output falls (Berument, et al, 2009). Other studies provide empirical evidence that rising oil prices reduce output and increase inflation (Rasche and Tatom, 1977, 1981; Darby, 1982; Burbidge and Harrison, 1984; Hamilton, 1983, 1996; Mork, 1989; Santini, 1985; Gisser and Goodwin, 1986; and Lee, et al., 1995). As a result, tax revenues fall and budget deficits increase. Oil price changes also affect trade and exchange rates. Oil consumption is difficult to decrease in the short-run for oil-importing countries. When oil prices increase, the inelastic demand curve for oil means total spending on oil imports increases. This puts pressure on the exchange rate and depreciates the local currency. This depreciation, in turn, may further affect economic performance. Even if depreciation increases the aggregate demand for oil-importing countries, prices may increase due to the exchange rate pass-through and lower output may occur due to higher input costs (Berument, et al 2009). However, the reverse will be the case for oil-exporting countries.

With regard to oil price shocks, one interesting issue is the asymmetric effect of oil price changes; that the impact of oil price increases and oil price decreases are not the same. Park and Ratti (2007) show that oil price increases have a greater (or significant) influence on the economy than a decrease in oil price. It is of empirical importance, therefore, to investigate the asymmetric effect of oil price changes on output and prices in Nigeria in view of the role of oil in an oil-dependent economy, like Nigeria. The rest of the paper is structured as follows. Section 2 provides the literature review and the theoretical background, while Section 3 presents the structural vector autoregressive (VAR) model. The empirical analysis is conducted in Section 4, while the summary and conclusions are contained in the last Section.

II. Literature Review

Although there is vast literature that investigates the effects of oil prices on the real economy, there are relatively few studies that investigate the asymmetric effect of oil price changes on economy activities, in developing economies, like Nigeria. Lee, et al. (1995) are the first to employ recent advances in financial econometrics and model oil price asymmetry using a univariate generalized autoregressive conditional heteroscedasticity (GARCH, 1, 1) model. They calculate an oil price shock variable, reflecting the unanticipated component as well as the time-varying conditional variance of oil price changes, introduce it in various vector autoregression (VAR) systems, and find that oil price volatility is highly significant in explaining economic growth. They also establish evidence of asymmetry, in the sense that positive shocks have a strong effect on growth while negative shocks do not. A disadvantage of the Lee, et al. (1995) approach, however, is that oil price volatility is a generated regressor.

Elder and Serletis (2008) examine the direct effects of oil price uncertainty on real economic activity in the United States, over the modern Organization of Petroleum Exporting Countries (OPEC) period, in the context of a structural VAR that is modified to accommodate GARCH-in-Mean errors. As a measure of uncertainty about the impending oil price, they use the conditional standard deviation of the forecast error for the change in the price of oil. Their main result is that uncertainty about the price of oil has had a negative and significant effect on real economic activity over the post-1975 period, even after controlling for lagged oil prices and lagged real output. Their estimated effect is robust to a number a different specifications, including alternative measures of the price of oil and of economic activity, as well as alternative sample periods. They also find that accounting for oil price uncertainty tends to reinforce the decline in real GDP in response to higher oil prices, while moderating the short-run response of real GDP to lower oil prices.

Rahman and Serletis (2008) investigate the asymmetric effects of uncertainty on output growth and oil price changes as well as the response of uncertainty about output growth and oil price changes to shocks using general bivariate framework in a modified vector autoregression. They employ simulation methods to calculate Generalized Impulse Response Functions (GIRFs) and Volatility Impulse Response Functions (VIRFs) to trace the effects of independent shocks on the conditional means and the conditional variances, respectively, of the variables. They find that bivariate, GARCH-in-mean, asymmetric VAR-BEKK model embodies a reasonable description of the monthly U.S. data, over the period from 1981:1 to 2007:1. They show that the conditional variance-covariance process underlying output growth and the change in the real price of oil exhibits significant non-diagonality and asymmetry, and presents evidence that increased uncertainty about the change in the real price of oil is associated with a lower average growth rate of real economic activity.

Mork (1989) investigates whether a strong relationship between oil price changes and the GNP growth rate in the US continues to hold when the sample period is extended to the oil price collapse in 1986 and the oil price is corrected for the effect of oil price control. He finds that the negative correlation between oil price increases and the GDP growth rate still exists. But the real effects of oil price decreases are different from those of oil price increases, with oil price decreases not having a statistically significant impact on the US economy.

Davis and Haltiwanger (2001) use VAR to examine the response of job creation and destruction to separately defined, positive and negative oil price shocks with plant-level census data from 1972Q2 to 1988Q4 on employment, capital per employee, energy use, age and size of plant, and product durability, at the four-digit SIC level. Examining the job creation and destruction between aggregate and allocative transmission mechanisms, they find that aggregate channels would increase job destruction and reduce job creation in response to an oil price increase, while an oil price decrease reduces job destruction and increases job creation symmetrically. However, allocative channels would increase both job creation and destruction asymmetrically in response to both price increases and decreases.

Hooker (1996) studies the asymmetric effects of oil price shocks on GNP by analyzing the response of interest rates to oil price shocks. He believes that monetary policy responds to oil price increases and not to oil price decreases. In the impulse response function analysis, response of short-term interest rates to the oil price increases and decreases is asymmetric, which means that oil price shocks influence the GDP through interest rates asymmetrically.

Sadorsky (1999) investigates the dynamic interaction between oil price and other economic variables using an unrestricted VAR with US data on industrial production, interest rate of a 3-month T-bill, oil price (measured using the producer price index for fuels), real stock returns (calculated using the difference between the continuously compounded returns on the S&P 500, and inflation measured using the consumer price index). The data are monthly from 1947.1 to 1996.4. After unit root and cointegration tests, he runs an unrestricted VAR with ordering of interest rates, real oil price, industrial production and real stock returns. For oil price changes he uses the growth rate of real oil price and oil price volatility (*SOP*) which is calculated by a GARCH(1 1). He finds that oil price changes and oil price volatility have a significantly negative impact on real stock returns. He also finds that industrial production and interest rates respond positively to real stock returns shocks. According to him, the response of the stock market to oil price shocks is asymmetric. When he uses asymmetric oil price shocks (positive oil price changes and negative oil price changes), positive shocks explain more forecast error of variance in real stock returns, industrial production and interest rates than negative shocks during the full sample period. For the post-1986 period, positive and negative oil price shocks explain almost the same fraction of forecast error variance of real stock returns, while in the pre-1986 period positive oil price shocks contribute more to the forecast error variance in real stock returns than negative oil price shocks.

In a research work conducted by Park and Ratti (2007) using multivariate vector autoregressive approach for a sample period of 1986:1-2005:12 in Norway (an oil-exporting economy like Nigeria), their findings reveal that oil price fluctuations account for a six percent volatility in real stock returns. However, for most European economies understudied, it has been shown that increased volatility of oil prices significantly depresses real stock returns. For the United States, the study reveals that oil price shocks, rather than interest rates, explain more of the fluctuations in real stock market returns. This also conforms to the study of Sadorsky (1999) that oil prices explain a larger fraction of the forecast error variance in real stock returns than interest rates after 1986.

In a work conducted by Bjørnland (2008) for Norway, in which stock returns are incorporated in a structural VAR model, it is observed that a 10 percent rise in oil prices, increase stock returns by 2.5 percent with robust results for linear and non-linear measures of oil prices. The author concludes that the Norwegian economy responds to higher oil prices by increasing aggregate wealth and demand, while emphasizing the role of monetary policy shocks, in particular, as driving forces behind stock price variability in the short run.

Eryiğit (2009) analyze the impacts of oil price changes on the sectoral indices of the Turkish stock exchange using daily data. Adopting the ordinary least square technique, he estimates an extended market model which include market return, oil prices (in Turkish Lira), oil price in dollars and exchange rate (USD/TL) to determine the effects of the oil price (USD) changes on market indexes in Istanbul Stock Exchange (ISE) for the period of 2000 - 2008. His findings show that changes in oil price (TL) has statistically significant effects on electricity, wholesale and retail trade, insurance, holding, investment, wood, paper, printing, basic metal, metal and non-metal products, machinery and mineral products indices at the 5 percent significance level. In addition, changes in oil price (USD) have a significant positive effect on wood, paper printing, insurance and electricity sub-sector indices.

Using a similar methodology as well as the Granger causality approach for the United States for the period 1990:1 to 2007:2, Afshar, *et al* (2008) examine three specifications of oil prices on stock returns. They find out that oil price declines have a significant impact on stock returns, but not oil price increases. Further analysis by these authors suggests that oil price shocks and the USD currency are important sources of stock return variability. According to Basher and Sadorsky (2006), oil price increases act as inflation tax, which will lead consumers to source for alternative energies, increase risk and uncertainty which adversely affect stock prices and reduce wealth. They adopt an international multi-factor model that allow for both conditional and unconditional risk factors to explore the link between oil price risk and emerging stock market returns. They find strong evidence that oil price risk impacts stock price returns in emerging markets.

Miller and Ratti (2009) examine the long-run relationship between the world crude oil price and international stock markets for the sample period 1971:1–2008:3 using a co-integrated VECM. They conclude that international stock market indices respond negatively to increases in the oil price in the long run. They also establish the existence of a long-run co-movement between crude oil price and stock market during 1971:1–1980.5 and 1988:2–1999.9 with evidence of a breakdown in the relationship after this period. They find that it was suggestive of the possibility that the relationship between real oil price and real stock prices has changed in recent time period compared to the earlier period.

Papapetrou (2001) attempts to investigate the linkages among oil prices, real stock prices, interest rates, real economic activity and employment for Greece using a multivariate vector-autoregression (VAR) approach. The empirical results from the paper suggest that while oil prices were important in explaining stock price movements, stock market returns do not lead to changes in real activity and employment. They however, observe that changes in the oil price affect real economic activity and employment. Driesprong, *et al* (2003) findings suggest that oil price changes significantly predict negative excess returns and that financial investors seem to under-react to information in the oil price. They observe a strong linkage between monthly stock returns and lagged monthly changes in oil price.

Cunado and de Gracia (2003) analyze the effect of oil price changes by looking at the asymmetric effect of oil price changes on output for a set of European countries. Following the existing literature, they measure oil prices in four different ways. These four methods are: oil price growth from four quarters earlier; only the positive of these growths; maximum growth level of oil prices compared to one, two, three, and four years prior; and the positive standardized oil price shocks with the conditional standard deviation that comes from the GARCH (1,1) specification. They provide the evidence that (i) oil price increases lower the output but the evidence for oil price decreases on output is not statistically significant and (ii) oil price shocks' effect on output is higher when oil prices are more stable than when they are more volatile. Their results suggest that a non-linear relationship(s) may exist between oil prices and output.

In a later study, Jimenez-Rodriguez and Sanchez (2005) extend the previous study by including Norway (a net oil-exporting European country) and a set of non-European countries including Canada, Japan, and the US. They also consider positive as well as negative standardized oil shocks to the analyses. They find that the effect of oil-price rise on output decline is higher than the effect of oil-price fall on output increase. With the oil-exporting countries in their sample (Norway and the UK), oil price increase favorably affects Norway but adversely affect the UK.

It is important to recognize that the effects of oil price increases on output growth of individual countries are mostly positive. They do not find negative and statistically significant effects of oil price shocks on the output growth even for oil-importing countries. They note that not finding these effects of oil price increases on oil-importing countries does not contradict the existing literature.

Mountford (2005) find that positive oil shocks (even non-significant ones) increase output for two periods in the UK. Similarly, Hooker (1996) argues that after 1973, oil prices no longer Granger causes output and Jimenez-Rodriguez and Sanchez (2005) observe that Japanese output increases with oil shocks. Jimenez-Rodriguez (2008) also argues that even if "[a]n oil price increase lowers the level of aggregate manufacturing output in all countries under study ... [t]his similarity of response is, however, unclear when we consider the eight industry groups within manufacturing." She observes that textile, wearing apparel, and leather industry output increases for France, Germany, and Spain with positive oil price shocks. However, this does not mean that the adverse effects of oil price shocks for growth are not present.

Lippi and Nobili (2008) maintain that the source of oil shocks may affect economic performance differently: oil price increases due to higher oil demand shocks affect output differently than oil price increases due to lower world oil supply shocks. They argued that positive oil supply shocks decrease domestic production. In order to assess the effects of oil supply shocks, they employ the sign-restrictions approach pioneered by Canova and Nicolo (2002) and Uhlig (2005). They set up a three-variable VAR model that includes world crude oil production, twelve real price changes, and domestic growth rates. Following Lippi and Nobili (2008), they define positive oil supply price shocks such that oil production decreases but oil prices increase at the contemporaneous period where no additional restrictions are put on for additional periods as well as for their effect on output.

In Nigeria, attempts have been made to examine the asymmetric effect of oil price on output and prices. For example, Aliyu (2009b) assesses empirically, the effects of oil price shocks on real macroeconomic activity in Nigeria. In line with the approaches employed in the literature- that is classifying oil price as asymmetric and net specifications oil price specifications- Granger causality tests and multivariate VAR analysis were carried out using both linear and non-linear specifications. Inter alia, the latter category includes two approaches employed in the literature, namely, the asymmetric and net specifications oil price specifications. The paper finds evidence of both linear and non-linear impact of oil price shocks on real GDP. In particular, asymmetric oil price increases in the non-linear models are found to have positive impact on real GDP growth of a larger magnitude than asymmetric oil price decreases adversely affects real GDP. The non-linear estimation records significant improvement over the linear estimation and the one reported earlier by Aliyu (2009a). Further, utilizing the Wald and the Granger multivariate and bivariate causality tests, results from the latter indicate that linear price change and all the other oil price transformations are significant for the system as a whole. The Wald test indicates that our oil price coefficients in linear and asymmetric specifications are statistically significant.

Olomola (2006) investigated the impact of oil price shocks on aggregate economic activity (output, inflation, the real exchange rate and money supply) in Nigeria using quarterly data from 1970 to 2003. The findings revealed that contrary to previous empirical findings, oil price shocks do not affect output and inflation in Nigeria significantly. However, oil price shocks were found to significantly influence the real exchange rate. The author argues that oil price shocks may give rise to wealth effect that appreciates the real exchange rate and may squeeze the tradable sector, giving rise to the “Dutch-Disease”.

Akpan (2009) analyses the dynamic relationship between oil price shocks and economic acivities. His findings show that major oil price shocks significantly increase inflation and also directly increases real national income through higher export earnings, though part of this gain is seen to be offset by losses from lower demand for exports generally due to the economic recession suffered by trading partners. The findings also reveal a strong positive relationship between positive oil price changes and real government expenditures.

III. Econometric Specification

The Nigerian economy can be described in a structural form model as follow:

$$V_0 y_t = V(L) y_{t-1} + \varepsilon_t \tag{1}$$

where V_0 is the contemporaneous coefficient matrix; V(*L)* is a matrix of polynomial in the lag operator *L* , y_t is an n x 1 data vector that includes [rGDP, CPI, M_2, Dr, RER, Po, ASI]. rGDP stands for real gross domestic product; CPI is the consumer price index; M_2 represents monetary aggregate broadly defined, Dr is the deposit rate (which is the policy variable) and RER stands for rer exchange rate defined as nominal exchange rate (naira/dollar) multiplied by relative prices of the US CPI and the Nigerian CPI; Po is the oil prices asymmetry using the Nigeria's bonny light and ASI stands for all-share index, proxied for the activity in the capital market. ε_t is a vector of *n* x 1 serially uncorrelated structural disturbances and var(ε_t) = Θ , where Θ is a diagonal matrix, so the structural disturbances are assumed to be mutually uncorrelated.

The reduced form VAR model is:

$$y_t = M(L) y_{t-1} + \mu_t \tag{2}$$

where $M(L) = V_o^{-1} V(L)$ is a matrix of polynomial in the lag operator *L* and var(υ_t) = Ψ .

To achieve the identification of the model in equation 1 from the estimated parameters in the reduced form in equation 2, one could have used as the baseline identification scheme, the popular and convenient method based on the Choleski decomposition (as in Sims, 1980, among others). However, this approach implies a recursive structure which imposes restrictions (which cannot be tested) on the basis of an arbitrary ordering of the variables and the estimated result may be sensitive to the ordering imposed. As such, we identify the model by using a non-recursive structure based on economic theory that allows contemporaneous simultaneity among the variables by following Kim and Roubini (2000). The non-recursive identification used as the baseline identification imposes exclusion on the contemporaneous incidence of the structural shocks based on prior theoretical and empirical information about the economic structure.

As shown in equation 3 below, the following restrictions are applied to the contemporaneous structural parameters in (1). All the zero restrictions are on the contemporaneous structural parameters and no restrictions are imposed on the lagged structural parameters (An and Sun, 2008).

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & f_{16} & 0 \\ f_{21} & 1 & 0 & 0 & 0 & f_{26} & 0 \\ f_{31} & f_{32} & 1 & f_{34} & 0 & 0 & 0 \\ 0 & 0 & f_{43} & 1 & f_{45} & f_{46} & 0 \\ f_{51} & f_{52} & f_{53} & f_{54} & 1 & f_{56} & f_{57} \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ f_{71} & f_{72} & f_{73} & f_{74} & f_{75} & f_{76} & 1 \end{pmatrix} \begin{pmatrix} rGDP \\ CPI \\ M_2 \\ Dr \\ RER \\ PO \\ ASI \end{pmatrix} = K(L) \begin{pmatrix} rGDP \\ CPI \\ M_2 \\ Dr \\ RER \\ PO \\ ASI \end{pmatrix} + \begin{pmatrix} \varepsilon_{rGDP} \\ \varepsilon_{CPI} \\ \varepsilon_{M2} \\ \varepsilon_{Dr} \\ \varepsilon_{RER} \\ \varepsilon_{Po} \\ \varepsilon_{ASI} \end{pmatrix} \tag{3}$$

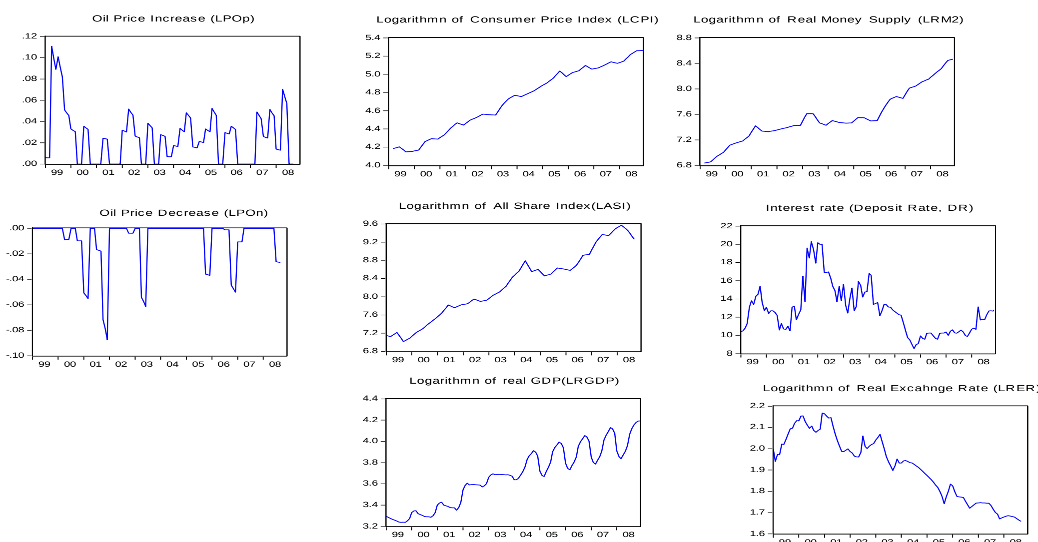
ε_{rGDP}, ε_{CPI}, ε_{M2}, ε_{Dr}, ε_{RER}, ε_{Po} and ε_{ASI}, are structural disturbances on real GDP, consumer price index, aggregate money supply, deposit rate, real exchange rate oil price asymmetry and all-share index, respectively.

