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STOCK MARKET INTEGRATION: AN EVALUATION OF THE IMPACT OF EMERGING AND DEVELOPED STOCK MARKETS ON THE NIGERIAN STOCK EXCHANGE.

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A thesis submitted to the Postgraduate School, Ahmadu Bello University in partial fulfillment for the award of Masters of Economics Department of Economics, Ahmadu Bello University Zaria

March, 2010

DECLARATION

I declare that the work in the thesis entitled “Stock Market Integration: An Evaluation of the Impact of Emerging and Developed Stock Markets on the Nigerian Stock Exchange” has been performed by me in the Department of Economics under the supervision of Professor Abdul Ganiyu Garba and Dr. Ishaya Audu. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at any university.

Abraham, Terfa Williams _____ _____

Signature Date

CERTIFICATION

This thesis entitled STOCK MARKET INTEGRATION: AN EVALUATION OF THE IMPACT OF EMERGING AND DEVELOPED STOCK MARKETS ON THE NIGERIAN STOCK EXCHANGE by Abraham Terfa Williams meets the regulation governing the award of the degree of M.Sc Economics of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

Prof. Abdul - Ganiyu Garba

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Chairman, Supervisory Committee

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ABSTRACT

Between March 5th 2008 and April 3rd 2009, the All Share index of the Nigerian Stock Exchange (NSE) dropped by 69.94%. The decline (though at varying levels) was also witnessed among emerging and developed stock markets. While various factors could be responsible for the performance of the Nigerian stock market, this study examined the role of emerging and developed stock markets on the performance of the Nigerian stock exchange. The philosophy of the study was premised on the increasing linkage of financial markets across the globe and the likely implication of such interdependence on financial market performance within the context of the current global financial crisis. Since many actions were taken globally to avert the impact of the global financial crisis, the study also examined how the Nigerian stock exchange responded to such policy actions. Five day weekly data on the all share indices for emerging (African) and developed stock markets were collected from 10th December 2007 to 3rd July 2009. For the emerging stock markets, the study sampled South Africa, Egypt and Tunisia while for the developed stock markets; the United States, United Kingdom and Japan were sampled. Autoregressive Distributed Lag model, Granger Causality test and Augmented Engle Granger cointegration test, were the econometric frameworks employed for the study. These models were chosen because of their ability to model the precise impact and lag it takes for a set of explanatory variables to impact on the dependent variable, the short run direction of influence connecting such variables and to test if the variables are integrated or not. Attributed to the significant integration test result, it was found that developed stock markets had impact on the performance of the Nigerian stock exchange; an evidence that was lacking among the Nigerian and the selected African emerging stock markets however. Except for Tunisia though, both the developed and emerging stock markets were found to have a unidirectional short run influence on the Nigerian stock exchange: implying that short run distortions from these markets can affect the performance of the Nigerian stock exchange, but not vice versa. In terms of how the Nigerian stock exchange responded to the global policy actions intended to avert the financial crisis, the study found from descriptive evidence that the Nigerian Stock Exchange was more responsive to oil market policy adjustment and monetary policy actions than to fiscal policy actions/stimulus packages. The study concluded by looking at the implication of the integration found between the Nigerian and the developed stock markets on the performance of the Nigerian stock exchange and raised certain issues relating to the possibility of enhancing stock market integration among African stock exchanges.

ABSTRACT

Between March 5th 2008 and April 3rd 2009, the All Share index of the Nigerian Stock Exchange (NSE) dropped by 69.94%. The decline (though at varying levels) was also witnessed among emerging and developed stock markets. While various factors could be responsible for the performance of the Nigerian stock market, this study examined the role of emerging and developed stock markets on the performance of the Nigerian stock exchange. The philosophy of the study was premised on the increasing linkage of financial markets across the globe and the likely implication of such interdependence on financial market performance within the context of the current global financial crisis. Since many actions were taken globally to avert the impact of the global financial crisis, it was also pertinent for the study to examine how the Nigerian stock exchange responded to such policy actions. Five day weekly data on the all share indices for emerging (in Africa) and developed stock markets were therefore collected from 10th December 2007 to 3rd July 2009. For the emerging stock markets, the study sampled South Africa, Egypt and Tunisia while for the developed stock markets; the United States, United Kingdom and Japan were sampled. Autoregressive Distributed Lag model, Granger Causality test and Augmented Engle Granger cointegration test, were the econometric frameworks employed for the study. These models were chosen because of their ability to model the precise impact and lag it takes for a set of explanatory variables to impact on the dependent variable, the short run direction of influence connecting such variables and to test if the variables are integrated or not. Attributed to the significant integration test result, it was found that developed stock markets had impact on the performance of the Nigerian stock exchange; an evidence that was lacking among the Nigerian and the selected African emerging stock markets however. Except for Tunisia though, both the developed and emerging stock markets were found to have a unidirectional short run influence on the Nigerian stock exchange: implying that short run distortions from these markets can affect the performance of the Nigerian stock exchange, but not vice versa. In terms of how the Nigerian stock exchange responded to the global policy actions intended to avert the financial crisis, the study found from descriptive evidence that the Nigerian Stock Exchange was more responsive to oil market policy adjustment and monetary policy actions than to fiscal policy actions/stimulus packages. The study concluded by looking at the implication of the integration found between the Nigerian and the developed stock markets on the performance of the Nigerian stock exchange and raised certain issues relating to the possibility of enhancing stock market integration among African stock exchanges.

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ABBREVIATIONS/DEFINITIONS

ADF	Augmented Dickey Fuller test (a unit root test)
ADL	Autoregressive Distributed Lag (an econometric model for lagged explanatory variables – inclusive of the lagged values of the dependent variable)
AIC	Akaike Information Criteria
AIM	Alternative Investment Market
BOE	Bank of England
BOJ	The Bank of Japan
BVAR	Bayesian Vector Autoregressive (a probabilistic version of the VAR model
CASE 30	Cairo and Alexandria Stock Exchange for top 30 stocks (Egypt)
CBN	Central Bank of Nigeria
DJIA	Dow Jones Industrial Average
DW	Durbin Watson Statistics (used to detect first order autocorrelation in a time series. Preferred value should be about to indicate no autocorrelation
ECB	European Central Bank
EMH	Efficient Market Hypothesis
FTSE 100	Financial Times Stock Exchange for largest 100 stocks in Britain
GDP	Gross Domestic Product
IFCI	International Finance Corporation Investibles
IMF	International Monetary Fund
JSE	Johannesburg Stock Exchange (South Africa)
LOOP	Law of one Price. The law states that identical goods must have identical prices thus market risk and hence well-defined preferences would interact in markets that would eventually clear
LSE	London stock exchange

MENA Region Used by Marashdeh (2005) to refer to stock markets in Egypt, Turkey, Jordan and Morocco

MPR Monetary Policy Rate (in Nigeria's CBN)

NASDAQ National Association of Securities Dealers Automated Quotation System (in the US)

NIKKEI 225 *Nihon Keizai Shimbun* stocks based on the average prices of 225 equities in Japan

NSE Nigerian Stock Exchange

OPEC Organization of the Petroleum Exporting Countries

SEAQ Stock Exchange Automated Quotation System: a computerized system for displaying prices and transactions in securities on the U.K stock Exchange

SEC Security and Exchange Commission (in Nigeria)

TED spread An indicator of perceived credit risk in the general economy

TUNINDEX Tunisia Stock Index

UK United Kingdom

US United States of America

US Fed Federal Bank of the U.S.A (equivalent of Nigeria's CBN)

USM Unlisted Securities Market

VAR Vector Auto Regressive Model (an econometric model for explanatory variables – not inclusive of the lagged values of the dependent variable)

CHAPTER ONE: GENERAL INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Over the past few decades, the world stock markets have surged and emerging markets have accounted for a significant part of the boom (Yartey and Komla, 2007). In Nigeria, following the deregulation of the capital market in 1993, the Federal Government in 1995 internationalized the capital market with the abolition of laws that constrained foreign participation in the Nigerian capital market. There are now no limits to the extent of integration between Nigerian economy and foreign economies. In recent times, Nigeria has also moved towards integrating her stock market with other African and Global exchanges (ANDnetwork, 2006).

In the 1980s, many emerging markets' opened their stock market to foreign investors. By the 1990s, most of these countries in Asia, Latin America and Russia faced severe financial crises (see Yang *et al*, 2002 for instance on stock market integration and financial crises: the case of Asia). These events have helped in stimulating a debate about the benefits of stock market integration and more generally the debate about the benefits of globalization (see Stiglitz, 2002).

While the Investment and Securities Act of 1999 Part II, 8(i) and 8(j) provides institutionalize support for market integration in Nigeria (*see* Appendix (B) *for an extract of the* Act), the Pensions Act 2004 on the other hand, provides institutional backings for investing Pension Funds in the Stock market (*see also* Appendix (B) *for an extract of the* Act). The pension reform Act has the potential of making the stock market to house a huge chunk of the nation's wealth. The investment and securities Act of 1999 in institutionalizing market integration in may expose the Nigerian capital market to contagion.

Understanding the potential and actual impacts of stock market integration on the Nigerian stock exchange (especially in this time of global economic melt down) is therefore important if Nigeria is to avoid the adverse consequences.

1.2 STATEMENT OF THE PROBLEM

Events in emerging financial markets during the past decade have given rise to debate about the role of globally integrated capital market in generating and, spreading financial crises (Collins and Biekpe, 2004). From 2004, when the Nigerian Central Bank compelled licensed banks to consolidate, the Nigerian capital market has become increasingly integrated to the global capital market system.

The global economic melt down which originated from *Developed Markets* towards the beginning of the fourth quarter in 2007, has continued to have wide spread impact on *Emerging markets* across the globe. Available data showed that between 5th March 2008 and 3rd April 2009, the All Share index of the Nigerian Stock Exchange (NSE) dropped from 66,370.2 to 19,954.15 points: a decline of 69.94% in just one year. The decline (at varying levels) was also witnessed among emerging stock markets in Africa and of developed economies over the same period. These events have helped in stimulating a debate about the response of emerging stock markets to developed stock markets and the benefits of stock market integration.

As the global financial crisis continued to spread across the globe, various government and financial institutions took certain steps to address the situation. It would also be of importance for this study to examine the responsiveness of the Nigerian stock exchange to such policy actions.

1.3 RESEARCH QUESTIONS

From the above discussion, the research questions were:

(a) Do emerging and developed stock markets impact on the performance of the Nigerian Stock Exchange?

(b) Does the Nigerian stock exchange have short run relationship with emerging and developed stock market or are they cointegrated in the long run?

(c) How does the Nigerian stock exchange respond to policy actions intended to avert the impact of the financial crisis?

1.4 OBJECTIVES OF THE STUDY

The broad objective of the study was to examine the integration of the Nigerian stock exchange with emerging and developed stock exchanges in the context of the global economic and financial crisis. The specific objectives were:

(a) To examine the impact of emerging and developed stock markets on the performance of the Nigerian Stock Exchange.

(b) To ascertain the short run and long run relationship of the Nigerian stock exchange with the emerging and developed stock markets, and

(c) To examine the responsiveness of the Nigerian stock exchange to policy actions intended to avert the impact of the financial crisis.

1.5 RESEARCH HYPOTHESES

In line with the broad objective, the study sought to test the following hypotheses:

Hypothesis One:

H_o: The Nigerian Stock Exchange is not integrated with Emerging stock Markets.

H_1: The Nigerian Stock Exchange is integrated with Emerging stock Markets.

Hypothesis Two:

H_o: The Nigerian Stock Exchange is not integrated with Developed stock Markets.

H_1: The Nigerian Stock Exchange is integrated with Developed stock Markets.

1.6 SIGNIFICANCE OF THE STUDY

This study is potentially useful as an *ex post* evaluation that is relevant for policy purpose to players in the stock market. In addition it contributes to the literature on stock market integration.

Financial globalization-the phenomenon of rising cross border financial flows-is often blamed for the string of damaging economic crises that rocked a number of emerging markets in the late 1980s in Latin America and in the 1990s in Mexico and a handful of Asian countries (Kose *et al*, 2007). This study therefore serves as a guide for the Nigerian stock market (a part of the global financial system) even as it integrates with other stock markets globally. The aim is to avoid damaging contagion that may lead to the experiences of Latin American and Asian countries of the 1980s and 1990s.

The study results could be very useful to the Investment and Securities Commission, in that it provides empirical basis for Part II number 8(t) of the Act. The study results could also serve as a reference study for the Pension Reform Act document of 2004, as the Act contains a section that supports the investment of Pension funds in the Nigerian Stock Exchange. It is clear that contagion can undermine the insurance function of the Pension Reform Act

For firms (quoted companies) that seek to be listed in foreign stock markets, this study will call their attention to the need to carry out careful evaluations before making choices. It could also provide potentially useful information for the investing public and quoted firms could use it to analyze risk. For individual and institutional investors in the stock market, this study also, suggests the need for them to understand the interconnection between markets and the volatile nature of stock market integration.

