ANALYZING THE DYNAMICS OF STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN NIGERIA: 1984-2017

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BEING A Ph.D THESIS PRESENTED TO THE DEPARTMENT OF BANKING AND FINANCE FACULTY OF BUSINESS ADMINISTRATION UNIVERSITY OF NIGERIA ENUGU CAMPUS

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APPROVAL PAGE

This thesis has been approved for the Department of Banking and Finance, Faculty of Business Administration, University of Nigeria, Enugu Campus.

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DECLARATION

I, Udemezue, Ndubuisi Nnnakee, a postgraduate student in the Department of Banking and Finance, with Registration Number PG/Ph.D/12/64257 do hereby declare that the work embodied in this thesis is original and has not been submitted in part or full for any degree of this university or any other institution of higher learning.

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DEDICATION

Dedicated to my parents, Mr. Bartholomew and Mrs. Gloria Udemezue, both of blessed memory.

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First and foremost, I ascribe this research work to the God Almighty. He provided me with life, health, intelligence, financial resources, perseverance and human assistance to put this thesis together. I am eternally grateful, and to him alone be all Glory and Praise.

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ABSTRACT

This work analyzed the dynamics of stock market development and economic growth in Nigeria from 1984 – 2017. The specific objectives were to: determine the impact of stock market size on Nigeria's economic growth; determine the impact of stock market liquidity on Nigeria's economic growth; ascertain whether there was existence of long – run relationship between stock market development and Nigeria's economic growth; determine the existence and level of volatility clustering in Nigerian stock market, and determine the degree and direction of causality between stock market development and Nigeria's economic growth. Variables such as market capitalization, number of listed companies, total value traded, turnover ratio, all share index, banking development, inflation rate, trade openness and real gross domestic product were used in the investigation. *Ex-post-facto* research design was used for the study which was guided by the five research objectives and hypotheses. The study's population was the values of stock market indicators from 1961 – 2017, excepting all share index which was 1984 – 2017; also was the values of macroeconomic variables from 1960 – 2017. Time series data covering the period of 1984 – 2017 were used as the sample size. Autoregressive Distributed Lag model (ARDLM), Exponential Generalized Autoregressive Conditional Heteroscedasticity (1.1) (EGARCH) model and Toda Yamamoto causality test, along with their preliminary and diagnostic tests were employed to test the hypotheses all of which were conducted at 0.05 level of significance. For purpose of accuracy in results, E-views statistical package was employed. Among the major findings of the study were that stock market size had positive and significant impact on economic growth. The stock market liquidity had positive but non-significant relationship with the economic growth. There was volatility clustering with explosive persistence and negative asymmetric parameter in the market. The study concluded that the Nigeria stock market is growth inducing; but still relatively underdeveloped and was plagued with volatility, for market indices to exert significant impact on the growth of the economy. Among other recommendations, Security and Exchange Commission should through moral suasion and/or government legislation bring private companies that have met certain financial thresholds to convert to public companies. This is part of the strategy used to get MTN listed on the Exchange, and AIRTEL is also being listed. Other telecommunication companies should be approached. This will increase the number of listed companies and go a long way in broadening and deepening the base of the market to promote growth.

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CHAPTER ONE
INTRODUCTION

1.1. BACKGROUND TO THE STUDY

Every economy seeks to create and promote an effective financial system. Financial system comprises of money and capital markets. The capital market consists of stock market, issuing houses, investment advisers, regulators, fund managers, etc. The stock market is the key participant and hallmark of the capital market; hence two of them are often used interchangeably. Principally the stock market lies at the heart of the financial system. Its primary function is to serve as a mechanism for transforming savings into financing for the real sector.

The stock market is viewed as a complex institution with inherent mechanisms through which medium to long term funds of the major sectors of the economy (house-holds, firms and governments) are mobilized and made available to various sectors of the economy (Levine, 2003; Nyong, 1997; Akinde, 2015). It creates a market place where funds can be raised through assets with attractive yields, liquidity and risk characteristics (Bencivenga & Smith, 1991; Akingbohumgbe, 1996). A large proportion of these funds are allocated to firms basically on their rate of returns.

Stock markets serve important functions in an economy by facilitating savings mobilization, allocation of funds for investment, offering portfolio diversification opportunities, providing liquidity for investors and conveying corporate information (Greenwood & Smith,1996; Levine & Zervous, 1998; Sharp & Bailley, 1999; Rousseau & Wachtel, 2000; Beck & Levine, 2003; Paudel, 2005 cited in Shahbaz, Ahmed, & Ali, 2008; Akinde, 2015).

Further, stock markets also serve these critical purposes: they encourage broader ownership of productive assets by small savers and hence enable them to benefit from economic growth and wealth distribution. They improve competitiveness of domestic companies and enhance their ability to compete globally. They also attract foreign portfolio investments which are critical in supplementing the domestic saving levels.

Additionally, through the provision of equity capital, the stock markets enable companies to avoid over-reliance on debt financing, thus improving corporate debt-to-equity ratio (Yartey & Adjasi, 2007; Olusegun, 2011). They help in diffusing stresses on the banking system by

matching long-term investments with long term capital. Further governments go to the markets to borrow for their infrastructural developments. In most developing countries however, according to Olusegun (2011), stock markets have fallen short of expectations in spite of their great potentials for financing development. As a result, these countries have resorted to external borrowing that has brought them excruciating foreign debt problems.

A stock market undergoes different stages of development that bring improvements in its functioning. Stock market development implies increasing or improving a stock market's ability to satisfy an economy's needs as stipulated among the main functions of stock markets. The development of stock markets provides opportunities for greater funds mobilization, improved efficiency in resource allocation and provision of relevant information for appraisal (Levine & Zervous, 1996; Inanga & Emenuga, 1997; Ifeoluwa & Motilewa,2015).

The level of stock market development is reflected in the quality of services provided by the stock market. According to Okonkwo, Ogwuru, and Ajudua (2014), the primary measure to assessing the expansion of a stock market is to look at changes in its dimension. El Wassal (2013) corroborates by stating that there is no single criterion that could be used to measure stock market development, there are set of indicators needed to capture the main aspects of the development, namely; stock market size, stock market liquidity, stock market volatility, stock market concentration and stock market linkage to real sector performance. Using these varieties of indicators could provide a more robust, dynamic and accurate depiction of stock market development as it is a complex and multi-faceted concept and no single measure of indicator can capture all these aspects of development.

The development of a stock market is primarily a private sector activity (El- wassal, 2015). This notwithstanding, it must be noted that the supporting role of the government is crucial for a market to develop.

Mckinnon (1973) and Goldsmith (1969) have suggested that there is a linkage between the stock market development and economic growth. Economic growth is an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. In simplest form, it refers to an increase in aggregate productivity. Higher economic growth is positively associated with and can be translated to an increased quality of life or standard of living. According to Onwuemere, Imo, Okafor, and Ugwuanyi (2012), one of the

major ways to generate economic growth is to create capital goods and increase productivity. The rate of capital growth is highly dependent on the rate of savings and investments.

A good number of studies like Beck, Levine, and Loayza (2000), Riman, Esso, and Eyo (2008), Dafarighe (2009), and Donwa and Odia (2010) state that stock markets play a crucial role in economic growth. It is regarded as a necessary tool for economic growth and development as it provides listed companies the platform to mobilize much needed capital for long- term investments. This idea that stock market development promotes economic growth dates back to the works of Bagehot (1873) and Schumpter (1912) both cited in El-wassal (2013). This link between stock markets and economic growth pivots on a major strand of finance- growth hypothesis (Schumpter, 1912; Mckinnon, 1973; Ifeoluwa & Motilewa, 2015) with an insight into how finance intermediation facilitates economic growth. Corroborating, Levine and Zervous (1996), Khan (2000), and Caporale, Howells and Soliman(2004) assert that the finance intermediation comes through a number of channels, savings mobilization, funds allocation, liquidity and risk diversification. Through these channels economic growth is engendered. For instance, savings mobilization may increase the rate of saving and if stock markets allocate savings to investment projects yielding higher returns, the increasing rate of return to savers will further make savings more attractive. Consequently, more savings will be channeled into the corporate sector for investments bringing about economic growth.

However, there is the other side of the argument stating that the link between stock market development and economic growth centers on growth–finance hypothesis. The early proponents of this approach were Robinson (1952), Lucas (1988) and Chandavakar (1992). Others were Gurley and Shaw (1960), Gelb (1989) and Singh (1997). They all cast doubt on the importance of stock market for economic growth. They argue that it is economic growth that accelerates development of stock market through the increasing demand for financial instruments which expedite stock market development. Yet another side of the argument could not specifically establish any link (Summer, 1988; Mayer, 1988; Mazur & Alexander, 2001). They contend that even large stock markets are unimportant sources of corporate finance. The debate is on-going with contemporary scholars taking diverse positions.

In Nigeria, the stock market is represented by Nigerian Stock Exchange (NSE). The NSE is the center-point and hallmark of Nigerian Stock Market. It provides a mechanism to mobilize private and public savings as well as making such funds available for productive purposes.

The NSE was established as Lagos Stock Exchange in 1960. It started operations in 1961. In 1977, it was renamed Nigerian Stock Exchange with branches established in some major commercial cities of the country.

The Nigerian Stock Exchange has been undergoing some positive changes since its establishment. The changes, according to Soyode (1990), became remarkable with the introduction of the Structural Adjustment Programme (SAP) which resulted in the deregulation of the financial sector and the privatization exercise that exposed investors and companies to the significance of the stock market. Further, there have been numerous infrastructural developments in the market. Amongst them are: introduction of the automated trading system (ATS); linking up the market with the Reuters Electronic Contributor System for online global dissemination of the market information; launching of the market's internet system (CAPNET), and the introduction of Central Securities Clearing System (CSCS) as part of the infrastructural supports for meeting the challenges of internationalization and achieving enhanced service delivery. Unfortunately, prima facie all these have not yielded positive impact on Nigeria's economy. The listing requirements are still stringent and expensive. And the market still suffers from capital flows arising from volatility in foreign portfolio investments.

1.2 STATEMENT OF THE PROBLEM

The Nigerian stock market is full of uncertainty and instability, causing large financial losses and confidence crisis among the investors. Within the period under review (particularly between 1997 and 2017), it had shed trillions of Naira intermittently. Further, the market appears isolated from the Nigerian macro-economy as it is not playing its signaling function. This is suggestive of a disconnection between the market and the Nigerian economic performance. Perhaps the market has not yet developed to be able to influence the economy. Another important concern is the lack of consensus among scholars on the nature of relationship existing between stock markets and economic growth. The ongoing conflicting positions are clear evidence that earlier studies conducted may not have been enough to produce a definite answer. In the light of the foregoing, this work becomes compelling to seek answers to a number of questions.

Levine & Zervous (1996), and Obadan (1998) posit that stock market should serve as a dependable guide in the measurement of changes in the level of economic activities.

According to them, stock market should serve as signal to economic changes. In other words, when stock market experiences growth, it is supposed to spur economic growth. According to Akinde (2015), in many countries of the world, the stock market plays invaluable roles in economic growth. Stock market has been identified as an institution that contributes to the economic growth of both emerging and developed economies. This is achieved by being a conduit for channeling resources to institutions that have need of funds. Theorists have maintained that the trend of stock market performance indices contribute to national economic growth (Schumpeter, 1932 and Goldsmith, 1969 as cited in Murtala, Suraya, & Zunaidah, 2015; Levine & Zervous, 1996; Greenwood & Smith, 1997; Boca, 2011). Also empirically, a large body of studies clearly show that stock market development is strongly and positively connected with the level of economic growth (Guglielimo, Peter, &Alan,2003; Ogunleye & Adeyemi, 2015). There is, therefore, some evidence that the stock market at its efficient level remains an important contributor to economic growth.

The Nigerian stock market has no doubt witnessed some relative stability and also recorded some reasonable growth over the years, particularly since the deregulation and various privatization exercises (Soyode, 1990; Okodua & Ewetan, 2013; Ogunleye & Adeyemi, 2015). The growth is evident in many aspects: for example, the increasing number of capital market instruments traded on the exchange, market capitalization and market index. In addition, the internationalization of the market and improvement in the infrastructural facilities in the market in line with what obtains in the developed nations such as automated and internet transactions has enabled the market to benefit from the current economic globalization (Murtala, Suraya, & Zunaidah, 2015). All these have facilitated increase of public interest in the market (Olusegun, Oluwatoyin, & Fagbeminiyi, 2011). Evidently, with these developments the NSE is positioned to positively impact on the economy. According to El- Wassal (2005), such observed phenomenal growth of emerging markets has been considered as a significant development to trigger process in the concerned economies. However, this remains to be satisfactorily verified.

These developments notwithstanding, there have been cases of corruption/market infractions and corporate governance issues in the market. According to Onyeama (2013) and Oteh (2014), these impinge on investors' confidence and the general economic growth. Further, and very important, the market is heavily dominated by very few companies. This distorts the signaling function of stock markets. Again, issues of macro-economic instability particularly

high inflation rate in the system and uncertainty in the political space like ethnic unrest and insecurity can pose some constraints on the market to bring about economic growth.

1.3 OBJECTIVES OF THE STUDY

The broad objective of this study was to analyze the dynamics of stock market development and economic growth in Nigeria between 1984 and 2017. The specific objectives were:

1. To determine the impact of stock market size on Nigeria's economic growth.
2. To determine the impact of stock market liquidity on Nigeria's economic growth.
3. To determine whether there is a long- run relationship between stock market development and Nigeria's economic growth.
4. To determine the existence and degree of volatility clustering in Nigerian stock market.
5. To determine the nature of causality between stock market development and Nigeria's economic growth.

1.4 RESEARCH QUESTIONS

The following research questions became necessary in order to address the objectives:

1. To what direction and degree did stock market size impact on Nigeria's economic growth?
2. To what direction and degree did stock market liquidity impact on Nigeria's economic growth?
3. To what direction and degree was there long run relationship between stock market development and Nigeria's economic growth?
4. To what degree was there volatility clustering in Nigerian stock market?
5. To what degree and direction was there causality between stock market development and Nigeria's economic growth?

1.5 HYPOTHESES OF THE STUDY

The hypotheses for this study are stated in their null forms as follows:

1. Stock market size did not have positive and significant impact on Nigeria's economic growth.
2. Stock market liquidity did not have positive and significant impact on Nigeria's economic growth.
3. Stock market development did not have long-run relationship with Nigeria's economic growth.

4. There was no volatility clustering in Nigerian stock market.
5. There was no causal relationship between stock market development and Nigeria's economic growth.

1.6 SCOPE OF THE STUDY

In this study, the focus was on stock market development and economic growth. The time frame of the study covered thirty four years from the year 1984 to 2017. The choice of the base year, 1984, was informed by the fact that it was the first full year of operation of the NSE all-share index (ASI), which is one of the variables of the study. The exchange maintains an ASI formulated on 3rd January, 1984 at 100 basis points. For the currency of the study, 2017 was chosen and to the best of the researcher's knowledge, 2017 is the most current year that has an official published dataset. It is the researcher's belief that 2017 is current enough as to make the work significant and useful for valid decision making.

The geographical scope is Nigeria while variables of interest are stock market and Nigerian economy. As regards to content scope, the research work covered almost all the activities of the major indicators of Nigerian stock market. Further the work reflected the dynamism of Nigerian stock market as it captured the bubbles and the bursts that characterized the period of the study. The period witnessed among others the global financial crises from 2007 to 2009.

1.7 SIGNIFICANCE OF THE STUDY

This study may be of immense benefit to the following groups:

Policy Makers

Investors in developed markets are increasingly becoming convinced of the economic opportunities in investing in emerging markets. There are many possible emerging markets among which investors can choose. It therefore becomes essential that sound and practical policies are developed so as to ensure that Nigeria benefits from the tide of capital inflows, rather than misses out.

The study will help the policy makers to determine what polices that can be formulated, what regulatory acts that are needed and the necessity of amendments regarding the rules and regulations to develop the market and make it better functioning so as to contribute to the economy. It is expected to give policy directions to the relevant government agencies regarding market transaction costs, listing requirements and market diversification.

With the empirical evidence of this study, better policies could be drawn and implemented by both the government and regulator to position the market for a significant contribution to the economy.

Investors

Both local and foreign investors would benefit maximally from the study. It would increase their knowledge of the dynamism of the market. They would like to know the profitability of their investments and the efficiency level of the market where they want to invest their funds. For example, through stock prices they could gain better understanding of the company performances more accurately.

Academia

This study is intended to contribute to the existing theoretical and empirical literature in stock market and economic growth. Specifically, it aimed at analyzing the dynamics of stock market and the economic growth in Nigeria. It incorporated variables lacking in previous studies and therefore would help to provide more clarity on the relationship between the two major variables of interest. It is hoped that the findings of this study would serve as a secondary source of information for future related studies.

General Public

The result of this study would be of immense benefit to the general public. Majority of uninformed investors, particularly individual investors who are ignorant of the workings of the market would be educated and guided. It would provide the needed awareness among them for greater patronage of the market. It is the desire of every adult to own a financial investment to depend on during the rainy day.

Business Organizations

This work would be beneficial to business organizations, manufacturing companies and financial institutions (insurance companies, banks, etc.). The recommendations of the study if implemented would help stimulate investments in the market and this would largely benefit the business organizations as their floatation would be sufficiently subscribed.

Nigerian Economy

The entire economy will benefit in terms of productivity, job creation, economic growth and development.

1.8 LIMITATIONS OF THE STUDY

Our study has some limitations within which our findings need to be interpreted carefully. The limitations include:

Data unavailability: This work would have also conducted test on the impact of market concentration on Nigeria's economic growth, but some of the annual series on traded shares of the four most capitalized companies which dominated the market were not available for the study period. All of them, with the exception of Nestle Plc. have not been long in the Nigerian stock exchange so as to build up a good sample size for robust analyses. For example, Dangote Plc. which as at February, 2019 had the largest market capitalization with 28.55% just got listed in October 2010, whereas GTBank and Zennith were listed in 2004. The four companies accounted for 54% of market capitalization as at February 2019.

The option of obtaining high frequency series like monthly data (from the four companies) to be able to achieve a good sample size was extremely difficult. The inclusion of market concentration in the study could have provided a more robust, dynamic and accurate depiction of stock market development.

Further, this study would have employed a multivariate model that would include exchange rate and inflation rate (as control variables) for volatility test. However, their monthly data were incomplete (particularly, inflation rate) for the sample period. We place premium on monthly and daily series for volatility test because it needs high frequency observations to prevent smoothing off the swings.

Additionally, findings of this study may not be completely generalized because the sample size was restricted to thirty four years which is just relatively large, (ASI came into full operation in 1984). Sample size statistical tests normally require a large sample size to ensure more precise results. The larger the sample size, the more universal the results. Employing larger samples size could have produced sweeping results.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

This chapter contains the review of related literature on the topic under study. It includes an overview of Nigerian stock market, review of the existing conceptual and theoretical literature as well as empirical works. The chapter also has the summary of the points and issues discovered in the course of the review.

2.2 CONCEPTUAL REVIEW/FRAMEWORK

2.2.1 Concept of Stock Market Development

Stock market development implies increasing or improving a stock market's ability to satisfy an economy's needs as stipulated among the main functions of stock market. It suggests improvements in its functioning. The development of stock market provides opportunities for greater funds mobilization, improved efficiency in resource allocation and provision of relevant information for appraisal (Inanga & Emenuga, 1997; Ifeoluwa & Motilewa, 2015). According to El Wassal (2013), one can define a 'developed' stock market as a market that is sufficiently large and liquid relative to the size of its economy- possessing a non-concentrated market capitalization and demonstrating adequate linkage to the performance of the real economic sector.

The level of stock market development is reflected in the quality of services provided by the stock market. According to Okonkwo, Ogwuru, and Ajudua (2014), the primary measure to assessing the expansion of a stock market is to look at changes in its dimension. El Wassal (2013) had earlier stated that there is no single criterion that could be used to measure stock market development, there are set of indicators needed to capture the main aspects of the development, namely, stock market size, stock market liquidity, stock market volatility, stock market concentration and stock market linkage to real sector performance. Using these varieties of indicators could provide a more robust, dynamic and accurate depiction of stock market development as it is a complex and multi-faceted concept and no single measure of indicator can capture all these aspects of development.

- **Stock Market Size**

Market size is an important measure of stock market development. This is because the level of savings mobilization and risk diversification depend largely on the market size. There are

two main indicators of stock market size: market capitalization and the number of listed companies.

i. Market Capitalization Ratio:

A common indicator for evaluating stock market size is market capitalization ratio. This is calculated by dividing the market value of listed shares by the gross domestic product (GDP). This indicator has been widely used in the literature as a stable measure of stock market development for a number of reasons.

First, it is a measure of stock market size which is positively correlated with the ability to mobilize capital and diversify risk. Second, it gives a measure of the size of the stock market relative to the size of the economy. Third, it is presumed to include companies past retained profits and future growth prospects so that a higher ratio to GDP can signify growth prospects as well as stock market development (Levine & Zervos, 1998; Bekaert, Harvey & Landblad, 2001; Rajan & Zingales, 2003). However, the main short-coming of this indicator according to Adelega (2008) is that high ratio solely driven by the appreciated values of only a few companies with little or no change in the amount of funds raised and no change in the breadth of the market may be misinterpreted as stock market development.

ii. Number of Listed Companies

This specifies the number of all the companies listed in the country's stock exchange at any point in time. It is a complementary measure of stock market size. It's major advantages are that it is a proxy for the breadth of the stock market and is not subject to stock market fluctuations (Bakaert, Harvey & Landblad, 2003; Rajan & Zingales, 2003; karolyi, 2004). Additionally, it is not tainted by possible mis-measuremet of GDP which characterizes many developing countries.

However, the indicator has two main setbacks: first, the number of listed companies can be affected by corporate restructuring, combination and merging. Second, the measure may allocate a low score to economies where industrial structure is concentrated in the sense of having only a smaller number of large companies (Rajan & Zingales; 2003; karolyi, 2004).