Before we explain the details of our identifying restrictions, it is worth noting that the following relations are contemporaneous restrictions on the structural parameters of y_0 without further restrictions on the lagged structural parameters. In constructing the identifying restrictions in the model, the paper follows Jimenez-Rodriguez, (2007), Gordon and Leeper (1994), Kim and Roubini (2000), Davis and Haltiwanger (2001) and Lee and Ni (2002). It is assumed that aggregate output, (rGDP) is only contemporaneous influenced by oil price changes (Po), and the prices (CPI) only react immediately to innovations in aggregate output and oil prices. The first two equations of the system (3) support the idea that the reaction of the real sector (aggregate output and prices) to shocks in the monetary sector (money, interest rate and exchange rate) is sluggish (Jimenez-Rodriguez, 2007). The third equation of the system (3) can be interpreted as a short-run money demand equation. Money demand is allowed to respond contemporaneously to innovations in output, prices and interest rate.

The fourth equation represents the monetary policy reaction function. The monetary authority sets the interest rate after observing the current money stock, oil prices and the exchange rate, but does not respond contemporaneously to disturbances in aggregate output and prices. The argument is that information about the latter variables is only available with a lag, since they are not observable within a month (Jimenez-Rodriguez, 2007). The exchange rate, being an asset price, reacts immediately to all other macroeconomic variables. We also assume that oil prices are contemporaneously exogenous, that is, oil prices do not respond contemporaneously to disturbances in other macroeconomic variables (Lee and Ni, 2002; Jimenez-Rodriguez, 2007). Furthermore, all share index (ASI) responds contemporaneously to all macroeconomic variables. It is worth noting that the non-recursive structure (contrary to the recursive one) allows contemporaneous interactions between the interest rate and the exchange rate, and the non-reaction of the interest rate contemporaneously to changes in output and inflation (Sims and Zha, 1998), as well as the contemporaneous interactions between the interest rate and money stock (Kim and Roubini, 2000).

The VAR models are estimated in levels using monthly data[1] between 1999 and 2008. All the variables are in logarithms and real form except interest rate (Dr). Given the short sample, this paper does not consider an explicit analysis of the long-run behavior of the economy. By estimating the VAR in levels, implicit cointegrating relationships are allowed in the data. Standard information criteria are used to select the lag lengths of the VAR, which turn out to be 12. There is no evidence of structural breaks at the 5 percent confidence level using Chow test.

Figure 1 displays the data used for the estimation of the Structural VAR



[1] These data are collected from various publications of the Central Bank of Nigeria.

IV. Empirical Analysis

Contemporaneous Coefficients

The baseline model is estimated with 12 lags and a constant is assumed. The model is just identified, with 21 zero restrictions[2]. The likelihood ratio test suggests that over-identified restrictions cannot be rejected at conventional significance level with the Chi-square (7) = 2965 and a p-value of 0.000. Table 1 reports the estimated contemporaneous coefficients in the structural model.

Table 1: Estimated Contemporaneous Structural Parameters

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0.62* & 0 \\ 0.24* & 1 & 0 & 0 & 0 & -0.02 & 0 \\ -3.46* & -2.25* & 1 & -1.23* & 0 & 0 & 0 \\ 0 & 0 & 37.91* & 1 & -53.94* & 14.88* & 0 \\ -27.78* & -23.70* & -35.52* & -0.63* & 1 & 7.41* & -39.31* \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 84.19* & 62.83* & 76.16* & -0.21 & 23.91* & 3.82* & 1 \end{pmatrix}$$

Note: * denotes significance at 1% levels of significance.

Table 1 estimates contemporaneous structural parameters for oil price increase. Parameters of oil price decrease are not reported here but are available on request. Aggregate output (rGDP) is contemporaneously influenced by oil price changes (Po) and the impact is negative and significant (f16>0). Prices (CPI) only react immediately to innovations in aggregate output and oil prices. An increase in oil prices increases CPI but not significantly (f_{26}<0) and increase in output reduces prices significantly (f_{21}>0). The third equation of the system (3), which is a short-run money demand equation, is allowed to respond contemporaneously to innovations in output, prices and interest rate. An increase in output, prices, and exchange rate significantly increase demand for money (f_{31}<0; f_{32}<0 and f_{34}<0), which conform to *a priori* expectations.

The fourth equation, which represents the monetary policy reaction function, shows that monetary authority sets the interest rate after observing the current money stock, oil prices and the exchange rate, but does not respond contemporaneously to disturbances in aggregate output and prices. An increase in money demand and oil price leads to an appreciation of the currency (f_{43}>0;

[2] Number of restrictions are derived using the formula $(n^2-n)/2$, where n is the number of variables in the SVAR model.

and $f_{46}>0$), while a depreciation in the exchange rate increases interest rate ($f_{45}<0$). The exchange rate, being an asset price, reacts immediately to all other macroeconomic variables. An increase in output, price, money demand interest rate and all-share index results in exchange rate deprecation ($f_{51}<0$; $f_{52}<0$; $f_{53}<0$; $f_{54}<0$ and $f_{57}<0$). Also, an oil price increase results in the appreciation of the naira ($f_{56}>0$).

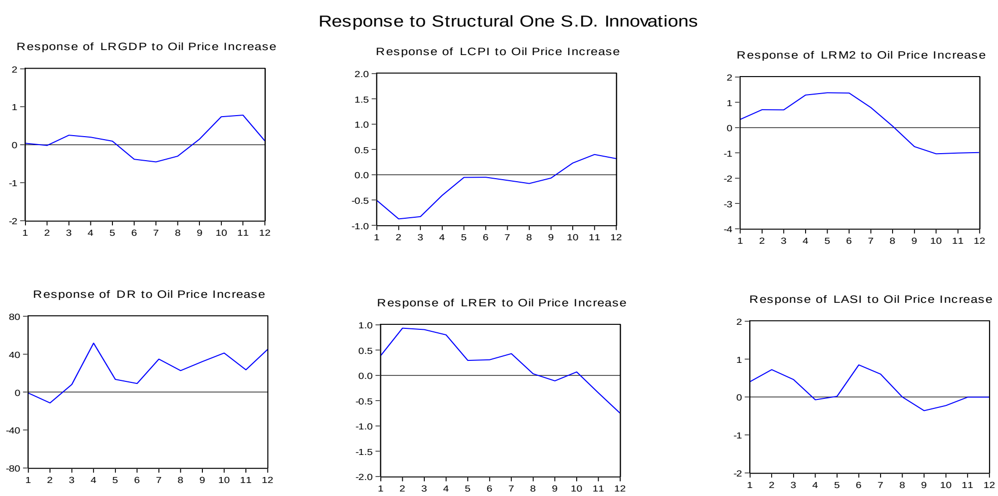
Since oil prices are contemporaneously exogenous, they do not respond contemporaneously to disturbances in other macroeconomic variables. All-share index (ASI) responds contemporaneously to all macroeconomic variables. An increase in prices and demand for money reduce all share index ($f_{72}>0$ and $f_{73}>0$). However, an increase in interest rate raises the all share index ($f_{74}<0$).

Impulse Response Functions

Asymmetry Impact of Oil Price

Impulse response functions are dynamic simulations showing the response of an endogenous variable over time to a given shock. Figures 2 and 3 reveal the impulse response of an asymmetric impact of oil prices on output, price, money demand, exchange rate and all-share index.

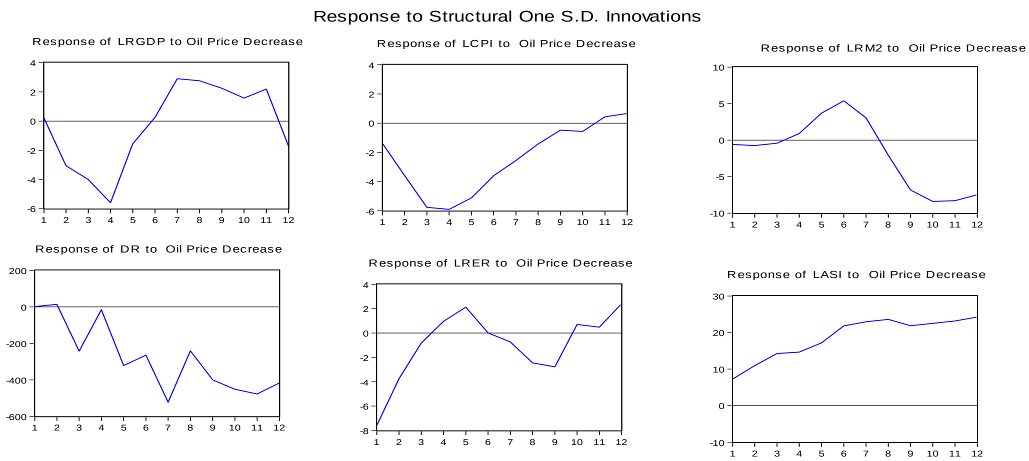
Figure 2: Impact of Oil Price Increase on output, price, money demand exchange rate and all-share index



These figures show that positive oil price shocks are associated with an increase in real GDP after two months, whereas oil price decrease significantly reduces real output immediately. It is evident that the effect of an oil-price rise on the increase in output is less than the effect of an oil-price fall on the decrease in output.

Jimenez-Rodriguez and Sanchez (2005) findings for Norway confirm this. For an oil-importing country, they found that the effect of an oil-price rise on output decline is higher than the effect of an oil-price fall on output increase.

Figure 3: Impact of Oil Price Decrease on output, price, money demand, exchange rate and all-share index



In Nigeria, oil price increase leads to depreciation of the naira, which is contrary to *a priori* expectation. This confirms the findings by Jimenez-Rodriguez and Sanchez (2005), and Chen and Chen (2007) that a rise in real oil prices led to a depreciation of the real exchange rate for G7 countries. However, Berument, et al (2009) find that the currency appreciates significantly for Oman and the UAE (which are net oil exporting countries) when oil price is increased. They also find that the currency appreciates for Iran, Kuwait, Syria, and Tunisia but these effects are not statistically significant. However, one needs to be cautious in interpreting the exchange rate effects of oil price shocks because the effect may depend on the exchange rate regime, and the willingness of central banks to use their exchange reserves for a share of oil during international trade transactions. Even though oil price increase results in exchange rate depreciation, the depreciation in exchange rate arising from oil price increase is less than that of oil price decrease.

It is expected that the impact of oil price increase on stock returns in oil-exporting countries, like Nigeria, should be positive as shown in the literature (Park and Ratti (2007). This paper establishes that oil price increase raises the all-share index immediately. However, oil price decrease also increase all-share index, which is puzzling. One may interpret this as evidence of the possible non-linearity of the relationship between oil prices and all-share index. It is also glaring that even though, oil price increase raises all-share index, the positive impact of oil price increase on all-share index is less than that of oil price decrease.

Shocks to oil price raises money supply immediately and this also impacts interest instantaneously. However, declining in price due to oil price increase for an oil-exporting country like Nigeria that is characterized by fiscal dominance is puzzling. It is expected that oil price increase will raise inflation immediately. However, oil price decrease reduces money supply immediately and this transmits into reduction in price significantly. It is glaring that the impact of an oil price decrease on price is higher than that of an oil price increase.

Variance Decomposition

What is the contribution of the different structural shocks on real GDP, consumer price index, monetary policy rate, aggregate money supply, nominal exchange rate and all-share index, arising from oil price asymmetry? The paper assesses this issue by computing the percentage of the variance of the *k*-step ahead forecast error that is accounted for by the identified structural shocks. Table 2 reports the variance decomposition at horizons up to 24 months for real GDP, consumer price index, monetary policy rate, aggregate money supply, oil price, nominal exchange rate and all-share index.

Table 2(a): Structural Variance Decomposition- Oil Price Increase

Variance Decomposition of LRGDP:

Horizon	S.E.	rGDP(Shock1)	CPI(Shock2)	M2(Shock3)	Dr(Shock4)	RER(Shock5)	P0(Shock6)	ASI (Shock7)
6months	2.05	83.50	10.35	0.011	0.006	0.002	6.122	0.000
12	2.91	52.67	26.81	0.030	0.008	0.003	20.47	0.001
24	8.41	19.57	60.23	0.030	0.012	0.002	20.142	0.003

Variance Decomposition of LCPI:

Horizon	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6months	3.76	21.008	65.653	0.005	0.002	0.000	13.331	0.001
12	4.06	20.519	65.901	0.009	0.005	0.001	13.564	0.001
24	4.54	22.647	63.394	0.008	0.005	0.002	13.942	0.002

Variance Decomposition of LRM2:

Horizon	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6months	5.41	11.188	66.613	0.0022	0.008	0.004	22.185	0.001
12	6.59	12.633	62.616	0.0034	0.005	0.003	24.736	0.001
24	7.84	13.705	54.0888	0.007	0.005	0.004	32.186	0.002

Variance Decomposition of DR:

Horizon	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6months	110	24.741	49.564	0.010	0.005	0.002	25.674	0.003
12	158	27.343	32.485	0.015	0.015	0.003	40.135	0.005
24	197	24.768	34.428	0.014	0.014	0.002	40.768	0.004

Variance Decomposition of LRER:

Horizon	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6months	3.21	29.891	44.270	0.011	0.010	0.001	25.814	0.002
12	3.72	31.964	42.435	0.014	0.013	0.002	25.566	0.003
24	4.84	34.132	32.118	0.011	0.012	0.002	33.722	0.002

Variance Decomposition of DLPOP

Horizon	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6months	1.92	10.124	16.624	0.008	0.006	0.001	73.237	0.001
12	2.04	14.454	19.030	0.009	0.006	0.001	66.497	0.001
24	2.69	13.165	38.141	0.009	0.006	0.002	48.674	0.001

Variance Decomposition of LASI

Horizon	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6months	2.77	44.682	34.051	0.025	0.055	0.119	21.063	0.003
12	3.76	48.290	36.302	0.018	0.032	0.067	15.286	0.002
24	6.81	16.433	57.434	0.013	0.023	0.040	26.051	0.002

Factorization: Structural

Shocks to oil price (increase in oil price) contribute between 22.2- 32.2% to money supply variance decomposition as shown in Table 2(a) and Appendix 1, whereas oil price decrease explains 18.1-86.5 percent of the variance decomposition of money supply in the same period (Table 2(b). It is evident that oil price decrease has a greater impact on money supply than oil price increase. Also, the impact of oil price increase on real exchange rate shock averages 28 per cent between 6 and 24 months horizon, whereas oil price decrease contributes, on the average, 88 per cent of the variation in real exchange rate, which implies that the impact of oil price decrease on real exchange rate is significantly higher than that oil price increase.

Table 2(b): Structural Variance Decomposition- Oil Price Decrease

Variance Decomposition of LRGDP

Period	S.E.	Shock1 (LrGDP)	Shock2 (LCPI)	Shock3 (LrM2)	Shock4 (Dr)	Shock5 (LRER)	Shock6 (LrPO)	Shock7 (LASI)
6	7.93	5.328	0.461	0.006	0.017	0.002	94.185	0.000
12	9.93	6.254	1.860	0.006	0.017	0.001	91.861	0.000
24	41.56	4.134	1.403	0.004	0.013	0.000	94.45	0.000

Variance Decomposition of LCPI

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6	12.11	10.652	6.060	0.002	0.008	0.000	83.278	0.000
12	12.59	10.773	6.040	0.002	0.008	0.000	83.176	0.000
24	17.70	10.167	4.710	0.004	0.011	0.001	85.108	0.000

Variance Decomposition of LRM2

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6	15.67	63.096	18.832	0.001	0.001	0.001	18.067	0.001
2	23.50	34.978	10.643	0.003	0.007	0.001	54.364	0.001
24	51.29	10.703	2.7834	0.005	0.014	0.0001	86.493	0.000

Variance Decomposition of DR

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6	513.01	7.938	3.445	0.007	0.0193	0.001	88.588	0.000
12	1173.58	2.445	0.867	0.008	0.021	0.001	96.658	0.000
24	1568.82	2.975	0.7891	0.007	0.019	0.001	96.209	0.000

Variance Decomposition of LRER

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6	9.51	8.5189	5.7837	0.007	0.022	0.001	85.667	0.000
12	10.64	7.775	5.394	0.006	0.020	0.001	86.803	0.000
24	19.73	6.147	3.612	0.005	0.014	0.001	90.219	0.000

Variance Decomposition of DLPON

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6	5.53	3.881	0.867	0.003	0.011	0.001	95.236	0.000
12	10.67	2.136	1.089	0.005	0.015	0.000	96.753	0.000
24	17.91	2.084	1.106	0.006	0.016	0.000	96.787	0.000

Variance Decomposition of LASI

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
6	39.45	10.659	1.922	0.006	0.016	0.003	87.391	0.000
12	69.00	3.526	0.802	0.006	0.016	0.001	95.645	0.000
24	112.83	2.322	0.538	0.006	0.016	0.001	97.115	0.000

Factorization: Structural

Oil price increase accounts for an average of 15.5 percent variation in real output between 6 and 24 months horizon, whereas oil price decrease contributes, on the average 93.2 percent to the variation in real output in the same period. Next to its own shocks, the contribution of oil price increase to prices is about 14 percent after 24 month horizon, while oil price decrease accounts for 85 per cent of the variation in prices after 24-month horizon. The variance decomposition suggests that shocks to oil price (increase in oil price) on the average explains 35.3 percent and 21 percent of the variation in deposit rate and all-share index, respectively, between 6 and 24 months horizon. However, oil price decrease contributes on the average 94 percent and 93 percent of the variance decomposition of deposit rate and all-share index, respectively, for the same period. It is evident from these findings that an oil price decrease impacted more significantly on the Nigerian economy than an oil price increase.