Studies on globalization, external linkages, international trade and/or integration reveal a gap in the literature. Most studies on external linkages focused on its impact on economic growth using the gross domestic product as a proxy for openness which is rather too aggregative (see for instance Abrego and Osterholm, 2008; Osterholm and Zettelmeyer, 2008 etc). Other studies evaluate the impact of international trade and globalization on Nigeria by concentrating on visible (export and import) trade. These studies (e.g Garba, 2005; Muttaka, 2005; Aigbokhan, 2005; etc) do not focus on the kind of trade that is perculiar to the stock market- portfolio investment for instance. Further more, studies on the economic effect of globalization on developing countries focus on the financial market using arguments pioneered by McKinnon- Shaw (see Alayande, 2004; Adeoye, 2007 etc). Yang *et al* (2002) have

shown that stock market integration also explained the financial crises experienced by Asian economies in the 1990s. This study on stock market integration adds value to existing literature and offers useful information for understanding the transmission mechanism of the global financial crisis into Nigeria.

1.7 SCOPE OF THE STUDY

The study samples three emerging stock markets (Tunisia, Egypt and South Africa) and three developed stock markets (US, UK and Asia). It uses the All Share Index (stock prices) as the linking variable for the stock market (its twin index is the Market Capitalization). The five-day weekly data were collected from 10th December 2007 to 3rd April 2009 i.e. a sample size of 345days (or 67weeks). The choice of 5-day weekly data is because the Nigerian stock market operates from Monday to Friday.

1.8 ORGANIZATIONAL FRAMEWORK

The study was organized into five (5) chapters. Chapter one presented the general introduction, while chapter two presented the conceptualization, theoretical and empirical literatures. In chapter three, the research methodology was discussed, while chapter four presented and discussed the results/findings of the study. Lastly, the summary, conclusion and recommendation of the study were presented in chapter five.

CHAPTER TWO: REVIEW OF LITERATURE

This section consist of three parts: conceptual analysis, theoretical and, empirical review of literature

2.1 CONCEPTUALIZATION

The key concepts in this study are the terms 'Stock Market Integration', Emerging Stock Markets, Developed Stock Markets and Contagion

2.1.1 Stock Market Integration

Generally in financial economics, the term 'Stock market integration' is used to refer to the area of research that covers many aspects of interrelationships across stock markets (see Marashdeh, 2005). Marashdeh used the term stock market integration to imply that stocks in all markets are exposed to the same risk factors and the risk premia on each factor are the same in all markets. He argued that 'the stock market' is a concept for the mechanism that enables the trading of company stocks (collective shares), other securities, and derivatives. Various studies have therefore used various measures for evaluating stock market integration.

Some studies (e.g Darrat *et al*, 2000) have used the correlation of the local market return with the world return as a measure of integration. Others (e.g. Maghyereh, 2003) have concentrated on the investment restriction as indicators of integration. Asset pricing models and recent econometric techniques have been used for measuring stock market integration (see Pesaran & Shin, 1995, 1998). While other studies are based on a common factor, '*law of one price'* (LOOP); others (e.g. Bekaert and Harvey, 2002) based their studies on another factor: '*the prices of stocks reflect a*

rational assessment of the true underlying worth of stocks'. Thus, stock market integration can be viewed as the interrelations of stock prices across developed and emerging stock markets.

To Onyuma and Okuma (2007), an Integrated Stock exchange is where, without restrictions, investors in one country can buy and sell equities that are issued in another. They noted that the objective of Integration is to link stock markets electronically so that their members can execute orders on exchanges that offer the best deals for their clients.

2.1.2 Emerging Stock Markets

Collins and Biekpe (2004) in their study conceptualized Emerging Stock Markets using five indices: market capitalization ratio to GDP, market value traded as a ratio to GDP, market turnover, number of listed companies and the IFCI (International Finance Corporation Investibles) composite index. They noted that emerging stock markets are markets that are dynamic and have increasing possibilities of improving upon the five indices earlier mentioned closer to those of the Developed Stock Markets. The following African countries were listed as having stock markets that are emerging: Egypt, Ghana, Kenya, Nigeria, South Africa and Tunisia. Recent data from IFCI fact book confirms the position of these African Stock markets as Emerging.

2.1.3 Developed Stock Markets

According to Cerny (2004), a Developed Stock Market for short, is any Stock Market that is known to drive (or influence to a great extent) the activities of other stock markets across the globe. Cerny identified these markets to include the US stock market, the UK stock market and Asian (i.e the Japanese) stock market. He provided evidence that the Asian stock markets opens first, followed by the European stock markets and then the US market. These markets are known to be highly capitalized and very volatile.

2.1.4 Contagion

Contagion has been defined as the spread of market disturbances from one market to another (Dornbusch *et al*, 2000). Theoretically, it is argued that contagion exist when country **A** gets a disease because country **B** (that is integrated with country **A**) has it. Contagion effects are then stronger between two volatile markets: the chance that market **A** (a volatile market) integrated with **B** (another volatile market) having a shock is high (Egert and Kocenda, 2007). Dornbusch *et al* (2000) identified two sources of contagion; the first type is caused by a fundamental spillover resulting from the normal interdependence among economies, such as trade and financial links. The second type of contagion is linked to the behaviour of investors. Williamson (2004) however argued that *Trade* is the most familiar channel of Contagion. Two channels of contagion were identified. The first type he noted is by a fundamental spillover resulting from the normal interdependence among economies: this is the *trade* link. The second is linked to the behaviour of investors responding to panics and market fundamentals.

Financial contagion refers to the process by which a crisis that begins in one region or country spreads to an economically linked region or country. The idea of contagion is that a small shock can have a large effect and that sometimes contagion is caused by information asymmetries. Asymmetric information can give rise to contagion between countries that are affected by common fundamentals (Allen and Gale, 2007).

2.2 THEORETICAL LITERATURE

This section of theoretical review of literature is concerned primarily with a search for the most suitable theory and model for the study. Based on the assumption that the prices of stocks reflect a rational assessment of the true underlying worth of stocks, it is important then to begin with the Efficient Market Hypothesis (EMH), which have been tested in various forms to analyze the efficiency of stock markets.

2.2.1 The Efficient Market Hypothesis

The Efficient Market Hypothesis (here after referred to as the EMH),asserts that financial markets are 'informally efficient', or that prices on traded assets, e.g., stocks, bonds, or property, already reflect all known information. In 1965 Eugene Fama published his dissertation arguing for the *random walk hypothesis*. In 1970 he published a review of both the theory and the evidence for the hypothesis. The paper extended and redefined the theory and included the definitions for three forms of market efficiency: weak, semi-strong and strong.

The weak form efficiency holds that share price exhibit no serial dependencies (i.e there are no 'patterns' to asset prices). The semi-strong form efficiency implies

that share prices adjust to publicly available new information very rapidly and in an unbiased fashion, such that no excess returns can be earned by trading on that information. Yet, for the strong- form efficiency, share prices reflect all information, public and private, and no one can earn excess returns. This theory therefore calls our attention to the importance of share price as a variable of concern to facilitate the evaluation of the possible impact of emerging and global stock markets on the Nigerian stock market, but do not present the appropriate model for evaluation because in all its three forms (weak, semi-strong and strong form), its basic concern is to test whether security prices (stock prices) fully reflect private or public information and do aid this study in evaluating the impact of other stock markets on another one.

Other variants of the EMH are the fair game models (which explains the behavior of stock prices in relation to given information set at a given period of time) and speculative bubbles which measures market swings by looking at market fundamentals such as dividends and earnings (see Christian and Renatas,2007).

The contesting models for explaining the impact of certain independent variables and their lag values on a specific dependent variable are the vector autoregressive models-VAR(see Yang et al 2002 for instance) and the autoregressive distributed lag models-ARDL (see also Marashdeh, 2005 for instance).

2.2.2 The Vector Autoregression (VAR) Model

The VAR system rests on the general proposition that economic variables tend to move together over time and also to be autocorrelated (Johnston and DiNardo, 1997). The VAR is commonly used for forecasting systems of interrelated time series and analyzing the dynamic impact of random disturbances on the system of variables.

The VAR approach side steps the need for structural modeling by modeling every endogenous variable in the system as a function of the lagged values of all the endogenous variables in the system.

The mathematical form of a VAR is:

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + Bx_t + \varepsilon_t \qquad (1)$$

where y_t is a k vector of endogenous variables, x_t is a d vector of exogenous variables, $A_1,\ldots, A_p$ and B are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated with their own lagged values and uncorrelated with all of the RHS variables. Since only lagged values of the endogenous variables appear on the RHS of each equation, there is no issue of simultaneity, and OLS is the appropriate estimation technique.

The VAR model however does not model the influence of current x_t on y_t. it only models the influence of past values of x (i.e lagged values of x) on y. What we seek in this section however is a model that offers a richer explanation to the dependent variable by looking at current and lag variables of the independent variables.

2.2.3 Autoregressive Distributed Lag (ADL) Model

The ADL model focuses on the relation of a dependent variable y_t on its lagged values and current and lagged values of one or more explanatory variables. The simplest example of an ADL scheme is:

$y_t = m + \alpha_1 y_{t-1} + ß_o X_t + ß_1 X_{t-1} + \varepsilon_t$ (2)[1]

this is labeled ADL(1,1) since the dependent variable and single explanatory variable are each lagged once. The ε series is presumed to be white noise. Inverting the lag polynomial in y gives:

$y_t = (1+\alpha_1+\alpha^2{}_1+\ldots)m + (1+\alpha_1 L+ \alpha^2{}_1 L^2+\ldots)(ß_o X_1+ß_1 X_{t-1}+\varepsilon_t)$ (3)

Thus the current value of y depends on the current and all previous values of x and ε. Alternatively, this relation shows that the current value of x has an effect on the current and future values of y. The simple lags in equation (2) imply a set of dynamic responses in y to any given change in x. There is an immediate response, followed by short-run, medium-run, and long-run responses. The long-run effect of a unit change in x_t is obtained by summing the partial derivatives. Provided the stability condition $|\alpha_1| < 1$ is satisfied, the sum is $(ß_o + ß_1)/ (1-\alpha_1)$.

The parameters of the ADL can often be simply revealed by reparametizing the equation (2) for instance. (How)? Replace y_t by $(y_{t-1} + \Delta y_t)$ and x_t by $(x_{t-1} + \Delta x_t)$. the result will be:

$\Delta y_t = m + ß_o \Delta x_t - (1-\alpha_1) y_{t-1} + (ß_o + ß_1) x_{t-1} + \varepsilon_t$ (4)

[1] $y_t = m + \alpha_1 y_{t-1} + ß_o X_t + ß_1 X_{t-1} + \varepsilon_t$ ---------- (2)
let $ß_o X_t + ß_1 X_{t-1} + \varepsilon_t = K$ ----------2a
then: $y_t = m + \alpha_1 y_{t-1} + K$
collecting the y terms together: $y_t - \alpha_1 y_{t-1} = m + K$
if $y_{t-1} = y_t$ then: $y_t (1 - \alpha_1) = m + K$
extending $(1 - \alpha_1)$ to a lagged polynomial yields: $y_t (1 - \alpha_1 - \alpha^2{}_1 - \alpha^3{}_1 - \ldots) = m + K$
dividing both sides by $(1 - \alpha_1 - \alpha^2{}_1 - \alpha^3{}_1 - \ldots)$ and inverting yields:
$yt = (1 + \alpha_1 + \alpha^2{}_1 + \alpha^3{}_1 + \ldots) m + (1 + \alpha_1 L + \alpha^2{}_1 L^2 + \alpha^3{}_1 L^3 + \ldots) K$ ---------- 2b
note that the lag parameter **L** is not applied to the **m** coefficient because **m** is a constant unlike **K.** **R**ecall also that $ß_o X_t + ß_1 X_{t-1} + \varepsilon_t = K$; now substituting for K in 2b yields
$y_t = (1 + \alpha_1 + \alpha^2{}_1 + \alpha^3{}_1 + \ldots) m + (1 + \alpha_1 L + \alpha^2{}_1 L^2 + \alpha^3{}_1 L^3 + \ldots)(ß_o X_1+ß_1 X_{t-1}+\varepsilon_t)$
reduced into
$y_t = (1 + \alpha_1 + \alpha^2{}_1 + \ldots) m + (1 + \alpha_1 L + \alpha^2{}_1 L^2 + \ldots)(ß_o X_1+ß_1 X_{t-1}+\varepsilon_t)$ -- (3)

The parameters in equation (4) could be estimated by running the OLS regression of Δy_t on a constant (m), Δx_t, y_{t-1} and x_{t-1}. From the estimated coefficients and their variance-covariance matrix, one could derive estimates of the four parameters in equation (3) namely: m, α_1, $ß_o$, $ß_1$ and their standard errors. Alternatively, one could estimate these parameters directly by applying OLS to equation (3) and (4) by transforming the equation into their linear form and not imposing any restrictions (See Johnston and DiNardo, 1997).