- **Stock Market Liquidity**

Market Liquidity, according to Investopedia (2013), is defined as an asset's ability to be sold without causing a significant movement in the price and with minimum loss of value. Further defining stock market liquidity, Odita (2009) defines liquidity as the probability that

the next trade is executed at a price equal to the last one. He further added that a market is considered to be deeply liquid if there are ready and willing buyers and sellers in large quantities. Levine (1997) defines market liquidity as the ease and speed with which capital market agents can convert assets into purchasing power at agreed prices. According to Engle and Lange (1997), market liquidity is the ability to perform a transaction without cost.

Liquid markets present a number of advantages:

i. They render financial assets more attractive to investors who can transact in them more easily. In addition, liquid markets allow investors to switch out of equity if they want to change the composition of their portfolio.
ii. Liquid markets permit financial institutions to accept larger asset-liability mismatches.
iii. They allow companies to have permanent access to capital through equity issues.
iv. Liquid markets allow a central bank to use indirect monetary instrument and generally contribute to a more stable monetary transmission mechanism (Sarr and Lybek, 2002).
v. According to Osinubi (2001), liquidity of stock markets also facilitates profitable interactions between the stock market and the money market. In this way, shares become easily acceptable as collateral for bank lending, thereby boosting credit and investment. However, theory is unclear about the effects of greater liquidity on growth. Bencivenga and Smith (1991) show that by reducing uncertainty, greater liquidity may reduce savings rates enough to slow growth.

There are five dimensions of market liquidity: tightness, immediacy, depth, breadth and resiliency. Tightness refers to low transaction costs, such as the difference between buy and sell prices. Immediacy stands for the speed with which orders can be carried out and settled, and this reveals among other things, the efficiency of the trading, clearing and settlement systems. Depth refers to the existence of abundant orders, either actual or easily uncovered of potential buyers and sellers, both above and below the price at which a security would be trading on the market. Breadth means that orders are both numerous and large in value with minimal impact on prices while resiliency means the speed with which price fluctuations resulting from trade gradually disappear (Sarr and Lybek, 2002).

The liquidity measure complements the measure of stock market size because market may be large but inactive. A comprehensive measure of liquidity would quantify all the costs associated with trading, including the time cost and the uncertainty of finding a counterpart and finalizing the transaction. However, no single measure can unambiguously measure

tightness, immediacy, depth, breath and resiliency. Due to the difficulties involved in elaborating such a measure, the most commonly used indicators of liquidity are: ratio of traded value to gross domestic product (GDP) and turnover ratio.

i. Traded Value / GDP (Total Value Traded Ratio)

This equals the total value of shares traded on the stock market divided by GDP. It measures the organized trading of shares as a percentage of national output and therefore should reflect stock market liquidity on an economy-wide basis.

Traded value is a volume-based indicator (EI-Wassal, 2013). Volume-based indicators are most useful in measuring market breadth, that is, the existence of both numerous and large orders in volume with minimal transaction price impact.

ii. Turnover Ratio

This indicator measures transactions in comparison with the size of the stock market. It equals the value of total shares traded divided by market capitalization. It gives an indicator of the number of times the outstanding volume of shares changes hands. Its value usually increases with the level of development of the stock market.

Turnover ratio as an indicator of liquidity complements traded value/GDP. While the latter captures market trading relative to the size of the economy, the former measures trading compared with the size of the stock market. A small, liquid market will have a high turnover ratio but a small traded value/GDP ratio. According to El-Wassal (2013), a high turnover ratio is often used as an indicator of low transaction cost. However turnover is also considered as a good indicator of speculative activity in the market. Higher turnover ratio means that shares have frequently changed hands, which may reflect a tendency for speculation.

To capture a more comprehensive picture of stock market liquidity, the two indicators are very important. This is because using only one of them will provide insufficient information of liquidity status of the market.

- **Stock Market Volatility:**

Stock market volatility is a measure for variation of price of a financial asset over time. It is essentially concerned with the dispersion of price changes. Poon (2005) refers to volatility as the spread of likely outcomes of an uncertain variable. There are significant implications surrounding stock market volatility, given that it affects incentives to save and invest.

According to Mohammad (2009), volatility in stock market influences attitude of investors in negative way that aggravates the aggregate investment levels. Osazerbaru (2014) also holds the view that volatility in stock market is capable of affecting economic growth negatively by triggering a rise in cost of capital. Similarly, Raju and Ghosh (2004) agrees that stock market volatility affects growth prospect, creates insecurity and in extreme cases, it acts as a barrier to investing. Likewise, Ishioro (2015) maintains that a volatile stock market weakens the growth and finance avenue, and that this detrimental weakness directly inhibits economic growth.

Stock market volatility may affect output growth through several possible channels: first, its link with market uncertainty and hence economic activity; second, association between market volatility and structural change in the economy; and thirdly link of volatility with cost of capital to corporate sector through expected return. It is important to note that stock market volatility has even more devastating effect on emerging economies than developed ones; this is because of their fragile nature. Emerging economies are not insulated from internal and external jolts and so, shocks are quickly transmitted into the macro-economy. Basically, volatility estimation has been at the cutting edge in a number of economic systems as a growth rate estimator.

While a certain level of volatility in the stock market is desirable, however if there exists excess volatility in stock returns, it may aggravate economic growth (De long, Shleifer, Summers, & Waldmann, 1989; Ferderer, 1993). Specifically, excessive stock market volatility will lead investors to demand higher risk premium, increasing the cost of capital which in turn will impede investment and hamper economic growth (Arestis, Demetriades & Luintel, 2001; Mala & Reddy, 2007). In addition, it may lead to a shift of funds to less risky assets which will cause companies to pay more for access to capital (Zulu, 1995; Levine & Zervous, 1996, Arestis, Demetriades & Luintel, 2001). In fact, theoretically, all other things being equal, the more volatile the stock market, the fewer savers will save and hence the less investment there will be. In other words, consistent volatility can be a reflection of underlying economic problems.

Stock market index data are good examples of financial time series data used to study stock market volatility. It is a specialized tool used essentially to capture the overall performance of the stock market. It reveals the overall trend in the equity market as it is a comprehensive measure of market trends indicating the general stock market price movements. The NSE All

Share Index is Nigeria stock market index; it is a broad based index composed of all the stocks listed on the NSE. The index is given by the formula:

Current market value of companies x preceding market value of companies

Preceding index value

Mele (2008) states that stock market volatility is largely countercyclical, being larger in bad times than in good times. Accordingly, stock expected returns lower much less during expansions than they increase during recession. This is because the investors' required return is not only countercyclical but also asymmetrically related to the development of the business cycle which happens when risk-premium (i.e. the investors expected return to invest in the stock market) increase more in bad times than they decease in good times. Engle and Victor (1993) attribute the causes of volatility to the arrival of new, unanticipated information that alters expected returns on a stock. Changes in local or global economic environment, trading volume, trading practices can impact on information that is available to the market. However, Shiller (2000) has the view that market volatility is due to fundamental shift in investors' behavior, such behavior is seen to be driven less by fundamental variables (as posited by the efficient market hypothesis) and more by sociological and psychological factors (behavioral finance model).

There are other factors that cause market volatility; the improved speed and efficiency with which financial transactions are carried out, the increased inter-dependence and inter-connectivity of stock market (boarder listing) and the greater homogeneity of investors' behaviour.

These factors largely relate to the speed at which the stock market accommodates shocks and impute the relevant information into prices. Much as these factors may lead to a higher level of volatility, they however, produce different characteristics of volatility dynamics. For example, a market where the information gets incorporated faster into the price must revert to the normal level of volatility faster and must have a reduced persistence of volatility shocks. Summarily, factors driving market volatility would correspond to the stage of the domestic market and to its degree of integration with other markets.

- **Stock Market Concentration**

Market Concentration may be measured in terms of share of market capitalization accounted for by the large companies in the market. According to Maunder et al (1991), market concentration exists when capitalization of three to five companies in the market have greater

share of the total market capitalization. According to EI Wassal (2005), there is stock market concentration when the ten largest companies' capitalization dominates the total market capitalization. The important point to note here is that stock market concentration occurs when only a few companies dominate a given market in terms of market capitalization.
Concentration adversely affects market development as it hampers market breadth, limiting the range of attractive investment opportunities. The high degree of concentration signals poor liquidity. In addition, having a stock market which is driven by only a few companies could weaken the link between stock prices for non-leading companies and/or their performance and growth prospects. In other words, the prices of stocks in non-leading companies are affected by market movements of stock prices of leading companies more than their own performance and prospects. This distorts the "signaling" function of stock market. Another adverse effect of market concentration is that it may encourage speculative activities as investment alternatives are limited and diversification possibilities limited as well.

2.2.2 Concept of Economic Growth

Economic Growth is an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. In simplest form, it refers to an increase in aggregate productivity. According to Kuznets (1973), economic growth may be referred to as the long-term increase in a country's capacity to provide for its population increasingly variety of economic goods. It is the rise of real domestic product per capita, which may be viewed as the efficient utilization of the available economic resources in a country to produce goods and services. One of the major ways to generate economic growth is to create capital goods and increase productivity (Onwuemere, Imo, Okafor & Ugwuanyi, 2012). In turn the rate of capital growth is highly dependent on the rate of savings and investments.

Gross domestic product (GDP) is commonly used as an indictor of the economic health of a country, as well as a gauge of a country's standard of living. As an important statistic that indicates whether an economy is expanding or contracting, GDP can be tracked over long spans of time and used in measuring a nation's economic growth or decline. Higher GDP (economic growth) is positively associated with and can be translated to an increased quality of life or standard of living.

GDP is determined by calculating the monetary value of all the finished goods and services produced within a country's boarder in a specific time period. It can be measured in normal or real terms, the latter of which is adjusted for inflation.

The importance of long-run growth (since long run relationship is being investigated) lies in the fact that over long periods of time, even small rates of growth, such as two percent annual increase will have large effects. The larger impact of a relatively small growth rate over a long period of time is due to the power of exponential growth. The rule of 72, a mathematical result, states that if something grows at the rate of X% per year, then its level will double every 72/X years. For instance, a growth rate of 2.5% per annum leads to a doubling of the GDP within 28.8 years. Thus, a small difference in economic growth rates between countries can result in very different standards of living for their populations if the small difference continues for many years.

2.2.3 Conceptual Framework.

The relationship between stock market development and economic growth has been such that a positive relationship is expected. Stock markets play critical role in intermediation between surplus units (savers) and deficit units (borrowers). Levine (1991) explains that well functioning stock markets have often reduced problems of asymmetric information and thereby reduce the costs of lenders and borrowers. This ensures increased productivity through efficient and effective allocation of resources. He further states that countries with a well developed stock market system have been associated with a better per capita income than countries that do not have.

In principle, the stock market is expected to accelerate economic growth, by providing a boost to domestic savings and increasing the quantity and the quality of investment. The market is expected to encourage savings by providing individuals with an additional financial instrument that may better meet their risk preferences and liquidity needs. The market is expected also to provide avenue for growing companies to raise capital at lower cost. The stock market therefore is able to positively influence economic growth through encouraging savings among lenders and providing avenues for firm financing.

A good number of academic literatures are in support that stock markets induce economic growth. Schumpeter (1912) as cited in Atoyebi, Ishola, Kadiri, Adekunjo and Ogundeji (2013) and El-wassal (2013) states that stock markets significantly boost real economic

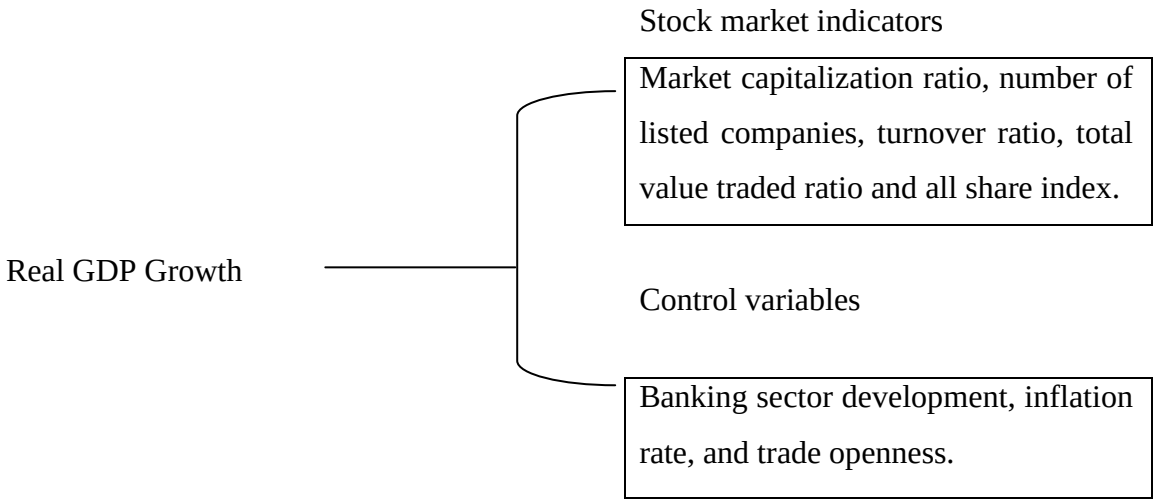
growth. He asserts that finance has a positive impact on economic growth as a result of its effect on productivity, growth and technological change.

The interplay of stock market indicators/variables induces the economic growth. These are market capitalization ratio, number of listed companies, total value traded ratio, turnover ratio, all share index. The control variables with link in economic growth are banking sector development, inflation rate, trade openness.

Total value traded and turnover ratios which are indices for liquidity allow savings and investments in long term projects which eventually lead to economic growth. The assumption behind number of listed companies and market capitalization ratio representing market size is that overall they are positively correlated with the ability to mobilize capital and diversity risk on an economy wide basis thereby leading to growth.

Figure 2.1

Conceptual Flow-Chart



The conceptual flow chart in figure 1 above shows the link between economic growth and stock market development. It shows the conceptual links between the variables. It explains that economic growth is induced by stock market indicators.

2.3 CONTEXTUAL REVIEW

2.3.1 The History of Nigerian Stock Exchange (NSE)

The need for establishment of a stock exchange in Nigeria arose partly from the worsening government earning joined with the escalating recurrent expenditure which left gap for capital budgeting. Under this circumstance, budget deficit was inevitable if capital

investments were to be increased. Hence the development plan of that time needed a sizeable proportion of the planned investments to be financed through borrowing.

Therefore, on 1st March 1959, following the recommendation of a commission set-up by the then colonial government to advise on ways and means of fostering stock market in Nigeria, the Lagos Stock Exchange was registered. It became incorporated on 15th September 1960, and subsequently began operations on the 5th June, 1961. The Exchange started with $3 billion capital (Murtala, Suraya, & Zunaidah, 2015), and with 19 securities listed for trading (CBN, 2007). The securities comprised of 3 equities, 6 FG bonds and 10 industrial loans.

On the 2nd of December, 1977, the Lagos Stock Exchange was renamed Nigerian Stock Exchange (NSE). From 1977 till date (March 12, 2018), the Exchange has increased its trading floors to fourteen, namely, Lagos (1959); Kaduna (1978); Port Harcourt (1979); Kano (1989); Onitsha (1990); Ibadan (1990); Abuja (1999); Yola (2002); Benin (2005); Uyo (2007); Ilorin (2008); Abeokuta (2008); Owerri (2009), and Bauchi (2009).

The Exchange maintains an All Share Index (ASI) with 1984 as the base year (1984 = 100). This is a total market (broad-base) index. Only common stocks (ordinary shares) are included in the computation of the index and it is value weighted. The ASI reached the 1000 mark on September 1992 and presently, as at 29th March, 2018 it was at 40, 586.7 Mark.

There is an important event in the history of stock market on 30th April, 1985. Second-tier security market (SSM) was created for the special purpose of listing small and medium scale enterprises (SMEs) that are unable to meet the stringent requirements of the first-tier market. This is a welcome development as SMEs are the engine of growth of any economy and therefore play an important role in the overall industrial development of an economy.

In 1993, The Nigerian Capital Market was deregulated with the price of new issues being determined by issuing houses. Deregulation is aimed at improving the competitiveness of the market as well as enhancing investors' friendliness. Sequel to this, the Federal Government in 1995 internationalized the market with the abrogation of laws that constrained foreign participation in the market. The laws were replaced with the promulgation of Nigerian Investment Promulgation Commission Decree and the Foreign Exchange Decree to open up the market. This has made it possible for foreigners to participate in the Nigerian capital market both as operators and investors. It should be noted that the Exchange in preparatory for the internationalization had since June 2, 1987 been linked up with the Reuters Electronic contributory system.

From the foregoing it can be assertively said that the NSE has witnessed tremendous growth since its establishment. The growth can further be seen in the increasing number and choices of market instruments traded on the Exchange, market operators and improvement on market infrastructure.

2.3.2 Development of Market Infrastructure in Nigeria Stock Market

The Nigerian Stock Exchange has continued to evolve in order to meet the needs of investors, and achieve the highest level of competiveness. It is consistently seeking innovative ways to deliver its products and services in an efficient and competitive manner, and to achieve global best practices. Among the recent infrastructure developments it has witnessed are:

- **Capnet**

This was launched in November 1996 as one of the infrastructural support for meeting the challenges of internationalization and achieving an enhanced service delivery. The internet system facilitates communication among local and international participants in the market. Subscribers to the system include stock-brokers, quoted companies, issuing houses, etc. who use the facility to access key market information like trading statistics (current and historical), corporate trading results, etc.

- **Central Securities Clearing System (CSCS)**

CSCS was launched in 1997. Its main purpose is for clearing, settlement and delivery of securities. It aims at fostering efficiency and investor friendliness on the Exchange. Also it offers custodian and depository services.

- **Automated Trading System (ATS)**

Automated Trading System (ATS) refers to a proceeding whereby dealers on the trading floor of the Exchange enter buy and sell orders for shares into electronic trading system. The trading system is designed to generate trades automatically when selling and buying prices match. It became operational on 27th April 1999 and replaced the call-over trading system.

During the period of call-over trading system, NSE was faced with a great challenge of the ever growing volume of transactions on one hand and ensuring transparency in transactions on the other. The system had then overstretched and was very cumbersome that it threatened the investor confidence in the market. Transaction cycle was long and inconclusive in some cases.

ATS is one of the most outstanding innovations in the Nigerian stock market. It has eliminated the delays of the past in getting securities disposed and facilitates T+3 (Transaction day + 3 days) settlement cycles. Some of its benefits include reduced cost of transactions, greater liquidity, greater competition and increased transparency.

- **Trade Alert**

On 24th March, 2005, the NSE launched the Trade Alert to secure the market against unethical conducts, especially unauthorized sales of clients' shares. The Trade Alert, when subscribed to by an investor, sends a notice to the investor's mobile phone indicating all transactions taking place in his account at the Central Securities Clearing System.

The benefits of Trade Alert include:

- It stops unauthorized trades before they are concluded
- Knowledge of in and out bound transactions on your account.
- Effective control of transactions
- It improves confidence in the stock market

- **Remote Trading**

Remote Trading is a system where brokers trade from the comfort of their offices. This is made possible with their computers connected to the main trading machine through fiber optics. The system does not allow information to fitter to unauthorized users. It guarantees safe delivery of data from the main frame of the trading machine to the computers in the stock broker's officers. This was introduced in late 2004.

- **Trading Platform**

The NSE on September, 30th 2013 deployed a world class trading engine platform – the Nasdaq X-Stream Trading also referred to as X-GEN. Before\ now, the NSE had been trading on the platform known as the Horizon which had been in use since 1999. The new platform has enabled the Exchange to create an improved trading experience, improved market order flow, increase in the number of trades, high availability, direct market access, remote trading and income diversification.

Also the X-GEN has brought about the advent of mobile trading technologies to the retail and institutional segments of the Nigerian capital market. It has the capacity to allow investors to have real time access to the market as well as their portfolios via the web and mobile phones. This gives investors the ability to execute market orders in near real time conditions anywhere in the world.

- **X- Whistle**

The NSE has designed an effective whistle blowing program tagged X-Whistle. It was launched on March 24, 2014. It is a program that empowers a whistle-blower (an employee, investor, issuer, stock broker, etc.) to report possible violations of the rules and regulations of the Exchange and the Securities' laws. It provides a dynamic and robust capital market regulatory regime.

It also provides all stakeholders with the means of expressing their concerns in a responsible and effective manner. X- Whistle is a very powerful means of upholding the integrity of the capital market, promoting transparency and confidence for people to invest.

- **Market Surveillance System**

NSE has successfully gone on-line with a new market surveillance system powered by Nasdaq SMARTS. The adoption of SMARTS surveillance system is aimed at the goal of continuously protecting the integrity of the market and safeguarding it from fraud, manipulation and abusive practices; thus ensuring a fair and orderly market. The surveillance tool will enhance the market's protective approach towards detecting and deterring abusive tendencies in the market on a real time basis.

- **Corporate Governance**

On November 3, 2014, the NSE with the Convention of Business Integrity (CBI) introduced the foremost Corporate Governance Rating System (CGRS) in Nigeria. The CGRS is designed to rate companies listed on the NSE based on the quality of their corporate governance, integrity, compliance and the reputation of their directors, thereby improving the overall perception of and trust in Nigeria's capital market and business practices.

These above-mentioned innovative developments have enhanced market liquidity, offered opportunities for price discovery, improved efficiency in service delivery on the Nigerian stock market. All these, no doubt, are part of strategies to transform the market into a world class stock market.

2.3.3 Capital Market Operators in Nigeria

The Nigerian Capital Market comprises of the following institutions: Securities and Exchange Commission (SEC), Nigerian Stock Exchange (NSE), stock brokers, issuing houses, fund managers, underwriters, registrars, Investment and Securities Tribunal (IST), etc.

- **Securities and Exchange Commission (SEC).**

The SEC is the apex regulatory institution in the Nigerian capital market. It is a Federal Government agency established by the Securities and Exchange Commission Act No. 71 of 1979. SEC maintains surveillance over the market with the mandate of ensuring ordering and equitable dealings in securities, and protecting the market against insider trading abuses. It is to ensure that investors' interests are protected thereby enhancing their confidence in the market.