It is evident that the impact of oil price increase or decrease on output and price differs significantly, with the dominance of the impact of an oil price decrease on output and price. This is not surprising in that Nigeria depends solely on oil and any negative shocks to the price of oil will affect revenue and invariably hinder the execution of projects and plans. Moreover, in all the variance decomposition, oil price shocks, CPI and real GDP play significant role in determining the variance decompositions arising from all the shocks. The implication is that any policy to move the economy forward must center on price stability and rapid economic growth, and oil price plays a significant role in this regard.

V. Summary and Conclusions

This paper develops a structural VAR model in which the asymmetric effect of oil price shocks on output and price, among others, are analyzed within a unifying model. The model is applied to Nigeria from 1999:01 to 2008:12. Our analyses start from a set of sensible identifying assumptions which are consistent with Nigeria's economic structure. The resulting predictions support the identifying assumptions in that the estimated dynamic responses are close to the expected movements of macroeconomic variables. Then we study the relationship among oil price shocks, output, price, money, deposit rate, exchange rate and all-share index, and the following empirical results are found.

First, that positive oil price shocks are associated with an increase in real GDP after two months, whereas oil price decrease significantly reduces real output immediately. Second, that oil price decrease leads to a depreciation of naira, which is also established by Jimenez-Rodriguez and Sanchez (2005) and Chen and Chen (2007). Third that the impact of oil price shock on money supply and all-share index is asymmetric; it raises the all-share index and money supply immediately. Fourth, that shocks to oil price (increase in oil price) contribute between 22.2- 32.2% to money supply variance decomposition whereas oil price decrease contributes 18.1-86.5 percent of the variance decomposition of money supply in the same period; and fifth, that oil price increase accounts for an average of 15.5 percent variation in real output between 6 and 24 months horizon, whereas oil price decrease contributes, on average 93.2 percent to the variation in real output in the same period.

In conclusion, the asymmetric effect of oil price shocks on output and price indicates that economic policy should respond cautiously to it. This justifies the establishment of Sovereign Wealth Funds (SWF), known as the Nigerian Sovereign Investment Authority Act 2011[3]. Lucas, (quoted in Berument, et al 2009) also pointed out in his speech (Tokyo, November 11, 2004) that "[...] in reacting to oil price shocks, it is, therefore, important that policy-makers do not repeat the mistakes of the past [. . .] Monetary policy should aim to ensure that inflation expectations are not adversely affected by the unavoidable 'first-round' direct and indirect effects of an oil price shock on the price level and that they remain anchored to price stability. By preventing oil price shocks from having 'second-round' effects on inflation expectations and on wage and price-setting behaviour, monetary policy can contain the unfavourable consequences of these shocks on both inflation and growth [...]."

This study limits itself to an analysis of the effects of oil price shocks on the growth of economic activities in Nigeria. The results constitute a small portion of the domain of associations and further studies in relation to existing economic structures and the transmission channels of oil price movements are required. For example, the effects of oil price shocks on fiscal balance, current account, interest rates and real exchange rates could also be explored.

[3] A Sovereign Wealth Fund (SWF) is an investment fund owned by a sovereign state/nation with the mandate to invest in financial assets such as stocks, bonds, precious metals, property and other financial instruments. Sovereign Wealth Funds are usually established to save and invest the excess liquidity that arises from natural resource exploitation. When for instance revenue from crude oil sales exceed the budget projections, the extra revenue represents excess liquidity. Pumping the excess liquidity through spending back into the national economy has the capacity to disrupt planned economic fundamentals, particularly in a situation when the inflation rate is high. The net effect of that is that the value of money is affected, economic plans are disrupted and the economic targets become unrealized. There is thus the need to warehouse and save the excess liquidity and then invest it for the long-term in order to ensure that a nation maximizes its benefits.

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Appendix 1: Structural Variance Decomposition- Oil Price Increase

	Variance Decomposition of LRGD							
Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	1.000724	99.85536	0.000000	0.000000	0.000000	0.000000	0.144637	0.000000
2	1.311121	99.65083	0.237091	0.001111	0.000182	0.000312	0.110414	5.75E-05
3	1.399445	93.04086	3.645264	0.003298	0.000366	0.000913	3.309202	9.66E-05
4	1.739927	93.52406	3.049095	0.004695	0.001113	0.001555	3.419184	0.000300
5	1.921871	94.44085	2.517231	0.008770	0.003705	0.001738	3.027435	0.000275
6	2.055238	83.50630	10.35207	0.011129	0.006377	0.002072	6.121808	0.000249
7	2.183855	78.27181	11.99271	0.010429	0.006114	0.002063	9.715986	0.000882
8	2.209431	76.86380	11.74083	0.013909	0.007198	0.002104	11.37061	0.001543
9	2.347814	73.04432	16.46450	0.022899	0.009954	0.002151	10.45452	0.001653
10	2.672486	61.57190	22.74533	0.025579	0.009049	0.002306	15.64456	0.001280
11	2.908175	52.73440	26.83532	0.029422	0.008932	0.002661	20.38818	0.001087
12	2.910181	52.67209	26.81149	0.030017	0.008920	0.002706	20.47336	0.001411
13	3.486505	54.87414	26.42126	0.021827	0.006737	0.001920	18.67229	0.001827
14	4.484537	44.76002	37.58546	0.022849	0.008213	0.001560	17.61969	0.002219
15	5.077001	39.49647	45.51701	0.027908	0.010956	0.001855	14.94328	0.002519
16	5.525319	35.44744	51.41660	0.031306	0.013012	0.002477	13.08618	0.002981
17	5.780174	37.20347	50.41322	0.034629	0.015335	0.002949	12.32717	0.003224
18	5.866433	37.02789	49.49106	0.036290	0.016956	0.003189	13.42135	0.003268
19	6.087726	34.63072	48.13932	0.033990	0.016320	0.003022	17.17350	0.003125
20	6.480132	30.74794	49.85999	0.031647	0.014660	0.002671	19.34003	0.003065
21	7.128605	26.66131	53.66608	0.030253	0.013391	0.002367	19.62374	0.002863
22	7.826544	22.54776	56.95892	0.029200	0.012172	0.002173	20.44713	0.002645
23	8.328680	19.93164	59.48884	0.029608	0.011844	0.002176	20.53332	0.002572
24	8.410387	19.57853	60.23245	0.030173	0.011882	0.002160	20.14222	0.002580

Variance Decomposition of LCPI:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	1.376299	33.44756	52.79277	6.26E-34	4.89E-33	1.81E-32	13.75967	2.79E-34
2	2.563569	26.63812	57.75112	0.000279	3.61E-06	2.35E-05	15.61043	2.97E-05
3	3.430329	24.21577	61.22767	0.000890	5.04E-05	3.38E-05	14.55544	0.000142
4	3.647166	22.34248	63.51586	0.001786	0.000274	6.23E-05	14.13922	0.000316
5	3.717664	21.50621	64.85924	0.003262	0.000955	7.34E-05	13.62963	0.000628
6	3.761555	21.00778	65.65282	0.004891	0.002007	0.000132	13.33148	0.000895
7	3.827293	20.76324	66.25905	0.006842	0.003364	0.000338	12.96615	0.001019
8	3.872231	21.01247	66.10218	0.008214	0.004453	0.000659	12.87099	0.001033
9	3.873923	21.02800	66.06670	0.008915	0.004982	0.000916	12.88945	0.001035
10	3.916839	21.35534	65.67937	0.008787	0.004900	0.000998	12.94959	0.001016
11	4.003974	21.13530	65.46625	0.008506	0.004773	0.000957	13.38322	0.000989
12	4.069992	20.51995	65.90082	0.008533	0.004887	0.000942	13.56385	0.001021
13	4.087106	20.97259	65.46603	0.008574	0.005006	0.001032	13.54566	0.001104
14	4.110390	21.42562	65.12445	0.008491	0.005100	0.001139	13.43407	0.001125
15	4.217343	21.70991	65.10392	0.008083	0.004897	0.001219	13.17090	0.001069
16	4.318838	21.94276	64.78337	0.007740	0.004707	0.001329	13.25907	0.001022
17	4.418462	22.46773	64.17248	0.007522	0.004509	0.001474	13.34529	0.000993
18	4.477916	22.56959	63.81362	0.007490	0.004394	0.001605	13.60231	0.000992
19	4.503912	22.46470	63.72145	0.007636	0.004362	0.001684	13.79916	0.000998
20	4.510880	22.40988	63.68674	0.007870	0.004438	0.001723	13.88834	0.001011
21	4.511656	22.41215	63.66973	0.008043	0.004547	0.001742	13.90278	0.001017
22	4.515012	22.43122	63.61037	0.008039	0.004541	0.001751	13.94307	0.001016
23	4.525749	22.55197	63.38343	0.008033	0.004591	0.001761	14.04919	0.001024
24	4.546398	22.64724	63.39424	0.008281	0.004851	0.001834	13.94246	0.001093

Variance Decomposition of LRM2:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	0.45896	39.14602	11.12995	0.037426	0.110756	7.65E-06	49.56526	0.010581
2	1.10497	11.53108	39.27221	0.011301	0.057501	0.000927	49.12480	0.002175
3	1.77618	21.18370	44.23166	0.005141	0.044336	0.003394	34.53093	0.000850
4	3.16135	22.70953	49.81956	0.001696	0.018869	0.004481	27.44555	0.000309
5	4.35621	15.36944	60.14128	0.001738	0.011364	0.004448	24.47144	0.000284
6	5.41613	11.18804	66.61299	0.002229	0.007612	0.003862	22.18476	0.000508
7	5.78558	9.826010	68.83885	0.003219	0.006671	0.003621	21.32088	0.000749
8	5.83501	9.732507	69.28268	0.004009	0.006616	0.003802	20.96934	0.001046
9	5.94379	10.80769	67.37720	0.004194	0.006414	0.003927	21.79935	0.001219
10	6.15362	12.09378	64.69029	0.003960	0.005987	0.003782	23.20084	0.001353
11	6.35563	12.47667	63.25757	0.003727	0.005625	0.003600	24.25143	0.001380
12	6.59839	12.63357	62.61695	0.003580	0.005281	0.003361	24.73589	0.001368
13	6.81723	13.21855	62.26577	0.003626	0.004979	0.003224	24.50241	0.001441
14	6.91755	14.11882	61.52815	0.004119	0.004924	0.003212	24.33917	0.001606
15	6.95469	14.66215	61.06215	0.004658	0.004928	0.003329	24.26102	0.001763
16	6.98343	14.54217	60.71440	0.005597	0.005066	0.003564	24.72731	0.001889
17	7.05806	14.29711	59.45731	0.005998	0.004987	0.003884	26.22872	0.001997
18	7.15967	14.12942	57.79739	0.006124	0.004846	0.004185	28.05585	0.002180
19	7.31430	14.33314	55.93457	0.005972	0.004644	0.004361	29.71501	0.002305
20	7.48997	13.93082	54.51155	0.005974	0.004479	0.004534	31.54026	0.002390
21	7.62876	13.51049	53.85773	0.006236	0.004493	0.004626	32.61395	0.002466
22	7.70977	13.35786	53.83380	0.006685	0.004681	0.004617	32.78981	0.002540
23	7.78056	13.50445	53.95909	0.007101	0.005012	0.004535	32.51721	0.002609
24	7.84268	13.70490	54.08878	0.007409	0.005482	0.004473	32.18630	0.002656

Variance Decomposition of DR:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	2.68258	19.92558	58.00939	9.194802	0.002184	1.51E-07	12.86784	0.000209
2	14.3579	33.11660	2.449054	0.365194	0.000733	0.024871	64.04297	0.000569
3	16.8518	27.68096	2.901303	0.309323	0.056337	0.066194	68.94130	0.044580
4	101.662	17.41244	54.98303	0.009409	0.001805	0.001872	27.59012	0.001324
5	108.497	24.58542	49.63721	0.010156	0.003227	0.002026	25.75903	0.002927
6	110.108	24.74122	49.56448	0.010158	0.004707	0.002150	25.67428	0.003006
7	117.865	22.51709	46.33067	0.014350	0.008732	0.002656	31.12281	0.003688
8	120.647	21.91216	44.82833	0.014261	0.010724	0.002587	33.22837	0.003566
9	137.191	29.66079	39.15081	0.013396	0.010419	0.002481	31.15846	0.003641
10	145.194	28.38380	35.74796	0.012111	0.011181	0.002333	35.83903	0.003594
11	150.089	30.46123	33.51968	0.012703	0.012447	0.002576	35.98747	0.003892
12	158.847	27.34305	32.48541	0.015151	0.014826	0.002504	40.13541	0.003647
13	177.342	21.94742	37.15369	0.012182	0.012670	0.002068	40.86895	0.003019
14	179.527	22.63418	36.25610	0.012633	0.012873	0.002019	41.07904	0.003142
15	182.036	23.04095	36.65992	0.012331	0.012785	0.002134	40.26882	0.003065
16	182.991	22.81796	37.11284	0.012238	0.012755	0.002278	40.03879	0.003132
17	185.188	24.35391	36.32199	0.011950	0.012633	0.002264	39.29404	0.003209
18	187.081	24.01099	36.09302	0.011799	0.012553	0.002274	39.86620	0.003154
19	187.510	24.04216	36.09976	0.012075	0.012665	0.002294	39.82765	0.003391
20	190.474	24.97860	36.11082	0.011927	0.012349	0.002224	38.88061	0.003469
21	192.138	25.43300	35.68316	0.012004	0.012462	0.002221	38.85345	0.003704
22	193.023	25.52747	35.36855	0.012603	0.012818	0.002203	39.07250	0.003859
23	195.578	24.96043	34.90698	0.014241	0.013864	0.002220	40.09813	0.004147
24	197.293	24.76893	34.42804	0.014640	0.013925	0.002216	40.76806	0.004188

Variance Decomposition of LRER:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	0.786254	64.14839	10.76340	0.089708	0.050618	1.59E-05	24.92588	0.021988
2	1.957416	39.74958	33.40622	0.022385	0.016366	1.56E-05	26.79998	0.005448
3	2.891767	32.94016	44.97839	0.011488	0.009827	0.000230	22.05717	0.002734
4	3.087273	29.77029	44.12284	0.011482	0.010506	0.000401	26.08192	0.002557
5	3.174894	29.50398	44.95722	0.010862	0.009951	0.000541	25.51500	0.002444
6	3.214500	29.89078	44.27049	0.010910	0.010148	0.000683	25.81442	0.002571
7	3.299757	29.45493	44.33402	0.012249	0.011129	0.001170	26.18354	0.002961
8	3.374507	28.39024	46.53198	0.013988	0.013869	0.001682	25.04520	0.003039
9	3.386231	28.35770	46.62721	0.015394	0.015546	0.002105	24.97890	0.003137
10	3.422006	29.71772	45.74751	0.015818	0.015653	0.002598	24.49721	0.003489
11	3.531071	31.54213	44.45486	0.015194	0.014790	0.002444	23.96715	0.003438
12	3.727564	31.96470	42.43544	0.014268	0.013345	0.002195	25.56692	0.003136
13	3.789361	31.31709	41.18846	0.014174	0.013067	0.002181	27.46198	0.003051
14	3.823017	31.10199	40.61322	0.014151	0.012875	0.002275	28.25246	0.003026
15	3.917028	31.54953	41.39726	0.013653	0.012265	0.002242	27.02217	0.002885
16	4.039443	33.38428	40.77363	0.012949	0.011655	0.002360	25.81235	0.002780
17	4.231491	35.47181	39.67896	0.012025	0.010878	0.002313	24.82141	0.002596
18	4.353739	37.63495	37.91135	0.011718	0.011037	0.002576	24.42582	0.002550
19	4.365132	37.64549	37.74433	0.011827	0.011509	0.002720	24.58153	0.002597
20	4.404246	37.33493	37.20349	0.012396	0.011988	0.002726	25.43167	0.002796
21	4.483820	36.91165	36.14875	0.011971	0.011641	0.002658	26.91048	0.002849
22	4.620457	37.20825	34.82658	0.011274	0.011072	0.002549	27.93749	0.002786
23	4.736365	35.54620	33.58703	0.010792	0.011039	0.002427	30.83977	0.002733
24	4.846075	34.13226	32.11798	0.010964	0.011611	0.002361	33.72198	0.002839

Variance Decomposition of DLPOP:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	100.0000	0.000000
2	1.273294	0.068765	11.26119	0.009409	0.006137	0.000303	88.65326	0.000941
3	1.332315	7.660726	11.10351	0.011520	0.008539	0.000638	81.21420	0.000867
4	1.447821	6.736056	13.24216	0.012400	0.009688	0.000778	79.99776	0.001161
5	1.754552	11.78722	16.05046	0.009473	0.006611	0.000535	72.14491	0.000800
6	1.905086	10.12397	16.62419	0.008440	0.005656	0.000475	73.23656	0.000713
7	1.929525	11.96270	16.22469	0.009490	0.005665	0.000466	71.79628	0.000709
8	1.976875	13.94569	17.38608	0.009233	0.005621	0.000445	68.65226	0.000677
9	1.982776	14.38788	17.28658	0.009672	0.005775	0.000444	68.30897	0.000680
10	2.007197	14.52774	18.46147	0.009832	0.006197	0.000749	66.99335	0.000664
11	2.012146	14.45636	18.79674	0.009793	0.006204	0.000919	66.72925	0.000730
12	2.037578	14.45446	19.03023	0.009797	0.006282	0.001121	66.49739	0.000719
13	2.038356	14.45870	19.01735	0.010293	0.006387	0.001122	66.50542	0.000725
14	2.043764	14.84063	18.93383	0.010257	0.006358	0.001288	66.20690	0.000727
15	2.082250	14.41357	19.00726	0.011143	0.006689	0.001366	66.55924	0.000735
16	2.092854	14.50373	18.84498	0.012115	0.007362	0.001555	66.62952	0.000745
17	2.111810	15.13382	19.27256	0.012753	0.008155	0.001735	65.57011	0.000875
18	2.119141	15.36214	19.29639	0.012676	0.008674	0.002229	65.31700	0.000899
19	2.222859	13.97346	23.77028	0.011523	0.008320	0.002350	62.23324	0.000826
20	2.384986	12.20293	30.28784	0.010666	0.007245	0.002077	57.48850	0.000748
21	2.538593	11.76617	35.69598	0.010367	0.006970	0.001841	52.51791	0.000755
22	2.545751	12.06427	35.68816	0.010390	0.007242	0.001837	52.22735	0.000757
23	2.603019	12.47651	36.44155	0.010050	0.006930	0.001817	51.06240	0.000746
24	2.696327	13.16543	38.14065	0.009963	0.006586	0.001744	48.67493	0.000695