The ADL (p,q) scheme gives a richer lag structure that still retains the specification of just one explanatory variable:

$$A(L)y_t = m + B(L)x_t + \varepsilon_t \qquad (5)$$

2.3 EMPIRICAL LITERATURE

This section reviews related empirical literatures. It presents in summary, their study objectives, methodology and key findings. These studies lay the foundation upon which this present study builds up on.

2.3.1 External Linkage and Growth

Bharma (2002) evaluated the effect of stock market liberalization on stock market volatility among other objectives. Using a two country continuous- time dynamic general equilibrium model for an economy with one *good,* based on the assumption that prices are endogenous, the study found that market volatility increases when one country opens its stock market to external investors. The methodology of the study was however theoretic and its assumption (such as an economy with one good) may not be realistic. Besides, the study lacks empirical

content for a specific case investigation. The study however establishes a strong theoretical link between stock market integration and volatility, that is, volatility increases as stock markets integrates. And that integration has implication for market swings, correlations and risk premia.

Abrego and Osterholm (2008) investigated the impact of external linkage on the growth using Colombia as a case study. Their objective was to investigate the extent to which economic growth in Colombia is been driven by external factors viz-a-viz domestic factors. They sought to understand how sensitive the Colombian economic growth is to external economic conditions as well as investigate the importance of shocks to a number of macroeconomic variables for GDP growth. The paper used a Bayesian Vector Autoregressive (BVAR) model adapted from Villani (2008). The data used included: data on world GDP (excluding Colombia); the nominal three-month U.S treasury bill rate; the JP Morgan EM bond index spread for Latin America (excluding Colombia); and the high-yield corporate bond spread in the U.S (aiming to capture general investor risk aversion). They found that domestic factors (i.e. investment climate and fiscal policy) account's for about 60 percent of growth while external development (global economic growth) account for 40 percent. The impulse response functions indicated that monetary and fiscal policy shocks had a moderate impact on domestic growth, while the effect of global growth is considerably stronger. Though this study carried out its investigation using non-stock market related index (except for the high-yield corporate bond spread in the U.S), it established that economic linkage between countries, introduces external influence into domestic economic balance and that some times, this influence can be stronger than domestic influence.

Eboreime and Iyoko (2008) assessed how competitive the Nigerian economy is and the obstacles or threats to its competitiveness in a globalizing world. Despite the perceived benefits that accrue to participating countries in the game of globalization, they showed that both internal and external threats affect the development of domestic production capacity in negative ways, thus hindering the nation from reaping the gains of globalization. Though their study also looks at globalization from the point of view of trade and Nigeria's contribution to the global GDP, they showed clearly (using descriptive, historical and comparative methods) that Nigeria is not a major player in the global field of trade. And that, while Nigeria only contributes negligibly to world trade (about 0.22% to the worlds GDP), Nigeria is however exposed to threats (a retrospective view of the competitiveness of the Nigerian economy in a globalizing world) which indicates that the country is highly deficient in the fundamental pre-requisites required for a successful integration in the global market place. Though their study showed that globalization exposes countries to both internal and external treat, the evidence it provides concerning Nigeria's integration with the rest of the world is not sufficient. Besides the study focuses on export and import goods and do not look at trade facilitated through financial market integration.

2.3.2 Regional and Global Stock Market Integration

Increasing globalization of the world economy has an impact on the behaviour of national stock markets (Cerny, 2004). The relaxation of all types of economic barriers and development in information technology are among others, expected to induce stronger stock market integration. One of the aims of the study was to find out

the impact of information releases on market returns, volatility and trading volumes. The study used 8 month high frequency data covering 5minutes to 1 day from Bloomberg for U.S, London, Frankfurt, Paris, Warsaw and Prague. The Granger causality tests revealed that markets seem to react very quickly to the information revealed in the prices on other stock markets. And that in all cases the reaction occurs within one hour. The finding paints a clear picture of how volatile stock markets are and the possible danger of external shock transmission from one integrated market to the other.

Ashraf and Ahmed (2003) investigated the interlinkages and causal relationship between the U.S stock market (using Nasdaq), the Japanese stock market (using Nikkei) with the Indian stock market. They collected daily data from January 1999 to August 2004. The Johansen cointegration test was employed to measure the long-term relationship between the indices and the Granger-Causality tests was used to check the short-term causal relationships. They found that there is no long-term relationship of the Indian stock market with that of the U.S and Japanese stock markets. Also that the Nasdaq (US market) and Nikkei (Japanese market) have stronger causal relationship in 1999 to 2001 but disappears in 2002 to 2004. This implies that the Indian stock market have no long-run equilibrium with the US and Japanese stock markets. The finding for Nasdaq and Nikkei have another implication for the present study. It shows that in the space of one to two years, strong causal relationship between markets can weaken (or disappear). Thus asides understanding the impact (short-run as well as long-run) of certain stock markets on a particular stock market, it is also important to understand how the choice of stock market operators responds to global economic events and data releases (in the short-run as well as the long-run).

Recently, the need for regional stock market integration has been emphasized. ANDnetwork (2006) published that the African Stock Exchanges Association (ASEA) have emphasized that Nigerian based multinationals and banks should list their shares on other exchanges. In a paper 'promoting regional financial market integration' Patrick (2003) argued that capital market integration benefits retail investors (through lower prices for all financial services), securities regulators (through more efficient, more liquid and broader securities market), corporations (through cheaper financial alternatives) and governments (through more efficient allocation of capital rising from the fact that saving's can flow more easily and cheaply to investment and because barriers will have been dismantled).

Yartey and Adjasi (2007) examined the importance and the future of African stock markets. They collected data for 19 African countries including Nigeria, Egypt, Ghana and South Africa. Following a rather descriptive and trend analysis, they found that stock markets have contributed to the financing of the growth of large corporations in certain African countries. The paper concluded that better technical and institutional development to address the problem of low liquidity, will aid Africa to be better positioned for the challenge of integration. Other studies like Mwenda (2000, 2001) argued that there is a strong correlation between the efficiency of legal framework and the development of African stock markets. Using Zambia as a case study he concluded that inadequate liquidity and poorly drafted legislation have affected the growth of African markets (Mwenda, 2001).

Yartey (2008) however examined the determinants of stock market integration and development in emerging markets with particular focus to South Africa. The study used a panel data set for 42 countries for the period 1990 to 2004. The study

found that macroeconomic factors such as income level, gross domestic investments, banking sector development, private capital flows and stock market liquidity are important determinants of stock market development and integration in emerging markets including that of South Africa.

2.3.2.1 Stock Market Integration in Asia

The study by Kolari and Min (2002), examined the long- run relationship and short-run dynamic among the US, Japanese and 10 Asian stock markets with particular attention to the 1997- 1998 Asian financial crisis. The study employed the recently developed Vector Auto regression (VAR) technique of the generalized impulse response analysis by Koop, Pesaran and Potter (1996); Pesaran and Shin (1998) to estimate short-run dynamic causal linkages across stock markets. To comprehensively investigate the impact of the Asian crisis, the study divides the data into 3 periods: pre crisis (2nd Jan 1995 – 31st Dec 1996), crisis (1st July 1997 – 30th June 1998) and post crisis (1st July 1998 – 15th May 2001). The data consist of daily stock index closing prices of two developed stock markets and ten Asian emerging markets (Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Pakistan, Philippines, Singapore, Thailand, Taiwan and US). The sample period is from 2nd January 1995 to 15th May 2001 (i.e 1662 daily observation). The study found that in Asia both long-run cointegration relationships and short run causal linkages among these markets strengthened during the financial crisis than before the crisis. And that these markets have generally been more integrated after the crisis than before the crisis. The study also found that the U.S stock market exerted substantial influence on most Asian stock markets in all three sample periods. They conclude that the degree

of integration among countries tends to change overtime, especially around periods marked by financial crises.

In another study, Click and Plummer (2003) examined stock market integration in Indonesia, Malaysia, the Philippines, Singapore and Thailand (these five countries are the original member of the Association of Southeast Asian Nations and now includes Brunei, Cambodia, Laos, Myanmar and Vietnam) in the aftermath of the Asian financial crises. The paper specifically considered whether these five ASEAN countries are cointegrated. Using daily stock index data in local currency[2] from 1st July 1998 through 31st December 2002 (i.e. 1175 observations), the empirical results showed that ASEAN were cointegrated after the Asian financial crisis. And that, the results are consistent whether daily data or weekly data are used or, whether analyzed in local currency, the US dollar or the Japanese Yen. This shows that such studies could be done using index denominated in local currency or dollar denominated and the findings would still be robust.

2.3.2.2 Stock Market Integration in Europe

The study by Licht (1997) gives a good insight into the organization and workings of how stock markets are integrated in Europe. The purpose of the paper was to analyze the trend toward stock market integration which member states in the European Union had under gone. The paper discusses the London stock exchange in the UK. It used the term stock market integration in its more popular meaning i.e.

[2] To convert the local currency index into US dollar, multiply the local currency index by the dollars-per-foreign-currency exchange rate. This conversion will however make the stock indices to follow a common trend. Such approach (owing to the unification in numeraire), do not allow for the reflection of country specific response to market changes in domestic parities. Hence, Click and Plummer (2003) splitted their study into two: first to allow for dollar denominated index and the other, to allow for local currency. Our aim is to allow for country specific response.

subsuming such phenomena as multiple listing and cross border trading. Often times, it was noted that the activities are also referred to as 'internationalization of stock markets'.

The principal stock market in the UK is the London stock exchange (LSE) formally called the international stock exchange of the UK and the republic of Ireland. The LSE runs three markets: the official list (divided into a domestic section and an international section); the unlisted securities market (USM) and the Alternative Investment Market (AIM). The third market flopped in the wake of the 1987 stock market crash and was finally closed in 1990. In January 1997 the LSE tightened the regulatory requirements for the AIM, particularly with regards to disclosure. The LSE introduced a sweeping reform nick-named 'Big Bang', that included removal of the traditional distinction between jobbers (dealers) and brokers, introduction of competition from banks and foreign institutions, liberalization of commission, and the introduction of the stock exchange automated quotation system (SEAQ). These reforms led to an immediate success, which consolidated LSE's position as the undisputed leader among European stock exchanges and the most internationalized stock exchange in the world. One of the factors that led to success of the reforms was the fact that London was already a major international financial center.

It can be seen from the above discussion that the LSE had two sections for the dealings of quoted big companies; a domestic section and an international section, such that it is possible to side track possible sources of market volatility that is peculiar to external linkage (as well as those originating from the domestic economy). Asides this strategy of dividing the market, the LSE also adopted market reforms that was expected to strengthen the operation of the market. Yet, Licht (1997)

noted that European stock markets are partially integrated (noting that only Greece stands out as being fully regionally integrated). This implies that European stock markets are first of all integrated within their region before considering integrating with global stock markets.

2.3.2.3 Stock Market Integration in the MENA Region

Marashdeh (2005) examined the linkages among four emerging stock markets in the MENA region (namely Egypt, Turkey, Jordan and Morocco) with developed stock markets represented by the US, UK and Germany stock markets. The study employed monthly stock market data covering 115 months for the period Dec 1994 to June 2004. The stock prices were expressed in local currencies. The Augmented Distributed Lag (ADL) model was adopted to evaluate the impact of these stock markets on one another. Using Egypt as a dependent variable, the study found that U.S and U.K markets have significant influence on the MENA stock markets as well as having a significant long run relationship with the Egyptian stock market. When Turkey was used as a dependent variable, it was found that Egypt and Morocco had a significant influence on Turkey. For Jordan, only Egypt and Turkey had long-run impact on the Jordanian bourse. Lastly for Morocco, the results showed that both Egypt and Turkey have long-run impacts on Morocco. However it was found that the stock market in Turkey affected the stock market in Morocco negatively. Meaning that, a fall in the price index of Turkey, will have a positive effect on the price index in Morocco and vice versa. For the case of European stock markets, it was found that all stock markets in the MENA region are integrated with each other but are

segmented from the international stock markets (only Egypt as well as Greece, were found to be integrated with the developed stock markets).