Consequently, SEC is to see to the rapid growth and development of the capital market. It ensures that parties that take decisions, especially on investments do so on the strength of good information and sound process. By that it is to attract more funds into the market and also attract more viable companies.

- **Nigerian Stock Exchange (NSE)**

The NSE is the centre point of the Nigerian Capital Market. It is the most active participant of all the operators in the market. It is a place where long term securities of various forms such as shares and bonds are traded. Therefore it is an intermediary between suppliers of and the users of funds. This allocative function of NSE is critical in determining the overall growth of the economy. Hence, it plays an indispensable role for which it is described as the hallmark of the Nigerian Capital Market.

NSE provides all necessary facilities, rules and conducts for healthy competition and growth of the market. It is a self-regulatory organization and it is privately owned.

- **The Investments and Securities Tribunal (IST).**

The Investments and Securities Tribunal (IST) is an independent and specialized court that has the same status as a High Court of the Federal Republic of Nigeria. The IST is empowered to adjudicate on matters relating to capital market activities such as:

  - Interpretation of any law, enactment or regulation to which the investment and securities act applies
  - Disputes between capital market operators
  - Disputes between quoted companies and the regulator or the stock exchange.

- **Stock Broking Firms**

A Stock-broking firm is the intermediary between the NSE and investors who may want to buy or sell securities. It is the gateway of investors into the NSE. In other words, It is a

brokerage firm that buys and sells securities on behalf of investors for brokerage commission. In Nigeria we have not less than 258 brokerage firms.

Also, the stock-broking firms perform the function of analyzing developments in the market. From the results of their analysis, they educate investors and recommend stocks as well as buying same for them.

- **The Issuing House**

This is an institution that is charged with the responsibility of preparing prospectus, packaging, timing, pricing, underwriting and the sale of new securities offered to the public by companies and governments. Specifically, underwriting is one of the vital businesses of the issuing house.

- **The Registrar**

Registrar is an institution in the capital market that keeps the records in respect of quoted stocks in the market. The registrar keeps the register of members and their shareholdings. It is the duty of the registrar to issue certificate of share-holding to the investors/shareholders as well as issues and dispatches dividend warrants to the holders (very soon this practice of dividend warrants will stop as dividend will be credited to the bank accounts of the share-holders).

2.3.4 Other Legislations Affecting Capital Market Development in Nigeria

Apart from the laws and regulations form SEC, there are other laws that in one way or the other impact on capital market development in Nigeria. They include:

- **Companies and Allied Matters Act (CAMA) 1990.**

The CAMA impacts on the market in such areas as incorporation of companies, particularly public companies and corporate governance issues. It makes several provisions on shares and debenture. Section 22 (5) specifically restricts private companies from issuing shares or debentures to the public. The rights and liabilities attached to shares, allotment of shares as well as the right to transfer shares are contained in CAMA.

- **The Public Enterprises (Privatization And Commercialization Act)**

The act provides, among others things for the use of the capital market to facilitate the sale of shares of government owned enterprise and sale of government shareholdings in business entities.

- **Banks and Other Financial Institutions Act (BOFIA) 1991.**

BOFIA stipulates that banks can channel their deposits into lending activities either directly by loan or indirectly through capital markets. Section 4 empowers the Central Bank of

Nigeria (CBN) to invest any amount deposited with it in treasury bills or such other securities.

- **National Insurance Commission Act, 1997**

National Insurance Commission (NAICOM) also regulates the investments an insurance company can make under the provisions of its act. The act has specific provisions for the investment of public funds in the capital market, etc.

- **The Nigerian Investment Promotion Act 1995**

It provides protection of interests of foreign investors in the capital market. It provides for interest guarantees, transfer of capital, profits and dividends by foreign investors to their home countries.

- **Pension Reform Act, 2004.**

It provides for where the funds managed by pension funds administrators (PFAs) should be invested. One of such places is in the capital market. Pursuant to this, a regulation on investment of the fund was issued to license PFAs detailing criteria for investment in capital market securities.

2.3.5 Problems Facing Nigeria Stock Market

Nigeria stock market is faced with numerous problems which have contributed to limiting its potentials.

- **Inadequate Investor Protection**

Investors are not adequately protected. The regulatory authorities have been unable to apply relevant sections of Investment and Security Act (ISA) to sanction market operators who are involved in infraction. Many investors have lost huge sums of money in the market and have not obtained adequate remedy. Most often than not the process of obtaining justice is unduly long and this is very discouraging.

- **Lack of Market Depth**

A fundamental part of the current problem with the capital market is its shallowness. There is a need to get more companies to get listed on the Exchange. The Market also lacks derived financial products, as NSE offers only basic products. All these are needed to strengthen and deepen the market. Osaze (2007) reported that as of 2007, less than 1% of the registered companies in Nigeria were quoted on the NSE, with only 214 equities listed even though the

Exchange was established in 1961. As of 2017, out of about 1.5m registered companies only 167 were quoted on the Exchange.

While as of 2007, Singapore stock exchange established in 1979 had over 500 equities; Hong-Kong established in 1986 had 695, and Istanbul established in 1986 had over 900. All these exchanges were established over seventeen years after Nigerian stock market.

- **Low Level of Awareness about the market**

There is still the problem of low awareness about the market by the citizenry. This is very common among the rural dwellers and the low class citizens. Even those that have knowledge of its existence still do have scant information about the operations of the market. Consequently, misconception about the market is rife. For instance some investors would expect the market to be similar to commodity market in terms of profitability. The number of individual investors in the Nigerian stock market is insignificant when related to the population of over 180 Million Nigeria people. This is quite poor.

- **Ineffectiveness and Dishonesty of Capital Market Operators.**

Stock market operators must exhibit the highest level of good corporate governance, fairness and accountability. There are cases of corruption in form of misappropriation of income and assets, unauthorized sales of clients' shares, delays in remitting proceeds of sales of shares, etc. Okoye (2013) stated that corruption has severely hindered capital mobilization in the market. Oteh (2012), as has been earlier cited, specifically stated that this has continued to undermine market integrity, thereby eroding investors' confidence.

- **Poor Perception of the Market**

The issue of investors' perception of the market is very important. The decision to invest in a stock market is influenced by perception. A good perception of a stock market, country or region would attract investments into it, whereas poor perception will undoubtedly impact negatively on the level of investments. The public and international perception of Nigerian stock market is poor. This is partly contributed by political crisis, security challenges and economic instability.

- **Hang-Over Effects of Globalization**

The hang-over effect of the 2007-2010 Global Financial Crisis is yet to end. The crisis led to massive withdrawal of investors from the markets (mostly emerging markets). Skepticism is common among the investors concerning the markets. Recent reports of transactions across the market indicators show that the market is yet to recover from the crisis fully. For example

the market capitalization and all share index have not been able to reach their levels prior to the crisis. The result is the inability of the market to mobilize funds for economic growth and development.

- **Paucity of Investible Funds**

There is dearth of investible funds from local investors due to low savings arising from low salary levels/income. Access to margin facilities is very limited and this has hindered participation in the market.

2.4 THEORETICAL REVIEW

2.4.1 Theory of Stock Market Development

Understanding both the dynamics and the determinants of the development of stock markets is not only crucial to understanding the relationship between finance and economic growth, but also has important policy implications as it sheds light on areas that need government actions to make the economic and institutional environment conducive to stock market development. Hence, there is increasing number of studies trying to identify key determinants behind stock market development by constructing models. These are micro-based asset pricing models and the macro-based Calderon-Rossell model.

Under the micro-based asset pricing models, there are two types of factors which can affect the fundamental value of stock. Fundamental value of stock, of course, is crucial to the development of stock market because it is useful in determining stock market prices. The factors are macro- economic and portfolio characteristic factors.

According to Lintner (1965), Merton (1973) and Cochrane (1991), the macro- economic factors include foreign exchange rate, interest rate, stock market volatility, stock market liquidity, economic growth and industrial production. Whilst portfolio characteristic factors are the rate of stock return, the variance of stock returns, dividend or earnings, company size, among others (Fama, 1965 & Ross, 1976).

However, under the macro-based model, Calderon-Rossell (1991) indentifies economic growth and stock market liquidity as the determinants of stock market development. The model postulates that stock market development is the result of the combined effect of economic growth and liquidity on both stock prices and the number of listings. The model was further modified by Yartey (2008) who incorporated other economic, financial and institutional variables that might affect stock market development.

Furthermore, apart from the two models, there exists a large volume of literature linking stock market development to macro-economic and institutional factors (Sin-Yu, 2017). Among the macro-economic factors identified are level of economic development, banking sector development, inflation rate, exchange rate, private capital flows and trade openness (Greewood, & Smith, 1997; Levine, 2005; Jeffus, 2005; Yartey, 2008; El-wassal, 2013; Niroomand, Hajilee & Al Nasser, 2014).

Similarly, institutional factors such as share holders' protection, corporate governance, political risk, stock market integration and institutional quality are indentified by the literature as crucial factors influencing stock market development (La porta, Lopez-de-silanes & Shleifer, 2000; Bekaert & Harvey, 2000; Mishkin, 2001).

Some of the macro economic factors are discussed here-under:

- **Banking Sector Development**

The development of the banking sector is important for stock market development. However, the debate on the relationship between the banking sector development and stock market development are inconclusive. Some researchers argue that banking sector and stock market are substitutes while others postulate they are compliments.

Yartey and Adjasi (2007), Merton & Bodie (2004), Levine (2005) and Yartey (2008) opine that banking sector development promotes stock market development. They, however, put a caveat that very high levels of banking sector development have a negative impact on the growth of stock market because stock markets and banks at that level tend to substitute each other as financing vehicles. Yartey (2008) substantiated the above assertion by postulating a non-monotonic relationship between banking sector development and stock market development. Non-monotonic relationship suggests that at the early stages of its development, the banking sector is a compliment to the stock market in financing investment. However, as both of them develop they begin to compete with each other as vehicles for financing investments. Stiglitz (1985) and Bhide (1993) had long before argued that in terms of substitutability, banking sector performs better than the stock market in providing financing functions of the economy.

The above scenario not-with-standing, it is recognized that support services from the banking sector contributes significantly to the development of the stock market. Consequently, liquid inter banks market, largely supported by an efficient banking system, are important for the

development of stock market. Conversely, a weak banking system can constrain the development of the stock market.

- **Inflation Rate**

Theoretical studies argue that higher inflation rates are associated with less liquid and smaller stock market as it tends to allocate less efficiently. In addition, they demonstrate that there exists a non-linear relationship between the inflation rate and stock market development-with a particular threshold level after which the financial sector experience an abrupt drop in performance (Huybeans & Smith, 1999; Boyd, Levine & Smith, 2001).

Low and predictable rates of inflation are more likely to contribute to stock market development. Both domestic and foreign investors will be willing to invest in the stock market where there are expectations of low inflation.

- **Exchange Rate**

Economic theories demonstrate a strong association between exchange rate behavior and stock market performance. Jorion (1991) argues that currency appreciation (or depreciation) can have a negative (or positive) impact on stock prices.

- **Level of Economic Development**

The more developed a country is the more deeply entrenched will be its stock market (Rajan & Zingales, 2003; La porta, Lopez-de-silanes & Shleifer; 2006). According to Aduda, Malija and Onsongo (2012), stock market tend to develop as the economy grows and financial return progresses. Mccauley & Remolona (2000) and Shah & Thomas (2001) had earlier stated that the size of the economy is an important factor in the development of liquid and well-functioning stock markets.

- **Trade Openness**

Literature suggests it benefits stock market development in two different ways. First, trade openness is beneficial to the stock market development through the improvement of the supply side of the stock market (Rajan & Zingales, 2003; Braun & Raddatz, 2005). Second, it facilitates stock market development by increasing the demand of financial products and services (svaleryd & Vlachos, 2000; Vazakidis & Adamopoulos, 2009). Several scholars have affirmed that financial openness and liberalization increase stock market activity (Levine & Zervous, 1998; Bekaert & Harvey, 2000; Edison & Warnock, 2003).

Institutional Factors

On institutions, in general, theories have explained how favorable institutional factors, such as common law systems, legal protection for shareholders, effective corporate governance

system and bureaucratic quality can help foster the development of stock market (Bekaert & Harvey, 2000; Mishkin, 2001; Svaleryd & Vlachos, 2002).

Edison (2003) on his part listed three broad measures of institutional quality. The first is the quality of governance, including political rights, public sector efficiency, corruption and regulatory burdens. The second is the legal protection of private property and law enforcement. The third is accountability and the limits placed on the executive and political leaders.

According to Billmeier & Massa (2007), good institutions may positively affect the development of stock market through at least two channels; first, adequate institutions augment economic growth by enhancing market fundamentals, promoting trust, and facilitating exchange. Second, good institutions means better protection of property rights, less corruption and more transparency; all of which foster investor confidence and ultimately increase the demand for securities.

Therefore, the development of good quality institutions can affect the attractiveness of equity investment and lead to stock market development. Yartey (2007) posits that the development of good quality institutions can be an important factor in the development of stock market in emerging economics. Furthermore, Yartey (2007) attempted to identify law and order, democratic accountability, bureaucratic quality as important determinants of stock market development in Africa because they reduce stock market volatility and political risk and enhance the viability of external finance.

In this work, institutional factors may be grouped into these components: the legal and regulatory frame work, market infrastructure and other factors.

- **Legal And Regulatory Framework**

An adequate regulatory framework is crucial to the development of stock markets. Demirgue-kunt & Maksimaic (1998) state that firms in countries with high ratings for the effectiveness of their legal systems are able to grow faster by relying more on external finance. This view was corroborated by Galindo & Micco (2004) and Djankov, La Porta, Lopez-de- silanes and Shleifer (2005) who specifically argue that strengthening property rights, credit protection and investor protection through company laws and commercial codes as well as disclosure of company's activities and proper accounting practices are key determinants of the stock markets development. Yartey (2008) shares the same view by

positing that strengthening of property rights could broaden appeal and confidence in stock markets investment.

La Porta, Lopez- de- silanes and Shleifer (1997) state the consequence of having lower quality of legal rules and law enforcement arguing that affected countries will have smaller and narrower capital markets, and that the listed firms on their stock markets are characterized by more concentrated ownership.

The components of the legal and regulatory framework are: the legal framework itself, supervision of legal framework and enforcement of the relevant laws. One important aspect of the framework is establishing a supporting infrastructure for contract enforcement and dispute resolution.

Level of shareholder protection therefore is a key regulatory determinant of stock market development (Shleifer & Vishny,1986). Stock market development is more likely in countries with strong shareholder protection because investors do not fear expropriation as much. In addition, ownership in such markets can be relatively dispersed, which provides liquidity to the market.

- **Market Infrastructure**

The provision of a robust financial infrastructure for trading, clearing and settlement of transactions is generally considered to be a public good (IMF, 2003). The absence of a sound and efficient market infrastructure linking the counterparties in securities transactions makes the development of stock market unlikely. An inefficient securities settlement structure is a fundamental impediment to stock market development as it raises settlement and operation risks, increases transactions costs, hinders price discovery and may restrict the range of participates in the market (Arvai & Heenan, 2008).

There are various types of infrastructure that governments need to build; they include the following elements: a modern payment system for clearing and settling securities transactions, and a physical infrastructure for the operation of primary and secondary markets.

- **Others: Political Risk**

Erb, Harvey and Viscanta (1996) and Yartey (2008) are of the opinion that political risk is an important factor in investment decisions and have important implications for stock market development. The literature suggests that political risk is a priced factor for which investors are rewarded and that it strongly affects the local costs of equity, which may have important

implications for stock market development. Consequently, Yartey (2008) expects countries with low political risk to have well-developed stock markets. Whilst conversely Bekaert (1996) posits that higher levels of political risk are related to higher degree of market segmentation and as a result low level of stock market development.

- **Bureaucratic Quality:**

This measures the institutional strength and quality of bureaucracy. This measure is expected to be a shock absorber that minimizes reversions of policy when government changes. High points are given to countries where the bureaucracy is autonomous from political pressure and have an established mechanism for recruitment and training.

2.4.2. Theory of Economic Growth

Economic growth theories have emphasized three determinants: capital accumulation; human capital; and research, development and innovation (Stern, 1991). This section will focus on the theories of economic growth such as

2.4.2i. Classical Economic Theory

This was a combination of economic work done by Adam Smith, David Ricardo and Robert Malthus in the 1700s (eighteen century). The main point of the theory is that population growth will always eliminate the positive effects of technological development and GDP per capital will always return to the survival level.

Economists behind this theory developed an idea of a "subsistence level" to model the theory. According to them, if real GDP rises above the subsistence level of income, it will engender an increase in population, and as a consequence the real GDP will come down to the subsistence level. On the other hand, if the real GDP falls below this subsistence level, the population will decrease through deaths and the real GDP will rise back to the subsistence level.

Kallie Wells (n.d.) termed this "subsistence level" as the "Steady state GDP". Any deviation from the steady state is temporary and will eventually return. This is based on the concept that when there is a growth in GDP, population will increase. The increase in population will have an adverse effect on GDP due to the higher demand on limited resources from a larger population. The GDP will eventually come back to the steady state. On the other hand, when GDP deviates below the steady state, population will decrease and thus reduce demand on the resources. In turn, the GDP will rise to its steady state. The theory views the growth

process as strictly endogenous, placing special emphasis on the impact of capital accumulation on labour productivity.

The theory argues that there are several factors which enable increased economic growth:

- Role of market in determining supply and demand
- The productivity of labour, the theory argues that income per capital is determined by the state of the skill, dexterity and judgment with which labour is applied in any nation.
- Role of trade in enabling grater specialization
- Increasing returns to scale, e.g. specialization seen in modern factories and the economies of scale of increased production. The theory places emphasis on the role of increasing return to scale.

The theory considers three potential limits to growth: an insufficient supply of workers, the scantiness of nature, and an erosion of the motives of accumulation. It maintains that scarcity and potential depletion of renewal and depletion of exhaustible resources may limit human productive activity and the growth of the economy.

2.4.2ii. Neo-Classical Growth Theory

The Neo-Classical growth theory was developed by Robert Solow and Trevor Swan in the 1950s. It is a new version of the classical growth theory. It is sometimes called exogenous growth theory. The theory focuses on three factors that impact economic growth: labour, capital and technology, or more specifically, technological advances. It approaches growth based on supply-side factors. Further, the theory assumes that there are diminishing returns to capital and labour.

One of the main purposes of this growth model is to explain how it is possible to have permanent growth in GDP per capita. It stresses that technological change has a major influence on an economy, and that economic growth cannot continue without advances in technology. It is the technological progress only that affects the GDP per capita in the long-run. Permanent growth in GDP requires continuous technological progress. Therefore, there will be a permanent increase in GDP per capita when there is a technological development that increases productivity of labour. In the absence of technological progress, growth would be constant.

Another postulation of the theory is that there are diminishing returns to capital and labour. The returns of both labour and capital of an economy are diminishing. That means that

increases in these two have exponentially decreasing returns (diminishing returns). The output per worker (growth per unit of labour) increases with the output per capita (growth per unit of capita), but at a decreasing rate; this means increasing both of them has only a temporary and limited impact on increasing economic growth.

Technology on the other hand is boundless in the growth it can add and output it can produce. The theory therefore opines that for a steady economic growth rate to be accomplished there should be proper combinations of the amounts of the three driving forces: labour, capital and technology.
This theory is criticized on the ground of its claim that long-run growth is determined by an exogenous factor (technological progress) which is outside the model.

2.4.2iii. Endogenous Economic Growth Theory

Endogenous growth theory or new growth theory was developed in the 1980s by Robert Lucas and Paul Romer. They opined that rate of economic growth is strongly influenced by human capital and rate of technological innovation. Here the emphasis is on technical progress resulting from the rate of investment, the size of the capital stock, and the stock of human capital. The theory is a new one which explains the long-run growth rate of an economy on the basis of endogenous factors. It places greater emphasis on the concept of human capital. How workers with greater knowledge, education and training can help to increase rates of technological advancement. Unlike physical capital, human capital has increasing rates of return. The theory is of the view that an increase in population or the share of people working in the knowledge sector will increase economic growth (Morley, 2015). Hence the focus on what increases human capital (e.g. education) and technological change (e.g. innovation).

One of the main objectives of the endogenous growth theory is to make the technological progress an endogenous variable to be explained within the model. Economic growth is primarily as a result of endogenous factors other than external forces. The proponents of this model were unsatisfied with the assumption of technological progress as an exogenous variable as postulated in neoclassical theory. This is more so when Solow-Swan theory makes no attempt to explain how, when and why technological progress takes place.

Technological progress is said to arise through increase in savings and investments as well as population growth. There are many different explanations for technological progress:

- They consider technological development as a public good.
- It is possible for the government to affect the growth rate.
- They predict convergence of GDP per capita between countries in the long run. This is a consequence of the public good property of the technological developments.

  Some of the vital points of the model are:
- Investment in human capital (the quality of the labour force) is a key ingredient of growth.
- Private sector investment in research and development is a key source of technical progress.
- Increasing labour productivity does not have diminishing returns, but they may have increasing returns.
- There are increasing return to scale from capital investment especially infrastructure and investment in education and telecommunications.

Protection of property rights and patents is essential in providing incentives for businesses and entrepreneurs to engage in research and development.

This theory is quite radical for some reasons:

- The prediction of higher economic growth for a larger population suggests that neoclassical growth theory got things completely wrong.
- Because ideas are what economists label as non-rival, there will be an economic incentive for more people to work in the knowledge sector if there are intellectual property rights such as patents and copyright.

2.5 THEORITICAL OVERVIEW OF STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH NEXUS

There are divergent views on the relationship between stock market development and economic growth. Early views by Schumpeter (1912), Mckinnon (1973) and Shaw (1973) contend that stock market is an important component that would enhance economic growth. They argue that the services provided by stock markets – mobilizing savings, allocating capital, managing risk, monitoring managers, etc. are key for technological innovation and economic growth.

On the other side, there are views which claim that stock market is unimportant to the economic changes. Lucas (1988) argues that the importance of stock market to growth is

exaggerated. He stated that financial development is not a vital element of growth, describing it instead as a restraining factor to growth. Corroborating, Tachiwou (2009) contends that excessive market liquidity is undesirable for economic growth attainment. He explained that too large liquidity may cause shift in investments by shareholders to alternative investments, and this will reduce the level of commitments and corporate control over the management.
There are various schools of thought who have put forward different hypotheses to explain relationship between stock market development and economic growth.