Variance Decomposition of LASI:

Period	S.E.	Shock1	Shock2	Shock3	Shock4	Shock5	Shock6	Shock7
1	0.476192	27.96145	0.020105	0.008926	0.035511	0.320221	71.65143	0.002360
2	1.045267	36.98355	0.213769	0.001918	0.047326	0.204369	62.54858	0.000491
3	1.563697	50.95685	12.06458	0.009550	0.082432	0.191633	36.69448	0.000478
4	2.047635	66.47436	11.73961	0.023540	0.080350	0.156227	21.52293	0.002985
5	2.201233	70.91979	10.15991	0.032652	0.084433	0.170577	18.62902	0.003624
6	2.774338	44.68199	34.05028	0.025543	0.055814	0.119751	21.06377	0.002846
7	3.071132	36.56933	42.18674	0.022647	0.046440	0.100364	21.07212	0.002362
8	3.230401	34.98623	45.81231	0.020778	0.042065	0.090860	19.04553	0.002238
9	3.442662	41.39600	40.59894	0.018588	0.037367	0.080024	17.86702	0.002061
10	3.666521	47.91379	35.83291	0.016728	0.033688	0.070872	16.13003	0.001981
11	3.714245	49.19490	34.96602	0.016414	0.032954	0.069416	15.71825	0.002051
12	3.766318	48.29022	36.30222	0.018444	0.032444	0.067739	15.28669	0.002245
13	3.925032	44.47010	40.65692	0.019989	0.030584	0.062393	14.75763	0.002389
14	4.196972	39.07154	45.16874	0.019996	0.027102	0.054571	15.65539	0.002657
15	4.534026	33.78510	48.64457	0.017882	0.023222	0.046963	17.47964	0.002616
16	5.140303	27.26519	51.94012	0.014038	0.018477	0.037205	20.72273	0.002247
17	5.718288	22.72732	53.77568	0.011343	0.015933	0.031289	23.43651	0.001927
18	5.844021	21.82766	54.33071	0.010876	0.017080	0.032183	23.77960	0.001887
19	5.868500	21.87077	53.88010	0.010905	0.019381	0.035562	24.18142	0.001872
20	5.993473	20.99429	52.16682	0.010890	0.021777	0.038773	26.76563	0.001815
21	6.139365	20.02151	50.47268	0.011383	0.024222	0.041215	29.42721	0.001775
22	6.272251	19.21836	50.63751	0.012734	0.026140	0.042898	30.06055	0.001802
23	6.460821	18.15612	52.96297	0.013368	0.026398	0.042937	28.79646	0.001754
24	6.815466	16.43297	57.43568	0.013127	0.024937	0.040514	26.05112	0.001651

Factorization:
Structural

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

Adeniyi O. Adenuga*

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

JEL Classification: E40, E44, G1, G11, O16

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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
			₦'Billion	₦'Billion	%	%	₦'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.

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

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_α:

β<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:

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

and the ecm can be written as:

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

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:

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

and the ecm can be written as:

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

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:

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

and the ecm can be written as:

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

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:

$$\Delta yr = \beta_0 + \sum_{i=1}^{k-1} \beta_i \Delta yr_{t-i} + \sum_{i=0}^{k-1} \alpha_i \Delta \pi_{t-i} + \sum_{i=0}^{k-1} \chi_i \Delta ir_{t-i} + \sum_{i=0}^{k-1} \delta_i \Delta sr_{t-i} + \sum_{i=0}^{k-1} \phi_i \Delta (mcr)_{t-i} +$$
$$\sum_{i=0}^{k-1} \varphi_i \Delta (tr)_{t-i} + \sum_{i=0}^{k-1} \gamma_i \Delta (vr)_{t-i} + \sum_{i=0}^{k-1} \eta_i \Delta cf_{t-i} + \sum_{i=0}^{k-1} \kappa_i \Delta cpr_{t-i} + \Omega ecm_{t-1} + \varepsilon_t \text{..........(11)}$$

where:

Δ indicates the first difference of a series.

β_0, β_i, α_i, χ_i, δ_i, ϕ_i, φ_i, γ_i, η_i, κ_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*** (4.376)	-11.239*** (3.486)	13.461*** (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*** (3.406)		5.568** (3.078)
D(CF(-2))	4.688* (3.184)		6.230** (3.173)
D(LCPI(-1))		-1.406** (42.745)	
D(CPR(-3))	0.471** (0.226)		
D(CPR(-4))	0.443** (0.245)	0.638** (0.295)	0.530** (0.257)
D(IR(-1))	7.353*** (2.057)		6.369*** (2.048)
D(IR(-2))	4.210** (1.696)		3.100** (1.605)
D(IR(-4))		11.141*** (2.028)	
ECM1(-1)	-0.534*** (0.158)	-0.508*** (0.088)	-0.588*** (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.

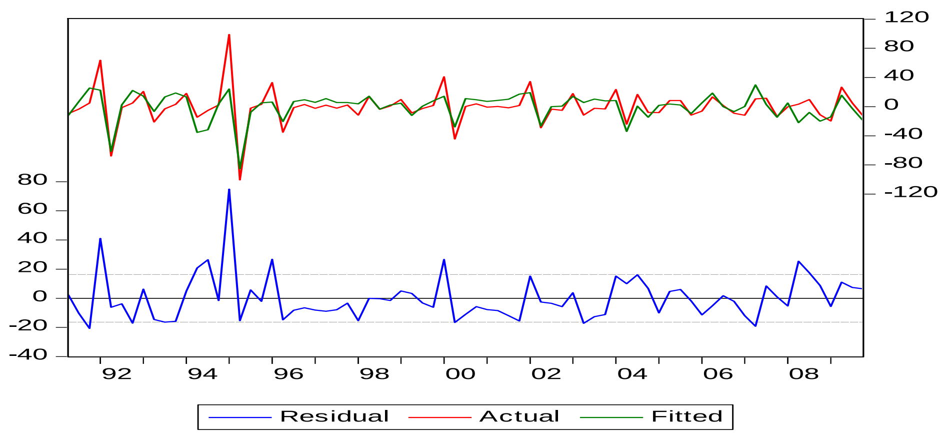
The ECM1 for Model A with mcr as a measure of stock market development indicates that 53.4 per cent of the previous quarter's disequilibrium from long-run equilibrium is corrected for within a quarter. In other words, the coefficient of the error correction term which measures the speed of adjustment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

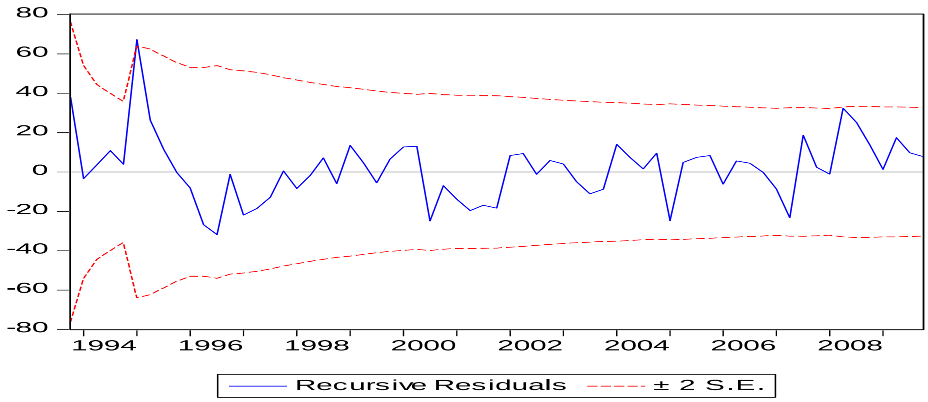
The residual graph, which shows the actual and fitted observations, is depicted below in Fig. 1. It shows that the fitted observations are as close as possible to their observed value.

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



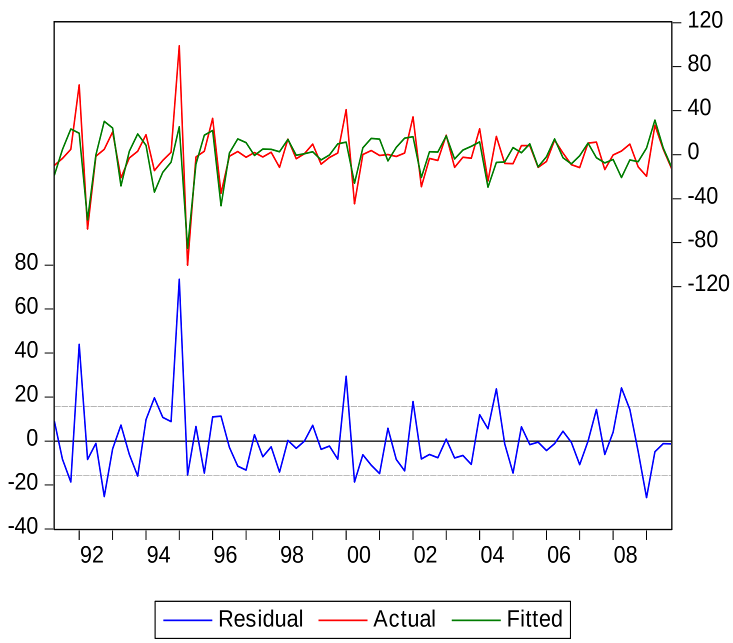
It can be observed from the results in Model C with vr as the measure of stock market development that the coefficient of the error correction term ECM1 (-1) has the expected negative sign and it is highly significant at the 1.0 per cent level of significance. The significance of the error correction 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).

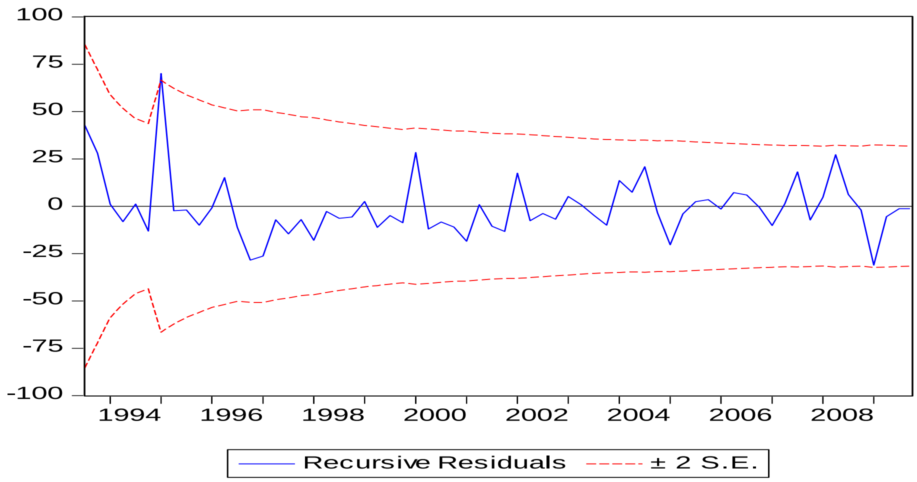
The residual graph, which shows the actual and fitted observations, is depicted below in Fig. 3. It indicates that the fitted observations are as close as possible to their observed value.

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		

Financial Liberalisation and Financial Fragility in Nigeria

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Abstract

Nigeria's financial liberalisation started in 1987 but this was followed by a banking crisis. The experiences of countries such as Nigeria which have experienced banking crises immediately after financial liberalisation have prompted some authors to posit that liberalisation is responsible for financial fragility and banking crisis. Using an index which measures the gradual progression and institutional changes involved in financial liberalisation, this paper conducts an empirical evaluation of the impact of financial liberalisation on financial fragility in Nigeria. The results show that liberalisation has exerted a significant negative effect on financial fragility in both the short run and long run.

JEL Classification: E44, E58, G18, O55

Keywords: Nigeria, Financial Liberalisation, Financial Fragility

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I. Introduction

The Nigerian government embarked upon financial liberalisation as part of its Structural Adjustment Programme (SAP) in 1987 with the belief that freeing up financial markets would help in stimulating economic growth. There was a banking crisis in the immediate aftermath of the financial liberalisation. The deregulation of interest rates in 1993 resulted in a wide increase in the interest rate spread and the increased lending rates made it difficult for small and medium scale enterprises to secure loans. In addition, the relaxation of entry into banking resulted in the widespread establishment of banks which were poorly-managed and stretched the regulatory capacities of the Central Bank of Nigeria (CBN). The banking crisis was at its most severe stage between 1991 and 1995 and by 1993, insolvent banks accounted for 20 percent of total assets and 22 percent of banking system deposits (Caprio and Klingebiel, 1996). Various measures were put in place to cope with the crisis which included establishment of a deposit insurance scheme, re-regulating interest rates, strengthening the regulatory powers of the CBN and legislations enhancing the speedy trial of erring banking officials.

In this paper we conduct an empirical evaluation of the effects of financial liberalisation on financial fragility in Nigeria. Financial liberalisation has been recognised as a key factor responsible for financial fragility and banking crises (Diaz - Alejandro, 1985; Demirguc - Kunt and Detragiache, 1999; Kaminsky and

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Reinhart, 1999). However, some authors have shown that such fragility after liberalisation occur only in the short-run and that financial liberalisation promotes stability and growth in the long-run (Kaminsky and Schmukler, 2002; Loayza and Ranciere, 2004; Tornell and Westermann, 2004). Thus, we aim to test the effects of financial liberalisation on financial fragility in the long-run. We have developed an index of financial liberalisation which measures the different phases of the deregulation and institution building process involved in financial liberalisation. This index is then included as an explanatory variable in a financial fragility equation to examine the effects of liberalisation on financial fragility in Nigeria.
The rest of this paper is organised as follows. The next section provides a review of the literature and section 3 gives an overview of Nigeria's financial sector. The analytical framework is presented in section 4 and this is followed by the econometric analysis in section 5. The last section concludes the paper.

II. Literature Review

II.1 Review of Theory

The theoretical link between financial liberalisation and economic growth has been identified by many authors such as Schumpeter (1912), McKinnon (1973), Shaw (1973), Galbis (1977), and Pagano (1993). Schumpeter (1912) discards the common belief at that time that money's sole function was a medium of exchange and nothing else. This view was summed up in the notion "that the creation of money is merely a technical matter, with no deeper significance for the general theory of economic life" (Schumpeter 1912, p.100). He disagrees with Ricardo's belief that banks cannot contribute to the process of wealth creation but asserts that banks - and indeed all financial intermediaries - are created not only for transporting money but also for granting credit.

Schumpeter asserts that creation of credit by banks is essential for economic development, and makes the assumption that only the entrepreneur needs credit. Credit provides the entrepreneur with purchasing power without which, it would be impossible to produce. Credit can therefore be seen to feed industrial development. However, credit does not just come automatically but has to be borrowed and this can be done only through financial intermediaries. Financial intermediaries are seen to perform the role of bridging the gap between products and means of production and they achieve this by providing the entrepreneur with purchasing power. Economic development can then proceed once the entrepreneur has been empowered by credit.

McKinnon (1973) and Shaw (1973) projected the analysis that financial liberalisation was needed to remedy the problems caused by financial repressive policies of developing countries. McKinnon and Shaw both identified financial repression as a regime consisting of the imposition of interest-rate ceilings, foreign-exchange regulations, direct credit allocation policies, high reserve requirements, and heavy taxation of the financial sector. They identified many developing countries as pursuing such policies, which had the effect of retarding economic growth in the long run. Such policies they both argued resulted in shallow finance, which reduced the real size of the financial system and, consequently, hampered its role of efficient mobilisation and allocation of resources. McKinnon and Shaw note that the problem with lagging economies is not lack of investment opportunities but unattractive savings. A main feature of shallow finance is that the low level of interest rates discourages agents from saving and consequently, this makes capital for investment hard to come by. Lagging economies are also characterised by manipulation of prices in virtually all markets.

Galbis (1977) extended the analysis of McKinnon and Shaw. He examines an economy comprised of two production sectors with contrasting financial constraints and technological processes, but which produce the same output. There are two sectors: a less efficient sector and a more efficient sector which is more technologically advanced and has higher rates of return on investment. With low deposit rates of interest because of financial repression, investment will take place in the less efficient sector as it would be more profitable for firms to invest rather than increase their bank deposits. Credit will not flow to the more efficient sector. However, with increased deposit rates following financial liberalisation, the low return on investment in the less efficient sector means that firms would prefer to increase their bank deposits – by reducing investment – and this increases credit flowing to the more efficient sector. The higher rate of return on investment in the more efficient sector means that the quality of investment will increase, and this will increase economic growth.

The importance of financial development to growth has also been highlighted in the endogenous growth models. The endogenous growth theories emphasise the role of financial intermediaries in economic growth. They show how there can be self-sustaining long-run growth as a result of liberalised financial markets and better functioning financial intermediaries. The influence of financial markets on economic growth can be best seen in the simplest of these endogenous growth models. The model of Pagano (1993) may be utilised to make the point. In this framework the ‘AK’ model, in which aggregate output is a linear function of the aggregate capital stock, can be expressed as:

$$Y_t = AK_t \tag{1}$$

Pagano (1993) assumes firstly that the population is stationary. He also assumes that a single good is produced in the economy, which can be consumed or invested (to depreciate at the rate of δ per period); and thirdly, he assumes that a proportion (1-φ) of the flow of saving is lost during financial intermediation.
Following from these assumptions, gross investment can be expressed in the form below:

$$I_t = K_{t+1} - (1 - \delta)K_t \quad (2)$$

Capital market equilibrium is given by:

$$\varphi S_t = I_t \quad (3)$$

This follows from combining the third assumption with the capital market equilibrium condition (saving = investment) that rules in a closed economy with no government.

From equation (2) the growth rate of output, Y, at time t + 1 will now be:

$$g_{t+1} = Y_{t+1}/Y_t - 1 = K_{t+1}/K_t - 1$$

Using equation (3) and dropping the time indices the steady-state growth rate can now be expressed as:

$$g = A\frac{I}{Y} - \delta = A\varphi s - \delta \quad (4)$$

where s = S/Y is the gross saving rate.

Equation (4) shows that financial development can affect growth in three ways:

(a) Improving the allocation of capital - by raising A, the social marginal productivity of capital, financial intermediaries improve the allocation of capital. This can be done in two principal ways: first, by inducing individuals to invest in riskier but more productive technologies by providing risk-sharing opportunities; and second, by collecting information and making sure that the most productive investments are financed.