The ADL model adopted by Marashdeh (2005) is presented below:

$$\alpha(L,p)y_t = a_0 + \sum_{i=1}^{k} ß_i\,(L,q)x_{it} + \lambda' w_t + \varepsilon_t \qquad (6)$$

for all t=1,…,n where; $\alpha(L,p) = 1 - \alpha_1 L - \alpha_2 L^2 - \ldots - \alpha_p L^p$

$$ß_i(L,q_i) = ß_{io} + ß_{i1}L + ß_{i2}L^2 + \ldots + ß_{iq}L^q \qquad (7)$$

for all i=1,2,…,k.

y_t is the dependent variable, a_0 is the constant term, L is the lag operator such that $Ly_i = y_{t-1}$. w_t is SX1 vector of say the exogenous variables with fixed lags. The order of the distributed lag on the dependent variable and the regressors is selected using either the Akaike Information Criterion (AIC) or the Shwartz Bayesian Criterion (SIC).

Factoring equation (7) into equation (6), the expression can be re-specified in a linear form (with the assumption of one independent variable) as follows:

$$y_t = a_0 + a_1 y_{t-1} + \ldots + a_n y_{t-n} + b_1 x_t + b_2 x_{t-1} + \ldots + b_n x_{t-n} + u_t \qquad (8)$$

where the length of the lag as mentioned earlier shall be selected by using a selection criterion.

Marashdeh estimated this model by changing the dependent variable with respective stock market so as to examine the influence others have on it. The study however did not take into account the adjusted coefficient of determination parameter. It only used the t and f statistics to test for individual and general statistical significance of the independent variables on the dependent variable.

2.3.2.4 Stock Market Integration in the Middle East

Darrat *et al* (2000) assessed market linkages in the case of three emerging markets in the Middle East (Egypt, Morocco and Jordan). The data consisted of 35 months stock market index from October 1996 through August 1999. Using cointegration and error-correction techniques the paper found that Middle East emerging stock markets are segmented globally, but appear highly integrated within the region. The Granger test in conjunction with error-correction model indicated that the Egyptian stock market is a dominant force driving other markets in the region.

The model was specified in this form

$$ÄJ = a_0 + a_1L\ ÄJ + a_2LÄM + a_3LÄE + a_4LEC + u_1 \quad (9)$$
$$ÄM = b_0 + b_1L\ ÄJ + b_2LÄM + b_3LÄE + b_4LEC + u_2 \quad (10)$$
$$ÄE = c_0 + c_1L\ ÄJ + c_2LÄM + c_3LÄE + c_4LEC + u_3 \quad (11)$$

Where J = Jordan Stock index, M = Morocco and E = Egypt. The notation Ä was used to represent the different variables in their stationary form. EC was the error correction term while u_1, u_2 and u_3 were their respective error correction term. L represented their lag length (which was lagged to three).

2.3.2.5 Stock Market Integration in Nigeria

Abraham (2008) examined the fluctuation of prices on the Nigerian stock exchange from 31 December 2007 to 5 September 2008. The focus of the paper was to examine the influence of US stock market (DJIA), Japan (NIKKEI) and South Africa (JSE) on the Nigerian stock exchange (NSI). The Autoregressive Distributed lag model employed was specified as follows:

$$NSI = a_1 + a_2NSI_{t-1} + \ldots + a_nNSI_{t-n} + b_1JSE_t + b_2JSE_{t-1} + \ldots + b_nJSE_{t-n} + U_t \quad (12)$$

$$NSI = c_1 + c_2NSI_{t-1} + \ldots + c_nNSI_{t-n} + d_1DJIA_t + d_2DJIA_{t-1} + \ldots + d_nDJIA_{t-n} + E_t \quad (13)$$

$$NSI = e_1 + e_2NSI_{t-1} + \ldots + e_nNSI_{t-n} + f_1NIKKEI_t + f_2NIKKEI_{t-1} + \ldots + f_nNIKKEI_{t-n} + V_t \quad (14)$$

For model one and three, it was found that the JSE and the NIKKEI do not significantly explain the variation in the NSI. For model two however, the DJIA at lag four was found to positively influence 3.7 percent of the variation in the NSI. The granger causality test provided evidence of a short run two – way relationship between the NSI and the DJIA: Implying that, both markets had precedence of information in the short run that can influence the performance of the other within days. The major strength of the study is that it provides an empirical evidence for the use of the autoregressive distributed lag model in modeling how other stock markets can influence the performance of the Nigerian stock exchange. This present study extends the sample by adding two emerging stock markets from Africa (Tunisia and Egypt) and one developed stock market from the UK. It further employs cointegration test to examine whether the Nigerian stock exchange is integrated with the selected stock markets.

Tella (2008) in his paper 'The global economic crisis, global stock market and the Nigerian stock market' raised certain issues about inter-relationship between the current global financial crisis and stock markets around the world with special interest of such impact on the Nigerian stock exchange. He noted that issues of contagion (i.e. the spread of market disturbances from one market to another) are concerned with the transmission of financial variable movements from one country to another. Two sources of contagion were identified following Dornbusch *et al* (2000). The first type is caused by a fundamental spillover resulting from the normal interdependence

among economies, such as trade and financial links. The second type was linked to the behavior of investors. Though he identified stock market instruments to include equity ordinary shares and preference shares; government bonds; debentures stocks and bonds (which act as industrial loans); the descriptive analysis focused on government transaction/industrial loans from 1980 – 2006 as well as flow of non-oil foreign capital from 1990 – 2005. On these bases, he argued that the Nigerian stock market has a low level of integration with world financial system. He therefore traced the linkage of the Nigerian stock market to foreign capital inflow into the market as result of liberalization in the economy. He concluded that it is only when stock markets are efficient that the activities of one stock market can affect another market. He contends however that markets can respond to the same events in the same way. Noting that this could be regarded as temporary and as a coincidence, he further argued that, market integration through globalization and advancement in information technology, could make the Nigerian stock market to also become susceptible to the vagaries of the happenings around the world. As a point for further research, he called for empirical investigations to show that the Nigerian stock market can have serious contagion effect.

Though the studies reviewed above provide a foundation for this study, the study is however anchored on three literatures: Cerny (2004), Marashdeh (2005) and Tella (2008). Cerny (2004) provided the literature upon which the sample size (i.e. daily data of more than eight months) was drawn and the need for evaluating the impact of increasing globalization of the world economy on national stock markets. Marashdeh (2005) and Abraham (2008) provided the literature upon which the theoretical framework for this study (i.e. the ADL model) was based. Lastly, Tella

(2008) raised specific issues relating to the effects of global stock markets on the Nigerian stock market and the need for providing empirical evidence on how the Nigerian stock market can have contagion effect from global stock markets and global economic activities.

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter presents the analytical framework, estimation techniques and the sources of data to be used for this study

3.1 TYPES AND SOURCES OF DATA

Secondary (time series) data were collected on a 5-day weekly basis for Nigeria's All Share Index along side three emerging stock markets (i.e. Case30-Egypt, Tunindex-Tunisia, and JSE -South Africa); and United States (Dow Jones Industrial Average-DJIA), United Kingdom (FTSE 100) and Asian stock market(s) (NIKKEI 225),from www.sbaresearch.com (for Nigeria, Tunisia and Egypt), www.reuters.com (for US,UK and Asia) and www.jse.co.za (for JSE).[3] Other sources of data include BBC website/news, www.nigerianstockexchange.com , JSE website, *the Economist* magazine, CNN news and Nigerian dailies. The stock prices were closing prices and were local currency denominated.

The five-day weekly data were collected from 10th December 2007 to 3rd July 2009 i.e. a sample size of 410 days. The choice of 5-day weekly data was because the Nigerian stock market operates on a 5-day (Monday to Friday) basis.

Global economic event/ policy actions covering major monetary policy actions, fiscal stimulus, oil market information/ policy adjustment were collected from the internet and major national/ foreign news magazine or dailies.

[3] The U.S has other stock indices viz: Nasdaq, S&P500 as well as the DJIA. The U.K also has FTSE 250, FTSE All, Tech Mark and FTSE 100 as well. Japan has two major indices, NIKKEI 225 and Hang Seng. The selection of DJIA, FTSE 100 and NIKKEI 225 is based on the listing criteria of reuters.com. Nigeria, Tunisia, S/Africa and Egypt have basically one index as captured by sbaresearch.com and jse.co.za

3.2 ANALYTICAL FRAME WORK

This section analyzed the stochastic properties of the time series data collected. The discussion focused on mean, coefficient of variation and test of stationarity. The coefficient of variation was obtained by dividing the standard deviation of each of the series by their mean values, multiplied by 100.

The data collected was also examined in terms of market peaks and bottoming out performance for the selected stock markets. In a tabulated form, the period it took for each market to bottom out from the recession over the sample period was also documented.

Stationarity test were performed by employing the Augmented Dickey Fuller unit root test. The aim of the test was to tell if the mean, variance and co-variance of the selected stock markets were constant all through in their level form. The test also tells about the volatile nature of a series.

Line graphs were also presented to convey a general picture of the trend behaviour of the selected stock markets.

3.3 MODEL SPECIFICATION

To test these hypotheses, the study employed the Autoregressive Distributed Lag (ADL) framework adapted from Marashdeh (2005) as against the Vector Autoregressive (VAR) model. The VAR system rests on the general proposition that economic variables tend to move together over time and also to be autocorrelated (Johnston and DiNardo, 1997). Its usage is most suitable for *forecasting* systems of interrelated time series and analyzing the dynamic impact of random disturbances on the system of variables. Thus, it is an important framework for predictive purposes.

The ADL framework was chosen for this study because of its *explanatory* power. While the ADL framework explains the variation of a dependent variable by using its lagged values and the current and lagged values of one or more explanatory variables, the VAR uses the past values of a dependent variable as well as the past values of one or more independent variables to estimate their influence on the present values of the dependent variable. In so doing, the VAR excludes the impact of the current values of the explanatory variables which could also be found to significantly explain variation in the dependent variable (Grene, 2004).

The ADL model as adapted from Marashdeh (2005) and Abraham (2008) is specified as follows:

$$NSE_t = C + \alpha_1 NSE_{t-1} + \ldots + \alpha_n NSE_{t-k} + ß_o JSE_t + ß_1 JSE_{t-1} + \ldots + ß_n JSE_{t-k} + \Phi_o TNSE_t + \Phi_1 TNSE_{t-1} + \ldots + \Phi_n TNSE_{t-k} + Þ_o CASE_t + Þ_1 CASE_{t-1} + \ldots + Þ_n CASE_{t-k} + \varepsilon_t \quad \textbf{(3.1)}$$

$$NSE_t = C + \alpha_1 NSE_{t-1} + \ldots + \alpha_n NSE_{t-k} + g_o FTSE_t + g_1 FTSE_{t-1} + \ldots + g_n FTSE_{t-k} + h_o DOW_t + h_1 DOW_{t-1} + \ldots + h_n FTSE_{t-k} + k_o NIKKEI_t + k_1 NIKKEI_{t-1} + \ldots + k_n NIKKEI_{t-k} + \upsilon_t \quad \textbf{(3.2)}$$

Emerging markets = JSE, TNSE and CASE (i.e. S/Africa, Tunisia and Egypt respectively). Developed markets = DOW, FTSE, and NIKKEI (i.e. United States, United Kingdom and Japan respectively). ε_t and υ_t are their residuals respectively. While α_n , $ß_n$,, Φ_n, $Þ_n$, g_n ,h_n and k_n are parameters to be estimated, **m** and **f** represents the intercept (i.e the transformed mean of NS) of the model.

For 3.1 and 3.2 it is expected that α's > 0.

The Scharwtz information criterion was used to determine the lag length. Since we have a relatively large degree of freedom of over 300 sample points, the problem of insufficient degree of freedom was kept in check.

To perform this estimation, the series were log transformed. The choice of the lag length was made based on the Scharwtz information criterion (which allowed for a

lag lenghth of 5). The lagged sum of each of the coefficient was then obtained. The constant term as well as the lagged sum of each of the market was then divided by the lagged sum of the dependent variable (i.e. NSE).

Granger causality test was used to supplement the analysis of the study so as to measure the short run influence of the selected stock markets on the Nigerian stock exchange. The granger causality test was estimated using Eviews software. The test was distinguished in three cases: *Unidirectional granger causality* (when changes in Y is explained by X in the short run but not the other way round), *bidirectional*[4] (when both X and Y influences each other in the short run) and *no causality* (when there is no statistical evidence that X and Y influences each other in the short run.

For the cointegrating relationship among the stock markets, the Augmented Engle Granger (AEG) Cointegration test was employed. The AEG framework begins with testing for stationarity of all the series. Where these series are nonstationary at levels $I(0)$, a linear regression is then estimated and the residuals obtained from the regression and tested for stationarity using the Augmented Dickey Fuller (ADF) test. If the residuals are stationary, then cointegrating relationship holds. If otherwise, there will be said to be know cointegration among the variables. Thus the test of this cointegration technique was based on the Augmented Dickey Fuller (ADF) test.