2.5.1 Supply Leading Hypothesis:

Generally, there has been increasing literature arguing in favour of stock market as being vital in stimulating growth. It argues that stock market development cause positive influence on economic growth through the supply of financial services. AI-Yousif (2012) supports this view of supply leading hypothesis stating that financial intermediation contributes to economic growth by increasing the size of saving and improving the efficiency of investments. Saving and investment naturally play an important role in economic growth and development. Saving determines the national capacity to invest and thus to produce which in turn affects the potential economic growth. In this school of thought were also Chee, Zulkornain, Siong and Khim (2003) and Caporale, Howells and Soliman (2004) who claim that the existence of well-functioning stock markets channeling limited resources from supply units to deficit units will provide an efficient allocation of resources, thereby promoting economic growth.

Levine (1991) attempts to list two ways through which stock markets affect growth. The first involves firm's efficiency and depends on the externality of human capital production. Stock markets increase from efficiency by eliminating the premature withdrawal of capital from firms. This accelerates the growth of the economy. The second way stock markets can affect growth is to raise the fraction of resources devoted to firms. By increasing the liquidity of firm's efficiency, stock markets encourage firm investment, and this stimulates economic growth.

Rateb (2005) has also tried to mention the ways thorough which stock markets influence economic growth. First, through an increase of the saving rate by using economic policies affecting directly the determinants of private saving behavior; second, through the channeling of more saving to investment and avoiding the loss of funds during the intermediation process; and third, through the improvement of capital productivity, that is resources being

allocated more productively. If savings channeled through the market are allocated more efficiently, it leads to economic growth.

In more detail, Khan (2000) states these channels through which stock market affects growth as: firstly mobilizing savings, that is stock markets pool the savings of diverse households and make these funds available for lending. Secondly, allocating savings by determining which investment opportunities are worthwhile. Thirdly, reducing risk by spreading investors savings across many different investment opportunities. Fourthly, by creating liquidity which facilitates economic growth.
Schumpeter (1912) summarises it arguing that services provided by stock market: mobilizing savings, evaluating projects, allocating capital, managing risk and monitoring managers, all are essential for technological innovation and economic growth.

There are critics of this hypothesis, Bhide (1993), Summer (1988) and Morck, Shleifer and Vishny (1990) argue that stock market liquidity may negatively influence corporate governance because very liquid stock market may encourage investor myopia hence no incentive for corporate control among shareholders. This is very detrimental as even corporate managers will now focus on short term profits rather than creating new wealth through organic growth.

2.5.2. Demand Following Hypothesis/Growth-Finance Hypothesis

This hypothesis argues that stock market growth follows economic growth. As the economy expands, its demand for certain financial instruments increases which in turn lead to stock market development. The hypothesis argues that it is economic growth that accelerates development of stock market through the increasing demand for financial instruments which expedite development of the stock market. In fact, many economists have given a very minor, if any, role to the stock market in economic growth.

It is the view of Robinson (1952) that stock market does not spur economic growth; that is, stock market simply responds to development in the real sector. According to Lucas (1988), the financial sector does not matter very much, and that any correlation between finance and economic growth is a result of growth leading financial development. Also, Gurley and Shaw (1960), and Gelb (1989) argue that the causal relationship runs from growth to financial deepening, and that demand for financial services increases with economic growth. In a similar vein, Demetriades & Hussein (1996) and Chee, Zulkormain, Siong, and Venus (2005)

support that stock market development responds to economic growth when real growth has taken place, so that the expansion of stock market is only a result of the need of real economic activities.

Giving more detail, Singh (1997) contends that stock markets do not in any way lead to long run economic growth due to macroeconomic instability, volatility and arbitrariness of pricing process; and that instead the macroeconomic activities have an upper hand in the interaction between the two variables. While Charkavarty (2005) adds that stock market prices are highly sensitive to some fundamental macroeconomic indicators. He summits that as the economy expands the demand for certain financial instruments increases, leading to the growth of these services and the end result is that the developments in macroeconomic activity influence the stock market development.

However, Patrick (1966) while conceding to the existence of demand following hypothesis states that supply leading hypothesis still holds but only when the economy is at its developmental stage. According to him demand following hypothesis prevails when the level of economic development has reached an advanced stage.

2.5.3. Bi-Directional Hypothesis

This hypothesis contends that there is bi-directional causality between stock market development and economic growth. It argues that stock market and economic growth have a reciprocal relationship. A country with well-developed financial system, stock market in particular, can promote high economic expansion through technological changes, products and services innovation. This will in turn create a high demand for the financial institutions. As the financial institutions effectively respond to this demand, these changes will stimulate higher economic achievement. Both stock market development and economic growth are therefore positively interdependent and their relationship could lead to bidirectional causality (Majid, 2007). Dawson (2008) also posits that there exists a bi-directional causality from financial market to economic growth and from economic growth to financial market.

2.5.4. Independent Hypothesis

This hypothesis argues that stock market development and economic growth is not causally related (Mazur and Alexander, 2001). Mayer (1988) argues that even large stock markets are unimportant sources of corporate finance. Stiglitz (1985) has earlier contended that stock market liquidity cannot enhance incentives for acquiring information about firms or exerting

corporate governance. Summer (1988) points out strongly that stock market development can even be detrimental to economic growth by encouraging counterproductive corporate takeovers and promote short term profits which do not accord corporate managers a chance to focus on the long term prospect of investment.

2.6 THEORETICAL FRAMEWORK.

2.6.1 Endogenous Growth Theory and Stock Market Development

This study is based on the endogenous growth theory. It is traced from the works of Levine and Zervos (1996), and Levine (2003) that used endogenous growth theory to explain that stock markets boost economic growth through better resource allocation or increased firm's productivity. The endogenous growth theory has it that stock markets have a positive role in the economic growth of a country through providing a channel to enhance domestic savings and boost investments (Levine and Zervos, 1998). Pagano (1993) has earlier posited that under endogenous growth theory that the financial intermediation (stock market) can affect economic growth through an increase in the saving rate, the channeling of more saving to investment and the improvement of capital productivity with better resource allocation toward their most productive use. Again, Pagano (1993) supported by Agarwal (2001) strongly pointed out that the link between financial development and economic growth stems mainly from the insights and techniques of endogenous growth theory. According to them, the theory has shown that there can be self-sustaining economic growth without exogenous technical progress and that growth can be related to preferences, technology, income distribution and institutional arrangement.

The endogenous growth theory clarifies how stock market development may affect economic growth through saving and investments. In other words, endogenous growth theory provides more detail on channels through which stock market influence economic growth.

Firstly, stock markets can affect economic growth through efficient resources allocation. Stock markets evaluate the potential innovative project, finance the most promising ones, and monitor the carrying out of the investments. That is, stock markets help the functioning of efficient resource allocation. Secondly, stock markets can influence economic growth through information channels. Holmstrom and Tirole (1993) argue that stock markets function as a monitor of managerial performance because the stock price incorporates performance information. A poorly performing management may become the target for a take-over. Thus, the information that is reflected in a firm's share price is important for

structuring managerial incentives to build up a firm's productivity, and hence economic growth in aggregate.

Bencivega and Smith (1991) are among the first to propose endogenous growth theory, and also to identify the channels through which financial markets affect long run economic growth. They emphasize that financial markets help diversify agent's liquidity and investment risk, attract more savings into productive investment and prevent the premature withdrawal of physical capital invested in the long term projects. With the existence of financial markets, more capital can be kept in productive investment which raises the rate of economic growth.

Using the theory of the endogenous growth theory, Levine (1997) outline two channels through which financial markets may affect economic growth: capital accumulation and technological innovation. Human capital reflects the educational level of the workforce; as an individual becomes more specialized and better trained, his productivity increases. Technological innovations reflect scientific development, and are evidenced by new production techniques and the creation of entirely new goods and services.

Summarily, it is clear that the glowing interest of recent literature in the link between stock market development and growth stems from the insights of endogenous growth theory. Here growth is self-sustaining.

2.7. EMPIRICAL REVIEW

2.7.1. Evidence from Nigeria

2.7.1i. Short Term Impact Evidence: OLS

Osinubi and Amaghionyeodiwe (2003) empirically investigated the relationship between stock market development and economic growth for the period 1980 to 2000. The study employed ordinary least square (OLS) estimation technique for analysis of the data. The findings of the study showed that stock market development had no significant effect on economic growth during the period 1980 – 2000. It had a positive relationship with economic growth. The major implication of findings is that if the NSE would contribute to rapid economic growth, policies must be fashioned out to eliminate those factors that blur the effectiveness of the vehicle through which stock market activities influence economic growth.

In the same vain Ujunwa and Salami (2010) examined the relationship between the stock market development and economic growth. They used annual time series data from 1986 to 2006. Values of the total share traded, rate of turnover and market capitalization ratio were used to represent the stock market development variable while the dependent variable was represented by GDP per capital. They equally used OLS technique, and their findings aligned with Osinubi and Amaghionyeodiwe (2003) in terms of market capitalization ratio and turnover ratio which showed that stock market had positive association with the economic growth. However, the stock market liquidity was negatively correlated with economic growth. This was in contrast with the empirical work of Levine (1996) which showed that stock liquidity is important in determining economic growth.

Ewah, Esang and Bassey (2009) appraised the impact of capital market efficiency on economic growth in Nigeria. They employed time series data on market capitalization, money supply, interest rate, total market transaction and government development stock for the period 1961-2004. Using OLS estimation technique, they found that the capital market in Nigeria has the potentials of growth inducing, but that it had not contributed meaningfully to the economic growth of Nigeria. They attributed this to low market capitalization, low absorptive capitalization, illiquidity, misappropriation of funds among others.

Likewise both Ihendinihu and Onwuchekwa (2012), and Osho (2014) studied the impact of stock market development on Nigerian economic growth. The two studies used OLS estimation method. Whereas the former used time series data that span from 1984 to 2011, the latter's time period of study was between 1984 and 2011. In their separate studies, they obtained similar results indicating that stock market development was positively correlated with economic growth.

Further, Ifeoluwa and Motilewa (2015) examined the impact of stock market liquidity on economic growth of Nigeria between the years 1980 and 2012. OLS was employed to estimate the basic model specified for the study. The variables of their study were total value traded to GDP ratio, government consumption expenditure, foreign direct investments, the interest rate and the labour force. The study found that stock market liquidity was not a statistically significant variable explaining economic growth in Nigeria for the periods under study. The outcome of this study supports the findings by Ujunwa and Salami (2010), however it contradicts the work of Levine (1996).

Osinubi (2002) had earlier investigated whether stock market contributed to economic growth in Nigeria between the periods of 1980 to 2000. He adopted the use of OLS method to analyze the model of the study. The variables in the model included market capitalization ratio, new issues, and value of transaction ratio as stock market indicators whereas gross capital formation, public capital expenditure, trade openness, debt ratio and dummy variables relating to political stability and public policy were used as control variables. The result of the study indicated that there was a positive relationship between all the stock market development variables used and economic growth. However the effect was said to be weak and insignificant.

In like manner Owolabi and Ajayi (2013) investigated whether stock market promoted economic growth between 1971 and 2010 in Nigeria. The variables used were gross capital formation, FDI, market capitalization and debt overhang. The result revealed that there was a positive relationship between economic growth and all the stock market variables used. The findings of the work of Rasaki, Saffiyah, Kamilu and Hakeem (2013) corroborate this result by indicating a positive relationship between stock market development and economic growth from the period of 1981to 2008. It found that the former influenced the latter. OLS method was used in work.

Also the study of Adigwe, Nwanna and Ananwude (2015) examined the effect of stock market on economic growth between 1985 and 2014 using OLS. They used market capitalization ratio for market size while value of stock traded represents market liquidity as variables, trade openness and inflation rate serve as control variables. They found that stock market had a positive influence on economic growth, though it has not translated to a meaningful growth.

Reporting a complete different result, Oluwatosin, Adekanye, and Yusuf (2013) found that all the capital market indices had not significantly impacted on the GDP. Specifically, the results of their study showed that market capitalization and number of listed companies had a negative impact. They used OLS estimation method and covered a period of 13 years (1999 to 2012).

2.7.1ii. Short and Long Term Impact: Error Correction Model (ECM).

Eriemo (2014) examined the influence of stock prices and capital market development on the level of economic progress in Nigeria. It used time series data covering the period of 1980 to 2012. ECM was adopted as analytical technique for the study. The short-run result showed that level stock prices and capital market development had positive and significant effect on

the economic growth. The ECM showed a satisfactory speed of adjustment to equilibrium in the long run.

Akinde (2015) examined the link between series of stock market fundamentals and economic growth and development in Nigeria between 1980 and 2013. He adopted ECM and granger causality tests for the analysis of the model. The study employed variables such as market capitalization, total transaction value and all share index for stock market development and real gross domestic product for the economic growth. The paper established a significant positive relationship between the explanatory variables and the explained variable.

Okonkwo, Ogwuru, and Ajudua (2014) had earlier appraised the stock market performance and economic growth in Nigeria from 1981 to 2012. The model was estimated with ECM, while Granger causality test was conducted to establish causal relationship among the variables. The variables were Real GDP, total value traded, market capitalization ratio, turnover ratio and number of listed companies. The result revealed that stock market impacted on economic growth. It also revealed that there was no causal relationship between stock market development and economic growth.

Deviating from the preceding findings, the results of Ogunleye and Adeyemi (2015) were mixed with the variables. In their investigation of impact of stock market development on economic growth in Nigeria between 1970 and 2008, their findings revealed that market capitalization and broad money supply had positive influence on economic growth. On the contrary, total value traded ratio, turnover ratio and gross capital formation reflected negative long-run relationship with the dependant variable.

- **Vector Error Correction Model (VECM)**

Ezeoha, Ebere, and Ndi Okereke (2009) used Vector Error Correction Model (VECM) to examine the nature of relationship existing between stock market development and the level of investment flows in Nigeria. The time frame of the study ranged from 1970 to 2006 on quarterly basis. The study showed that stock market development was able to induce growth in domestic private investment front but unable to do so in the case of foreign private investment.

Similarly, Adenuga (2010), in his study of the relationship between stock market development and economic growth, also found that stock market promoted economic growth in Nigeria between the periods 1990 to 2009. Equally the study also used VECM and

quarterly data like that of Ezeoha et al. (2009). The variables used in the study include market capitalization, turnover ratio and total value traded.

Okoye, Modebe, and Okorie (2016) examined the link between capital market development and economic growth adopting VECM as estimation technique. They used series of stock market indicators such as market capitalization ratio, value traded ratio and turnover ratio while GDP was used to represent economic growth over the period 1981 to 2014. The study showed that in the short run market capitalization ratio and turnover ratio had significant negative effect on GDP while in the long run all the independent variables had significant negative impact on GDP.

Abubakar, Omoshola, and Aminu (2016) examined the impact of financial market development on economic growth in Nigeria using annual time series data covering the period of 1981 to 2014. They employed VECM as the econometric methodology to analyses these variables: market capitalization ratio, total value traded, money supply, credit to private sector ratio and total reserve. The results showed that overall there is a positive effect of financial market development on economic growth in Nigeria. Almost all the financial markets, namely, stock and money markets were found to have a positive impact with the exemption of foreign exchange market having a negative impact.

Oke (2013) showed mixed results in his study of the short and long run effects of capital market activities on the growth of Nigerian economy. He applied OLS and VECM analytical techniques to analyze annual data series on all share index, market capitalization and number of dealings between 1985 and 2011. He used OLS technique for the short-run impact and VECM for the long-run. He found a positive relationship between capital market operations and economic performance in the short run while in the long run market capitalization ratio and number of dealings showed negative impact whereas ASI indicated positive relationship. Similar to the findings of Oke (2013) for long run impact of capital market on economic growth is the result of the study by Maduka and Onwuka (2013). They used VECM technique for the period ranging from 1970 to 2008. The result revealed that capital market had a negative and significant effect on economic growth of Nigeria.

Radically, the result of Osamwonyi and Evbayiro-Osagie (2012) revealed that stock market development followed economic growth (i.e. demand following hypothesis). The study showed that macroeconomic variables influenced stock market index in the period between

1975 and 2005. The macroeconomic variables were interest rates, inflations rates, exchange rates, fiscal deficit, gross domestic product (GDP) and money supply.

- **Auto-Regressive Distributed Lag model (ARDL).**

Okodua and Ewetan (2013) found that Nigerian economic growth was less sensitive to changes in stock market capitalization as well as the average dividend yield. The study used ARDL estimation technique. It combined stock market indicators and some traditional macroeconomic variables for the estimation of the relationship between the periods 1981 to 2011. The variables were market capitalization ratio, value of traded securities, average dividend yield, interest rate and foreign direct investment as the independent variables while GDP was a proxy of economic growth. The implication of the result is that Nigeria stock market lacked the capacity to serve as a barometer for measuring the overall health of the Nigerian economy as well as its direction in the long-run horizon.

Osakwe and Ananwude (2017) got similar findings like Okodua and Ewetan (2013). In their study exploring the relationship between stock market development and economic growth in Nigeria from 1981 to 2015, they found that the stock market had positive but insignificant relationship with economic growth both in short and long-run. Market capitalization and turnover ratio were used to proxy stock market development while GDP growth rate represented economic growth.

Iheanacho (2016) examined the relationship between financial intermediary development and economic growth in Nigeria over the period 1981-2011 using ARDL approach. The results showed that the relationship between financial development and economic growth in Nigeria was insignificantly negative in the long-run but significantly negative in the short run.
Owusu (2016) findings fall in line to support the negative effect of stock market development on economic growth. The study employed ARDL technique to analyse time series data on market capitalization ratio, total value traded ratio, turnover ratio and real GDP over the period 1987 to 2014.

- **Volatility**

The following empirical studies have been undertaken to investigate stock market volatility in Nigeria. Babatunde (2013) investigated the relative contribution of stock market volatility on economic growth over the period 1980 to 2010 (annual time series). He used Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) model. The study

revealed that the volatility shock was quite persistent in Nigeria and that it might distort growth of the economy.

Osazevbaru (2014) empirically tested for the presence or nonexistence of volatility clustering in the Nigerian stock market. He used both daily and monthly time series data of share prices (represented by all share index) for the period 1995 to 2009. ARCH and GARCH models were adopted for the estimation, and the result indicated that the market exhibited volatility clustering. He also discovered that the rate at which the response function decayed was high. Okpala and Nwezeaku (2009) had earlier investigated the presence of volatility in Nigeria stock market using forty one companies with data from 1996 to 2005. Using EGARCH model, they found less volatility persistence and existence of leverage effect. In a similar vein Ngozi (2014) used daily all share index from 2008 to 2013 to examine the applicability of first order GARCH models alongside three alternative error distributions and the common features of stock market returns in Nigeria. The result showed the evidence of leverage effect in stock returns, implying that stock returns volatility in the Nigerian capital market did not have equal response to the same magnitude of positive and negative shocks.

Oseni and Nwosa (2011) examined volatility in stock market and macroeconomic variables with Exponential GARCH (EGARCH), and also employed LA-VAR Granger causality test to analyse the nexus between the two major variables of interest in Nigeria for the period 1986 to 2010 (annual time series). The variables of the study were all share index, real GDP, inflation rate and short term interest rate. The result of the analysis suggested that there was a bi-causal relationship between stock market volatility and real GDP volatility; conversely there was no causal relationship between inflation volatility and stock market volatility.

Hassan, M., Maroney, N.,El Sady, H. and Telfah, A. (2003) found that ARCH and GARCH effects exists in African stock markets, with Nigeria and South Africa stock markets showing that politics has a significant impact on these markets. They maintained that African stock markets volatility increases with good news because once good news appears; investors may flood in, thus increasing volatility. On the contrary Ogum (2002) claimed that negative shocks increase volatility in African major stock markets.

2.7.1.iii. Causality Test: Empirical Study Based On Causal Relationship

Aye (2013) investigated the dynamic causal relationship between financial deepening, economic growth and poverty in Nigeria. The short-run causality between the variables of the study model was tested using a modified Hsaio-Granger causality within VAR and VECM

framework. The period of the study was between 1960 and 2011. The result showed a short run unidirectional causality from growth to poverty conditional via finance.

The study of Adefeso, Egbetunde, and Alley (2013) also indicated a unidirectional causal relationship between stock market development and economic growth in Nigeria from the latter to the former. The study supported demand following hypothesis. The study examined the long-run and causal relationship between both stock market development and economic growth in Nigeria using VECM based causality test on annual data from 1980 to 2010.

Similar to the findings of Aye (2013) and Adefeso et al. (2013), Ogbo and Oladipo (2012) had earlier found a unidirectional causality between the stock market and economic growth which runs from economic growth to stock market. Their study specifically examined the relationship between stock market development and economic growth in Nigeria between 1981 and 2008. They employed Granger causality test approach on the variables such as GDP, market capitalization, value of the total transaction, new issues and bank total.

Also Ndako (2010) had earlier discovered the existence of uni-directional causality from economic growth to financial development in his investigation of long-run causality between financial development and economic growth. He employed VAR based causality test for long-run horizon and Granger causality for short run period. He also applied Egarch Model to test for effects of financial liberation on stock market volatility in Nigeria.

Studying the impact of capital market on economic development and causal relationship between them, Ozurumba and Ogboi (2013) employed multiple regression analysis and Granger causality test to carry out the investigation. The result showed that there was a unidirectional causal relationship running from economic development to capital market. In the case of impact, there was a significant impact of capital market on economic development.

Though Riman, Esso and Eyo (2008) found in their study a unidirectional relationship between stock market development and economic growth, the causation was from stock market to growth affirming supply leading hypothesis. This is a slight departure from the above evidence. They applied VECM and Granger causality tests as estimation techniques on GDP.(Proxy for stock market development) and a control variable which represented financial structure. The time period of the study ranged from 1970 to 2004.