(b) Channelling funds to firms - by raising φ, the proportion of saving channelled to investment, intermediaries can help to increase the growth rate g.

(c) Affecting the savings rate - by raising s, the private savings rate, the financial system increases the resources available for capital accumulation, and given that returns to capital are non-decreasing, the financial system can permanently raise the rate of growth of output per capita.

The link between financial liberalisation and financial fragility has been highlighted by some authors such as Dell'Ariccia and Marquez (2005), Ranciere, et al. (2005), and Demirguc-Kunt and Detragiache (1999).

Dell'Ariccia and Marquez (2005) showed that financial liberalisation can increase the incidence of financial crisis through a number of ways. The first avenue relates to a changing information structure of financial markets. When the number of borrowers whose financial and credit history are unknown to the banks increases, there is more competition in credit markets and banks stop screening and credit is granted to all borrowers. With increasing and indiscriminate lending, coupled with the fact that it is only credit granted to known borrowers that yield positive profits, banks are increasingly exposed to risk, and the probability of a crisis increases. Second, financial liberalisation, through capital account liberalisation, can induce capital inflows which could result in a fall in deposit interest rates. Such a fall in banks' costs of funds could result in less stringent lending rules and, consequently, lead to a lending boom which would increase financial fragility.

Another way through which financial liberalisation could induce fragility is through the relaxation of entry into banking. Increased competition from new entrants forces the incumbent (which could be a monopoly or oligopoly) to lower lending standards and desist from screening of borrowers to pooling. This will increase credit but at the same time, reduce the bank's loan portfolio and profits which would increase financial vulnerability. The implication of the above is that increased credit due to indiscriminate lending causes deterioration in the loan portfolio of banks and reduces profits. The lending boom also makes the banking system vulnerable to macroeconomic shocks because increased lending makes banks' profits sensitive to fluctuations. The overall effect is that the probability of financial fragility increases following financial liberalisation.

Demirguc-Kunt and Detragiache (1999) show that financial liberalisation increases interest rate risk which can increase banking crisis. This is because interest rate deregulation resulting in increases in short-term interest rates means that banks have to increase deposit interest rates. However, they will not be able to increase lending rates because most long-term loans have fixed interest rates. Thus, banks will be forced to incur losses or at best record lower profits because the interest rates on loans cannot be adjusted quickly. In addition to this, even if lending rates can be increased under short notice, this would cause an increase in non-performing loans. Thus, higher interest rates resulting from financial liberalisation would increase financial fragility. Furthermore, the removal of interest rate ceilings means that loans to high risk borrowers will become possible and could even be profitable. This is because banks can charge higher interest rates for high risk borrowers and, thus, the proportion of high-risk loans will increase. The liberalisation of financial markets relaxes bank supervision and regulation which could result in imprudent practices by banks. The establishment of a deposit insurance scheme can also result into a crisis if banks resort to moral hazard behaviour and lend to customers who are not credit worthy since they feel that the deposit insurance will bail them out in the event of any crisis.

II.2 Review of Empirical Literature

A number of studies have been conducted to empirically examine the relationship between banking crisis or financial fragility on one hand, and financial liberalisation on the other hand. There seems to be a consensus from these studies that financial liberalisation increases the incidence of banking crisis and leads to fragility of the financial sector. A review of some of the empirical literature is provided below.

Demirguc-Kunt and Detragiache (1998) conducted a study to examine the determinants of banking crisis using a sample of 65 developing and developed countries. The authors employed data over the period 1980 – 1994 and the estimation involved the use of a multivariate logit model. The dependent variable is a dummy variable for banking crisis where the dummy takes on a value of zero if there is no crisis and the value of one if there is a crisis. Explanatory variables employed include the ratio of private credit to GDP as a proxy for financial liberalisation, the growth rate of real GDP, terms of trade, real short-term interest rate, inflation, rate of depreciation of the exchange rate, and ratio of bank cash and reserves to bank assets. Other variables are a dummy variable for deposit insurance, indexes of the quality of institutions, and per capita GDP. The results of estimation showed a significant positive effect of the private credit ratio on the probability of banking crisis, thereby, implying that financial liberalisation has increased the incidence of banking crisis in the countries. Other variables which had a significant positive effect on the probability of banking crisis are the real interest rate, inflation, and deposit insurance. The variables that were significantly negatively related to the probability of banking crisis are growth rate of real GDP, terms of trade, per capita GDP, and variables that captured law and order.

Demirguc-Kunt and Detragiache (1999) conducted a study using data for 53 countries to examine the relationship between financial liberalisation and financial fragility. The study period covered 1980 – 1995 and a multivariate logit model was used to examine the probability of a banking crisis. The dependent variable was a dummy variable for banking crisis and the primary explanatory variable was a financial liberalisation dummy variable. The financial liberalisation variable takes on a value of zero prior to removal of interest rate controls and a value of one after removal of interest rate controls. Other explanatory variables include the growth rate of real GDP, terms of trade, real short-term interest rate, inflation, rate of depreciation of the exchange rate, ratio of bank cash and reserves to bank assets, a dummy variable for deposit insurance, indexes of the quality of institutions, and per capita GDP. The results showed a significant positive coefficient for the financial liberalisation variable, thus implying that financial liberalisation is a significant factor leading to financial fragility. Other variables which had significant positive coefficients are the real interest rate, inflation, and lagged total credit growth. The variables which were negatively correlated with financial fragility were real GDP growth, terms of trade, and per capita GDP.

Tornell and Westermann (2004) study sought to examine the relationship between financial liberalisation and financial fragility. The authors employed data for 52 countries over the period 1980 – 1999. The dependent variable is financial fragility which is defined as the negative skewness of credit growth. Financial liberalisation is measured by an index which captures a more liberalised financial system if cumulative capital inflows exceed 10 percent of GDP or if such series experience a trend break. The authors found that financial liberalisation is associated with an increase in the mean of credit growth and a fall in the skewness of credit growth. This has the implication that financial liberalisation leads to increased financial fragility.

Loayza and Ranciere (2004) employed the pooled-mean group estimator to examine the effects of financial intermediation and financial liberalisation on economic growth and financial crisis. The authors used data for 75 countries over the period 1960 – 2000. The results of estimating growth regression showed that financial intermediation has had a negative effect on economic growth in the short-run but the relationship has been positive in the long-run. Using the standard deviation of the growth rate of the ratio of private sector credit to measure financial volatility arising from financial liberalisation, the authors found that financial volatility increases the incidence of banking crisis and this has had an adverse effect on economic growth. The authors concluded that financial liberalisation increases financial volatility and this increases the incidence of banking crisis.

III. Overview of the Nigerian Financial Sector

The banking system in Nigeria effectively started with the establishment of the African Banking Corporation in 1892. Two years after the establishment of the African Banking Corporation, the Bank of British West Africa (BBWA) (now called First Bank) was established and this new bank acquired the African Banking Corporation. Other banks that were established in this early period were the Anglo-African Bank in 1905[1], Barclays Bank Dominion, Colonial and Overseas in 1917 (now called Union Bank) and the British and French Bank in 1949 (now called United Bank for Africa). The early period of banking in Nigeria was characterised by lax regulations and there were virtually no restrictions or laws guiding the establishment of banks.[2]

The first indigenous bank was the Industrial Commercial Bank which was established in 1929. Other early indigenous banks were the Nigerian Mercantile Bank established in 1931, National Bank of Nigeria established in 1933, Tinubu Properties Limited in 1937 which later became the African Continental Bank, Agbonmagbe Bank established in 1945, and Nigerian Farmers and Commercial Bank which was set up in 1947. There was a boom in the establishment of banks from the late 1940s into the early 1960s but most of these banks did not last long and failed within a few years. Generally, many of the indigenous banks did not survive, while the expatriate banks fared better. The reasons for this included the fact that many of these indigenous banks lacked the managerial expertise to effectively run the banks. Another reason was the fact that the foreign banks were linked to their head-offices in developed countries, and they had access to more capital and most of the indigenous banks could not compete with them.

The widespread failure of banks necessitated the need for regulation. A commission of inquiry - Paton Commission - was then set up in 1948 to investigate

[1]The name of this bank was changed to Bank of Nigeria and it was later acquired by the BBWA
[2]The only restriction was that they could not issue Bank of England notes

banking in Nigeria and recommend appropriate actions needed for the regulation of the industry. The government acted on the recommendations of the Paton Commission in 1952 when it enacted the 1952 Banking Ordinance. Despite the fact that the 1952 Banking Ordinance put some regulatory control into the banking industry, there were still a lot of concerns that more needed to be done. First, it was felt that the expatriate banks exerted too much control over banking activities and that they were not favourably disposed to the developmental needs of the country. They were seen more as avenues for the expatriate companies to obtain funds and did not serve indigenes well. There was also no recognised body to conduct regulatory and supervisory activities in this sector. There was no central bank and the body that was responsible for issuing currency was the West African Currency Board (WACB). All these concerns resulted in the government setting up the Loynes Commission in 1958 and following the submission of the report of this commission, the Central Bank Ordinance of 1958 was enacted which established the Central Bank of Nigeria.

The Central Bank of Nigeria (CBN) started operations on the 1st of July 1959 with an authorised capital of ₦3.0 million which was paid by the Federal Government. The 1960s marked the beginning of the CBN's regulatory control of banking in Nigeria. There were a number of amendments to the 1958 Ordinance, all of which resulted in more stringent banking regulations and restrictions to entry. For instance, amendments to the 1958 Ordinance were made in 1961, 1962, and 1964 and a new decree was enacted with the 1969 Banking Decree. All these banking legislations further regulated banking and notable developments were the increase of paid-up capital for banks, guidelines regarding liquidation of banks, and stipulation of capital-deposit ratios.

Financial liberalisation started in Nigeria in 1987. The liberalised policies induced a flurry of activities in the financial sector. Most notably, there was a big increase in the number of banks operating in the country. The number of commercial banks operating in the country doubled from 29 to 65 between 1986 and 1992, while the number of branches increased from 1367 to 2275. However, there was a disproportionate concentration of bank branches in the urban areas as opposed to the rural areas with about twice as many bank branches in the urban areas to the rural areas. In addition to this, the number of merchant banks had quadrupled by the mid-1990s from 12 in 1986 to 51 in 1997.

With the proliferation of banks in the aftermath of financial liberalisation, there was an increase in the amount of loans granted by banks. Banks' loans and advances increased from ₦46.9 billion in 1987 to ₦57.6 billion in 1990, and then to over ₦650 billion by 2000 (Table 1). The table also shows that the composition of banks loans between the private and public sectors has been fluctuating since liberalisation. The credit provided by banks to the private sector was greater than credit to the public sector immediately after liberalisation from 1987 to 1991. This was reversed from 1992 to 1995 when credit to the public sector exceeded private sector credit, but this again changed from 1996 and private sector credit has since been larger than public sector credit.

Lewis and Stein (2002) identified two major factors that induced the increase in the number of banks operating in the country after liberalisation. The factors are the liberalisation of the capital account and the abolition of import licensing. These two policies limited the degree of rent-seeking in the economy, but with liberalisation came the dual foreign exchange mechanism where only banks were allowed to buy foreign currency at an official rate which they then sold at the autonomous/premium rate. This resulted in a shift in the pattern of rent-seeking from trade to financial services. Banking licences were granted based on political connections and the CBN's role was reduced to just granting licences.

Table 1:Banking System Credit To The Economy

YEAR	BANKING SYSTEM CREDIT (N MILLION) TO:			GROWTH OF CREDIT (%) TO:		
	Economy	Private Sector	Public Sector	Economy	Private Sector	Public Sector
1980	10787.5	7190.9	3596.6	21.7	32.8	4.4
1981	16268.5	9654.2	6614.3	50.8	34.3	84.1
1982	21906.8	11371.5	10535.3	34.7	17.8	59.3
1983	28182.1	12353.9	15828.2	28.7	8.6	50.3
1984	31141.6	12942	18199.6	10.5	4.8	15
1985	32680.3	13700.2	18980.1	4.9	5.9	4.3
1986	36820.3	17365	19455.3	12.7	26.7	2.5
1987	46926.4	25476.1	21450.3	27.4	46.7	10.3
1988	57326.3	29773.6	27552.7	22.2	16.9	28.4
1989	49259.1	30942.8	18316.3	-14.1	3.9	-33.5
1990	57674.9	36631	21043.9	17.1	18.4	14.9
1991	83823.7	45325.2	38498.5	45.3	23.7	82.9
1992	171071.1	79958.9	91112.2	65	4	136.7
1993	280657.6	95489.7	185167.9	74.7	19.7	103.2
1994	439113.8	151000.3	288113.5	8.1	47.5	-8.7
1995	474361.4	211358.6	263002.8	8.1	47.5	8.7
1996	332301.2	221835.6	110465.6	-25.4	21.8	-58
1997	321216.8	274958.4	46258.4	-3.3	23.9	-58
1998	485689.7	351760.7	133929	51.2	27.9	188.9
1999	632010.1	455205.2	176804.9	30	29.19	32.01
2000	667621.7	596001.5	71620.2	-23.1	30.9	-162.3
2001	848992.9	854999.4	-6006.5	79.89	43.5	95.16
2002	1394422.7	1023783.5	373639.2	64.6	19.7	-6320.6

Source: CBN Major Economic, Financial and Banking Indicators, 2004

By 1991, the financial sector was experiencing a banking crisis, but the signs of the unstable and volatile nature of the sector had started to emerge in the late 1980s when it came to the attention of the authorities that 8 banks (out of the 66 banks operating then) were technically insolvent. The government took some steps to bolster regulation and the Nigeria Deposit Insurance Corporation (NDIC) was created in 1988 to complement the CBN's efforts in banking supervision and the NDIC was primarily charged with insuring deposits and with bank inspection. Other prudential initiatives were the increase in the minimum paid-up share capital for all banks in 1991.[3] This period also saw varying degrees of reversals of the financial liberalisation policy. Interest rate controls were re-introduced in 1991 but were again de-controlled in 1992. The CBN also stopped further bank licensing in early 1991, coupled with new prudential guidelines on asset quality that were put in place which required better and more transparent accounting and loan classification from banks. The CBN Act, and the Banks and Other Financial Institutions Act were promulgated in June 1991 to strengthen the CBN's regulatory powers and granted the CBN more power in licensing banks and sanctioning failing banks. Despite these new steps, the CBN was still effectively answerable to the Presidency and the lack of independence hampered its effective prudential regulation and supervision of banks. The CBN was used more by the government to service its excessive budget deficits which exceeded 10 percent of GDP between 1991 and 1993.

Brownbridge (1998) notes that 60 percent of the total loan portfolios of state-owned banks were non-performing in 1994. The banks were also subject to high operating costs with the state-owned banks incurring costs of 76 percent of net earnings as against 49 percent for other banks (Brownbridge, 1998). Between 1993 and 1996, over N1 billion had been involved in frauds and forgeries in banks (Alashi, 2002). The new prudential guidelines introduced in 1991 made sure banks adequately classified non-performing loans and this provided the first indication of the extent of decay in the industry. State-owned commercial banks' ratio of classified loans (i.e. bad or doubtful debts) to shareholders funds was 2300 per cent, while for the private commercial banks, the ratio ranged between 151 per cent and 282 per cent. Merchant banks had a ratio of over 200 per cent. Classified loans for the whole industry were 45 per cent of total loans and advances (Brownbridge, 1998), and by 1996, classified loans of banks had reached ₦72 billion (Alashi, 2002).

By 1993, 28 banks were identified as insolvent and a further 26 were in the early

[3]This was increased from N20million to N50million for commercial banks and N12million to N40million for merchant banks.

stages of distress and the CBN took over six state-owned banks. The political instability with the annulment of elections and the taking-over of power by a military regime did not help matters and bank runs were clearly evident by 1994. This further exacerbated interest rates and interbank rates were over 100 percent in 1994. In a bid to restore some stability in the financial system the government re-introduced interest rate and exchange controls in 1994.

The Failed Banks (Recovery of Debts) and Financial Malpractices Decree was promulgated in 1994. The licences of 2 banks were suspended in 1994 and in 1995 17 private banks had been taken over by the CBN, while in the period from 1992 to 1995, 10 state banks had been taken over. In 1995, the CBN estimated that 60 out of 115 (effectively half the number of banks in the country) were distressed. Overall, 30 percent of total deposits and 20 percent of total assets of the banking system were held by the insolvent banks.

IV. Analytical Framework

The theoretical framework for our analysis of the effects of financial liberalisation on financial fragility draws from Dell'Ariccia and Marquez (2005), Loayza and Ranciere (2004), Tornell and Westermann (2004) and Demirguc-Kunt and Detragiache (1999). Consequently, we make use of a financial fragility equation and include financial liberalisation and some other variables as explanatory variables in the equation.

The financial fragility equation takes the following form:

$$FRAGILITY_t = \alpha_0 + \alpha_1 FINDEX_t + \alpha_2 INFLVOL_t + \alpha_3 GOVCON_t + \alpha_4 CASHBANK_t + \varepsilon \qquad (5)$$

where FRAGILITY = financial fragility

FINDEX= financial liberalisation index

INFLVOL= volatility of inflation

GOVCON= ratio of government consumption to GDP

CASHBANK = bank liquid reserves to bank assets ratio

ε = error term

To measure fragility, following other studies (Loayza and Ranciere, 2004) we have used the standard deviation of the growth rate of domestic credit provided by banks. This variable is employed primarily because of the observed infrequent, sharp and abrupt falls in credit growth associated with fragility. These abrupt falls in credit growth have been observed to occur during the banking crisis that are typical of the boom-bust cycles associated with financial liberalisation. The boom period sees rapid expansion of bank credit coupled with extreme credit risk, which leads to financial fragility and leaves the financial system prone to crisis (Loayza and Ranciere, 2004; Tornell and Westermann, 2004).

Financial liberalisation is the primary explanatory variable of interest. It is increasingly being recognised that the traditional measures of financial development such as the broad money ratio, ratio of credit to the private sector, and ratio of liquid liabilities do not give any indication of the progression and institutional changes involved in financial liberalisation policies. Consequently, recent studies have developed indexes that explicitly measure the progression made with liberalisation and track the different institutional changes involved with reforms (Bandiera, et al., 2000; Laeven, 2000; Arestis, et al., 2002; Kaminsky and Schmukler, 2002; Abiad, et al., 2004). In line with these studies, we have developed an index of financial liberalisation (FINDEX) which is derived from the method of principal components. Principal component analysis is useful for reducing the dimension of a data set and extracting the main relations from it. This method has been used in the financial liberalisation literature to obtain an index which measures the different phases of the deregulatory and institution-building process (see Bandiera, et al., 2000). What we do is to identify seven major indicators of moves towards liberalisation which are: bank denationalisation and restructuring, interest rate liberalisation, strengthening of prudential regulation, abolition of directed credit, free entry into banking, capital account liberalisation, and stock market liberalisation. We then allocate to each of these variables a value of 0 prior to liberalisation. After liberalisation, the indicators take on values from 1 and this increases depending on the progress made for each specific liberalisation policy. We get a matrix of 7 variables and then apply principal components analysis. We use the first principal component as our index of liberalisation, and this first component accounts for 78% of the total variation.