The model estimation was done using the Eviews econometric software. The software provides a window for the analysis of five day weekly data. While other software such as PcGive, Statistica, Stata and so on, could also be used for the analysis, Eviews was chosen for one reason: because of familiarity of usage by the researcher.

[4] Gujarati (2005) refers to it as bilateral causality or feedback.

3.4 ANALYSIS OF STOCK MARKET RESPONSE

As the global financial crisis continued to spread across the globe, various government and financial institutions took certain steps to address the situation. These actions in a broad sense include fiscal and monetary policy measures. The question here is that: how did the Nigerian stock exchange respond to these global policy actions? This question could be answered in two ways: on one hand, by collecting secondary data on a broad range of variables (interest rate cuts and fiscal actions) and estimating how they affect Nigeria's stock exchange. On the other hand periodic data about global policy actions, events and data releases can be collected and their movements as these actions were taken observed. This study followed the second approach for one reason: to allow for narration and description on how the Nigerian stock exchange responded to these policy actions as they were announced or taken.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

This section discussed the stochastic properties of the data collected for the selected stock markets and analyzed the data in relation to objectives of the study. The data set is presented in Table 1 of Appendix A.

4.1 STOCHASTIC PROPERTIES OF THE SELECTED STOCK MARKETS

The table below shows the stochastic properties of the series and the peak/bottom out dates of the selected stock markets. The difference of days between the peak date and bottom out date was also tabulated. The discussion is divided into three: discussion of the mean/coefficient of variation, discussion on the peaks/bottom out date, and discussion on stationarity.

Table 4.1: Stochastic properties of the Selected Stock Markets

Stochastic Properties	NSE	JSE	TUN	CASE	FTSE	DOW	NIKKEI
Mean	46539.7	25681.23	2956.243	7907.634	5156.797	10679.04	11490.62
Standard deviation	14874.85	4569.741	199.8978	3008.907	869.6389	2033.428	2628.616
Coe. Variation (%)	31.96	17.79	6.76	38.05	16.86	19.04	22.88
Maximum	66370.2	33232.89	3418.13	11935.67	6503.9	13551.69	15653.5
Days	Wednesday	Thursday	Tuesday	Monday	Wednesday	Wednesday	Monday
Peak Date	5 March 2008	22 May 2008	9 Sept 2008	5 May 2008	12 Dec 2007	26 Dec 2007	24 Dec 2007
Minimum	19803.6	17814.42	2577.46	2972.32	3512.09	6521.4	7054.98
Days	Thursday	Thursday	Wednesday	Friday	Tuesday	Friday	Tuesday
Bottom out Date	26 Mar 2009	20 Nov 2008	2 Jan 2008	6 Feb 2009	3 Mar 2009	6 Mar 2009	10 Mar 2009
Difference of Days between Peak and Bottom Out Dates	277	131	-180	200	320	313	317
Stationarity test	0(I)	0(I)	0(I)	0(I)	0(I)	0(I)	0(I)

Source: Researchers Computation
Note: 0(I) means not stationary at levels

4.1.1 Mean and Coefficient of Variation

The mean shows the average index of each of the stock market over the sample period. The mean for the NSE was 57.5% higher than its minimum value indicating a significant drop of the market index over the sample period. The

percentage for the JSE, the TUN, the CASE, FTSE, DOW and NIKKEI are 30.6%, 12.8%, 62.4%, 31.9%, 38.9% and 38.6% respectively. Of all the markets, the Tunisian bourse turned out to have the lowest percentage indicating that all through the sample period, the TUN did not significantly vary away from its average performance.

The coefficient of variation further confirmed that the TUN index had the lowest variation in its trend (with a 6.76% coefficient of variation value). Stock markets with the highest coefficient of variation are the JSE, the NSE and the NIKKEI. A plot of the differenced trend graph in figure 4.2 showed that the trend variation for the TUN index was more stable among the selected stock markets.

4.1.2 Peaks and Bottoms

All the developed stock markets had their peak periods in December 2007, while the Emerging stock markets had theirs (though in varying months) in 2008. The FTSE peaked on 12 December 2007 and took 320 days to bottom out on the 3rd of March 2009. The NIKKEI then followed on 24th December 2007 and took 317 days to bottom out on the 10th of March 2009. Though the DOW reached its peak two days after the NIKKEI, it bottomed out 4 days before the NIKKEI on the 6th of March 2009. For the emerging stock markets, the NSE peaked on the 5th of March 2008 and took 277 working days to bottom out on the 26th of March 2009. The JSE was observed to reach its peak over the sample period on 22 May 2008, and took 131 days to bottom out on the 20th of November 2008. The number of working days it took for the CASE to bottom out on the 6th of February 2009 (after reaching its peak on the 5th of May 2008) was 200. For the TUN however, it was observed that the bourse had bottomed out of a downward fluctuation on 20 January 2008 and continued to record

a steady rise until it peaked on the 9th of September 2008. This explains the negative sign attached to 180 indicating that, the market bottomed out when others were peaking, and peaked when others were bottoming out of the global financial crisis.

4.1.3 Stationarity Test

The Augmented Dickey Fuller unit root test was used to examine if the series were stationary at levels. It was found that all the series were not stationary at levels: an indication that all the stock markets are volatile. Applying first difference however, the series became stationary. The stationarity result is presented below.

Table 4.2: STATIONARITY TEST: Augmented Dickey Fuller (ADF) Test

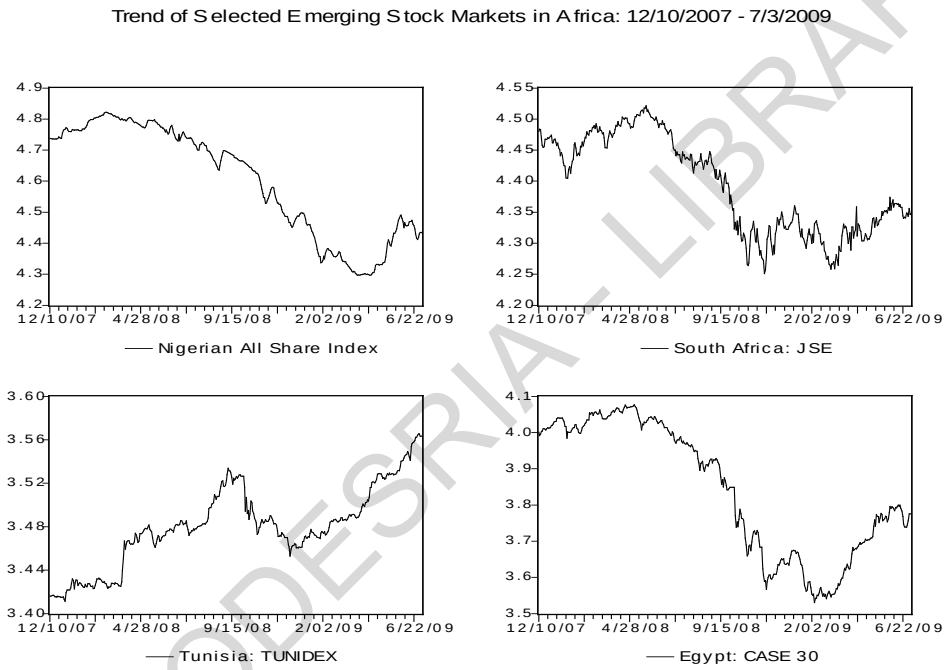
Level test *I*(0)		Critical Values		
ADF Stat	Bourses	1%	5%	10%
-0.157	Nigeria (NSE)	-3.448	-2.868	-2.571
-1.506	South Africa (JSE)	-3.448	-2.868	-2.571
-0.297	Tunisia (TUNINDEX)	-3.448	-2.868	-2.571
-0.902	Egypt (CASE30)	-3.448	-2.868	-2.571
-1.2126	United States (DOW JONES)	-3.448	-2.868	-2.571
-1.5533	United Kingdom (FTSE 100)	-3.448	-2.868	-2.571
-1.5108	Japan (NIKKEI 225)	-3.448	-2.868	-2.571
First Difference Test *I*(1)				
-12.129	Nigeria (NSE)	-3.448	-2.868	-2.571
-22.633	South Africa (JSE)	-3.448	-2.868	-2.571
-18.626	Tunisia (TUNINDEX)	-3.448	-2.868	-2.571
-16.859	Egypt (CASE30)	-3.448	-2.868	-2.571
-21.0315	United States (DOW JONES)	-3.448	-2.868	-2.571
-21.904	United Kingdom (FTSE 100)	-3.448	-2.868	-2.571
-21.125	Japan (NIKKEI 225)	-3.448	-2.868	-2.571

Source: Eviews Output

A plot of the trend at their level form shows that, for the Emerging markets, all the markets (except for Tunisia) have witnessed a persistent down ward trend. For Nigeria, the index peaked on 5 March 2008 at 66,370.2 points and by 3 April 2009, the index had declined significantly by 69.93% to 19,954.15. By 5 May 2008, the Egyptian Bourse (CASE 30) reached a peak at 11,935.67 points and declined by

61.24% to 4,625.81 by 3 April 2009. The JSE (South Africa) in less than 3 weeks peaked on 22 May 2008 at 33, 232.89 points, and by 3 April 2009, had significantly declined by 36.22% to 21,195.49. The Tunisian Stock market continued to witness an upward trend not until 8 September 2008 when the index reached a peak at 3,372.67. By 3 April 2009, the TUNINDEX had however fluctuated downwards to 3168.51: a slight decline of about 6.05%. A general look at the trends however suggests that the selected African Emerging Stock Markets have witnessed a steady downward trend.

Figure 1:

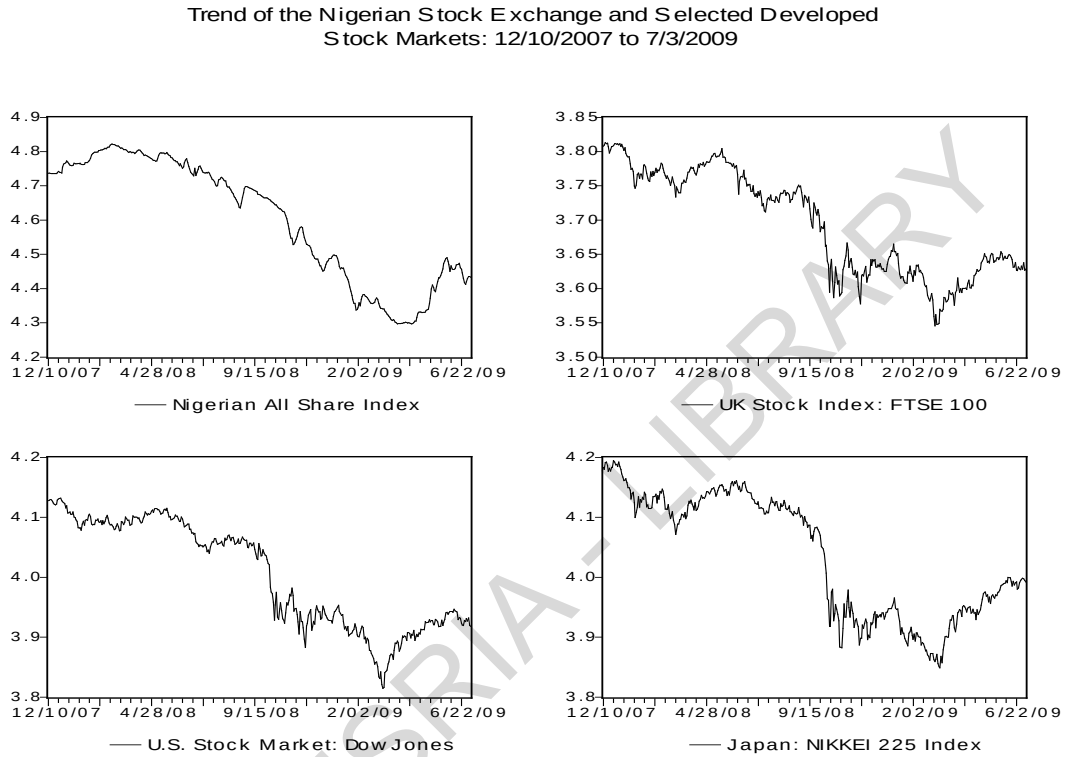


Source: Researcher's Presentation

A look at the trend for the DOW JONES, FTSE 100 and NIKKEI 225 suggested that these bourses also experienced downward fluctuation within a larger portion of the sample period. The FTSE 100 index as at 12 December 2007 stood at 6,503.9 points and by 3 April 2009, the index had collapsed by 38.04% to stand at 4,029.67 points. The Nikkei 225 index as 24 December 2007 stood at 15,653.5 points

and by the end of our sample period, stood at 8,749.84 points: a decline of 44.1%. In 26 December 2007, the Dow Jones stood at 13,551.69 points. By 3 April 2009, the index had declined by 41.42% to 7,938.66 points. The trend of the series is presented below:

Figure 2



Source: Researcher's Presentation

4.2 Impact of Emerging Stock Markets on the NSE

To determine the extent to which emerging and developed stock markets influences the performance of the NSE, the ADL model was applied. For the emerging markets, the estimation of the impact of Emerging Stock markets on the NSE showed that only the South African stock market (JSE) at lag 4 significantly explained the variation in the NSE (but significant only at 10% level). The R^2 Adjusted was found to be 23.01% and the DW statistics value of 1.99 showed no evidence of autocorrelation. The Eviews result is presented below:

Table 4.2(a): ADL Model of Emerging Stock markets on the NSE: Estimated (3.1)

Dependent Variable: NSE
Method: Least Squares
Date: 03/20/10 Time: 13:18
Sample(adjusted): 12/18/2007 7/03/2009
Included observations: 404 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000288	0.000307	-0.935506	0.3501
NSE(-1)	0.404429	0.051146	7.907418	0.0000
NSE(-2)	0.180834	0.054909	3.293357	0.0011
NSE(-3)	-0.092233	0.055453	-1.663275	0.0971
NSE(-4)	-0.044173	0.054812	-0.805906	0.4208
NSE(-5)	0.032778	0.050868	0.644375	0.5197
JSE	0.032542	0.030310	1.073640	0.2837
JSE(-1)	-0.005180	0.031675	-0.163532	0.8702
JSE(-2)	-0.009355	0.031498	-0.297020	0.7666
JSE(-3)	-0.023175	0.031511	-0.735471	0.4625
JSE(-4)	0.054474	0.031581	1.724923	0.0854
JSE(-5)	-0.028414	0.031395	-0.905031	0.3660
TUN	-0.007311	0.092742	-0.078830	0.9372
TUN(-1)	-0.023367	0.091811	-0.254511	0.7992
TUN(-2)	-0.060879	0.092949	-0.654973	0.5129
TUN(-3)	0.068900	0.093027	0.740639	0.4594
TUN(-4)	-0.085247	0.093340	-0.913293	0.3617
TUN(-5)	0.098871	0.091377	1.082022	0.2799
CASE	0.028367	0.029993	0.945808	0.3448
CASE(-1)	0.035054	0.030380	1.153833	0.2493
CASE(-2)	0.023985	0.030189	0.794485	0.4274
CASE(-3)	-0.011139	0.030189	-0.368973	0.7124
CASE(-4)	0.042861	0.030005	1.428463	0.1540
CASE(-5)	0.042664	0.029056	1.468305	0.1428

R-squared	0.279497	Mean dependent var	-0.00075
Adjusted R-squared	0.235887	S.D. dependent var	0.006613
S.E. of regression	0.005781	Akaike info criterion	-7.41091
Sum squared resid	0.012699	Schwarz criterion	-7.17321
Log likelihood	1521.006	F-statistic	6.40908
Durbin-Watson stat	1.999633	Prob(F-statistic)	0.00000

Source: Eviews Output

The model was then re-estimated (after excluding insignificant variables). The R^2 Adjusted improved to 24.03%. The JSE index then became significant at 5% level, while the DW value of 1.97 confirmed that there was no serial correlation among the residual of the independent variables. Generally, the F-stat was found to be 43.59 with a probability value of 0.000. This implied that information spilling out of the South African stock market significantly and positively explains current variation of NSE. The re-estimated model is shown below:

Table 4.2(b) Reduced ADL Model of Emerging Stock markets on the NSE

Dependent Variable: NSE
Method: Least Squares
Date: 03/20/10 Time: 12:23
Sample(adjusted): 12/17/2007 7/03/2009
Included observations: 405 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000322	0.000289	-1.116169	0.2650
NSE(-1)	0.402183	0.049103	8.190556	0.0000
NSE(-2)	0.143536	0.049125	2.921857	0.0037
JSE(-4)	0.064184	0.028262	2.271028	0.0237

R-squared	0.245945	Mean dependent var	-0.000749
Adjusted R-squared	0.240303	S.D. dependent var	0.006605
S.E. of regression	0.005757	Akaike info criterion	-7.466906
Sum squared resid	0.013291	Schwarz criterion	-7.427361
Log likelihood	1516.048	F-statistic	43.59704
Durbin-Watson stat	1.970361	Prob(F-statistic)	0.000000

Source: Eviews Output

4.2.1 Granger Causality Test

When Granger causality test was performed, it was confirmed that the JSE had unidirectional granger causality with the NSE in the short run. The Egyptian stock market was also found to have unidirectional granger causality with the NSE in the short run. The granger causality result is presented below:

Table 4.2(c): Granger Causality Test for NSE VS Emerging Markets

Pairwise Granger Causality Tests
Date: 03/20/10 Time: 12:34
Sample: 12/10/2007 7/03/2009
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
JSE does not Granger Cause NSE	408	5.92134	0.00292
NSE does not Granger Cause JSE		0.59667	0.55113
TUN does not Granger Cause NSE	408	0.06277	0.93917
NSE does not Granger Cause TUN		0.52485	0.59205
CASE does not Granger Cause NSE	408	10.8633	1.5E-05
NSE does not Granger Cause CASE		0.73594	0.17546

Source: Eviews Output

4.2.2 Cointegration Test

When tested for cointegration using the Augmented Engle Granger cointegration test, it was found that the NSE had no long run relationship with the selected African stock markets. This suggested that the NSE was not integrated with the selected emerging stock markets in Africa. This was because the ADF test statistic value of 1.943 (taking absolute value), was not significant at the 1% Mackinnon critical value. The Augmented Dickey Fuller test result used for this analysis is presented below:

Table 4. 2(d): ADF Result to ascertain Cointegration between the NSE and the selected Emerging Stock Markets

ADF Test Statistic	-1.850726	1% Critical Value*	-3.4484
		5% Critical Value	-2.8688
		10% Critical Value	-2.5706
*MacKinnon critical values for rejection of hypothesis of a unit root.			

Source: Eviews Output

The AEG cointegration was also performed at country specific levels and was found that the NSE had no cointegrating relationship with the JSE, Tunisia and Egypt. Their respective ADF test statistic values were -2.409, -0.7193 and -1.2191 against the critical values -3.4484 (at 1%), -2.8688 (at 5%) and -2.5706 (at 10%). These results clearly indicate that African stock markets are not integrated. Thus going by the granger causality estimation, it can be said that the impact of the JSE on the NSE was short termed and might not be sustained in the long run. The trend showing the movement in stock market index for the NSE and the selected African Emerging stock markets is presented below:

4.3 Impact of Developed Stock Markets on the NSE

The estimation for the impact of the developed markets (when lagged to 5) on the Nigerian Stock Market; showed that NSE_{t-1}, NSE_{t-2}, $FTSE_t$, DOW_{t-3}, $NIKKEI_{t-2}$ and $NIKKEI_{t-3}$ significantly explain part of the present variation of NSE going by their individual t-statistics. This result is presented in table 3.2 below:

Table (4.3): ADL Model for Developed Stock Markets on the NSE: Estimated (3.2)

Dependent Variable: NSE
Method: Least Squares
Date: 03/20/10 Time: 13:16
Sample(adjusted): 12/18/2007 7/03/2009
Included observations: 404 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000350	0.000296	-1.184759	0.2369
NSE(-1)	0.389690	0.051248	7.603976	0.0000
NSE(-2)	0.212275	0.054954	3.862769	0.0001
NSE(-3)	-0.083306	0.055821	-1.492362	0.1364
NSE(-4)	-0.050113	0.055269	-0.906713	0.3651
NSE(-5)	0.049027	0.051118	0.959085	0.3381
FTSE	0.112221	0.049956	2.246387	0.0253
FTSE(-1)	0.009234	0.054299	0.170052	0.8651
FTSE(-2)	-0.022001	0.054318	-0.405041	0.6857
FTSE(-3)	0.000935	0.054552	0.017140	0.9863
FTSE(-4)	0.024995	0.053936	0.463423	0.6433
FTSE(-5)	0.002164	0.051113	0.042332	0.9663
DOW	-0.036070	0.051212	-0.704324	0.4817
DOW(-1)	-0.021434	0.055099	-0.389008	0.6975
DOW(-2)	-0.072384	0.057039	-1.269041	0.2052
DOW(-3)	-0.127833	0.058354	-2.190625	0.0291
DOW(-4)	-0.104448	0.057427	-1.818784	0.0697
DOW(-5)	-0.035331	0.054715	-0.645724	0.5188
NIKKEI	-0.004619	0.038273	-0.120675	0.9040
NIKKEI(-1)	0.026801	0.041201	0.650495	0.5158
NIKKEI(-2)	0.118853	0.041776	2.844998	0.0047
NIKKEI(-3)	0.107149	0.041716	2.568544	0.0106
NIKKEI(-4)	0.044496	0.040424	1.100718	0.2717
NIKKEI(-5)	0.036578	0.032386	1.129428	0.2594

R-squared	0.286357	Mean dependent var	-0.00075
Adjusted R-squared	0.243163	S.D. dependent var	0.006613
S.E. of regression	0.005753	Akaike info criterion	-7.42048
Sum squared resid	0.012579	Schwarz criterion	-7.18277
Log likelihood	1522.938	F-statistic	6.629530
Durbin-Watson stat	2.004309	Prob(F-statistic)	0.000000

Source: Eviews Output

The model was then re-estimated after dropping the insignificant variables. The adjusted R-Squared then improved from 24.3% to 25.2%. The re-estimated model is presented below:

Table (4.3a) Reduced ADL Model of the Developed Stock markets on the NSE

Dependent Variable: NSE
Method: Least Squares
Date: 03/20/10 Time: 13:23
Sample(adjusted): 12/14/2007 7/03/2009
Included observations: 406 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000276	0.000287	-0.963161	0.3361
NSE(-1)	0.394865	0.048802	8.091140	0.0000
NSE(-2)	0.164082	0.048904	3.355171	0.0009
FTSE	0.080215	0.030871	2.598423	0.0097
DOW(-3)	-0.084127	0.041328	-2.035627	0.0424
NIKKEI(-2)	0.069592	0.030388	2.290150	0.0225
NIKKEI(-3)	0.064479	0.029183	2.209471	0.0277

R-squared	0.263086	Mean dependent var	-0.000747
Adjusted R-squared	0.252005	S.D. dependent var	0.006597
S.E. of regression	0.005706	Akaike info criterion	-7.477606
Sum squared resid	0.012990	Schwarz criterion	-7.408531
Log likelihood	1524.954	F-statistic	23.74125
Durbin-Watson stat	1.990492	Prob(F-statistic)	0.000000

Source: Eviews Output

The model showed that the Nigerian stock exchange responds positively to changes in the FTSE and NIKKEI stock market indices, while in responds negatively to the US stock market. The adjusted R-square of 25.2% implied that the present performance of the Nigerian stock market is partly explained by it's on past values, the current value of the FTSE index, and the Nikkei index at lags 2 and 5. The US stock market index however (i.e. the Dow Jones) had a negative impact on the Nigerian stock exchange implying that both markets might be responding to different factors. The result was significant at 1, 5 and 10% critical values and the Durbin Watson statistic of 1.99, shows that there was no autocorrelation problem in the model.

4.3.1 Granger Causality

To see the direction of short run influence of the developed stock markets on the Nigerian stock exchange, the granger causality test was also employed. The Eviews output is presented below:

Table 4.3b: Pairwise Granger Causality Tests For NSE VS Developed Markets

Sample: 12/10/2007 7/03/2009

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
FTSE does not Granger Cause NSE	408	9.24514	0.00012
NSE does not Granger Cause FTSE		0.68555	0.50440
DOW does not Granger Cause NSE	408	9.04478	0.00014
NSE does not Granger Cause DOW		0.95659	0.38507
NIKKEI does not Granger Cause NSE	408	10.0585	5.5E-05
NSE does not Granger Cause NIKKEI		0.03071	0.96976

Source: Eviews Output

For all the developed stock markets, it was found that they had a unidirectional influence on the NSE. That is, in the short run, it is the developed that markets that influences the performance of the NSE and not the other way round. These results were significant at 1, 5 and 10% critical values.