Close to the finding of Riman et al. (2008), Bashorun and Bakare-Aremu (2013) also discovered a unidirectional causality from the capital market to economic growth although there was bi-directional relationship between market capitalization ratio and economic growth. In their work they used VAR and Granger causality estimation methods on all-share index, market capitalization and number of deals as indicators of capital market development over the period 1981-2011. They found that stock market had positive and significant influence on economic growth.

Next are works that established bi-directional causal relationship between stock market development and economic growth. Anigbogu and Nduka (2014) examined the long-run and causal relationship between stock market performance and economic growth. They employed Granger causality, impulse response function and forecast error variance decomposition (FEVD) to capture shock transmission and AR root graph for stability test for the period 1987 to 2012. Their study found that stock market performance caused economic growth with feedback. They also discovered the existence of long-run relationship between the two major variables of interest.

Tarhom (2014) in his study examined the causal relationship between stock market performance and economic growth. The study used quarterly data for the period of 1990 to 2010. It adopted a pair-wise Granger causality test. Market capitalization ratio, all share index and value of shares traded were used as proxies for stock market development. Findings indicated evidence of strong bi-directional causality running from stock market performance to economic growth and vice versa. Additionally using VAR, the study revealed that stock market performance exerted positive impact on economic growth in Nigeria

Kolapo and Adaramola (2012) investigated the causal relationship between capital market and economic growth and the impact of the former on the latter. They employed Granger causality test which suggested a bi-directional causation between GDP and the value of transactions and also a uni-directional causality from market capitalization to the GDP.. The study period was between 1990 and 2010, while the model variables were GDP (dependent variable), market capitalization ratio, total new issues, value of transactions, total listed equities and government stocks (as independent variables). They also established a long-run relationship between the stock market and economic growth.

Chizea (2012) had also established a bi-directional relationship between stock market development and economic growth. Additionally he discovered that stock market development and economic growth had long-run relationship. He applied Granger causality test for the causal relationship between 1987 and 2007 whereas he used VAR and VECM to test for long-run relationship. He used three measures of stock market development: market capitalization ratio, turnover ratio and total value traded to GDP ratio, and one measure of bank; loans to deposit ratio.

Also Ovat (2012) used Granger causality test to find bi-directional or a two-way causation between stock market liquidity and economic growth with the strength of the causality coming more from stock market liquidity. However market size was found to have little or no effect on growth.

Further, the following studies indicated evidence in support of no causality between stock market development and economic growth .Osuala, Okereke and Nwansi (2013) examined the existence of causality between stock market performance and economic growth. They employed Granger causality test on annual time series of GDP (dependent variable), and market capitalization ratio, turnover ratio and total number of deals (independent variables) for the period of time ranging 1981 to 2011. However in the short-run they found uni-directional causality from total number of deals to economic growth. They also employed ARDL to discover a long-run relationship between stock market development and economic growth.

Okonkwo et al. (2014) earlier cited also revealed that the Nigerian economic growth and stock market development had no causal relations

2.7.2 Evidence from Other Developing Countries

Abebresa, Kamasa, and Pickson (2016) used ARDL Model coupled with Granger causality test to investigate the relationship between stock market development and economic growth in Ghana for the period 1991 to 2011. They used variables as market capitalization, foreign direct investment, money supply, inflation rate, human capital and GDP. The study revealed that stock market development had a negative impact on economic growth in the long run. Additionally, causality test revealed that there was no causal relationship between stock market development and economic growth in Ghana.

Osama (2015) investigated the causal relationship between stock market and economic growth in Egypt between the periods 2002 to 2013. He used Johansen co-integration and VAR based Granger causality as estimation tests on real GDP, market capitalization ratio and foreign direct investment (FDI). The results of the study did not show causal relationship between stock market development alone and economic growth. However, they indicated a link between stock market development as well as foreign direct investment and economic growth.

Odhiambo (2011) examined the dynamic causal relationship between stock market development and economic growth in South Africa. He applied ARDL-Bound test on three proxies of stock market development, namely, market capitalization ratio, total value traded ratio, turnover ratio against real GDP per capita (proxy for economic growth) over the period 1971 to 2007. Granger causality test was also employed. He established a uni-directional relationship flowing from stock market development to economic growth. The finding was consistent with the conventional supply-leading response in which the financial sector is expected to induce the real sector development.

In Malaysia, Chee, Zulkomain, Siony, and Venus (2005) using ARDL Bound test and Granger causality test investigated the relationship between stock market development and economic growth for the period 1978 to 2000. In the study, economic growth was represented by nominal GDP while the stock market development was measured by market capitalization ratio and turnover ratio. The study suggested that stock market development had a significant positive long-run impact on economic growth. It further revealed that stock market development granger caused economic growth. Hence the study provides empirical evidence in favour of finance led growth hypothesis for the Malaysian economy.

In India, Srinivasan (2014) investigated the direction of causality between stock market development and economic growth as well as whether there was long-run relationship between the two variables of interest. He employed ARDL, co-integration and causality tests covering the period 1991 to 2013. For the model, he used variables such as index of industrial production (Proxy of economic growth), capitalization ratio and turnover ratio both representing stock market development. The results of the study showed bi-directional causality between the market capitalization and economic growth and also a uni-directional relationship from turnover ratio to economic growth. Further there was indication of positive influence of stock market development over economic growth.

In Sri Lanka, Niranjala (2015) explored the effect of stock market on economic growth between 1990 and 2013. He also investigated the presence of causal relationship between the two variables of interest. VECM was employed and the result of the study revealed that stock market had positive impact on economic growth. The market indicators used were market capitalization ratio and total value traded ratio while economic growth indicator was GDP.

Furthermore, in Zimbabwe, Ishioro (2013) examined the causal linkage between stock market and economic growth for the period 1990 and 2010. He used market capitalization ratio, total value trade ratio and stock market volatility as proxies for stock market while real GDP growth rate served as proxy for economic growth. His study applied Yamamoto causality test and found a bi-directional causality between the two variables of interest.

2.7.3 Evidence from Developed Countries

In USA, Adamopoulos and Vazakidis (2013) examined the long-run relationship between economic growth and trade openness, inflation rate and stock market development. They also investigated whether there was causal relationship between stock market development and economic growth. VECM and Granger causality tests were applied for the period 1970-2012. The results showed that stock market development caused economic growth via trade openness and inflation rate. They also showed that stock market development induced an increase of economic growth and trade openness and a decrease of inflation.

In China, Lei and Mishra (2015) explored the relationship between Chinese Stock Market and economic growth using an ARDL Model and Yamamoto causality test. They found that the Global Financial Crisis had a significant impact on both Chinese real and financial sectors. Their findings also suggested that Shanghai A share market had a long run negative association with the real sector of the economy, however the magnitude of impact was tiny and could be ignored. They found an evidence of a relationship between stock market and real economy in the short run. For Chinese B Market, the result supported the demand-driven hypothesis which states that economic growth spurs development of stock markets.

In Korea, Yang and Yi (2008) used annual data from 1971 to 2002 to examine the financial development and economic growth relationship in the Korean economy. The findings of the study provided evidence that financial development caused economic growth and that there was one-directional relationship between the stock market and economic growth running from the stock market to growth.

Similarly, in Germany Antonious (2010) obtained the same result of unidirectional relationship from the stock market development to growth. He applied VECM and Granger causality tests on overall price index, GDP and bank lending rate for the period 1965 to 2007 to examine the relationship between stock market development and economic growth.

In United Kingdom, Fethi and Katircioglu (2015) empirically investigated the relationship between stock market/banking sector development and economic growth. They employed ECM and Granger causality tests on a quarterly data that covered the period 1965 to 2011. The results suggested that UK financial sector development was a good promoter of the domestic economy; that causality ran from stock market capitalization and volatility to real GDP, and that stock market volatility had a negative influence on the UK's GDP.

Furthermore, in USA, Guo (2002) showed that the stock market return volatility had a significant and negative effect on GDP growth. He used Generalised Method of Moments to investigate the impact of contemporaneous and lagged market returns with lagged GDP on future GDP growth between 1947 and 2000. Also Ramey and Ramey (1995) in cross-country evidence on the link between volatility and growth showed that macro-economic volatility is negatively related to economic growth. Likewise, Arcand, Berkes and Panizza (2012) found that macro-economic volatility still retained its negative and statistically significant effect on medium-term growth.

2.7.4 Evidence from Panel Analysis

In sub-Sahara Africa Enisan (2009) examined the impact and long-run causal relationship between stock market development and economic growth in seven sub-Sahara Africa countries. He employed VECM to carry out Granger causality and found that stock market development granger caused economic growth in Egypt and South Africa. However, in the context of VAR based causality, he found evidence of bi-directional relationship between stock market development and economic growth for Cote-D'Ivoire, Kenya, Morocco and Zimbabwe. In Nigeria, he found a weak evidence of growth–led finance. For the impact, the study suggested a significant positive long-run impact on economic growth. Overall, the study argued that stock market could help promote growth in Africa.

Again in Africa, Osanwayi and Kasimu (2013) examined the causal relationship and the direction of causality between stock market development and economic growth in Ghana, Kenya and Nigeria. They applied Granger causality test on panel data over the period of time

1989 to 2009. The findings revealed that there was no causal relationship between stock market development and economic growth in Ghana and Nigeria, but showed bi-directional causal relationship between the two variables of interest in Kenya.

In Europe, Caporale, Rault and Sova (2009) examined the relationship between financial development and economic growth in ten new EU members by estimating a dynamic panel model over the period 1994 to 2007. The evidence suggested that the stock markets were still undeveloped in the ten economies and their contribution to economic growth was limited owing to a lack of financial depth. Furthermore, Granger causality test indicated that causality ran from financial development to economic growth. They employed generalized method moments (GMM) estimation and Granger causality tests.

Still in Europe, Boubakari and Jin (2010) explored causality relationship between stock markets and economic growth based on time series data compiled from five Euronext countries (Belgium, France, Portugal, Netherlands and United Kingdom) for the period 1995 to 2008. Granger causality test was applied on the proxies of the stock market development: capitalization ratio, traded value turnover ratio and proxy of economic growth, GDP. The result suggested positive links between stock market and economic growth for France, UK and Netherland whose stock markets were liquid and highly active. However, the causality relationship was rejected for the countries in which their stock markets were small and less liquid (Belgium and Portugal).

In Asia, Azam, Haseb, Samsi and Raji (2016) examined the role of stock markets in economic growth for four Asian countries, namely, Bangladesh, India, China and Singapore. ARDL approach was applied on stock market development indicators, foreign direct investment (FDI) and inflation annual time series data over the period 1991 to 2012. The long-run elasticity estimates of the stock market development in all the countries showed positive sign but statistically significant only in China and Singapore. In the Short-run, stock market also had positive relation to economic growth in all countries but significant only in India and China. The findings revealed that stock market development and FDI inflows play vital roles in the process of economic growth in these selected countries.

Levine and Zervos (1996) examined whether there was a strong empirical association between stock market development and long-run economic growth. They used pooled cross-country time series regression of forty one countries (cutting across all the continents) from

1976 to 1993 to evaluate the association. They conglomerated measures such as stock market size, liquidity, and integration with world markets into index of stock market development. There were control variables such as political stability, investment in human capital and macro-economic conditions. The findings showed a strong correlation between overall stock market development and long-run economic growth. This means that the result was consistent with the theories that imply a positive relationship between stock market development and economic growth.

Also, Levine (2003) in his study of the effect of stock market liquidity on economic growth for forty nine countries over the period 1976 to 1993 found a statistically strong positive association between stock market and growth. He employed OLS technique towards achieving this objective. The variables of the study are total value of shares traded, market capitalization ratio and banking development as independent variables while GDP served as dependent variable

Table 2.1: Summary of Some Empirical Works on a Global Scale

Author(s)	Evidence From	Objective(s)	Methodology	Result(s)
Abebresa, Kamasa and Pickson (2016)	Ghana	To investigate the relationship between stock market development and economic growth	Autoregressive Distributed Lay Model (ARDL)	Negative
Osama (2011)	Egypt	Causal relationship between stock market and economic growth	VAR based Granger causality test	Showed no causal relationship between the two variables of interest.
Odhiambo (2011)	South Africa	Causal relationship between stock market development and economic growth	Granger causality test	Unidirectional relationship from stock market to economic growth
Chee, Zulkomain, Siony and Venus (2005)	Malaysia	Impact of stock market on economic growth	ARDL	Significant and positive impact
Srinivasan (2014)	India	Impact of stock market on economic growth and direction of causality	ARDL and Granger causality test	Positive impact and bi-directional relationship
Adamopoulus and Vazakid (2013)	USA	Long run relationship between economic growth and stock market development.	Vector Error correction model. VECM.	Positive impact
Lei and Mishra (2015)	China	Impact of stock market on economic growth	ARDL	Significant and positive impact
yang and Yi (2008)	Korea	To determine causal relationship between financial development and economic growth	Granger causality test	Unidirectional relationship from stock market to economic growth
Antonious (2010)	Germany	Casual relationship between stock market and economic growth	VECM based causality test and granger causality test	Unidirectional relationship from stock market to economic growth.
Fethi and Katireioglu (2015)	United Kingdom	Impact of stock market on economic growth	Error Correction Model (ECM)	Significant and positive impact.
Enisah (2009)	Seven sub-Sahara Africa	Impact of stock market on economic growth	VECM	Overall, showed that stock market could help promote growth in Africa.
Osanwayi and kasimu (2013)	Ghana, Kenya and Nigeria	To study causal relationship between stock market and economic growth	Granger causality test	No causal relationship between stock market and economic growth

				in Nigeria and Ghana, but showed bi-directional relationship for Kenya.
Caporale, Rault and Sova (2009)	10 new EU members	Impact of stock market on economic growth	Generalized method moments (GMM)	Positive impact
Boubakari and Jin (2010)	5 Euro-next countries: Belgium, France, Portugal, Netherland and UK	Relationship between stock market development and economic growth	Granger causality test	Positive link between stock market and economic growth for France, UK and Netherland, no causality in Belgium and Portugal
Azam, Samsiad Raji (2016)	4 Asian countries; Bangladesh , India, China and Singapore	Impact of stock market on economic growth	ARDL model	Showed that stock market played vital roles for economic growth in the selected countries
Levine and Zervos (1996)	Forty one countries across all the continents	Impact of stock market on economic growth in the long run	Panel pooled OLS regression	Showed positive relationship between stock market and economic growth

Table 2.2: Summary of Some Empirical Works on Nigeria

Osinubi and Amaghionye Odiwe (2003)	Nigeria	Impact of stock market on the economic growth	Ordinary least square (OLS)	Showed Positive impact on economic growth.
Ujunwa and Salami (2010)	Nigeria	Impact of stock market on economic growth	Ordinary least square (OLS)	Showed that stock market liquidity had negative impact on economic growth.
Ewah, Esang and Bassey (2009)	Nigeria	Effect of stock market on economic growth	Ordinary least square (OLS)	Showed no meaningful contribution to economic growth.
Adigwe, Nwanna and Ananwude (2015)	Nigeria	Impact of stock market on economic growth	Ordinary least square (OLS)	Positive effect on economic growth.
Ifeoluwa and Motilewa (2015)	Nigeria	Influence of stock market on economic growth	OLS	Stock market liquidity had a negative impact on economic growth.
Osinubi (2002)	Nigeria	Effect of stock market on economic growth	OLS	Positive but insignificant.
Owolabi and Ajayi (2013)	Nigeria	Impact of stock market on economic growth	OLS	Positive impact.
Oluwatosin, Adekanye and Yusuf (2013)	Nigeria	Impact of stock market on economic growth	OLS	Negative effect.
Eriemo (2014).	Nigeria	Influence of stock prices and capital market development on economic growth.	Error Correction Model (ECM)	Positive and significant.
Akinde (2013)	Nigeria	Link between stock market fundamentals and economic growth	Error Correction Model (ECM)	Positive and significant relationship
Okonkwo, Ogwuru and Ajudua (2014)	Nigeria	To appraise the stock market performance on economic growth	Error Correction Model (ECM)	Positive effect
Ogunleye and Adeyemo (2015)	Nigeria	Impact of stock market on economic growth	Error Correction Model (ECM)	Market capitalization had positive influence while turnover ratio and total value traded had negative effect.
Ezeoha, Ebere and Ndiokereke (2009)	Nigeria	To examine the nature of relationship existing between stock market development and level of investments	Vector error correction model. VECM	Stock market is able to induce growth in domestic private investments.
Adenuga (2010)	Nigeria	Study of relationship between stock market and economic growth	VECM	Showed that stock market promoted economic growth
Okoye, Modebe and Okorie (2016)	Nigeria	To examine the link between capital market development and economic growth	VECM	Negative and significant
Oke (2013)	Nigeria	Study of capital market activities on the economic growth	VECM OLS	Positive effect in the short run, market capitalization and number of dealings showed negative impact in the long run.
Okodua and	Nigeria	Examined stock market	ARDL	Economic growth was less

Ewetan (2013)		performance and sustainable economic growth.	Model	sensitive to changes in stock market capitalization
Osakwe and Ananwude (2017)	Nigeria	To study the effect of stock market on economic growth	ARDL Model	Positive but insignificant relationship
Iheanacho (2016)	Nigeria	Examination of the relationship between financial intermediary development and economic growth	ARDL Model	Insignificantly negative in the long run but significantly negative in the short run.
Babatunde (2013)	Nigeria	Investigation of stock market volatility on economic growth	EGARCH Model	Showed that volatility shock might distort economic growth
Osazeubara (2014)	Nigeria	Investigation of presence or non existence of volatility clustering in the stock market	ARCH And GARCH Models	Indicated that the market exhibited volatility clustering
Oseni and Nwosa (2011)	Nigeria	Analyzing the nexus between stock market and economic growth	EGARCH Model and LA-VAR Causality test	Indicated there was bi-causal relationship between stock market volatility and real GDP volatility.
Ngozi (2014)	Nigeria	Examination of the applicability of first order GARCH Models and common features of stock market returns	GARCH Model.	Showed the evidence of leveraged effect in stock returns.
Aye (2013)	Nigeria	Investigated the causal relationship between financial deepening, economic growth and poverty in Nigeria	VAR Based Causality Test	Unidirectional causality from growth to poverty via finance.
Adefesa Egbetunde and Alley (2013)	Nigeria	Examined the long run and causal relationship between stock market and economic growth	VECM based causality test	Indicated unidirectional causal relationship from economic growth to stock market.
Ogbo and Oladipo (2013)	Nigeria	Examined the relationship between stock market and economic growth	Granger causality test	Indicated unidirectional relationship running from economic growth to stock market
Ozurumba and Ogboi (2013)	Nigeria	Studied causal relationship between stock market and economic growth	Granger causality test	Showed unidirectional relationship running from economic growth to capital market
Anigbogu and Nduka (2014)	Nigeria	Investigate long-run causal link between stock market and economic growth	Granger causality test	Bi-directional causal relationship between stock market and economic growth
Tarhom (2014)	Nigeria	Examined causal link between stock market performance and economic growth	Granger causality test	Evidence of strong bi-directional causal relationship.
Osuala, Okereke and Nwansi (2013)	Nigeria	Investigated the existence of causality between stock market performance and economic growth	Granger causality test	No causality between the two variables of interest

The studies and findings on the global and domestic fronts presented in tables 2.1 and 2.2 showed mixed results in terms of effect of stock market development on economic growth (both short and long run). Further it is the same trend showing mixed results in examination of causal relationship between the two variables of interest. On volatility effect, there is evidence of convergence of findings indicating existence of volatility clustering.

2.8 Critique of the Reviewed Literature

The empirical studies discussed in section 2.6 examined the stock market development and economic growth relationships in both developed and developing countries. Some of the studies tried to find the impact of stock market development on economic growth while some examined the direction of causality between the two variables of interest.

There is no clear consensus from empirical studies on the relationship between stock markets development and economic growth in Nigeria and even across the globe. The results from the available studies are mixed. Some found positive relationship while others discovered negative link. However, a good number of the studies have been discovered as not being robust enough or being plagued by methodological problems, hence creating a need for a robust and reliable study.

On methodological approaches, majority of the reviewed empirical literature used OLS regression analysis method. Few of them used VECM while very few employed ARDL and VAR models. For causality test, pair-wise Granger causality test is in the majority while VECM and VAR based causality tests were infrequently used. Also, because almost all the reviewed works focused on impact and causal studies, GARCH family models (for volatility) were scarcely employed.

It is important to note that there is scarcity of reviewed works that brought together all these methods under one roof to allow for the comparison and robustness of empirical findings across the models. Only a handful of them employed up to two methods jointly. Another conspicuous thing is that just very few of the reviewed works used Toda and Yamamoto causality test. To my knowledge, its application is indeed very rare in studies in Nigeria. Toda and Yamamoto causality test is more strong and effective for causality measures. It overcomes the requirements and weaknesses associated with the Granger causality test. The requirements include that the time series data involved in the analysis are stationary, and also that the error terms entering the causality test are uncorrelated (Gujarati, 2006). Moreover, Toda and Philips (1998) observed that any causal influence in Granger causality result is

questionable where there are stochastic trends and the F-test is not valid unless the variables are cointegrated. Unfortunately, some of the works reviewed did not carry these tests before using Granger causality.

Coming to OLS which was predominantly used in the literature, its assumptions are stringent (Brooks, 2008). If any of these assumptions are not met, the estimator will no longer enjoy all of its properties. Besides, OLS method has a limitation, it does not remove unit root in non-stationary financial data. This may lead to biased or spurious result.
On GARCH family models, most of the very few works that used it did not even test for arch effect which determines whether the models are appropriate for the test. Also, instead of using monthly or daily data, some of the studies used annual time series. Volatility test needs high frequency data for robustness and reliable results.

Furthermore, there were omissions of variables in the model specifications of most of the reviewed works. The independent variables in the models are not comprehensive; some important variables were absent. For example, almost all the studies investigating stock market size either used capitalization ratio or number of listed companies as indicator; the two of them were rarely taken together. In most of the studies market capitalization ratio was frequently used. The same goes to the market liquidity where either traded value ratio or turnover ratio was used and were not taken jointly (although with exemption of some works).