Following Demirguc-Kunt and Detragiache (1998) the other explanatory variables included in the financial fragility model are the volatility of inflation, the ratio of government consumption to GDP, and the ratio of bank liquid reserves to bank assets. The volatility of inflation is included to take account of macroeconomic uncertainty. Increased macroeconomic uncertainty and a government that has lost control of managing the economy can increase volatility in the financial system and, hence, banking crisis. The government consumption ratio is a proxy for fiscal policy of the government. A government whose fiscal position is in bad shape may not be able to bail out banks experiencing difficulties and this can result in a full blown crisis as more banks experience difficulties. The ratio of bank liquid reserves to bank assets is used to measure liquidity of the banking system. Adverse macroeconomic circumstances should be less likely to lead to crisis in countries where the banking system is liquid (Demirguc-Kunt & Detragiache, 1998).

V. Econometric Analysis

V.1 Methodology and Data

The methodology that will be employed in this paper is based on the Autoregressive Distributed Lag (ARDL) framework of Pesaran, Shin and Smith (1996), Pesaran and Shin (1999), and Pesaran, Shin and Smith (2001). The ARDL method has a number of advantages over other cointegration techniques. First, it allows the use of variables that are integrated of different orders in estimating long-run relationships. Specifically, variables that are I (0) or I (1) can be included in the same cointegrating equation. Another advantage that follows from this is that there is no need for unit root testing of the variables. All that is needed is that the variables be either integrated of order 0 or 1.

The ARDL procedure comprises of two steps. The first step involves testing the null hypothesis of no long-run relationship among the levels of the variables. In order to do this, an F-test with a non-standard distribution is employed. Pesaran, Shin and Smith (1996) have provided two sets of asymptotic critical values for this test for the cases when all the variables are I (1) and for cases when all variables are I (0). If the computed F-statistic exceeds the upper critical value, then the null hypothesis of no long-run relationship can be rejected. On the other hand, if the F-statistic is lower than the lower critical value, the null hypothesis cannot be rejected. If the F-statistic falls within the upper and lower bounds, then the result is inconclusive and there is a need for unit root tests to be conducted to ascertain if all the variables are I(1) and I(0). If all variables are either I (1) or I (0), then the null hypothesis can be rejected, and otherwise, the null hypothesis cannot be rejected.

If a long run relationship exists, then the second step can be implemented. This involves estimation of the ARDL model using either the AIC or SBC to select the maximum order of lags to obtain long run coefficients. This method involves the estimation of an error correction model (ECM) of the ARDL model. Thus, equation 5 above has to be changed to the ECM form. The financial fragility equation now becomes:

$$\Delta FRAGILITY_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{6i} \Delta FRAGILITY_{t-i} + \sum_{i=0}^{k} \alpha_{1i} \Delta FINDEX1_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta INFLVOL_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta GOVCON_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta CASHBANK_{t-i} + a_1 FRAGILITY_{t-1} + a_2 FINDEX1_{t-1} + a_3 INFLVOL_{t-1} + a_4 GOVCON_{t-1} + a_5 CASHBANK_{t-1} \quad (6)$$

Accordingly, the null hypothesis of no cointegration is tested against the alternative using the F-test from Pesaran, Shin and Smith (1996). The null hypotheses for the equation are:

H0: $a_1 = a_2 = a_3 = a_4 = a_5 = 0$

Annual time series data from the World Development Indicators (WDI) CD-ROM 2008 have been used for the econometric analyses and the data ranges from 1970 to 2006.

V.2 Presentation and Discussion of Results

We first conducted unit root tests on the variables included in our model. Although unit root tests are not compulsory for the ARDL approach, we feel it is still necessary to make sure that all the variables satisfy the conditions under which the ARDL approach can be employed, that is, that all variable be either I(0) or I(1). The augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were carried out for all variables in the model and the results are presented in Table 2. From Table 2, both the ADF and PP tests show that three variables are integrated of order 1. These variables are: financial liberalisation index, bank liquid reserves and bank assets ratio, and government consumption. The two tests also jointly conclude that one variable: volatility of inflation is integrated of order 0. However, the two tests give different results for the financial fragility variable. While the ADF test suggests this variable is stationary in levels, the PP test suggests it is stationary in first differences. However, since both tests come to the conclusion that all variables are either I (0) or I (1), the conditions for the ARDL approach are satisfied.

Table 2: Unit Root Tests

	Levels		First Difference		
Variables	ADF	PP	ADF	PP	Conclusion
fragility	-3.21**	-2.52	-4.59*	-4.79*	I(0)/I(1)
findex	-1.01	-0.89	-3.49**	-3.52**	I(1)
inflvol	-2.75***	-2.71***	-6.16*	-8.46*	I(0)
govcon	-1.84	-1.92	-5.53*	-5.58*	I(1)
cashbank	-2.23	-2.51	-4.17*	-3.93*	I(1)

Notes: the null hypothesis for each column is the presence of unit roots.
* indicates significant at the 1% level, ** significant at the 5% level, *** significant at the 10% level
all the tests were conducted with constant and no trend

We next conduct cointegration tests to establish the existence of a long-run relationship between the variables by computing the F-statistic for the joint significance of lagged levels of the variables. Because annual data is used in this analysis, the maximum lag length was set to two and the Akaike Information Criterion (AIC) was then used to determine the appropriate lag length. The F-statistic obtained is 2.5429 and this suggests the existence of a long-run relationship between financial fragility and the explanatory variables. The F-statistic falls within the lower and upper bounds at the 90% significance level[4]. Since all variables are either I (0) or I (1) from Table 2, we can conclude that a long-run relationship exists for the variables in equation 6.

Since the F-statistics suggest that a cointegrating relationship exists between the variables, we can now move on to the next stage of the ARDL procedure by estimating equation 6. The results of the regressions are presented in equations 7 to 8.

The long-run coefficients are presented in equation 7 and we see that financial fragility is negatively related with financial liberalisation. The financial liberalisation index has a negative coefficient which is statistically significant. This offers support for the theory that financial liberalisation induces financial fragility. The variable measuring the ratio of bank liquid reserves to bank assets is positive and significant and this is as expected, that financial fragility will be less likely to occur the more liquid a banking system is.

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[4]The critical value bounds are from Table B in Pesaran, Shin and Smith (1996) (with an intercept and no trend). They are 2.425-3.574, 2.850-4.049, and 3.817-5.122 at the 90%, 95%, and 99% significance levels, respectively.

$$\underset{(-0.49)}{\text{FRAGILITY} = -20.27} - \underset{(-2.23)^{**}}{9.82\text{FINDEX}} + \underset{(0.09)}{0.12\text{INFLVOL}} - \underset{(-0.56)}{1.22\text{GOVCON}} + \underset{(4.51)^{*}}{4.93\text{CASHBANK}} \quad (7)$$

Notes:

* indicates that a coefficient is significant at the 1 percent level, ** significant at the 5 percent level, and *** significant at the 10 percent level.

Figures in parenthesis ( ) are t-ratios.

Equation 8 presents the estimates of the error correction form of the ARDL model and the results are quite similar with those from equation 7. The coefficient on the dynamic component of the liberalisation proxy is significant negative, thus implying that short-run changes in financial liberalisation lead to short-run changes in financial fragility. The volatility of inflation and government consumption ratio are insignificant, just like in the long-run estimation. Also, the ratio of bank liquid reserves to bank assets is positive and significant.

Thus, financial liberalisation has had a negative impact on financial fragility in both the short and long run in Nigeria. This result confirms what was observed after Nigeria's financial liberalisation where the lending boom due to indiscriminate lending heralded a period of banking crisis. Our results are consistent with the studies that have found financial liberalisation as a determinant of financial fragility (Demirguc-Kunt and Detragiache, 1998, 2000; Kaminsky and Reinhart, 1999). Although some studies find that financial liberalisation should enhance stability in the long-run (Loayza and Ranciere, 2004; Tornell and Westermann, 2004), our results are in contrast with these as we find that financial fragility still has a significant negative relationship with financial liberalisation in the long-run.

For the diagnostic tests, the R^2 is about 0.54 which suggests a reasonable fit of the error correction model to the data. The F-statistic suggests the joint significance of the explanatory variables, and crucially, the error coefficient term (ecm(-1)) is negative and statistically significant which shows that the long run coefficients are jointly significant. This further supports the existence of a long-run relationship between the variables. The coefficient on the error correction term (the speed of adjustment) of -0.67 means that there is a quick adjustment back to equilibrium after a shock. Specifically, the coefficient implies that about 67% of the previous year's deviation from long-run equilibrium will be corrected within a year.

$$\Delta\text{FRAGILITY} = \underset{(-0.48)}{-13.54\Delta C} + \underset{(1.83)^{***}}{0.27\Delta\text{FRAGILITY}(-1)} - \underset{(-2.04)^{***}}{6.56\Delta\text{FINDEX}} + \underset{(0.09)}{0.08\Delta\text{INFLVOL}} -$$

$$\underset{(-0.57)}{0.82\Delta\text{GOVCON}} + \underset{(3.83)^{*}}{3.29\text{CASHBANK}} - \underset{(-4.9)^{*}}{0.67\text{ECM}(-1)} \quad (8)$$

Adj. R^2 = 0.54
DW = 2.36
F(6,27) = [0.001]

Notes:
* indicates that a coefficient is significant at the 1 percent level, ** significant at the 5 percent level, and *** significant at the 10 percent level.
Figures in parenthesis ( ) are t-ratios, [ ] are p-values.

V.3 Parameter Stability Test

We have conducted parameter stability tests to ensure that the estimated parameters of our model are not varying over time. This is important because unstable parameters can result in a misspecification of the model and this could lead to biased results (Hansen, 1992). To test for parameter stability we use the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests given in Pesaran and Pesaran (1997). The null hypothesis of these tests is that the regression equation is correctly specified. Figures 1 and 2 present the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) graphs, respectively, to test for model specification and parameter constancy. The pair of straight lines in each figure indicates the 5 percent significance level and if the plotted CUSUM and CUSUMSQ graphs remain inside the straight lines the null hypothesis of correct specification of the model can be accepted, otherwise the null hypothesis is rejected and it can be concluded that the regression equation is misspecified. We see from the two figures that the CUSUM and CUSUMSQ plots stay within the lines indicating the 5 percent level of significance and we can, therefore, conclude that our equation has been correctly specified and there is the absence of instability of the coefficients.

Figure 1: CUSUM Test

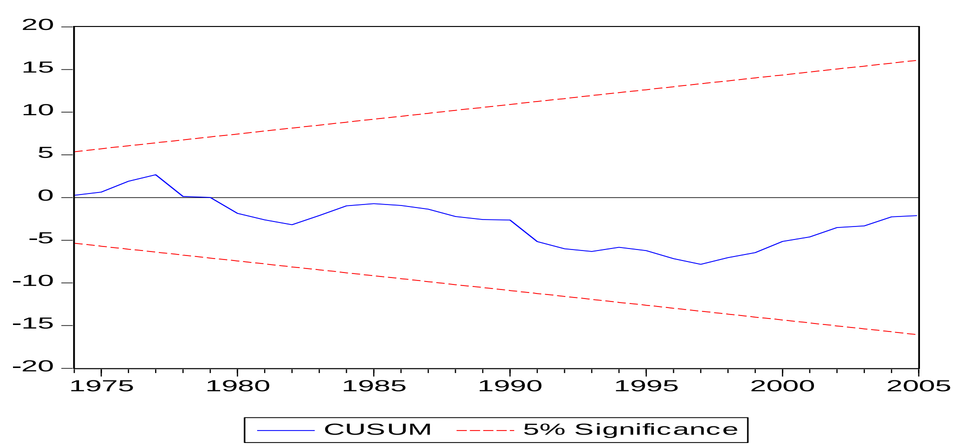
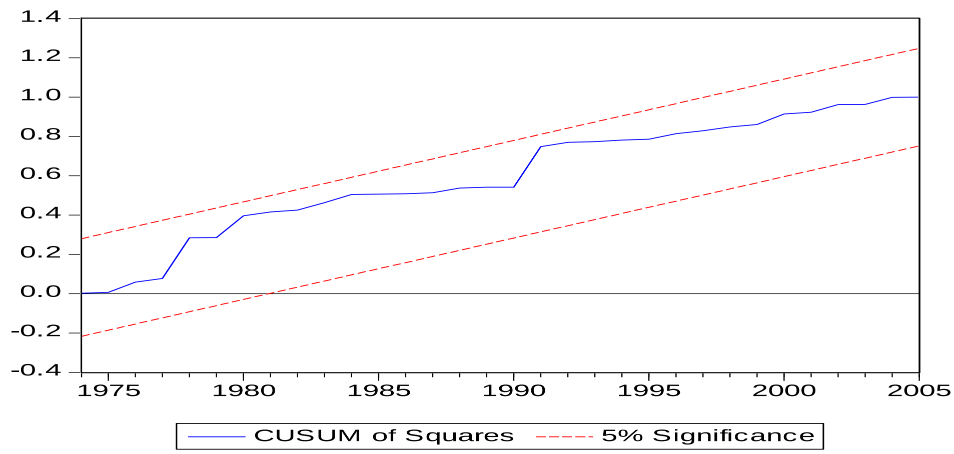


Figure 2: CUSUMSQ Test



VI. Conclusion

In this paper we conducted an empirical analysis of the effects of financial liberalisation on financial fragility in Nigeria. Nigeria's financial liberalisation started in 1987 and this was followed by a banking crisis from the late 1980s to early 1990s. This is similar to the experiences of some Latin American countries and has prompted some authors to assert that financial liberalisation leads to financial fragility.

In order to properly measure the gradual progression and institutional changes involved in financial liberalisation, we developed an index which is a summary measure of seven (7) liberalisation policies. The results of including this liberalisation index and some control variables in a financial fragility equation showed that financial fragility has had a negative relationship with financial liberalisation in both the short-run and long-run. This result confirms what was observed after Nigeria's financial liberalisation where the lending boom due to indiscriminate lending heralded a period of banking crisis. Our results are consistent with the studies that have found financial liberalisation as a determinant of financial fragility (Demirguc-Kunt and Detragiache, 1998, 2000; Kaminsky and Reinhart, 1999).

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Capital Flows and Financial Crises: Policy Issues and Challenges for Nigeria

Michael Emeka Obiechina*

Abstract

Experiences of economies that have suffered from financial crises indicate that emergence of integrated financial markets and high capital mobility made possible by the increasing globalization of world economies predisposes economies, especially developing ones to the volatility of capital flows. Also, the nature and source of capital flows plays critical role in determining the impact of its surge or sudden outflow from an economy, whereas foreign portfolio investment is adjudged the most volatile. Notwithstanding, no matter the nature of capital flows (flows over a medium-to-long-term); they are expected to influence the monetary aggregates, especially the economy's net foreign assets (NFA), inflation, real effective exchange rate, aggregate output (GDP) and possibly the domestic interest rates. Developing countries are attracting great amount of capital flows, Nigeria inclusive. With increasing capital flows, especially the Net Portfolio Investment (NPI) into the Nigerian economy and coupled with its undeveloped nature, the economy may not be insulated from the ravaging impact of capital flows and/or sudden flight, if proactive policy measures were not designed and implemented to forestall them. This paper underscores the relation between capital flows and financial crisis as well as policy issues and challenges for Nigeria. It points out that it is more desirable for the country to adopt and pursue vigorously, appropriate and coherent policies that would respond to the increasing capital flows or sudden capital flight rather than procrastinating, probably to be enmeshed in crisis that often requires very costly measures to solve. Consequently, it proffers policy measures that would forestall the impact of massive capital inflows and/or sudden capital flight from the Nigerian economy.

Key Words: Capital flows, Financial Crises
JEL Classification: F21, F32
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I. Introduction

The pursuits of economic growth, low inflation and sustainable balance of payment (BOP) have over time been the force behind most economic policies. The realization of these laudable objectives has no doubt been constrained by the interplay of factors, among, which include low level of domestic savings and investment and foreign exchange shortage. The emergence of integrated financial markets and high capital mobility made possible by the increasing globalization of world economies, has predisposed economies, especially developing ones to the volatility of capital flows - sudden

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and spontaneous, (herd behavior) and loss of market confidence, which often result in severe financial crises.

Capital flows[1] in terms of portfolio investment has been a notable feature of developed economies. This, however, is becoming a very important component of the balance of payments of many emerging economies, such as China, Hong Kong, India, Singapore, Taiwan, Brazil, South Africa etc (Obadan, 2004). The increase in capital flows, especially the foreign portfolio investment (FPI), which have more volatile and destabilizing effects, caused the financial crises suffered notably by Mexico in 1994, East Asian countries in 1997 and Russia in 1998 (Kahler, 1998). Experiences have shown that financial crises in emerging economies are very different today than they were in the past. Between 1940 and the 1970s, financial crises involved large fiscal deficits, repressed domestic financial systems, and balance of payments situations that were associated with sharp worsening of terms of trade. In the late 1990s, however, a 'new variety' of crisis evolved in Asia. Many of the emerging economies that experienced the financial trauma have been considered very successful until the crises explode (Strasek, et al, 2007).

Presently, the world economy is suffering from global financial and economic crises that owe its historical antecedent to the sub-prime mortgage lending crisis that engulfed the world largest economy, the USA in 2007. The magnitude, dimension and extent of the damages it has caused the world economy, is yet to be fully quantified, the crises have resulted in increasing cases of bailout plans for banks and investment companies by governments in the USA, Europe and Asia through partial nationalization and outright buy-over, thereby, putting to doubt the efficacy of capitalist structure in resource allocation.