4.3.2 Cointegration Test

The ADF test for the long run relationship connecting the Nigerian stock exchange and the developed stock markets is presented below:

Table 4.3c: ADF Test for Cointegration between NSE and Developed Markets

ADF Test Statistic	-4.965624	1% Critical Value*	-3.4484
		5% Critical Value	-2.8688
		10% Critical Value	-2.5706

*MacKinnon critical values for rejection of hypothesis of a unit root.

Source: Eviews Output

Since the ADF test statistic value of 4.96 is greater than the 1% critical (Mackinnon) value of 3.44, it can be drawn that the Nigerian stock exchange and the selected

developed stock markets are integrated. Thus, the developed stock markets are more likely to influence the performance of the Nigerian stock market than the emerging African stock market would.

4.4 TEST OF THE HYPOTHESES

The test of hypotheses is presented in a summarized form below.

Table 4.4.1: *Hypothesis One*

Hypothesis One	ADF-calculated Value	ADF- 1% Value	ADF 5% Value	ADF 10% value
ADF – statistic values	1.8507	3.448	2.869	2.571
H_o: Emerging Stock Markets are not integrated with the Nigerian stock Exchange	**H_o** (null hypothesis) **ACCEPTED**			
H_1: Emerging Stock Markets are integrated with the Nigerian stock exchange	**H_1** (alternative Hypothesis) **REJECTED**			

Source: Researcher's computation

Since the ADF calculated value is less than the ADF critical values at 1, 5 and 10%, the null hypothesis will be accepted implying that the selected emerging stock markets in Africa are not integrated with the Nigerian stock exchange. This was an indication of weak stock market integration within the African region.

The second test of hypothesis is presented below:

Table 4.4.2: *Hypothesis Two*

Hypothesis Two	ADF-calculated Value	ADF- 1% Value	ADF-5% Value	ADF-10% Value
F – statistic values	4.965	3.448	2.869	2.571
H_o: Developed Stock Markets are not integrated with the Nigerian stock exchange	**H_o** (null hypothesis) **REJECTED**			
H_1: Developed Stock Markets are integrated with the Nigerian stock exchange	**H_1** (alternative Hypothesis) **ACCEPTED**			

Source: Researcher's computation

For the second hypothesis, the ADF calculated value was greater than the ADF critical values at 1, 5 and 10% therefore, the alternative hypothesis will accepted implying that the Nigerian stock exchange was integrated with the selected developed stock markets.

4.5 GLOBAL POLICY ACTIONS TO AVERT THE FINANCIAL CRISIS

The data on the global policy actions have been tabulated and presented in table 2 of appendix A. This section discusses the responsiveness of the Nigerian Stock Exchange to them

4.5.1 Response to Monetary Policy Actions

Basically, monetary policy actions during this period were dominated by central banks interest rate cuts and adjustment. Looking at the time line of events table reveals that the following dates had major monetary policy actions:

7 February 2008: Bank of England (BOE) cuts rates by 0.25% from 5.5% to 5.25%. This action did seem to have worked in tandem with other policy actions and events as the NSE operators responded positively making the All Share index to have a steady bullish run for four consecutive weeks.

When the US Fed slashed interest rate by 75 basis points on the 18th of March 2008, this action appeared not to had worked in tandem with other market news such that the NSE continued to close red(on a weekly basis) from 7 March 2008 to 4 April 2008. Obviously, operators in the NSE did not feel the positive effect on this monetary policy action.

Due to slow economic growth and housing sector worries, the Bank of England (BOE) cut interest rates by 0.25% to 5% on the 10th of April 2008. The NSE Market responded positively to this policy in the first, but the next three weeks that followed, saw market operators responding negatively as the All Share Index closed red. On the 8 of August 2008 however, when the Bank of Korea cut interest rate, this factor worked positively with other domestic factors to bring about an improvement in the performance of the NSE as the market was seen to improve two weeks later.

The Bank of Japan (BOJ) on the 31st of October 2008 cut rates: during this period, the NSE had experienced a steady run closing red. This suggested that economic news and policy changes from Japan (some Asian countries) seem to have some lag before having influence on the operators of the NSE.

4 November 2008: Australia cuts rates; Hopeful signs in credit markets

When the European Central bank (ECB) cut rates on the 15th of January 2009, the NSE appeared still to be going through a period of bearish trend. At this stage of the global economy, most central banks appeared to be embarking on interest rate cuts but no much difference was made in reviving the plunge of global stock markets. Further more, on 5th of March 2009, the BOE cut interest rates by 50 basis points to a record low 0.5% on Thursday (i.e. February 26th) and would pump N75billion pounds of new money into buying assets mostly gilts[5] to combat recession. A day later, the NSE responded positively to this action, but continued to fall four weeks after. This implies that while interest rate cuts from the UK seem to have spontaneous impact of the performance of the NSE, and that from Japan (and the Asian countries) seem to

[5] Gilts are bonds (long term government financial instrument) issued by the government of the United Kingdom, South Africa and Ireland. The term is a British origin and refers to the debt securities issued by the BOE. A government bond is a bond issued by a national governments in the countries own currency.

exercise some lag before it is been factored into the information net of NSE operators, the impact of interest rate cuts from the US seem to have a mixed action reaction on the operators of the NSE.

4.5.2 Response to Fiscal Policy Actions/ Stimulus Plans

On the 4th of February 2008, the British government made a US$108billion commitment to prop up Northern Rock, a medium size banks. During this period, the NSE recorded a steady run for about four week's straight closing green. The US Fed on the 16th of March, 2008 put US$30billion of public funds to rescue Bear Stern to save the derivatives market: at this stage, the NSE had started to experience almost a steady bearish run from March down to October on a weekly basis. The fiscal policy actions/ stimulus plans operated during this period were: Fed reserve Bailout of Lehman Brothers (an Investment bank in the US) – 12th to 15th September 2008; US congress rejects US$700billion Wall Street bailout plan: The bailout plan is the biggest since the 1930s. This led to various bailout moves by individuals, central banks, institutions and governments. For example British Prime ministers bailout finance plan; Iceland move to nationalize 5 banks; move by central banks to cut rates; and so on; October, 2008: Passage of EESA (Emergency Economic Stabilization Act) of 2008 - A law enacted in response to the global financial crisis of 2008 authorizing the US secretary of the treasury to spend up to US$700 billion to purchase distressed assets, especially mortgage assets and make capital injections into banks; and 24th October: World Bank to double lending to help countries weather the Food, Fuel and Financial crisis. The bearish run suggested that the stimulus packages/ plans

implemented across the globe had no real or nominal effect on the performance of the NSE operators compared to the monetary policy actions by central banks.

November 2008 saw the broadening of the bailout plan by the US Treasury. On The second week of market activities saw the NSE operators responding positively to this action there after, the market continued on closing red on a weekly basis. Perhaps the expansion of the bailout plan was to rescue holdings like Citigroup.[6] The bailout plan was later extended to bailing out of the Auto industry on the 8th of December, 2008.

On the 10th of February 2009, Reuters reported that the US stock market plunged as bank rescue disappoints. The same day, the US offered US$1.5 trillion bank bailout plan (as Obama unveils the US$787 billion bailout plan on the 17th of February), but stocks slumped further. During this period likewise, the NSE on the average, continued to witness a down ward trend.

Clearly, country wide stimulus packages appeared not to be helping in rescuing the global economy from recession and so, on the 2nd of April 2009, the Group of 20 (G20) announced a US$1.1trillion to rescue global economy and financial system through funding of groups like IMF. As documented earlier by this study, the NSE had since 6th of March to the 3rd of April 2009 crashed by over 60%.

4.5.3 Response to Global Oil Market News, Policy and Events

Within our sample period, there are five dates that capture specific oil markets events: 23rd May 2008, 24th July 2008, 24th October 2008, December 2008 and February 2009. How did the NSE respond to these events, news and policy actions?

[6] 24 Nov: US Bailouts Citigroup with US$20billion capital

23 May 2008: high oil prices hammered energy-sensitive sectors and left investors on edge about inflation. Within this period, the NSE had a steady run closing red. It can be argued that the market moved in the direction on which the oil market was moving – South!

Then on the 24th of July 2009, oil prices slides lower from record high. Reasons: fears that Hurricane Dolly would damage oil and gas supply. Note that Oil is traded on futures market making it vulnerable to speculation that can raise prices as much as US$5 a barrel in a day (source: Daily Trust 24th July, page 27). During this period, the NSE continued to close red on a weekly basis (asides from the first week of August 2008).

On the 24th of October 2008, the Organization of the Petroleum Exporting Countries (OPEC) agreed to cut output sharply. Over this period, the NSE continued to plunge. Further on the 17th of December 2008, OPEC agreed to cut oil supply by 4.2million Barrels Per Day. Two days later and two weeks onward, the NSE operators recorded slight improvement. Due to the global economic melt down, the NSE resumed its bearish trend movement. And by 17th February 2009, the SBA Research reported that oil stocks had dragged down indices on the exchange. This is clear evidence that the NSE responds to oil market news, events and policy actions.

In summary, from the descriptive analysis done above, there are evidence that the NSE responds to oil market news, events and policy actions more than it does to fiscal or monetary policy actions. The evidence however, that the Nigerian stock market responds more to changes in monetary policy actions (such as interest rate cuts) is stronger compared to its response to fiscal policy actions/ stimulus plans.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The recent global economic melt down has adverse effect on national economies brought about by the inter linkages of markets. This study evaluated the impact of emerging and developed stock markets on the Nigerian stock market as well as examined how Nigerian stock exchange responds to global economic events, data releases and policy actions. The finding of the study suggested that the developed stock impacts on the performance of the Nigerian stock exchange more (i.e. by 25.2%) than the emerging stock markets do (which was by 24.0%). All the coefficients for both the emerging and developed stock markets were consistent except that the US stock market was found to negatively impact on the performance the Nigerian stock exchange at lag 3.

On short run relationship, it was found that all developed stock markets had a short run (unidirectional) influence on the performance of the Nigerian stock exchange. Implying that, short run shocks spilling from the developed stock markets could affect the short run performance of the Nigerian stock exchange. Asides the Tunisian stock exchange (which had no short run relationship with the Nigerian stock exchange), this finding was also consistent with the emerging stock markets.

In terms of the responsiveness of the Nigerian stock market to the global policy actions intended to cushion the impact of the crisis, it was found that the Nigerian Stock Exchange was more responsive to monetary policy actions than to fiscal policy actions/stimulus packages. Its responsiveness to Oil market policy adjustment however seem to be stronger compared to monetary and fiscal policy actions.

The hypotheses were then tested using the Augmented Dickey Fuller statistics at the 1% Mackinnon critical value. It was found that, the Nigerian stock exchange was not integrated with the emerging stock markets but was integrated with the developed stock markets. This reveals that emerging stock markets in Africa are weakly integrated but are strongly integrated with stock markets in developed economies.

5.2 Conclusion

The interconnection of global financial markets has consequences for national economies. This study evaluated the impact of emerging and developed stock markets on the Nigerian stock exchange. The study concluded that the recent down ward fluctuation experienced by the Nigerian stock market was to an extent explained by the linkage of the NSE with the developed stock markets in the US and UK. And that, while global actions were taken to bottom out the recession, the NSE responded to monetary policy actions of interest rate cuts and oil market policy adjustment more, than for fiscal policy actions and its associated stimulus plans.