Capitalization ratio and number of listed companies are very important and play complementary roles (El Wassal, 2013). They have their unique strengths and weaknesses and therefore should be employed simultaneously. In similar manner, making use of both the traded value ratio and turnover ratio would provide a more comprehensive picture of stock markets liquidity than the outcome obtained using only one of them.

Brooks (2008) argued that omission of relevant variables is more serious than the inclusion of irrelevant variables and therefore one should err on the side of including marginally significant variables. The consequence of omission of variables will be that the estimated coefficients on all the other variables will be biased and inconsistent unless the excluded variable is uncorrelated with all the included variables. Even if this is satisfied, the coefficient estimate in the constant term will still be biased. On the dependent variable, the use of absolute GDP as a measure of economic growth has been subjected to criticism on the ground that it does not reflect growth. Since the study examines changes over time, it is more

appropriate that it looks at changes in GDP; and it is GDP growth rate that is suitable for measuring economic growth over a specified period of time.

The reviewed empirical literature did not do much in improving the data characteristic and behavior of the time series. Standard and diagnostic tests of data behavior were in most cases not satisfactorily done or shown. For example some of the works that used OLS did not either test for autocorrelation or did but stopped with Durbin Watson (DW) method which is a crude way of measuring autocorrelation (DW method only tests the first order autocorrelation). Standard and diagnostic tests are vital because significant analyses and conclusions are enhanced when the data set is well behaved. Efforts should not be spared to ensure that data set is properly skewed, normally distributed, have minimal variance standard deviation and properly converged around the mean. These tests provide strong evidence of the robustness of models and will hence assure valid inferences to be drawn with high level of confidence.

Mostly all the reviewed works were tested for unit root with Augmented Dickey Fuller (ADF) and Philip Perron (PP) tests. To the best of the researcher's knowledge, almost all the works did not use structural break unit root consistent test. This depicts a stark neglect of structural changes/breaks which characterize an unstable economy like Nigeria and the nature of data (time series data) used in carrying out the analysis.

In an unsteady economy like Nigeria, it is important to consider structural changes/breaks in time series analysis. The need to identify structural breaks is necessary in order to consider variation in financial data due to policy adjustments or reforms, globalization and political instability. Moreover Gujarati (2006) states that ADF and PP test have low power; hence they tend to accept the null of unit root more frequently than is warranted. This is more so when a series contains one or more structural breaks. The traditional tests may find a unit root even when none exists.

In addition, the traditional unit root tests will fail with long span data. The power of these tests diminishes in the face of long time span of data. Besides Perron (1989) argues that most macroeconomic series are not unit root process; that they are trend stationary with structural breaks.

It is also important to note that the observation periods of most of the reviewed studies were too small to allow for a very robust analysis. Many of them covered a short period of time

such as an average of 20 years. These glaring deficiencies were addressed so as to achieve more reliable and valid results.

CHAPTER THREE
METHODOLOGY

3.1 RESEARCH DESIGN

Research design is the conceptual structure within which research is conducted. It is a framework that has been created to find answers to research questions. According to Onwumere (2009), research design is a format which the researcher employs so as to guide him in investigation and analysis of problems. Similarly, Aneke (1998) states that it is a plan drawn to find solutions to research problems. Further, research design provides general plan about what steps to be taken to answer research questions (Pannerselvan, 2011; Saunders, Lewis & Thornhill, 2012),

By method (using Onwumere research classification), this work will employ *ex post facto* research design. *Ex post facto* research is systematic empirical enquiry in which the researcher does not have direct control of variables because their occurrences have already taken place or because they are inherently not manipulatable (Sharma, 2012). The crucial point here is that there are existing data and the researcher merely obtains the data from established sources. Further, *ex post facto* research designs aims at measuring the relationship between one variable and another or the impact of one variable on another, without maneuvering the variables by the researcher (Onwumere, 2009). These variables are studied in retrospect to search for possible and reasonable relationships and probable impacts among them. In this work, analyzing the dynamics of stock market development and economic growth, the impact of stock market development on economic growth, and the causal relationship between the two variables were measured. In addition the presence of volatility in the stock market was measured.

By purpose, this work is an applied research which can be explained as the application of theory to relevant situations or phenomenon. Fundamentally, this work applied endogenous growth theory for explaining the relationship between stock market development and economic growth.

3.2 NATURE AND SOURCES OF DATA.

With regard to sources of data for this work, we used secondary data which refers to information already compiled, screened and stored by public agencies. Secondary data becomes largely ideal in this work since the research design *is ex post facto*. Also, secondary

data have the advantages of reliability when obtained from credible agencies thus enhancing realization of good and convincing results.

In this work, the secondary data are the values of market capitalization ratio, number of listed companies, turnover ratio, and total value traded ratio. Others include all share index, gross domestic product, inflation rate, credit to private sector/GDP ratio, and trade openness. These were sourced from the following agencies:

- NSE Fact Book
- Annual Reports and Statements of Accounts of NSE, SEC and CBN
- CBN Statistical Bulletin.

In terms of nature of data, this work used time series and purely quantitative data. According to Aneke (1998), time series data measure a particular variable during successive time periods or at different dates. Similarly, Brooks (2008) holds that time series are ordered by frequency which represents the interval or regularity with which the data is collected or recorded. The time periods for this work were on annual and monthly intervals.

3.3 STUDY POPULATION AND SAMPLE

A population in academic work is the entire set of individuals or objects of interest representing all measurements of interest to the sample collector (Aneke, 1998; Lind, Marchal & Wathen, 2005). Further, according to Osuala (2001), a population comprises the totality of units having certain desired characteristics in common.

This study focused on the Nigerian economy and analyzed the dynamics of stock market development and economic growth. Therefore population of the study comprises all the values of market capitalization, number of listed companies, turnover ratio, total value traded ratio and all share index. Others are inflation rate, credit to private sector/GDP ratio and trade openness from 1961-2017; and also the values of gross domestic product from 1960 - 2017.

For the sample of the study, the researcher took a period of 1984 to 2017 covering 34 years for the estimation and analysis. The choice of 1984 is informed by the fact that it was the first full year of operation of the Nigerian Stock Exchange All Share Index which is one of the variables of the study. The upper year 2017 is chosen because it is the most current year that has official published data sets.

3.4. MODEL SPECIFICATION

Hypothesis one

This model relies heavily on the work of Niranjara (2015) where he specified the effect of stock market size on economic growth in Sri Lanka as follows:

GDP = f (MCR + VT) 3.1

Where:

GDP = Gross domestic product.

MCR = Market capitalization ratio.

VT = Stock value traded ratio.

In modifying model 3.1, our general model becomes:

$\Delta RGDP = f (MCR + NLC + INF + TOP + BD) + \mu_t$ 3.2

Where:

$_t\Delta RGDP$ = Change in real GDP.

MCR = Market capitalization ratio.

NLC = Number of listed companies.

INF = Inflation rate.

TOP = Trade openness.

BD = Banking sector development.

μ_t = Error term.

The model in econometric linear form can be stated as:

$$\Delta RGDP_t = \beta_0 + \beta_1 MCR_t + \beta_2 NCL_t + \beta_3 INF_t + \beta_4 TOP_t + \beta_5 BD_t + \beta_6 MCR_{t-1} + \beta_7 NLC_{t-1}$$

$$+\beta_8 INF_{t-1} + \beta_9 TOP_{t-1} + \beta_{10} BD_{t-1} + \beta_{11} RGDP_{t-1} + \mu \quad 3.3$$

We included number of listed companies in our model because it is a complementary measure of stock market size (El Wassal, 2013). Its major advantages are that it is a proxy for the breadth of the stock market and is not subject to stock market fluctuations (Bakaert, Harvey & Landblad, 2003; Rajan & Zingales, 2003; Karolyi, 2004). Additionally, it is not tainted by possible mis-measuremet of GDP which characterizes many developing countries like Nigeria. Therefore its combination with market capitalization ratio in measuring the size of the market would show a broader picture of the market breadth than if only one of them is used. Similarly, INF, TOP and BD are added in the model as control variables because of the evidence that they have strong connection with economic growth (Bruno and Easterly, 1995).

Specifically, Majid (2007) stated that inflation has a very significant impact on growth. Also this work used real GDP rate as opposed to nominal GDP used in the adopted model.

Hypothesis Two

This model relies heavily on the work of Levine (2003) where he specified the effect of stock market liquidity on economic growth as follows:

$$GDP = f(TVT + BD + MCR) + \mu_t \quad 3.4$$

Where:

GDP = Gross Domestic Product

TVT = Total value of transactions

BD = Banking development.

MCR = Market capitalization ratio.

μ_t = Error term.

In modifying model 3.4, our general model becomes:

$$\Delta RGDP_t = f(TVT + TR + INF + TOP + BD) + \mu_t \quad 3.5$$

Where:

ΔRGDP = Change in real GDP.

TVT = Total value traded ratio.

TR = Turnover ratio.

INF = Inflation rate.

TOP = Trade openness.

BD = Banking sector development.

μ_t = Error term.

The model in econometric linear form can be stated as:

$$\Delta RGDP_t = \beta_0 + \beta_1 TVT_t + \beta_2 TR_t + \beta_3 INF_t + \beta_4 TOP_t + \beta_5 BD_t + \beta_6 TVT_{t-1} + \beta_7 TR_{t-1} + \beta_8 INF_{t-1} + \beta_9 TOP_{t-1} + \beta_{10} BD_{t-1} + \beta_{11} RGDP_{t-1} + \mu \quad 3.6$$

Inclusion of turnover ratio is very critical in measuring liquidity as it serves as an indicator of transaction costs on the stock market (Levine & Zervos, 1998). Additionally, it is a good indicator for speculative activity in the market. Also with turnover ratio we can check for the possibility that price effect might be dominating the relationship between total value traded

liquidity and economic growth. Total value traded has a shortcoming; when markets anticipate a large corporate profits, stock prices will rise immediately. In effect the price rise will increase the value of stock transactions thus raising the liquidity indicator without a rise in the number of transactions or a fall in transaction costs(Levine and Zervos, 1998). However, turnover is not affected by the price effect since it has stock prices both in the numerator and denominator.

Therefore to capture a more comprehensive picture of stock market liquidity, the two indicators - total value traded and turnover ratio are very important. This is because using only one of them will provide insufficient information of liquidity status of the market as both of them measure quite different aspects of liquidity. Similarly, INF, and TOP are added in the model as control variables because of the evidence that they have strong connection with economic growth (Bruno and Easterly, 1995).

Hypothesis Three

This was tested using the model for co-integrating regression test (bounds test) by Pesaran and Shin (1999) specified in equation 3.9. This approach has been used by quite a good number of scholars like Srinivasan (2014) in India, Chee, Zuikomain, Siony and Venus (2005) in Malaysia and Okodua and Ewetan (2013) in Nigeria.

Hypothesis Four

The EGARCH technique was used for this hypothesis as had been previously adopted by Alberg, Shalit and Yosef (2008) in Isreal; Al-Naijar (2016) in Jordan; karunanithy and Ramachandran (2015) in India, and Babatunde (2013). All of them were used for modeling volatility in stock market. The EGARCH technique is specified in equations 11 (mean equation) and 12 (variance equation). However, monthly data were used as against quarterly series used in the most of adopted works; this is to avoid the smoothing effect of low frequency series. Furthermore, the econometric model of the above works is: ASI C (a univariate model). Note that ASI stands for All Share Index and C for constant. However despite the fact that our model is also univariate we added autoregressive processors [AR (1 to 2)] in our model so as to take care of mistaking autocorrelation with arch effect, hence our model becomes ASI C AR (1 to 2).

Hypothesis Five

This was tested using the Yamamoto causality test following the form adopted by Ishioro (2013) in his study of stock market development and economic growth in Zimbabwe.

$$\begin{bmatrix} MC_t \\ NC_t \\ TVT_t \\ TR_t \\ RGDP_t \end{bmatrix} = \omega_0 + \omega_1 \begin{bmatrix} MC_{t-1} \\ NC_{t-1} \\ TVT_{t-1} \\ TR_{t-1} \\ RGDP_{t-1} \end{bmatrix} + \omega_2 \begin{bmatrix} MC_{t-2} \\ NC_{t-2} \\ TVT_{t-2} \\ TR_{t-2} \\ RGDP_{t-2} \end{bmatrix} + \omega_3 \begin{bmatrix} MC_{t-3} \\ NC_{t-3} \\ TVT_{t-3} \\ TR_{t-3} \\ RGDP_{t-3} \end{bmatrix} + \omega_4 \begin{bmatrix} MC_{t-4} \\ NC_{t-4} \\ TVT_{t-4} \\ TR_{t-4} \\ RGDP_{t-4} \end{bmatrix} + \varepsilon_t \quad 3.7$$

Where:

ω_0 = the intercept vector

$\omega_{(1,2,3,4)}$ = the coefficient vector of, MC, NC, TVT and TR .

ε_t= vector of error terms

3.5 DESCRIPTION OF THE VARIABLES IN THE MODEL

The variables of interest in this work are described in this section. Gross Domestic Product (GDP) is the dependent variable whereas market capitalization ratio, number of listed companies, total value traded ratio, turnover ratio and All Share Index (ASI) represent the independent variables. Also included in the independent variables are control variables which are: banking sector development, inflation and trade openness.

3.5.1 Gross Domestic Product (GDP)

GDP is commonly used as an indicator of the economic health of a country, as well as a gauge of a country's standard of living. It is an important statistics that indicates whether an economy is expanding or contracting; that is, it measures a nation's economic growth or decline. Higher GDP is positively associated with and can be translated to an increased quality of life or standard of living.

GDP is determined by calculating the monetary value of all the finished goods and services produced within a country's boarder in a specific time period. In this work inflation adjusted GDP growth was used. Among the works that employed real GDP are Fethi and Katircioglu (2015) in United Kingdom, Adamopoulos (2010) in Germany, Owusu (2016) in Nigeria and Osama (2015) in Egypt.

3.5.2 Market Capitalization Ratio

Market capitalization ratio is widely used in the literature as a stable measure of stock market development. It is popular and mostly acceptable for a number of reasons. First, it is a measure of stock market size which is positively correlated with the ability to mobilize

capital and diversify risk. Second, it gives a measure of the size of the stock market relative to the size of the economy.

This variable has been used in a good number of works such as Levine and Zervos (1996), Caporale, Howells and Soliman(2004), Pan and Mishran (2015) in China, Okudua and Ewetan (2013) in Nigeria, Chee, Zulkomain, Siony and Venus (2005) in Malaysia and Levine (2003).

3.5.3 Number of Listed Companies

This specifies the number of all companies listed in the country's stock market at any point in time. It is a proxy for the breadth of the stock market and is not subject to stock market fluctuations. Additionally, it is not tainted by possible mis-measurement of GDP which characterizes many developing countries. In addition to having a theoretical support for inclusion in our model, this variable has been used by Okonkwo,Ogwuru and Ajadua (2014).

3.5.4 Total Value Traded Ratio

This equals the total value of shares traded on the stock market divided by GDP. It measures the organized trading of shares as a percentage of national output and therefore should reflect stock market liquidity on an economy-wide basis. Traded value is a volume based indicator (El-Wassal, 2013). Volume-based indicators are most useful in measuring market breadth, that is, the existence of both numerous and large orders in volume with minimal transaction price impact.

Levine and Zervos (1998), Niranjara (2015) in Sri Lanka, Caporale, Howells and Soliman (2004), Levine (2003), Ndako (2010) in South Africa, Boubakari (2010) in Europe and Ujunwa and Salami (2010) are among the works that used this variable in their model.

3.5.5. Turnover Ratio

Turnover ratio measures trading comparatively to the size of the stock market; it equals the value of total shares traded divided by market capitalization. It gives an indication of the number of times the outstanding volume of shares changes hands. Its value usually increases with the level of development of the stock market. Further, it is often used as an indicator of transaction costs (Levine & Zervos, 1998). High turnover ratio implies low transaction costs. Additionally it is a good indicator for speculative activity in the market.

Turnover ratio had been employed in the following studies: Levine and Zervos (1998), Srinivasan (2014) in India, Odhiambo (2011) in India, Ogunleye and Adeyemi (2015) and Adenuga (2010) in Nigeria and Chee, Zulkomain, Siony and Venus (2005) in Malaysia.

3.5.6 All Share Index (ASI)

Generally, a market index is a statistical parameter which reflects composite value of a market characteristic. The index is calculated in such a manner that makes it generally representative of the market. Wikipedia (2008) explains stock index as: "it is computed from the prices of selected stock (typically a weighted average). It is a statistical index used by investors and financial managers to describe the market and to compare the return on specific investment".

Literature and other financial theorists including empirical works are overwhelmingly in support of the use of stock price index as proxy for stock market returns and market volatility. For example, Fisher (1930), Atoi (2014), Akinde (2015), Tarhom (2014) and, Osisanwo and Atanda (2012) among other studies have used stock price as proxy for stock market returns.

In Nigeria, stock index is represented by All Share Index (ASI) which is used as proxy for stock market returns. The NSE All Share Index is a total market (broad-based) index, depicting a total picture of the behavior of the common shares quoted on the NSE. It is calculated on daily basis revealing how prices have moved. It started in January, 1984 as the base year with a value of 100 marks and has now risen up to 40,586.7marks.

3.5.7. Banking Sector Development

This study controls for banking variable which is a dominant sub-sector in Nigeria. It includes commercial banks, non-banking financial institutions and the development finance institutions. Evidence from the World Bank (2007) clearly indicates that Sub-Sahara Africa is a bank-based economy. Therefore studies on the effect of stock market on economic growth in Nigeria that do not control for banking variable may likely suffer from an omitted variable problem. This is notwithstanding the on-going debate among researchers on the nature of relationship between the two institutions; while some have argued that they are substitutes others contend they are complements. The evidence from the developed financial market has also shown that they do control for banking variables as can be found in the work of Arestis, Demetriades and Luintel (2001).

Commercial banks are believed to be superior to other measures of banking development because it excludes credit to public sector which better reflects the extent of efficient resource allocation. Bank credit to private sector indicates intermediation to private sector divided by GDP. Beck and Levine (2004), and Levine, Loayza and Beck (2000) have all argued that bank credit to private sector is the best measure of banking development. This is because it is the proxy that relates to the quality and quantity of investment and hence economic growth.

Further, according to World Bank (2007), bank credit can be considered as the best measure because it essentially captures the degree to which banks are channeling the society's savings to most productive uses and hence economic growth. This measure according to them excludes credit to public sector because of the fact that in most cases, especially in the developing countries, credits to public sector are not as efficient as to those in the private sector due to the problems of mismanagement, corruption and bureaucracies.

These works, among others, have included banking sector development as control variables in their models: Fethi and Katircioglu (2015) in United Kingdom, Adamopoulos (2010) in Germany, Levine (2003), Levine and Zervos (1998), Pan and Mishran (2015) in China and Caporale, Raua, Sova and Sova (2009) in Europe

3.5.8. Inflation

Inflation depicts an economic situation where there is a general rise in the prices of goods and services continuously. Inflation is simply defined as the sustained rising in general price level. It is represented by the Consumer Price Index (CPI) which is regarded as the best measure for changes in price level. CPI is a statistical estimate constructed using the prices of a sample of representative items whose prices are collected periodically.

With increase in inflation, every sector of the economy is affected including interest rate, unemployment, exchange rates and stock markets. We have many empirical studies which have used inflation rate as control variables; they include Abebresa, Kamasa and Pickson (2016) in Ghana, Azam, Haseb, Samsi and Raji (2016) in Asia, Odhiambo (2011) in South Africa and Caporale, Raua, Sova and Sova (2009) in Europe.

3.5.9. Trade Openness

The analysis of the growth of exports and imports gives an indication as to the extent of the openness of an economy. The rate for trade openness is typically represented by nominal exports added by the nominal imports divided by nominal GDP.

Adam Smith and Richardo traditional models explained that openness will promote specialization. Thus, countries specialize in the production of goods and services that they have advantages and export such goods and services. On the other hand, countries without such advantages will import from these countries and specialize in other types of goods and services. As a result, resources are more optimally allocated.

The important fact about the relationship between trade openness and economic growth is that trade openness drives growth. A key channel through which trade can lead to economic expansion is productivity growth. As a country opens up to trade and invests in research and development, its comparative advantage can evolve over time towards the production of products with larger profit margin.

In addition to productivity growth, Romer (1994) finds that trade openness helps increase variety of consumption in domestic market. Edward (1993) highlights the impact of openness on international trade as important for growth; Acemoglu, Johnson and Robinson (2002) posit that openness in trade leads to the adoption of institutions that protect property rights, which is crucial to the creation of a sustainable economy with faster growth.

For trade openness, Levine and Zervos (1998), Pan and Mishra (2015 in China and Osinubi (2002) have added it in their models as control variable.

3.6 TECHNIQUE OF DATA ANALYSES

This work employed a number of data analyses techniques for evaluation of the data sets that were collected so as to obtain valid and unbiased results and hence make sound conclusions. The following analytical techniques and steps were taken:

- Preliminary/Standard Tests
- Regression Analysis
- Autoregressive Distributed Lag Model(ARDL)
- Diagnostic Tests
- Yamamoto Causality Test.

3.6.1 Preliminary/Standard Tests

These cover descriptive statistics, unit root/stationarity test, correlational analysis and graphical tools. They are tests designed to measure data characteristics, behavior and goodness towards employing them for model estimation.

3.6.1.1. Descriptive Statistics

These provide information on normality of the data sets. Tests covered here are the mean, median, mode, variance, standard deviation, skewness, kurtosis and normality. While the mean, median and mode were used to test for the centeredness of the data sets, the variance and standard deviation served to determine the dispersion of the data sets. For the normality, the Jacque Bera test was used to establish the normality or otherwise of the data distribution.

3.6.1.2. Test For Stationarity/Unit Root Test

Since the data set is a time series data, it is important to determine whether it is stationary or not because the stationarity or otherwise of a series can strongly influence its behavior and properties. This will help to determine the appropriate model to employ for estimating the relationship among the variables under study. The test for stationarity is even more important and necessary when we take cognizance of structural breaks in economic system. In view of the possible structural breaks, this work did not only use the traditional unit root test (ADF Test) but also employed the structural break consistent test. A series is stationary when it has constant mean, constant variance and constant auto-covariance for each given lag. It is important to note that the use of a non-stationary data can lead to spurious regression (high R-square and significant coefficient estimates).