In Nigeria, the abrogation of certain laws and subsequent entrenchment of investment friendly laws as well as the introduction of structural reforms facilitated the substantial flow of capital. Until 1986, Nigeria did not record any figure on portfolio investment (inflow or outflow) in her BOP accounts. This was attributable to the non-internationalization of the country's money and capital markets as well as the non-disclosure of information on the portfolio investments of Nigerian investors in foreign capital/money markets (CBN 1997:151). For example, the net

[1]It is a broad term, which includes different kinds of financial transactions: lending by governments and international organizations; bank lending, short-and long-term; investment in public or private bonds; investment in equities; and direct investment in productive capacity (Obadan, 2004). However, in this paper, due to paucity of data, capital flows is taken to imply NDI and NPI, which are reported in the Nigeria's Balance of Payment as oil and non-oil components.

portfolio investment (NPI) and net direct investment (NDI) were ₦151.6 million and ₦735.8 million in 1986, which rose to ₦51,079.13 million and ₦115,952.2 million in 2000, indicating a growth rate of 33,593.36 and 15,658.66 per cent, respectively. In 2005, NPI and NDI went up to ₦116, 035.00 million and ₦654,193.10 million indicating a growth rate of 127.17 and 464.19 per cent, respectively, compared with the 2000 figures. Furthermore, NPI and NDI grew by 202.43 and 22.69 per cent to ₦350, 919.40 million and ₦802, 615.70 million in 2008, respectively, when compared with the 2005 figures.

With increasing capital flows, especially, the NPI into the Nigerian economy and coupled with its undeveloped nature, the economy may not be insulated from the ravaging impact of capital flows and/or sudden flight, if proactive policy measures were not designed and implemented to forestall them. Consequently, there is, the need for urgent safety valves for the economy against the possible impact of the Dutch disease, sudden capital flight and perhaps, financial crisis. It is more desirable for the country to adopt and pursue vigorously, appropriate and coherent policies that would respond to the increasing capital flows or sudden capital flight rather than procrastinating, probably to be enmeshed in crisis that often requires very costly measures to solve. In a nutshell, the paper underscores the relation between capital flows and financial crisis, and the need to design and implement policies that would dampen the impact of massive capital inflows, and forestall sudden capital flight on the domestic economy.

The paper is structured into 5 sections. Following the introduction is section 2, which reviews the theoretical literature. In section 3, capital flows, financial market and a review of the macroeconomic environment are discussed. Section 4, provides some country experiences - on financial/currency crises and their major causes. It also looks at the current global financial and economic crises and their effects on the Nigerian economy as well the lessons to be learnt. Finally, section 5 discusses policy issues and challenges as well as recommendations.

II. Theoretical Literature

Most developing countries are characterized by low level of domestic savings, which has impeded the much-needed investment for economic development. In order to attain a desirable level of investment that would ensure sustainable development, developing country needs some foreign savings to bridge the savings-investment gap. The gap when financed through foreign savings comes in form of capital flows. Capital flows is transmitted through foreign direct investment (FDI), foreign portfolio investment (FPI), draw-down on foreign reserves, foreign loans and credits etc (Obadan, 2004). Theoretical literature has provided evidences of the benefits of capital flows; ironically, empirical evidence had established that they are not randomly available globally (Aremu, 2003). One of the fundamental issues of capital flows is the high risk of volatility, especially, FPI (short-term flows) that could be reversed at short notice, and probably leading to financial crisis[2]. The dangers of sudden capital flight are that they may create challenges for monetary policy and inflation management as well as foreign exchange rate stability and export competitiveness, especially, in countries with weak financial sectors and inappropriate macroeconomic policies.

Krugman (1979) in his seminal paper argued that financial crisis occurs when the continuous deterioration in the economic fundamental becomes inconsistence with an attempt to fix the exchange rate - typically the persistency of money-financed budget deficit and an attempt to maintain a fixed exchange rate - this has become known as the first-generation models of balance-of-payment crises. Krugman stated that the inconsistency can be temporarily papered over if the central bank has sufficiently large reserves, but when these reserves become inadequate, speculators force the issue with a wane of selling.

In disaggregating short-term capital by purpose and type, Kahler (1998) posited that pension funds and insurance company inflows tend to be relatively stable, while private flows from mutual funds (referred to as "hot money") respond to interest rate differentials among countries and are more quickly withdrawn in a panic. It is the increase in the inflow of hot money that has made emerging countries more vulnerable to financial crises than in the past. Fernandez-Arias and Montiel (1995) in their analytical exposition of surge in capital flows and its sustainability hinted on the possibility of macroeconomic distortions arising from internal imbalances necessitated by distortions in the domestic financial sector, the real economy or from inadequate macroeconomic policy framework. Siegel (1998) maintained that short-term investments that are easily liquidated and speculative capital movements threaten the stability of real economies, especially in the developing world, and force fiscal policy to be on keeping financial markets happy rather than on raising standards of living.

Financial crisis, however, may occur without changes in macroeconomic fundamentals and models built along this line are called second-generation models of balance-of-payment crises. First, there are situations where crises occur as a consequence of pure speculation against the currency. Calvo and Mendoza (1997) developed the model of herding behaviour; the model stresses

[2] ibid.

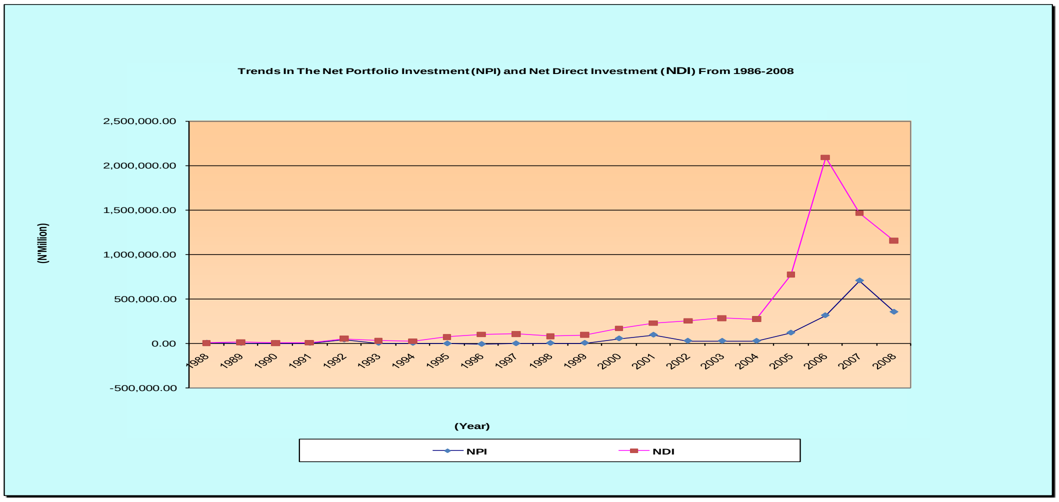
that information costs may lead foreign investors to take decisions based on limited information and, therefore, to be more sensitive to rumours. Second, crises could occur owing to the possibility of contagion effects. That is, a situation in which the devaluation by one country leads its trading partners to devalue in order to avoid a loss of competitiveness (Gerlach and Smets 1995), and also where crisis in one country may raise the odds of a crisis elsewhere by signaling that devaluation is more likely as a result of the initial crisis. The signal may then lead to a self-fulfilling speculative attack (Masson, 1998).

III. Capital Flows, Financial Market and Economic Growth in Nigeria

The introduction of Structural Adjustment Programme (SAP) in 1986 marked an epoch in the liberalization of the Nigerian economy. Prior to the period, the economy was predominantly regulated, that affected the free movement of capital necessary for economic growth. SAP heralded a lot of policy reforms that led to the publication of an Industrial Policy for Nigeria in January 1989. Critical policy reforms leading to the changes in the investment climate in Nigeria for both domestic and foreign investors (provision of enormous opportunity to participate in the economy) were the abrogation of the Nigerian Enterprises Promotion Decree 1989 and the Exchange Control Act of 1962 as well as their subsequent replacements with the Nigerian Investment Promotion Council Decree No 16 of 1995 and Foreign Exchange (Monitoring and Miscellaneous Provisions) Decree 17 of 1995.

As mentioned earlier, the country did not record any NPI on her BOP until 1986. Onosode (1997) posited that between July 1995 and July 1996, about US$6.0 million foreign portfolio investment (FPI) was made in the Nigerian capital market through the Nigerian Stock Exchange (NSE) for the first time since 1962, while for the whole of 1996, foreign investment through the Nigerian Stock Exchange totaled UD$32.99 million.

Figure 1: Trends in Net Portfolio Investment and Net Direct Investment from 1986 – 2008



In 1986, the NPI in Nigeria was ₦151.6 million. It rose to ₦51,079.13 million in 2000. By 2005, there was a tremendous increase in the NPI figure in Nigeria. It increased from ₦51,079.13 million to ₦116,035.00 million from 2000 to 2005, (a growth rate of 127.17 per cent). It marked the period when the banks were statutorily mandated to shore up their capital base from mere ₦2.0 billion to ₦25.0 billion. It rose to a record level of ₦703,677.60 million in 2007 before declining to ₦350,919.40 million in 2008. Similarly, the NDI was ₦735.8 million in 1986 and rose to ₦115,952.16 million in 2000. It further increased from ₦654,193.10 million in 2005 to ₦1,779,594.80 million in 2006, indicating a growth rate of 172.02 per cent. It, however, dropped to ₦759,350.40 million in 2007 before rising to ₦802,615.70 million in 2008. Comparatively, the NPI and NDI recorded an average annual figures of ₦74,625.76 million and ₦241,075.27 million during 1986 - 2008.

The capital flows into the Nigerian economy has not really been tremendous when compared with flows into some developing economies of South Africa and Brazil. For example, from 2001 to 2007, the average annual capital inflows into Nigeria in terms of FDI and FPI were US$33,006 million and US$60,172 million, while South Africa and Brazil were US$64, 237 million and US$69,998 million, US$182,441 million and US$240,451 million, respectively. FPI and FDI into Malaysia were US$47,256 million and US$45,693 million, respectively.

Table 1: Capital Flows into Nigeria in Relation to Some other Countries from 2001-2007 (US$ Million)

Year	Nigeria (US$'M)		South Africa (US$'M)		Brazil (US$'M)		Malaysia (US$'M)	
	FDI	FPI	FDI	FPI	FDI	FPI	FDI	FPI
2001	21,010	65,197	30,569	26,402	121,948	151,741	33,972	15,369
2002	25,222	76,929	30,604	35,677	100,863	137,355	37,542	15,844
2003	45,431	116,450	46,869	46,257	132,818	166,095	41,188	22,822
2004	51,109	132,351	64,451	62,853	161,259	184,758	43,047	50,938
2005	26,345	6,613	78,986	82,837	195,561	232,627	44,460	46,054
2006	29,313	9,028	87,765	102,750	236,184	300,582	53,836	65,764
2007	32,613	14,635	110,415	133,213	328,455	509,999	76,748	103,058

Source: International Financial Statistics (IFS), April, 2009

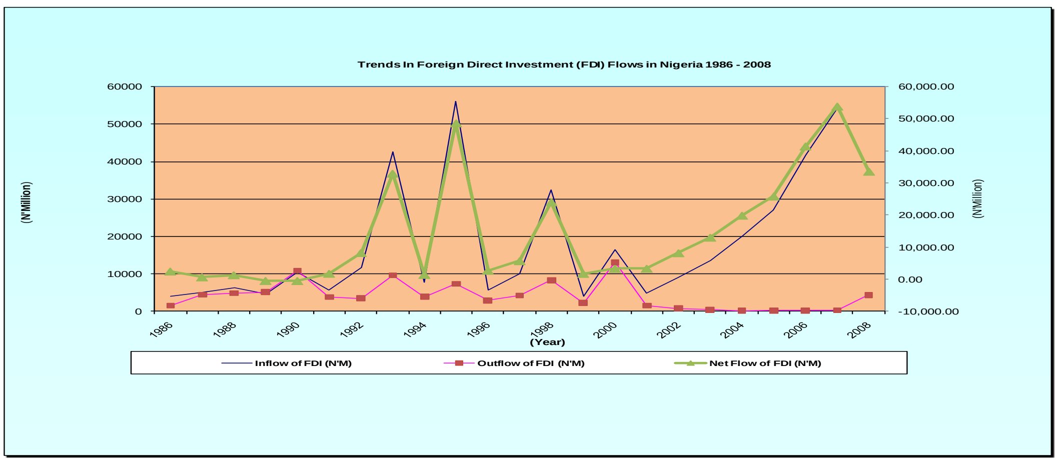
Table 2: Net Portfolio Investment (NPI), Net Direct Investment (NDI), Foreign Direct Investment (FDI) Inflow, Outflow and Net Flow into Nigeria

Year	NPI (N'M)	NPI Growth Rate (%)	NDI (N'M)	NDI Growth Rate (%)	Inflow of FDI (N'M)	Outflow of FDI (N'M)	Net Flow of FDI (N'M)
1986	151.60		735.80	69.50	4,024.00	1,524.40	2,499.60
1987	4,353.10	2,771.44	2,452.80	233.35	5,110.80	4,430.80	680.00
1988	2,611.80	(40.00)	1,718.20	(29.95)	6,236.70	4,891.10	1,345.60
1989	(1,618.80)	(161.98)	13,877.40	707.67	4,692.70	5,132.10	(439.40)
1990	(435.20)	(73.12)	4,686.00	(66.23)	10,450.20	10,914.50	(464.30)
1991	(594.90)	36.70	6,916.10	47.59	5,610.20	3,802.22	1,802.00
1992	36,851.80	(6,294.62)	14,463.10	109.12	11,730.70	3,461.50	8,269.10
1993	(377.00)	(101.02)	29,660.30	105.08	42,624.90	9,630.50	32,994.50
1994	(203.50)	(46.02)	22,229.20	(25.05)	7,825.50	3,918.30	1,455.60
1995	(5,785.00)	2,742.75	75,940.60	241.63	55,999.30	7,322.30	48,677.10
1996	(12,055.20)	108.39	111,297.80	46.56	5,672.90	2,941.90	2,731.00
1997	(4,780.50)	(60.34)	110,456.20	(0.76)	10,004.00	4,273.00	5,731.00
1998	(637.52)	(86.66)	80,750.35	(26.89)	32,434.50	8,355.60	24,079.70
1999	1,015.74	(259.33)	92,792.47	14.91	4,035.50	2,256.40	1,779.10
2000	51,079.13	4,928.76	115,952.16	24.96	16,453.60	13,106.60	3,347.00
2001	92,518.92	81.13	132,433.65	14.21	4,937.00	1,560.00	3,377.00
2002	24,789.19	(73.21)	225,971.96	70.63	8,988.50	781.70	8,206.80
2003	23,555.51	(4.98)	258,388.61	14.35	13,531.20	475.10	13,055.60
2004	23,541.00	(0.06)	248,224.55	(3.93)	20,064.40	155.70	19,908.70
2005	116,035.00	392.91	654,193.10	163.55	26,983.70	202.40	25,881.20
2006	311,780.30	168.70	1,779,594.80	172.03	41,734.00	263.10	41,470.70
2007	703,677.60	125.70	759,380.40	(57.33)	54,254.20	328.80	53,924.80
2008	350,919.40	(50.13)	802,615.70	5.69	37,977.70	4,362.50	33,615.20

Source: CBN Statistical Bulletin. 50 Years Special Anniversary Edition. 2008 is provisional figure.

Within the period, 1986 – 2008, the inflow of FDI was ₦4,024.00 million in 1986, while the outflow was ₦1,524.40 million, resulting in a net flow of ₦2,499.60 million. In 2000, ₦16,453.60 million was FDI inflow compared with ₦13,106.60 million outflow. In 2007, the FDI inflow and outflow were ₦54,254.20 million and ₦328.80 million, respectively, while the net flow was ₦53,924.80 million. However, in 2008, the inflow dropped to ₦37,977.70 million, while the outflow increased to ₦4,362.50 million, resulting in a net flow of ₦33,615.20 million. Averagely, the annual FDI inflow and outflow in the economy for the period under review was ₦18,755.49 million and ₦4,090.89 million, respectively, thereby, resulting in a net flow of ₦14,518.59 million. Achieving a positive net foreign investment is important in influencing the overall position of a country's external sector.

Figure 2: Trends in Foreign Direct Investment (FDI) Flows in Nigeria (1986 - 2008)



The Nigerian financial market has been witnessing growth since 1970s, although it remains relatively shallow when compared with some advanced and emerging countries. However, within the sub-Saharan African countries, the Nigerian financial market is noted to be among the largest with fairly diversified financial institutions and instrument (Nnanna, et al, 2004). Apart from the law reforms, there was also the economic and financial sector policy reforms designed to reduce barriers and attract investment into the country; easing of import and customs controls, infrastructural investment and financial innovations. The market has recorded tremendous achievements in the banking and insurance sub-sectors. The Nigerian financial markets is dominated mainly by the deposit money banks (DMBs'), while the markets accounted for 93.0 per cent of non-central bank assets in 2000 (World Bank, 2000) and 94.0 and 95.2 per cent of the aggregate financial savings in 2002 and 2003[3], respectively as well as 60.0 per cent of the stock market capitalization[4]. The banking sub-sector reform was adjudged as the

[3] Op. cit

[4] Paper presented by the Banking Supervision Department, Central Bank of Nigeria at the Monetary Policy Department's retreat in Kaduna, January 30-31, 2009

most successful, with the emergent of 24 strong banks (initially 25) down from 89, larger capital base (from under US$3.0 billion to over US$9.0 billion), rating of Nigerian banks by international rating agencies (S & P; Fitch) for the first time, branch network increased from 3,200 in 2004 to 3,866 in April 2007.