5.3 Recommendation

To minimize the transmission of market shocks to the Nigerian economy through the stock exchange the following recommendations were made:

i. The Nigerian Stock Exchange Operators/regulators should apply caution when considering further integrating with stock markets in developed economies as these markets have evidence of spreading market disturbance/shocks to the Nigerian economy.

ii. For the emerging stock market, the Nigerian stock exchange can enhance integration with them by lowering listing requirements for firms/companies from the emerging economy (and vice versa).

iii. Thirdly, the study recommends that individual/institutional investors should apply caution when investing in the NSE as the market have been shown to be susceptible to external shocks.

iv. Likewise, social security funds (such as pension funds) invested in the stock exchange/capital market should be kept to a barest minimum as the market has been shown to be volatile and susceptible to external shocks.

v. Lastly, the government should as well should be careful on how it intends to integrate the capital market with the rest of the world in pursuing its goals and vision 2020 as empirical evidence have shown that market crisis across the globe can impact on the Nigerian Stock Exchange

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Table 2: Selected Global Events, Policy Actions and Data Releases from August 2007 to April 2009

Date	Events	Policy Actions	Data Releases	Source
August, 2007	Liquidity crisis emerges			Wikipedia.org
September, 2007:	Northern Rock seeks and receives a liquidity support facility from the Bank of England			Wikipedia.org
October, 2007:			Record high US stock market October 9, 2007 Dow Jones Industrial Average (DJIA) 14,164	Wikipedia.org
10 December 2007		US Fed and 5 other central banks to lend US$90billion to end credit crisis.	US dollar down in 13 countries out of 16 major currencies of the world	Reuters.com
January, 2008:	Stock Market Volatility			Wikipedia.org
14 Jan 2008:			Price of Gold hits a new record high	Reuters.com
February, 2008:	Nationalisation of Northern Rock			Wikipedia.org
4 February 2008		British government makes a US$108billion commitment to prop up Northern Rock, a medium size banks.		Reuters.com
7 February 2008		Bank of England (BOE) cuts rates by 0.25% from 5.5% to 5.25%.		Reuters.com
20 February 2008			Dow Jones fell following news to bailout bond insurers. The US government guaranteed about US$2trillion of assets.	Reuters.com
March, 2008	Collapse of Bear Stearns			Wikipedia.org
March, 2008	Federal takeover of Fannie Mae and Freddie Mac (both mortgage institutions)			Wikipedia.org
13 March 2008			US dollar fell below 100 yen for the first time in 12years.	Reuters.com
16 March 2008		US Fed put US$30billion of public funds to rescue Bear Stern to save the derivatives market.		Reuters.com
18 March 2008		the US Fed slashed interest rate by 75 basis points		Reuters.com
25 March 2008			Consumer's confidence in US hits 5year low while future expectation tumbled to their lowest since 1974.	Reuters.com
10 April 2008		BOE cuts interest rates by 0.25% to 5% due to slow economic growth and housing sector worries.		Reuters.com
13 – 15 May 2008	China earth quake to affect about 10million people.			Reuters.com
19 May 2008			Earthquake cost to the industrial sector in China estimated as US$9.6billion having its impact on the gas sub sector and expected to shrink agricultural produce (grain production) by 15%.	Reuters.com
23 May 2008			High oil prices hammered energy-sensitive sectors and left investors on edge about inflation.	Reuters.com
19 June 2008		Swiss National Bank freeze interest rate at 2.75%.	US dollar rose back against major currency baskets	Reuters.com
27 June 2008			Bear Market of 2008 declared	Reuters.com
July 2008	Investors flee housing and stock assets toward commodities		Oil prices peak at $145 per barrel	Reuters.com
24 July 2008			Oil slides lower from record high for fears that Hurricane Dolly would damage oil and gas supply.	Reuters.com
6 August 2008			US dollar rises to 7 month high against the yen on oil rate.	Reuters.com
8 August 2008		Bank of Korea cuts interest rates.		Reuters.com
15 August 2008	Georgia signs cease fire agreements. Georgia is not an oil producer but the country is a key transit for the crude oil and gas export.			Reuters.com
15 August 2008			US annual inflation hits 17years high. India inflation hits 13years high.	Reuters.com
18 August 2008			Oil prices fell below US$114 a barrel.	Reuters.com
1 Aug to 4 Sept 2008			Coffee and cocoa prices remained constant at US$140.5 and US$2,996 respectively.	Bbc/commodities.com
September, 2008:	(1) Global Financial Crisis (2) Bankruptcy of Lehman Brothers (3) partial nationalization of Fortis holding			Wikipedia.org
12 – 15 September 2008		Fed Bails out Lehman Brothers (an Investment bank in the US).		Reuters.com
29 September 2008			US congress rejects US$700billion Wall Street bailout plan. The bailout plan is the biggest since the 1930s.	Reuters.com
October, 2008:	Iceland's major banks nationalized	Passage of EESA (Emergency Economic Stabilization Act) of 2008.	Large losses in financial markets world wide throughout September and October	Wikipedia.org

8 October 2008		BOE unveiled UK plan for Bank Recapitalization. The major aim is to encourage lending to the real economy		Bbc.co.uk
17 October 2008		US treasury to inject US250billion in exchange for preferred shares.		
22 October 2008			So far, the major characteristics of the global recession are: High Inflation rates; High interest rates; and lending collapse.	Reuters.com
24 October 2008		OPEC agrees sharp output cut.	(1) Home sales in US records biggest gains since July 2003. (2) World Bank to double lending to help countries weather the Food, Fuel and Financial crisis.	Reuters.com
28 October 2008			Dow Jones above 9000 (about 11% surge) as investors scooped up beaten-down shares and optimism grew that the U.S. Federal Reserve and other central banks will cut interest rates further.	Reuters.com
31 October 2008		BOJ (Japan) cuts rates	US consumers cut spending.	Reuters.com
November, 2008:	China creates a stimulus plan		Dow Jones Industrial Average (DJIA) touches recent low point of 7,507 points	Reuters.com
3 November 2008	(1) Global Auto sales shrink (2) Manufacturing crash adds to global gloom.			Reuters.com
4 November 2008		Australia cuts rates;	Hopeful signs in credit markets	Reuters.com
6 November 2008		Obama considers treasury peak as stocks slide		Reuters.com
7 November 2008		US: Treasury prepares to broaden bailout plan.		Reuters.com
10 November 2008		China enacts stimulus	AIG gets US$150 billion Government Bailout;	Reuters.com
12 November 2008			Home values drop for seventh straight quarter	Reuters.com
17 November 2008			Japan in Recession	
24 November 2008		US Bailouts Citigroup with US$20billion capital		Reuters.com
26 November 2008		China slashes rates as EU plots stimulus.		Reuters.com
27 November 2008		Asian Stocks post fifth day of gains, cheered by China's rate cut		Reuters.com
December 2008		The Australian Government injects 'economic stimulus package' to avoid the country going into recession,		Reuters.com
2 Dec 2008			Nigerian market capitalization down by N179 billion	Nigerianstockexchange.com
8 Dec 2008		US$15 billion for Auto Bailout		Reuters.com
11 Dec 2008		House to sign Auto Bailout Plan		Reuters.com
15 Dec 2008			Stocks Plunge as Auto bailout fail	Reuters.com
16 Dec 2008		Fed cuts rates to between 0–0.25 from 1. Expectation of the cut was put at 0.5		Reuters.com
17 Dec 2008			OPEC agrees 4.2million BPD oil supply cut	Reuters.com
22 Dec 2008	US Housing crisis deepens.	China cuts rate (its fifth cut in lending rate since September)		Reuters.com
25 Dec: 2008			In US, number of people filing for jobless benefits hit a 26-year high.	Reuters.com
31 Dec: 2008			Mortgage rates drop to another new low	Reuters.com
2 Jan 2009			Manufacturing sector tumbles in December, falling to a 28year low (lowest since 1980)	Reuters.com
15 Jan 2009		ECB cuts rate		Reuters.com
20 Jan 2009	Obama's swearing in; becomes the first black US president			Reuters.com
21 Jan 2009	Israel withdraws troops from Gaza			Reuters.com
2 Feb 2009			US GDP sees biggest drop in 27years	Reuters.com
4 Feb 2009			Auto sales near 27 year low	Reuters.com
5 Feb 2009			US job losses accelerate	Reuters.com
10 Feb 2009		US offer US$1.5 trillion bank bailout plan but stocks slump	US stock plunge as bank rescue disappoints.	Reuters.com

17 Feb 2009		Obama unveils US$787 billion bailout plan	Nigeria oil stocks drag indices down on the exchange	Reuters.com
19 Feb 2009			Nearly 5 million Americans drawing jobless benefits	
20 Feb 2009		Obama promotes strict over sight over stimulus		Reuters.com
24 Feb 2009			US recession fears could extend to 2010 as US home sales fall at record place	Reuters.com
26 Feb 2009		The BOE cut interest rates by 50 basis points to a record low 0.5%		Reuters.com
27 Feb 2009			US GDP Q4 2008 drops biggest since 1982	Reuters.com
2 March 2009	Combat operation in Iraq to end by Aug 2010			Reuters.com
5 March 2009		BOE to pump N75billion pounds of new money into buying assets mostly gilts to combat recession		Reuters.com
12 March 2009			US jobless rate nearing 10%	Reuters.com
13 March 2009			IMF Forecast: 2009 Global growth to slow below zero – the worst performance in our life time. IMF warns of great global recession.	Reuters.com
16 March 2009			US outputs plummets, manufacturing at record low.	Reuters.com
18 March 2009		Fed to buy long term US government debt		Reuters.com
19 March 2009			US jobless benefits on record high	Reuters.com
20 March 2009		US 2009 budget deficit revised to US$1.8 trillion		Reuters.com
23 March 2009			US existing home sales rose in February	Reuters.com
25 March 2009			25 March: US home sales climbs at fastest pace in 10months	Reuters.com
27 March 2009			US panel approves US$3.45trillion budget	Reuters.com
30 March 2009			US consumer spending edges up	Reuters.com
2 April 2009		G20 announces US$1.1trillion to rescue global economy and financial system through funding of groups like IMF		Reuters.com

Source:"http://en.wikipedia.org/wiki/Financial_crisis_of_2007%E2%80%932009" and Researchers Compilation

APPENDIX (B): Policy Document Extract

(i) **PENSION REFORM ACT 2004**

PART IX – INVESTMENT OF PENSION FUND

(Investment of Pension Funds)

Extracted

72. All contributions under this Act shall be invested by the pension fund administrators with the objectives of safety and maintenance of fair returns on amount invested.

73: - (1) Subject to guide lines issued by the commission, from time to time, pension funds and assets shall be invested in any of the following

(a) bonds, bills and other securities issued or guaranteed by the federal Government and the Central Bank of Nigeria;
(b) bonds, debentures, redeemable preference shares and other debt instruments issued by corporate entities and listed on the a Stock exchange registered under Investments and Securities Act 1999;
(c) Ordinary shares of public limited companies listed on a stock exchange registered under the Investment and Securities Acts of 1999 with good track records having declared and paid dividends in the preceding five years.
(d) Bank deposits and bank securities;
(e) Investment certificates of closed-end investment fund or hybrid investment funds listed on a Stock Exchange registered under the Investment and Securities Act 1999 with a good track records of earnings;
(f) Units sold by open-end investment funds or specialist open-end investment funds listed on the stock exchange recognized by the commission;
(g) Bonds and other debt securities issued by listed companies
(h) Real estate investment; and
(i) Such other instruments as the Commission may, from time to time, prescribe

(ii) **Investments and Securities Decree**

No 45 of 1999

Laws of the Federation of Nigeria

26th Ma y 1999

Part II

Functions and Powers of the Commission

8. The Commission shall -

(a) Regulate investment and securities business in Nigeria as defined in this Decree;
(c) Register securities to be offered for subscription or sale to the public;
(d) render assistance in all aspects including funding as may be deemed necessary to promoters and investors wishing to establish Securities Exchanges and Capital Trade Points;
(f) Register and regulate corporate and individual capital market operators as defined in section 30 of this Decree;
(g) Register and regulate the workings of venture capital funds and collective investments schemes including mutual funds;

(h) Facilitate the establishment of a nationwide system for securities trading in the Nigerian capital market in order t protect investors and maintain fair and orderly markets;
(i) facilitate the linking of all markets in securities through modern communication and data processing facilities order to foster efficiency, enhance competition, and increase the information available to brokers, dealers and investors;
(j) act in the public interest having regard to the protection of investors and the maintenance of fair and orderly markets and to this end to establish a nationwide trust scheme to Compensate investors whose losses are not covered under the investors protection funds administered by Securities Exchanges and Capital Trade Points;
(k) Keep and maintain separate registers of foreign direct investments and foreign portfolio investments;
(1) Register and regulate central depository companies and clearing and settlement companies, custodians of securities, credit rating agencies and such other agencies and intermediaries;
(m) Protect the integrity of the securities market against abuses arising from the practice of insider trading;
(n) act as a regulatory apex organization for the Nigerian Capital market including the promotion and registration of self-regulatory organizations and capital market trade associations to which it may delegate its powers;
(o) Review, approve and regulate mergers, acquisitions and 41 forms of business combinations;
(p) Promote investors' education and the training of all Categories of intermediaries in the securities industry;
(q) call for information from and undertake, inspect, conduct inquiries and audits of the Securities Exchanges, Unit Trusts, Mutual Funds, Capital Trade Points, Futures, Options And Derivatives Exchanges as well as other intermediaries and Self-regulatory Organizations in the securities industry;
(r) Call for or furnish to any agency such may be considered necessary by it for discharge of its functions;
(s) Levy fees or other charges on any person for carrying out investment and securities business in Nigeria;
(t) Conduct research into all or any aspect of the securities industry;
(u) Prevent fraudulent and unfair trade practices relating to the securities industry;
(v) Advice the Minister on dl matters' relating to the securities industry;
(w) Disqualify unfit individuals from being employed anywhere in the securities industry;
(x) Liaise effectively with the regulators and supervisors of other financial institutions locally and overseas;
(y) Perform such other functions and exercise such other powers not inconsistent with this Decree as are necessary or expedient for giving full effect to the provisions of this Decree.

Note numbers 8(i), 8(j) and 8(