3.6.1.3. Correlational Analysis

This is a test of association between variables. It is a statistical index employed to find out if the variables move in one direction or the opposite direction. It will show level of linear association. In this work, it shows level of association between stock market development variables and that of economic growth.

3.6.1.4. Graphical Tools

These are employed for easy comprehension of the important features of data. They have strong visual appeal; that is, they are designed to capture the attention of the reader. Comprising of graphs and bar charts, they are free from technicalities. Despite this attractiveness, graphical tools are not substitutes for the use of analytical techniques for making meaningful and reliable analysis of data. They may give inaccurate results.

3.6.2 Regression Analysis.

Regression analysis is concerned with the study of the dependence of one variable, the explained variable, on one or more other variables, the explanatory variables, with a view to

estimating and/or forecasting the mean value of the former in terms of the known or fixed value of the latter (Gujarati, 2006).

In addition, according to Onwumere (2009), regression analysis is a statistical technique used in measuring the impact of one or more variables (independent variables) on another variable (the dependent variable). Simply stated, regression model measures variations and movements of an outcome which is explained by independent variables. However, it has many assumptions and conditions upon which the validity and credibility of its results is predicated. Some of the assumptions are: no autocorrelation, homoscedasticity, linearity, normality and no perfect multicollinearity.

Regression analysis is more or less the most important tool of econometrics. It is a foundational model for most higher and dynamic econometric analysis. Hence in this work, it serves as the fundamental technique of data analysis. This is because the part of the focus of this work is on impact study where the dependence of economic growth on stock market indicators is investigated. The stock market indicators serve as independent variables whereas economic growth indicator whose changes/variations are explained serve as dependent variable.

3.6.3. Autoregressive Distributed Lag Model (ARDL)

In this work, we used Autoregressive Distributed Lag Model (ARDL) variant of regression analysis as proposed by Peseran and Shin (1999). ARDL Model is a standard least square regression which includes lags of both the dependent and independent variables as regressors (Greene, 2008). ARDL Model is a lagged and hence dynamic model which includes number of lags for each variable. The E-view 10 provides an automatic selection of the optimal number of lags.

ARDL involves four steps of tests: the procedure starts with baseline relationship. This is where the relationship between the independent and dependent variables in terms of direction and significance is contained. It represents the short run dynamics of the model. The ARDL Model for estimation of this relationship may be written as:

$$\gamma_t == \alpha + \sum_{i=1}^{p} \gamma\, \gamma_t + \sum_{i=1}^{k} x\, j, t - i\, \beta j, i + \epsilon t \qquad \text{Eq. 8}$$

Cointegration Test: The second step is bounds (cointegration) test which contains cointegrating relationship between the variables of our interest. If two series are cointegrated, it means they have a long-term relationship. In other words, a cointegrating relationship can

also be seen as a long-term relationship. In event that no cointegration is established, it simply means there will be no long-run relationship binding the series together thereby leaving it to wander apart without bound, the ARDL Model for determining long-run relationship is:

$\Delta\gamma_t$ == - $\sum_{i=1}^{p-1} \gamma_1 * \Delta\gamma_{t-1}$ + $\sum_{t=1}^{k} \sum_{i=0}^{qj-1} \Delta x j, t - i$ βj, i*-Φεc$_{t-1}$ + €$_t$ Eq. 9

Recent studies have indicated that the ARDL approach to cointegration is preferable to other conventional cointegration approaches (Peseran, Shin and Smith, 2001). One of the reasons is that ARDL is applicable irrespective of whether the variables are purely I(0) or I(1) or combination of the two. Another reason is that it is more robust and good for a small sample size. This is because it expands the model and brings out contemporaneous and lagged variables of the model.

Error Correction Term

The third step is error correction and speed of adjustment after establishing long-run relationship. There is error correction when cointeq(-1) is negatively and statistically signed. This would be followed by the speed of adjustment determined by the coefficient (this is the time it will take for the equilibrium to be restored).

Long Run Coefficients of the Cointegrating Relationship.

The fourth step represents the long-run dynamics of the model. It shows direction and degree of relationship of variables on long-run and individual basis.

3.6.4. Diagnostic Tests

Diagnostic tests are tests of violation of the assumptions of classical linear Regression Model (CLRM). They are performed to ensure that the assumptions of CLRM are satisfied; hence giving credibility and validity to regression results for inference. Specifically, having a clean bill on these assumptions makes the parameters (coefficient estimates) best linear unbiased estimator (BLUE). Some of the tests are autocorrelation, heteroscedasticity, normality, wald, CUSUM and multicollinearity.

3.6.4.1. Autocorrelation

There is presence of autocorrelation when the disturbance terms are correlated with one another for succeeding lags. It means the same covariance of the error term for succeeding lags. Normally the error terms should be uncorrelated. When autocorrelation is present but ignored, the regression results become biased and unreliable. Specifically it overestimates R^2, T-statistics and F-statistics and makes them look good thereby leading to type I error or type

II error. The Durbin Watson Statistics and Breuch-pagan Godfrey LM serial correlation test were used in this work to confirm the presence or absence of autocorrelation in the variables of interests.

3.6.4.2. Heteroscedasticity

It has been assumed that the variance of the error terms is constant; this is known as assumption of homoscedasticity. If the error terms do not have constant variance, they are said to be heteroscedasticity. This overestimates the standard errors of the intercept and consequently affects the T-value. If the model is still used in the presence of heteroscedasticity, any inference made could be misleading and biased. This work used the white heteroscedasticity test developed by White (1980).

3.6.4.3. Normality test

Here the assumption is that the disturbances are normally distributed. Normality assumption is required in order to conduct tests about the model parameters. One of the most commonly applied tests for normality is the Jarque-Bera Test. A normal distribution is symmetric and said to be mesokurtic. In absence of error normality, the inference we make about the coefficient estimates could be wrong. This study carried out a normality test to check if the residuals, a proxy for stochastic error terms follow a normal distribution or not.

3.6.4.4. Multicollinearity

One of the assumptions of the OLS estimation method is that the independent variables are not correlated with one another. When they are highly correlated with each other, multicollinearity occurs. It refers to a problem when the explanatory variables are not themselves independent.

OLS results suffer in the presence of multicollinearity; the R^2 will be high and the individual coefficients of the variables will have high standard errors making the regression looks good as a whole, but the individual variables are not significant. It will be difficult to observe the individual contribution of each variable to the overall fit of the regression. More than this, in the presence of multicollinerity, the regression becomes very sensitive to small changes in the specification so that adding or removing an independent variable leads to large changes in the coefficient values or significances of other variables.

3.6.5 Yamamoto Causality Test

The most common way to test the causal relationship between two variables is the Granger-causality proposed by Granger (1969). Granger causality means a variable (Y) influences variable (X) significantly or the other way round. Here, it is assumed that the disturbances are uncorrelated. This traditional causality test has its limitations.

First, time series data are often non- stationary (Maddala, 2001). This can cause the problem of spurious results. It is a condition that before using Granger causality test, the variables of interest must be stationary (Gujarati, 2006).

Second, a two variable Granger- causality test without considering the effect of other variables is subject to possible specification bias. As pointed out by Gujarati (2006), a causality test is sensitive to models specification. It will reveal different results if it (the variable) is relevant and yet is not included in the model. Therefore the empirical evidence of a two- variable Granger- causality is fragile because of the problem.

To mitigate these problems, Toda and Yamamoto (1995), and Dolado and Lutkepohi (1996) based on augmented VAR modeling, introduced a modified Wald Test Statistics (MWALD). This procedure has been found to be superior to ordinary Granger causality test since it does not require pre- testing for the co-integrating properties of the system and thus avoids the potential bias associated with unit roots and co-integrating tests as it can be applied regardless of whether a series is I(0), I(1) or I(2), non co-integrated or co-integrated of an arbitrary order.

Again, Toda and Yamamoto approach is a multivariate causality test therefore avoiding the issue of specification bias. Furthermore, the issue of auto correlation is taken care of because of the dynamic nature of this technique.

For Yamamoto causality test, we used this model:

$$\begin{bmatrix} Y_t \\ X_t \end{bmatrix} = \begin{bmatrix} \omega_{10} \\ \omega_{20} \end{bmatrix} + \begin{bmatrix} \omega_{11}^{(1)} & \omega_{12}^{(1)} \\ \omega_{21}^{(1)} & \omega_{22}^{(1)} \end{bmatrix} \begin{bmatrix} Y_{t-1} \\ X_{t-1} \end{bmatrix} + \begin{bmatrix} \omega_{11}^{(2)} & \omega_{12}^{(2)} \\ \omega_{21}^{(2)} & \omega_{22}^{(2)} \end{bmatrix} \begin{bmatrix} Y_{t-1} \\ X_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \quad \text{Eq.3.10.}$$

Where ω_0 represents the coefficient vector of stock market indicators, and ε_t= vector of error terms.

3.6.6 Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH).

Though some studies like Arestis, Demetriades and Luintel (2001) control for volatility to account for uncertainty that usually characterized equity markets, this work did not include volatility in the linear model stated above (ARDL) due to the following reasons. First, volatility occurs in clusters, bunches and it is unpredictable. Hence, linear models cannot be used to capture it (Engle, 1982). It is a common knowledge that ARDL Model is linear model that can capture the dynamic relationship among variables of interest while volatility is often non- linear models in nature that can be best captured using non- linear models like EGARCH.

Second, Pagan (1986) clearly indicates in his study the effect of combining a constructed data with observed data. He notes that such combination can create inconsistencies in estimations, lacking efficiency, leading to a misleading result and invalid inference. Beck and Levine (2004) also express concern with the construction of volatility in linear models. This is because the use of such models is not capable of capturing the high frequency factor that usually characterizes the stock market.

The above mentioned reasons explain why a separate model is employed in this study to examine volatility using the appropriate model - EGARCH. In line with Nelson (1991), EGARCH is specified under two equations: the mean and conditional variance equations.

Mean equation: $Y_t = \mu + \Sigma_t$ Eq. 3.11

Variance equation:

$$Log\,(\delta^2) = \omega + \beta.log\,(\delta^2_{t-1}) + \gamma \frac{\Sigma_{t-1}}{\sqrt{\delta_{t-1}}} \propto \left[\frac{\Sigma_{t-1}}{\sqrt{\delta_{t-1}}} - \sqrt{\frac{2}{\pi}}\right] \quad \text{Eq. 3.12}$$

Where:

ω, β, γ and $\propto$ are constant parameters.

$Log(\delta^2)$ = natural logarithm of the conditional variance.

$\beta.log\ (\delta^2_{t-1})$ = it measures the impact of last periods forecast varianceβ: indicates either positive or negative volatility clustering depending on its sign.

$\propto$ = Unconditional normalized standard deviation in absolute values. It captures the magnitude of shock.

γ = measures the leverage effect

Σ_{t-1} = residuals from mean equation.

This work preferred EGARCH model over other GARCH models because among other things it captures the asymmetric properties between returns and volatility. It addresses some limitations of ARCH and GARCH models like: non sensitivity in asymmetric response of volatility to shock. One of the primary restrictions on ARCH/GARCH models is that there is assumption of symmetric response of volatility to positive and negative shocks. It means that every reaction to shock is not always linear and positive; it can be positive or negative. Again, it addresses the difficulty in measuring persistence in a strongly stationary series.

CHAPTER FOUR

PRESENTATION AND ANALYSES OF DATA

4:0 Introduction

This chapter presents the datasets collected and collated from government agencies for the periods under study (1984 – 2017). The datasets are presented in tabular form for the purposes of clarity. In addition, the results of the various econometric and statistical methods of estimations are also contained in this chapter. Also, the various diagnostic, standard and validity tests conducted are shown with the main objective of assuring the reliability of the used datasets and estimated models.

4:1 Data Presentation

Table 4.1: Annual Observations of Real Economic Growth, Stock Market Indicators and Selected Control Variables 1984 – 2017

YEAR	BD	INF	MCR	NLC	RGDPR	TOP	TR	TVR
1984	7.3	39.6	3.2	93	-1.1	9.5	0.3	0.01
1985	6.8	5.5	3.3	96	9.5	9.8	0.4	0.01
1986	7.5	5.4	3.8	99	2.5	7.4	0.3	0.01
1987	8.5	10.2	3.5	100	-0.6	19.3	0.5	0.02
1988	8.5	38.3	3.0	102	7.4	16.4	2.5	0.1
1989	7.3	40.9	2.9	111	7.6	21.1	5.4	0.2
1990	6.7	7.5	3.2	131	13.0	31.1	2.0	0.1
1991	6.9	13.0	3.8	142	-0.8	35.4	1.0	0.03
1992	6.4	44.5	5.3	153	2.3	38.3	1.0	0.1
1993	10.1	57.2	5.3	174	1.3	30.5	1.0	0.1
1994	8.1	57.0	5.4	177	0.3	20.9	1.0	0.1
1995	6.2	72.8	7.6	181	2.1	59.0	0.8	0.1
1996	6.3	29.3	8.0	183	4.4	50.0	2.5	0.2
1997	7.7	8.5	6.8	182	2.8	50.8	3.9	0.2
1998	7.7	10.0	5.6	186	2.3	34.6	5.1	0.3
1999	8.1	6.6	5.5	195	2.8	38.7	4.8	0.3
2000	7.7	6.9	6.8	195	3.9	42.5	6.0	0.4
2001	9.4	18.9	8.0	194	4.2	39.7	8.9	0.7
2002	8.2	12.9	6.6	195	3.3	28.7	7.9	0.5
2003	8.2	14.0	10.0	200	9.5	38.9	8.6	0.9
2004	8.2	10.1	11.1	207	6.5	38.0	11.6	1.3
2005	8.3	11.6	11.3	214	6.5	45.1	10.1	1.1
2006	8.0	8.5	14.7	202	6.0	36.4	11.1	1.6
2007	11.2	6.6	30.9	212	6.5	37.0	20.6	6.4
2008	17.7	15.1	17.8	213	6.0	39.2	34.5	6.1
2009	20.7	12.0	11.3	216	6.7	30.4	13.7	1.5
2010	18.6	11.8	14.5	214	8.0	34.9	10.1	1.5
2011	16.9	10.3	10.4	198	5.3	41.7	9.7	1.0
2012	20.4	12.0	12.5	194	4.2	34.7	7.3	0.9

2013	19.7	8.0	16.5	190	5.5	30.8	7.9	1.3
2014	19.2	8.0	12.9	189	6.2	26.4	11.6	1.5
2015	19.8	9.6	10.5	184	2.8	21.3	9.7	1.0
2016	20.8	18.5	9.1	170	-1.6	18.0	6.2	0.6
2017	19.6	15.4	12.0	167	0.8	20.4	9.3	1.1

Sources:
1. Central Bank of Nigeria Annual Reports and Statement of Accounts (Various issues)
2. Central Bank of Nigeria Statistical Bulletin (Various issues)
3. Security and Exchange Commission Statistical Bulletin, 2010
4. Nigerian Stock Exchange Fact Book (Various issues)

Where:

BD = Banking Sector Development

INF = Inflation Rate

MCR = Market Capitalization Ratio

NLC = Number of Listed Companies

RGDPR = Real Gross Domestic Product Growth Rate

TOP = Trade Openness

TR = Turn-over Ratio

TVR = Total Value Traded Ratio

Table 4.2: Monthly Observations for All Share Index (ASI) 1984 – 2017

YEAR	ASI	YEAR	ASI
1984MO1	106.9	1987M04	157.5
1984MO2	106.1	1987M05	154.2
1984MO3	107.2	1987MO6	196.1
1984MO4	106.8	1987MO7	193.4
1984MO5	104.5	1987MO8	193.0
1984MO6	104.3	1987M09	194.9
1984MO7	105.0	1987M10	194.8
1984MO8	107.0	1987M11	193.6
1984MO9	104.0	1987M12	190.9
1984M10	102.0	1988MO1	190.8
1984M11	103.4	1988M02	191.4
1984M12	105.5	1988M03	195.5
1985MO1	106.2	1988M04	201.0
1985MO2	111.2	1988MO5	199.2
1985MO3	113.4	1988MO6	206.0
1985MO4	115.6	1988MO7	211.5
1985MO5	116.9	1988MO8	217.6
1985MO6	116.3	1988MO9	223.8
1985MO7	117.2	1988M10	228.5
1985MO8	116.0	1988M11	231.4
1985MO9	119.0	1988M12	233.6
1985M10	124.9	1989MO1	240.0
1985M11	127.3	1989M02	251.0
1985M12	128.4	1989M03	256.9
1986MO1	134.6	1989M04	257.5
1986MO2	139.7	1989MO5	257.1
1986MO3	140.8	1989MO6	259.2
1986MO4	145.9	1989MO7	269.2
1986MO5	144.2	1989MO8	281.0
1986MO6	147.4	1989MO9	279.9
1986MO7	150.9	1989M1O	298.4
1986MO8	151.0	1989M11	311.2
1986MO9	155.0	1989M12	325.3
1986M10	160.9	1990MO1	343.0
1986M11	163.3	1990M02	349.3
1986M12	163.8	1990M03	356.0
1987M01	166.9	1990M04	362.0
1987M02	188.2	1990M05	382.3
1987M03	161.7	1990M06	417.4
1987M04	157.5	1990M07	445.4

1990M08	463.6	1993M12	1,548.8
1990M09	468.2	1994M01	1,666.3
1990M10	480.3	1994M02	1,715.3
1990M11	502.6	1994M03	1,792.8
1990M12	513.8	1994M04	1,845.8
1991M01	528.7	1994M05	1,875.5
1991M02	557.9	1994M06	1,919.1
1991M03	601.0	1994M07	1,926.3
1991M04	625.0	1994M08	1,914.1
1991MO5	648.9	1994M09	1,956.0
1991MO6	651.8	1994M10	2,023.4
1991MO7	688.0	1994M11	2,119.3
1991MO8	712.1	1994M12	2,205.0
1991MO9	737.3	1995M01	2,285.33
1991M10	757.5	1995M02	2,319.77
1991M11	769.0	1995M03	2,551.13
1991M12	784.0	1995M04	2,785.49
1992MO1	794.0	1995M05	3,100.79
1992M02	810.7	1995M06	3,596.17
1992M03	839.1	1995M07	4,314.27
1992M04	844.0	1995M08	4,664.61
1992M05	860.5	1995M09	4,858.06
1992M06	870.8	1995M10	5,068.01
1992M07	893.3	1995M11	5,095.16
1992M08	969.3	1995M12	5,092.15
1992M09	1,022.0	1996M01	5,135.07
1992M10	1,076.5	1996M02	5,180.36
1992M11	1,098.0	1996M03	5,266,20
1992M12	1,107.6	1996M04	5,412.35
1993M01	1,113.4	1996M05	5,704.12
1993M02	1,119.9	1996M06	5,798.72
1993M03	1,131.1	1996M07	5,919.43
1993M04	1,147.3	1996M08	6,140.95
1993MO5	1,186.7	1996MO9	6,501.88
1993MO6	1,187.5	1996M1O	6,634.78
1993M07	1,188.8	1996M11	6,775.61
1993M08	1,195.5	1996M12	6,992.10
1993M09	1,217.3	1997M01	7,668.28
1993M10	1,310.9	1997M02	7,699.28
1993M11	1,414.5	1997MO3	8,561.38

1997M04	8,729.79	2000MO8	7,394.05
1997M05	8,592.32	2000MO9	7,298.88
1997M06	8,459.29	2000M10	7,415.34
1997M07	8,148.80	2000M11	7,141.43
1997M08	7,681.99	2000M12	8,111.01
1997M09	7,130.79	2001MO1	8,794.22
1997M10	6,554.77	2001MO2	9,180.53
1997M11	6,395.76	2001MO3	9,159.83
1997M12	6,440.51	2001M04	9,591.58
1998M01	6,435.62	2001M05	10,153.79
1998M02	6,426,17	2001M06	10,937.26
1998M03	6,298.50	2001MO7	10,376.43
1998M04	6,113.90	2001MO8	10,328.95
1998M05	6,033.90	2001MO9	10,274.10
1998MO6	5,892.08	2001M10	10,091.44
1998MO7	5,817.03	2001M11	11,169.57
1998MO8	5,795.71	2001M12	10,963.11
1998MO9	5,697.67	2002MO1	11,031.95
1998M10	5,671.00	2002MO2	10,644.75
1998M11	5,688.19	2002MO3	11,557.15
1998M12	5,672.76	2002M04	11,669.13
1999MO1	5,494.77	2002M05	11,657.11
1999MO2	5,376.48	2002M06	12,618.82
1999M03	5,456.22	2002M07	12,737.88
1999M04	5,336.52	2002M08	13,005.05
1999M05	4,916.21	2002M09	12,451.83
1999MO6	5,977.89	2002M10	12,007.92
1999MO7	4,964.34	2002M11	11,628.19
1999M08	4,946.16	2002M12	12,137.72
1999M09	4,890.77	2003M01	13,210.11
1999M10	5,032.45	2003M02	13,623.36
1999M11	5,133.20	2003M03	13,762.50
1999M12	5,266.43	2003M04	13,390.09
2000M01	5,752.90	2003M05	14,002.21
2000M02	5,955.73	2003M06	14,537.80
2000M03	5,966.24	2003M07	13.992.86
2000M04	5,892.79	2003M08	15,813.07
2000M05	6,095.35	2003M09	16,252.67
2000M06	6,466.72	2003M10	18,874.21
2000M07	6,900.73	2003M11	20,268.15