Table 3: Selected Financial Market Deepening Indicators

Year	GDP at Current Basic Prices (N'Million)	Money Supply (M2) (N'Million)	Credit To Private (CPS) (N'Million)	Market Capitalisation (MC) (N'Million)	MC/GDP (%)	Financial Deepening (M2/GDP) (%)	Financial Deepening (CPS/GDP) (%)
1986	69,147.00	27,389.80	18,299.90	6,800.00	9.8	39.6	26.5
1987	105,222.80	33,667.40	21,892.50	8,300.00	7.9	32.0	20.8
1988	139,085.30	45,446.90	25,472.50	10,000.00	7.2	32.7	18.3
1989	216,797.50	47,055.00	29,643.90	12,800.00	5.9	21.7	13.7
1990	267,550.00	68,662.50	35,436.60	16,400.00	6.1	25.7	13.2
1991	312,139.70	87,499.80	42,079.00	23,100.00	7.4	28.0	13.5
1992	532,613.80	129,085.50	79,958.90	31,300.00	5.9	24.2	15.0
1993	683,869.80	198,479.20	95,529.70	47,400.00	6.9	29.0	14.0
1994	899,863.20	266,944.90	151,000.30	66,400.00	7.4	29.7	16.8
1995	1,933,211.60	318,763.50	211,358.60	180,300.00	9.3	16.5	10.9
1996	2,702,719.10	370,333.50	260,613.50	285,800.00	10.6	13.7	9.6
1997	2,801,972.60	429,731.30	319,512.20	282,000.00	10.1	15.3	11.4
1998	2,708,430.90	525,637.80	372,574.10	262,500.00	9.7	19.4	13.8
1999	3,194,015.00	699,733.70	455,205.20	300,000.00	9.4	21.9	14.3
2000	4,582,127.30	1,036,079.50	596,001.50	472,300.00	10.3	22.6	13.0
2001	4,725,086.00	1,315,869.10	854,999.30	662,600.00	14.0	27.8	18.1
2002	6,912,381.30	1,599,494.60	955,762.10	764,900.00	11.1	23.1	13.8
2003	8,487,031.60	1,985,191.80	1,211,993.40	1,359,300.00	16.0	23.4	14.3
2004	11,411,066.90	2,263,587.90	1,534,447.80	1,925,900.00	16.9	19.8	13.4
2005	14,572,239.10	2,814,646.10	2,007,355.80	2,900,100.00	19.9	19.3	13.8
2006	18,564,594.70	4,027,901.70	2,650,821.50	5,120,900.00	27.6	21.7	14.3
2007	20,657,317.70	5,809,826.50	5,056,720.90	13,294,600.00	64.4	28.1	24.5
2008	24,296,329.30	9,166,835.30	8,059,548.90	9,516,200.00	39.2	37.7	33.2

Source: Computed from the CBN Statistical Bulletin. 50 Years Special Anniversary Edition

In terms of financial market performance, the money supply (M2)/GDP ratio, which measures the financial depth of the economy, was 39.6 per cent in 1986, and by 1996, it declined to 13.7 per cent. However, it rose from 21.7 to 37.7 per cent between 2006 and 2008. Similarly, the credit to private sector (CPS)/GDP ratio, which was 26.5 per cent in 1986, declined to 9.6 per cent in 1996. Between 2006 and 2008, it grew from 14.3 to 33.2 per cent. On the domestic capital market, the market capitalization (MC)/GDP ratio[5] grew from 9.8 to 10.6 per cent between 1986 and 1996. Apart from the decline witnessed from 1997-1999, it grew from 10.3 to 64.4 per cent from 2000 – 2007. However, it declined to 39.2 per

[5] The size of the stock market is assessed by its market capitalization relative to GDP. This measures equity trading as share of national output. It does not indicate how much firms have invested, it does give an indication of the potential to raise funds for investment through the stock market and provides information on prices that guide the allocation of resources (ibid.)

cent in 2008. The decline in the growth rate could be attributed to the impact of the global financial and economic crises.

Table 4: Selected Macroeconomic Indicators

Year	Real Gross Domestic Product (RGDP) (%)	Fiscal Balance/GDP (FB/GDP) (%)	Inflation Rate (%)	External Reserve (US$)	Current Account Balance/GDP (CAB/GDP) (%)
1986	2.45	-11.94	5.40	2.84	11.58
1987	-0.57	-5.60	10.20	7.50	16.29
1988	7.36	-8.74	38.30	5.23	22.71
1989	7.67	-6.98	40.90	3.05	27.27
1990	13.02	-8.27	7.50	4.54	29.83
1991	-0.81	-11.45	13.00	4.15	16.65
1992	2.26	-7.42	44.50	1.55	17.59
1993	1.28	-9.53	57.20	1.43	-5.03
1994	0.22	-7.81	57.00	9.01	-6.03
1995	2.16	0.05	72.80	1.61	-9.73
1996	4.38	-0.45	29.30	3.40	8.89
1997	2.82	-2.75	8.50	7.22	9.60
1998	2.94	-4.92	10.00	7.11	-12.24
1999	0.42	-8.93	6.60	5.42	1.45
2000	5.44	-2.26	6.90	9.39	15.56
2001	8.45	-4.68	18.90	10.27	2.31
2002	21.35	-4.36	12.90	7.68	-1.69
2003	10.23	-2.39	14.00	7.47	8.30
2004	10.48	-1.51	10.00	16.96	18.02
2005	6.51	-1.11	11.60	28.28	27.77
2006	6.03	-0.54	8.50	42.30	18.18
2007	6.52	-0.57	6.60	51.33	13.09
2008	6.71	-0.20	15.10	53.00	17.41

Source: Computed from the CBN Statistical Bulletin, 50 Years Special Anniversary Edition

In addition, review of the macroeconomic environment indicated that from the introduction of SAP in 1986 through 1996, the average annual real GDP growth was 3.6 per cent. Between 1986 and 1996, the fiscal balance (FB)/GDP ratio improved from -11.9 to -0.45 per cent, while inflation rate worsened from 5.4 to 29.3 per cent. During the period, the current account balance (CAB)/GDP ratio declined from 11.6 to 8.9 per cent, while the stock of external reserves grew from US$2.84 billion to US$4.5 billion by end-December 1996. By 1995, the federal government abandoned the SAP and moved to a partial or guided deregulation of the economy. Comparatively, the average annual real GDP growth improved to 7.4 per cent from 3.6 per cent between 1997–2007 and 1986 –1996, respectively, while it was 6.7 per cent in 2008. Meanwhile, the period 1999–2008, witnessed a stable democratic polity and this no doubt, would have influenced some of the macroeconomic aggregates. For example, the real GDP grew from mere 0.42 to 6.7 per cent between 1999 and 2008, while the fiscal balance (FB)/GDP ratio dropped from -8.93 to -0.20 per cent during the same period. Furthermore, the stock of external reserves grew from US$5.42 billion to US$53.0 billion by end-December 2008 between 1999 and 2008, while the current account balance (CAB)/GDP ratio increased from 1.5 to 17.4 per cent, respectively. Notwithstanding, the inflation rate soared from 6.6 to 15.1 per cent during the period.

4. Emerging Economies and Global Financial Crises

4.1 Emerging Economies Financial Crisis

The emerging economies have suffered three major financial crises since 1982: the American debt crisis of the 1980s, the Mexican crisis of 1994–1995 and the Asian crisis of 1997. Financial crises seem to have become the norm rather than the exception. In 1992-93, Europe was faced with possible threat of the collapse of the European Exchange Rate Mechanism (ERM). The Italian lira and British pound were withdrawn from the ERM, three other currencies (viz. the Spanish peseta, Irish pound and Danish krona) were devalued, and there was a substantial widening of the bands within which the currencies could fluctuate. In 1994-95, there was the Mexican currency crisis which saw a devaluation of the peso and brought Mexico to the brink of default. There were also spillover effects on Argentina and Brazil. Between July 1997 and mid-1998, the world experienced the effects of the East Asian crisis, which started with a run on the Thai baht, but spread to a number of other regional currencies, most notably the Indonesian rupiah, Malaysian ringgit and Korean won (so-called "Tom-Yam effect"). Also, some other large emerging economies such as Russia and Brazil were rocked by periods of significant market weakness, which required the assistance of the IMF (Ramkishen, 2005).

During 2007–2009, the world experienced financial and economic crises - following a period of unprecedented economic boom, a financial bubble, global in scope and brought about by the collapse of the US sub-prime mortgage market and the reversal of housing boom in other industrialized economies in 2007. The crises were also attributed to financial products engineering - financial products and instruments becoming so complex, leaving the regulators with the daunting task of coping with the complexity of financial innovations.

4.1.1 Mexico Crisis 1994-95

Before the financial crisis eruption in Mexico, the economy witnessed a tremendous surge in capital inflows in the early 1990's culminating in high growth rate of GDP, considered to be fundamentally sound and seen as a model for other growing economies to emulate. The Mexican government initiated structural changes and macroeconomic stabilization policies in the 1980 that provided an investment friendly climate and macroeconomic stability that were contributory to the capital inflows. Obadan (2004) observed that the economic environment was thus suitable for capital inflows, which were very significant and amounted to over US$100.0 billion in 1990-93. A substantial part of the financial inflows was however, in the form of equity and debt portfolio investments that is highly volatile. Furthermore, a large part of the inflow was used in financing consumption and public borrowing.

The once eulogized financial success started crumbling when the investors suddenly changed their attitudes, leading to interruption of capital flows, which affected the economy. By December 1994, the heightened inconsistency in monetary, fiscal and exchange rate policies caused huge capital reversals. In addition, investor's perception of the likely devaluation of the peso made the economy vulnerable to financial market crisis; speculative attack and massive capital outflow, as its foreign exchange reserves fell to US$12.9 billion from over US$30.0 billion. Many factors contributed to the crisis suffered by Mexico, among which are; large and growing current account deficits, rapid growth of capital inflows, which were mostly in the form of short-term investment (Hot Money), declining foreign reserve, increases in the USA rates, weaknesses in the financial system and political unrest.

4.1.2 The East Asian Crises 1997-98

Before the Southeast Asian crises began in 1997, Asia attracted almost half of the capital inflows to the developing countries. Southeast Asia in particular had high interest rates that attracted foreign investors. This led to a large inflow of money and a run-up in the asset prices. At the same time, the regional economies of Thailand, Malaysia, Indonesia, Singapore and South Korea experienced high GDP growth rates, 8-12 per cent, in the late 1980s and early 1990s. The Southeast Asian economies, however, started witnessing distress with the financial collapse of the Thai Baht, which was caused by the Thai government floating of the Baht, cutting its peg to the US$ and attempts to protect it in the face of severe financial stress.

During the crisis, Thailand had acquired a burden of foreign debt that made the country effectively bankrupt even before the collapse of its currency. As the crisis spread, most of the Southeast Asian economies experienced a drop in currencies, devalued stock markets and other asset prices, and a precipitous rise in private sector debt. By mid-1990s, Thailand, Indonesia and South Korea had large private current account deficits and the maintenance of fixed exchange rate encouraged external borrowing and led to excessive exposure to foreign exchange risk in both the financial and corporate sectors. Foreign debt-to-GDP ratios rose from 100 to 167 per cent in the four large ASEAN economies in 1993-96, while it shot up beyond 180 per cent during the worst period of the crisis. In Korea, the ratios rose from 13 to 21 per cent and then as high as 40 per cent. Many factors had been adduced as being responsible for the crises that engulfed the Southeast Asian economies. The financial crises may have had its origin traced to

1994, when China, a large economy in Asia effectively devalued its currency by 40.0 per cent and Japan, the second largest world economy, devalued its currency (the yen) by about 25.0 per cent from early 1995 to late 1996. The financial liberalization in Thailand led to rapid and uncontrolled build up of short-term debt by the private sector – a real estate bubble burst in Thailand. The bubble had been created by huge inflows of external capital. Private capital flows into Thailand between 1988 and 1995 totaled 52 per cent of GDP.

4.1.3 Recent Global Financial and Economic Crises

The financial and economic crises currently enveloping the world economies had its origin to the USA sub-prime housing mortgage crisis, which spilled over to many other economies. The roots are in banking rather than in securities market or foreign exchange unlike what happened with the Mexican and Asian crises. Even countries not affected by the financial crisis are now affected by 'second-round effects' as the crisis now becomes 'economic' (Soludo, 2007). It started in June, 2007, when two Bear Steams hedge funds collapsed. The mortgage brokers were driven by the lure of big commissions, talked buyers with poor credit into accepting housing mortgages with little or no down payment and without credit checks, while banks and financial institutions often repackaged these debts with other high-risk debts and sold them to world-wide investors creating financial instrument, Collateralized Debt Obligations (CBO) (Oluba, 2009).

The crises has led to unprecedented liquidity crunch: banks withholding lending facility; foreclosure of assets, including houses and consumer products; banks and banking products ratings being down-graded; weakened financial system; and loss of confidence in the capital market as well as a collapse or near collapse of some banks and industries. In attempt to restore confidence in the financial system and halt the colossal damages it has continued to inflict on world economies, banks, investment companies and manufacturing industries are being bailed out by governments in the USA, Europe and Asia through all sorts of intervention; partial nationalization, outright buy-over and injection of funds.

The crises have claimed great toil in many economies. Nigeria may not be insulated from the global financial and economic turmoil considering her increasing market size and economic deregulation as well as the impact of globalization. Soludo (2009) and Mordi (2009) aptly captured the impact of the global financial and economic crises on the Nigerian economy as: capital market downturn caused by foreign investors' divestment and panic sales by local investors', resulting in stock market crash as the All-Share Index (ASI) and Market Capitalization (MC) fell by 67.2 and 61.7 per cent, respectively, between

April 2008 and March 2009. Furthermore, they stated that as liquidity squeeze sets in and funds dried up, there was increase in the money market rates as well as increased demand pressure in the foreign exchange market, resulting in the exchange rate depreciation from ₦117 to ₦135 per US dollar as at end-December 2008 as well as high outflows and low inflows of foreign exchange into the economy.

4.2 Lessons

The lessons to be learnt are double-fold. First, the demonstration that crises; currency, financial and economic can quickly spread from country to country notwithstanding the macroeconomic fundamentals of countries involved. This is underscored by the glowing impact of globalization as natural geographical barriers of nations become broken down. The Mexican crisis of 1994-95 and East Asian Crises 1997-98 provides great lessons for developing countries. It represents a typified textbook example of what could happen to an economy aiming at having a flexible exchange rate, active monetary policy as well as open capital account, all at the same time, in what has come to be known as "impossible or inconsistent triology" model. The lessons include avoiding exchange rate pegs, strengthening financial systems, creating effective ways of restructuring company finances as well as being conscious of the structure and nature of capital flows.

Second, that in pursuit of industrialization through financial market development and capital accounts liberalization, economies is predisposed to all forms of risks and uncertainties. Consequently, economic policies and programmes should be developed and implemented in order to withstand such exigencies. Thus, this calls for institutional strengthening and development that would match the ever-increasing financial innovations; leveraging and swaps, etc; modern information society – that has broken down the natural barriers to the free movement of capital. Intelligent supervision and regulation of the financial system, more accurate information, and disciplined professional, devoid of corruption and cronyism, all these would in principle improve the efficiency and effectiveness of the financial system.

5. Policy Issues, Challenges and Recommendations

5.1 Policy Issues and Challenges

There are serious policy issues about capital flows because of their potential effects on macroeconomic stability, monetary and exchange rate management, competitiveness of the export sector and external viability. This is because no matter the nature of capital flows (flows over a medium-to-long-term), they are expected to influence the monetary aggregates, especially the economy's net foreign assets (NFA), inflation, real effective exchange rate, aggregate output (GDP) and possibly the domestic interest rates. The challenge is to understand what drives the capital flows and the impact of its sudden surge or reversal on the economy. No doubt, this may be country specific. However, the causes of capital flows can be generally grouped into three major categories: autonomous increases in the domestic money demand function; increases in the domestic productivity of capital; and external factors, such as falling international interest rates. The first two are usually referred to as “pull” factors, while the third is “push” factors. Interest rates can be useful for determining whether capital inflows are caused by “pull” or by “push” factors. Other things being equal, inflows driven by “pull” factors will be associated with upward pressure on domestic nominal interest rates, while inflows due to “push” factors, such as decline in international interest rates, will tend to put downward pressure on domestic interest rates.

Returns to foreign investors can also provide useful information: real returns, which depend on the expected path of the exchange rate, can be a key determinant. Closely related to this is the issue of trying to have a flexible exchange rate, active monetary policy as well as open capital account of the BOP, all at the same time ("impossible or inconsistent triology"). It may be difficult to achieve the triology in the presence of increasing capital flows or sudden reversals. The major policy challenge is developing optimal policy mix that would ensure the achievement of macroeconomic stability - maintaining both internal and external balances in the economy in the wake of capital surge or reversal.

The emergence of integrated financial markets and high capital mobility, fast-tracked by the globalization of world economies and information technology has predisposed economies, especially developing ones to the volatility of capital flows as well as the challenges of coping with the increasing financial market innovations; securitization of debt instruments into various swaps, derivatives (complex of financial innovations). These have left financial regulatory authorities enmeshed in loose financial system supervision and regulation.

The policy of liberalizing the financial market and capital account in the quest for economic reforms could exert heavy pressure on the macroeconomic variables, where the capital flows are channeled through inefficient and unsophisticated domestic banking systems; the rapid expansion of bank credit, strained credit assessment capabilities (bank supervision) and funds flowing into unprofitable or speculative activities. In addition, the challenge of corporate governance; issue of corruption in the private sector, especially the banking sector has more than ever required the attention of both the regulatory authorities and law enforcement agencies. The ever-increasing pressure of meeting shareholders expectations; domestic and cross-border expansions, growing cases of non-performing loans, apparently, facilitated by the banks executives and cronies, have invoked the need for adequate prudential supervision and regulation.

5.2 Recommendations

(i) Adequate Prudential Supervision and Regulation

Increase in capital flows could lead to expansion of bank credit as money balances increase. With a poorly supervised and weak banking system, the increase in commercial banks' reserves could encourage excessive risk-taking in lending to unprofitable and speculative activities. Building a strong institution and implementing sound supervision and regulations will help in reducing the risk of financial and currency crises - strengthening banking systems is important to ensuring that any increased capital inflows are allocated to their most efficient uses, instead of being loaned to cronies or directed to inefficient state-sanctioned projects.

(ii) Prudent Fiscal Policy.

In the event of massive flow of capital, prudent fiscal policy is often left as the only tool of stabilization - leading to the imposition of capital controls as a policy option in instances of destabilization caused by massive short-term flows or capital reversals occasioned by change in macroeconomic fundamentals. However, when capital controls are in place for a long time, they tend to become less effective with respect to flows and may hinder the development of the financial system and undermine the efficiency of resource allocation. The choice of prudent fiscal policy should be seen as a temporary measure by the fiscal authority to sterilize the effect of capital flows surge or sudden reversal.

(iii) Understanding the Composition of Capital Flows

As stated earlier, understanding the composition of capital flows and what drives the flows is very important in assessing the macroeconomic impact of capital flows in an economy. To this end, it is therefore, necessary to monitor the composition of the capital flows, including the currency composition and the distribution between NDI and NPI as well as the short-term borrowing of banks and government.

(iv) Building a Stable Macroeconomic Environment.

Large foreign reserves may constitute a temporary solution to an economy in the face of growing financial market turmoil, external shocks and its consequences on growth. Building large external reserves may not be a wrong policy direction insofar as it is aimed at protecting against interest and exchange rate fluctuations as well as short-term funding disruptions. However, it is not a sufficient solution to financial crisis. Developing comprehensive strategies that would forestall macroeconomic volatility, and strengthen an economy's ability to absorb both internal and external shocks is fundamental in managing financial crisis.

(v) Sequencing Capital Account Liberalization

Once a country opens up her economy to capital flows, it has to brace up against capital flows vulnerability. As the economy dismantles some of the impediments to capital flows, it should be cautious in liberalizing her capital account since this will help to insulate the economy in the wake of destabilizing surge of inflows or reversal of capital. Capital account liberalization should be done in an orderly and structured manner taking cognizance of the economy's level of development.

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