2003M12	19,942.84	2007MO4	47,123.99
2004M01	22,712.88	2007MO5	49,930.19
2004M02	25,169.29	2007MO6	51,330.46
2004M03	22,965.97	2007MO7	53,021.68
2004M04	26,205.20	2007MO8	50,291.09
2004M05	27,505.64	2007MO9	50,229.01
2004M06	29,098.89	2007M10	50,201.82
2004M07	27,062.13	2007M11	54,189.92
2004M08	25,076.12	2007M12	57,990.22
2004M09	22,739.68	2008M01	58,570.55
2004M10	23,526.13	2008MO2	65,652.38
2004M11	24,155.43	2008MO3	63,016.56
2004M12	23,844.45	2008MO4	59,440.91
2005M01	23,073.79	2008MO5	58,929.02
2005M02	21,953.50	2008MO6	55,949.00
2005M03	20,682.37	2008MO7	53,110.91
2005M04	21,961.70	2008MO8	47,789.20
2005M05	21,482.08	2008MO9	46,216.13
2005M06	21,564.78	2008M10	36,325.86
2005M07	21,911.00	2008M11	33,025.75
2005M08	22,935.36	2008M12	31,450.78
2005M09	24,635.91	2009M01	21,813.76
2005M10	25,873.81	2009MO2	23,377.14
2005M11	24,355.85	2009MO3	19,851.89
2005M12	24,085.76	2009MO4	21,491.11
2006MO1	23,679.44	2009MO5	29,700.24
2006MO2	23,842.99	2009MO6	26,861.55
2006MO3	23,336.60	2009MO7	25,286.61
2006MO4	23,301.22	2009MO8	23,009.10
2006MO5	24,745.66	2009M09	22,065.00
2006MO6	26,161.15	2009M10	21,804.69
2006M07	27,880.50	2009M11	21,010.29
2006M08	33,096.37	2009M12	20,827.17
2006M09	32,554.60	2010MO1	22,594.90
2006M10	32,643.68	2010MO2	22,985.00
2006M11	31,632.54	2010MO3	25,966.25
2006M12	33,189.30	2010MO4	26,453.20
2007MO1	36,784.51	2010MO5	26,183.21
2007MO2	40,730.71	2010MO6	25,384.14
2007MO3	43,456.14	2010M07	25,844.18

2010MO8	24,268.24	2013M12	41,329.19
2010MO9	23,050.59	2014M01	40,571.62
2010M10	25,042.16	2014M02	39,558.89
2010M11	24,764.65	2014M03	38,746.14
2010M12	24,770.52	2014MO4	38,492.13
2011M01	26,830.67	2014MO5	41,474.40
2011MO2	26,016.84	2014MO6	42,482.48
2011MO3	24,621.21	2014MO7	42,097.46
2011MO4	25,041.68	2014MO8	41,532.31
2011MO5	25,866,62	2014MO9	41,210.10
2011MO6	24,980.20	2014M10	37,550.24
2011MO7	23,826.99	2014M11	34,543.05
2011MO8	21,299.55	2014M12	34,657.15
2011MO9	20,373.00	2015M01	29,562.07
2011M10	20,934.96	2015M02	30,103.81
2011M11	20,003.36	2015M03	31,744.82
2011M12	20,730.63	2015MO4	34,708.11
2012M01	20,875.83	2015MO5	34,310.37
2012M02	20,123.51	2015MO6	33,456.83
2012MO3	20,652.47	2015MO7	30,180.27
2012MO4	22,045.66	2015MO8	29.684.84
2012MO5	22,066.40	2015MO9	31,217.77
2012MO6	21,599.57	2015M10	29,177.72
2012MO7	23,061.38	2015M11	27,385.69
2012MO8	23,750.82	2015M12	28,642.25
2012M09	26,011.64	2016M01	23,916.00
2012M10	26,430.92	2016M02	24,571.00
2012M11	26,494.44	2016M03	25,306.00
2012M12	28,078.81	2016M04	25,062.00
2013MO1	31,853.19	2016M05	27,663.00
2013MO2	33,075.14	2016M06	29,598.00
2013MO3	33,536.25	2016M07	28,010.00
2013MO4	33,440.57	2016M08	27,599.00
2013MO5	37,794.75	2016M09	28,335.00
2013MO6	36,164.31	2016M10	27,220.00
2013MO7	37,914.33	2016M11	25,242.00
2013MO8	36,248.53	2016M12	26,875.00
2013M09	36,585.08	2017M01	26,036.24
2013M10	37,622.74	2017M02	25,329.08
2013M11	38,920.85	2017M03	25,516.34

2017MO4	25,758.51		
2017MO5	29,498.31		
2017MO6	33,117.48		
2017MO7	35,847.75		
2017MO8	35,504.62		
2017MO9	35,439.98		
2017M10	36,680.29		
2017M11	37,944.60		
2017M12	38,243.19		

Source: NSE Fact Book (various issues)

Tables 4.1 and 4.2 as presented respectively fall in line with the objectives of investigating the impact of stock market development on economic growth and the presence of volatility in the stock market. Figures were collected, collated and arranged in a manner necessary and suitable for the requisite empirical and statistical estimations.

4.2 Descriptive Statistics and Test for Normality

Table 4.3: Basic Descriptive Statistics of the Data Series

	BD	**RGDPR**	**INF**	**NLC**	**MCR**	**TOP**	**TR**	**TVR**
Mean	11.25588	4.297059	19.30882	172.3235	8.917647	31.67353	6.979412	0.920000
Median	8.200000	4.200000	11.90000	185.0000	7.800000	34.65000	6.100000	0.450000
Maximum	20.80000	13.00000	72.80000	216.0000	30.90000	59.00000	34.50000	6.400000
Minimum	6.200000	-1.600000	5.400000	93.00000	2.900000	7.400000	0.300000	0.010000
Std. Dev	5.427550	3.354462	17.38692	39.03667	5.700211	12.16272	6.826809	1.453773
Skewness	0.851566	0.272067	1.629176	-0.963868	1.771342	-0.136434	2.075531	2.960497
Kurtosis	1.909702	2.863809	4.605016	2.580288	7.523217	2.658759	9.017977	11.39109
Jarque-Bera	5.793324	0.445727	18.68998	5.514128	46.76432	0.270445	75.71710	149.4139
Probability	0.055207	0.800224	0.000087	0.063478	0.000000	0.873522	0.000000	0.000000
Sum	382.7000	146.1000	656.5000	5859.000	303.2000	1076.900	237.3000	31.28000
Sum Sq. Dev	972.1238	371.3297	9976.067	50287.44	1072.249	4881.746	1537.976	69.74400
Observations	34	34	34	34	34	34	34	34

SOURCE: AUTHOR'S EVIEWS COMPUTATION

The table above shows the summary of descriptive statistics. The mean and median values of almost all the major variables (RGDPR, MCR and TR) are approximately equal excepting the TVR and NLC whose both values have some dispersion. Therefore, it can be said that these series are evenly distributed across the sample. Further, the standard deviation of the most of the variables reveals relatively low standard deviation, suggesting confidence on the two measures of centre.

On kurtosis, RGDPR, NLC and TOP are mesokurtic (their values are approximately 3) whereas the other variables are leptukurtic (values greater than 3). The skewness of the most of the variables ranged between -0.9 and 1.7 showing that the distribution is moderately skewed. It should be noted that skewness indicates degree of symmetry or degree from symmetry whereas kurtosis shows the degree of peakedness.

For Jarque–Bera which test for normality, in the case of individual variables, there are mixed results. According to the probability values, BD, NLC, RGDPR and TOP variables are normally distributed whereas others such as INF, MCR, TR and TVR are not. This notwithstanding, the dataset is still credible for econometric analysis and decisions (Brooks, 2010). Residual series of the datasets shows that the distribution is slightly short of being normally distributed. This is because the p.value of 0.047 is approximately equal to the benchmark error of 0.05 as can be seen in figure 4.1 on page 12 below. Nevertheless the null hypothesis of normality could be rejected; but in anyway the distribution is in conformity and consistent with the behaviour of financial time series (Brooks, 2010, Mandelbrot, 1963; Fama, 1965).

4.3 Test of Linear Association

Table 4.4: Correlation Matrix of the Variables under Study

	RGDPR	**MCR**	**NLC**	**TVR**	**TR**	**BD**	**INF**	**TOP**
RGDPR	1.000							
MCR	0.233	1.000						
NLC	0.501	0.659	1.000					
TVR	0.256	0.873	0.488.	1.000.				
TR	0.309	0.776	0.618	0.909	1.000			
BD	-0.008	0.511	0.393	0.376	0.503	1.000		
1NF	-0.308	-0.319	-0.213	-0.274	-0.361	-0.289	1.000	
TOP	0.140	0.293	0.679	0.187	0.236	-0.139	0.062	1.000

Source: Author's computation (extract from the eviews result of correlation matrix in appendix 1).

Table 4.4 presents the values of correlation among the variables measured in this study. Stock market size and liquidity measures are positively correlated with growth measure. Further, the stock market size indicators are positively correlated with stock market liquidity measures. This leads to suggest that when the size of the stock market increases, the stock

market becomes more liquid. As can also be seen in the table, there is positive correlation between the banking sector indicator and the stock market indicators. It will also be seen that banking sector development has negative relationship with economic growth.

Examining further, the two measures of stock market size are positively correlated at 66 percent, however, the measures of liquidity correlated positively at a higher percent of 90. It has been argued that high correlation is an indication of multicolinearity, but Gujarati (2004) has countered that high association is not a necessary condition for multicolinearity since there are cases where model with correlation of less than 50 percent suffer from multicolinearity. Fortunately, the Wald test conducted on the model of the study showed that the variables of the study are independent. Wald test shows if explanatory variables in a model are independently adding something to the model. Another important point for including the two liquidity variables is that they have theoretical support; they play complementary roles in explaining market liquidity.

4.4. Test for Stationarity Properties of the Series

Table 4.5: Summary of ADF Unit Root Tests Results.

Variables	ADF Stat	Critical values @1%	Critical Values @ 5%	Critical Values @ 10%	P. Value	Order of Integration
BD	-4.90	-4.28^{XX}	-3.56^{XX}	-3.21^{XX}	0.0022	1(1)
INF	-6.70	-4.39^{XX}	-3.61^{XX}	-3.24^{XX}	0.0001	1(1)
MCR	-5.96	-4.28^{XX}	-3.56^{XX}	-3.21^{XX}	0.0002	1(1)
NLC	-4.93	-4.27^{XX}	-3.55^{XX}	-3.21^{XX}	0.0020	1(1)
RGDPR	-4.66	-4.26^{XX}	-3.55^{XX}	-3.20^{XX}	0.0037	1(0)
TOP	-5.68	-4.29^{XX}	-3.56^{XX}	-3.21^{XX}	0.0003	1(1)
TR	-5.55	-4.28^{XX}	-3.56^{XX}	-3.21^{XX}	0.0004	1(1)
TVR	-5.99	-4.28^{XX}	-3.56^{XX}	-3.21^{XX}	0.0001	1(1)

XX = Stationary at the stated level of significance

Source: Author's computation (extract from the eviews unit root test results in appendix 2).

Table 4.6: Summary of Zivot-Andrew Breakpoint Consistent Test Results

Variables	Zivot Andrews Stat	Critical values @1%	Critical Values @ 5%	Critical Values @ 10%	Order of Integration
BD	-6.45	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(0)
INF	-6.93	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(0)
MCR	-5.84	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(0)
NLC	-6.55	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(1)
RGDPR	-6.05	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(0)
TOP	-5.86	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(0)
TR	-8.33	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(1)
TVR	-10.72	-5.57^{XX}	-5.08^{XX}	-4.82^{XX}	1(0)

XX Stationary at the stated level of significance

Source: Author's computation (extract from the eviews Zivot unit root test results in appendix 3)

The Augmented Dickey Fuller (ADF) and Andrew Zivot Breakpoint consistent tests were conducted to examine the unit root properties of the time series. The null hypothesis of non-stationarity of each variable was tested against the alternative hypothesis of stationarity. The decision rule is to reject the null hypothesis if the test statistic value exceeds the critical value at 5% level of significance.

To determine the appropriate unit root test for the series, we subjected the series to structural break test. This is necessary as employing a wrong unit root test will give misleading results. For instance, traditional unit root tests (ADF and PP) have low power in the face of series with structural breaks; they tend to accept the null of a unit root more frequently than warranted. With the exception of RGDPR, all the other variables have structural breaks (see appendix 3). Therefore while we used the traditional unit root test for RGDPR, the rest of the variables were tested with structural breakpoint unit root consistent test. The ADF result suggested that RGDPR is stationary at levels. Similarly the Zivot Andrew Breakpoint result showed that BD, INF, MCR, RGDPR, TOP and TVR are stationary at levels. However it showed that NLC and TR are stationary at first difference. Following the results, ARDL model was chosen for the purpose of analyses because it is suitable for combination of 1(1) and 1(0) variables.

4.5 Test of Hypotheses

In this section we test the hypotheses as specified in chapter one and modeled in chapter three. Reporting and interpreting the method of estimation and results were carried out in five

steps. They are: restating the hypotheses in null and alternative forms; stating of the test statistics/method of estimation; interpreting the results of the estimation; employing a diagnostic and validity tests to confirm the results of the estimation method adopted, and lastly using the validated results as decision criteria to accept or reject the null/alternative hypotheses.

4.5.1 Test of Hypothesis One

Restatement of Hypothesis in null and alternate forms.

Ho_1: Stock market size did not have positive and significant impact on Nigeria's economic growth.

Ha_1: Stock market size positively and significantly impacted on Nigeria's economic growth.

Decision Rule

Accept Ho and reject Ha if p-value of t-statistic is greater than 5% level of significance, ($p > 0.05$)

Reject Ho and accept Ha if p-value of t-statistics is less than 5% level of significance, ($p < 0.05$)

Test Statistic: Autoregressive Distributed Lag Model (ARDL Model)

Table 4.7: Summary of ARDL Estimates for Hypothesis 1

Variable	Coefficient	E-Stat	Prob
RGDPR(-1)	-0.712662	-2.947288	0.0215
RGDPR(-2)	0.311713	1.607499	0.1520
LNMCR	17.32517	3.124207	0.0167
LNMCR(-1)	2.903192	1.117255	0.3008
LNMCR(-2)	6.501144	2.439410	0.0448
LNNLC	18.41626	1.495817	0.1784
LNNLC(-1)	64.56277	3.131541	0.0165
LNNLC(-2)	-62.97823	-3.857705	0.0062
LNBD	-1.359101	-0.497292	0.6342
LNINF	0.317015	0.382900	0.7132
LNTOP	-2.382213	-1.157024	0.2852

R^2	=	0.967927	Adjusted R^2	=	0.857963
Prob (F-Stat)	=	0.003	DW Stat	=	2.360760

Source: Author's computation (extract from the ARDL estimates in appendix 4)

Interpretation of Result:

From the table, both the market capitalization and number of listed companies had positive relationship with economic growth. This is as expected and it is indicated by coefficient values of 17.3252 and 18.4163 respectively. The positive coefficient of market capitalization of 17.3 means that a 1% increase in it resulted in 17.3% increase in economic growth. Similarly, 18.4 positive increase in the number of listed companies indicate that 1% increase in it resulted in 18.4% increase in economic growth. However while market capitalization is significant at p-value of 0.01, number of listed companies is not significant at p-value of 0.17. Banking development, inflation and trade openness were used as moderating variables.

There is a goodness of fit as the R^2 is reasonably high at 97% indicating that 97% of the changes in economic growth are jointly explained by the lagged values of economic growth, the principal explanatory variables and the control variables. Further, the overall regression, F statistic is significant at 0.003 and therefore can be used for meaningful analyses. The Durbin Watson Statistic (DW) value of 2.36 shows there is suspicion of a first order serial correlation [AR(1)]. By rule of thumb, if the DW statistic is greater than 2, it indicates negative autocorrelation. This study conducted Breusch-Godfrey (BG) serial correlation to confirm autocorrelation or otherwise.

4.5.2 Testing the Validity of Model 1

4.5.3 Residual Based Diagnostic Tests

4.5.3.1 Test for Autocorrelation

We used BG test to confirm convincingly the presence of autocorrelation or otherwise. BG is a higher order serial correlation test.

Table 4.8: Breusch-Godfrey Serial correlation LM Test for Model 1

F- statistic	0.805677	Prob. F	0.4974
Obs* R – Squared	7.799209	Prob Chi Sq	0.0202

Author's computation (extract from model 1 diagnostic in appendix 5).

The probability of F-statistic gives strong evidence against the suspected autocorrelation, while Chi-squared statistic of 0.02 indicated presence of autocorrelation. However, in this kind of scenario, F-statistic takes precedence over Chi squared statistic. This is further

buttressed by Correlogram-Q- Statistics in appendix 5 which, in a graphical approach, shows that the bars are within the lines. This means no presence of autocorrelation. Hence confidently, we do not reject the null hypothesis of no autocorrelation.

4.5.3.2 Test for Heteroscedasticity

In order to determine that the assumption of the homoscedasticity is not violated by the model for the hypothesis, heteroscedasticity test was conducted on the model and the result presented below:

Table 4.9: Heteroscedasticity Test for Model 1

F-Statistic	0.446775	Prob. F	0.9333
Obs*R-Squared	19.36078	Prob Chi Sq	0.7325
Scaled explained SS	1.355126	Prob Chi Sq	1.0000

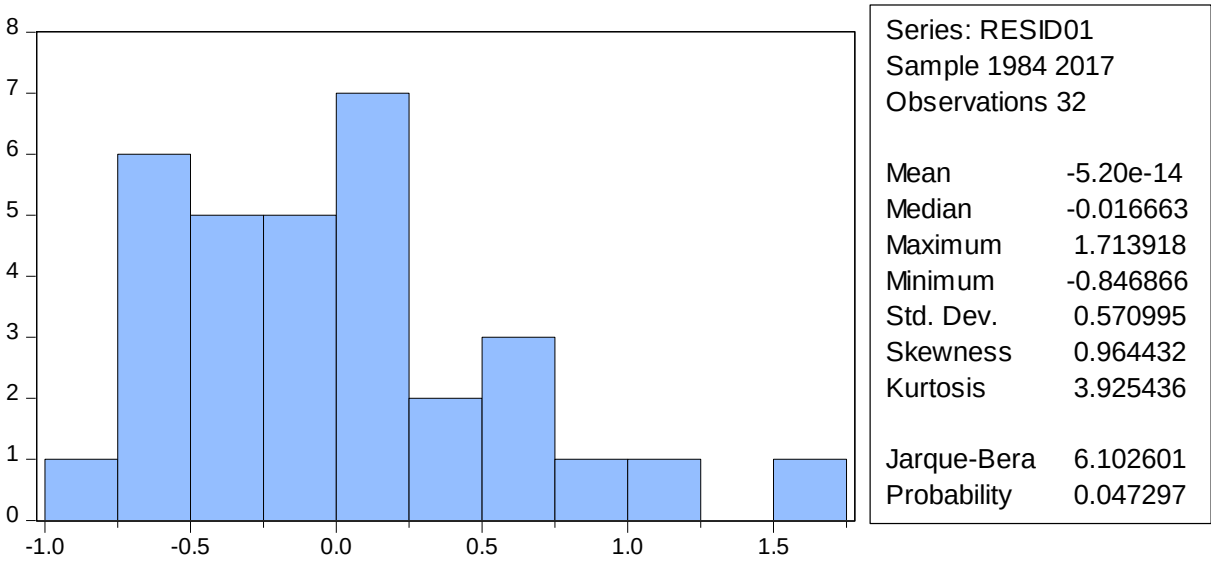
Author's computation (extract from model 1 diagnostics in appendix 5).

We do not reject the null hypothesis that the model is homoscedastic because the p-values of all the three tests are greater than 5% level of significance. In other words, the model is not heteroscedastic.

4.5.3.3 Test for Normality of the Residuals

To determine that the assumption of normal distribution of the residuals is not violated by the model for this hypothesis, normality test was conducted on the model and the result presented below.

Figure 4.1: Normality Graph.



Source: Evievs result of normality test.

The null hypothesis of normality could be rejected since p-value of Jarque Bera 0.04 is less than 0.05. This does not show normal distribution, however it is in conformity and consistent with the behaviour of financial time series (Brooks, 2005, Mandelbrot, 1963; Fama, 1965).

4.5.4 Stability Based Diagnostic Tests

4.5.4.1 Ramsey Test

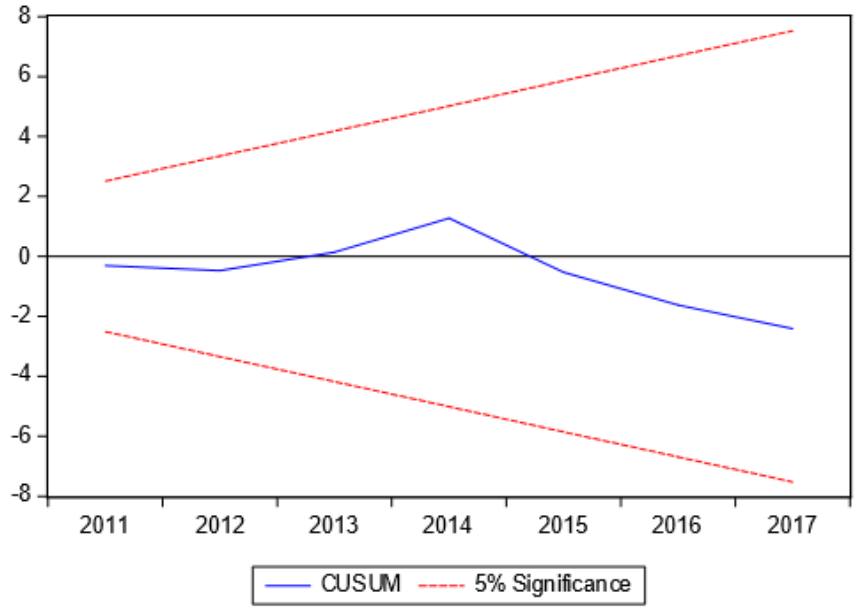
Table 4.10 Ramsey Regression Specifications Error Test for Model 1

	Value	**Probability**
T-Statistic	1.160297	0.2900
F-Statistic	1.346290	0.2900

Author's computation (extract from model 1 diagnostics in appendix 5)

The p-values of t and F statistics of 0.2900 showed that we could not reject the null hypothesis that the model is correctly specified. In other words, it means that the model has no specification error. This is further confirmed by another stability test – Cumulative Sum of Recursive Residuals (CUSUM). It's proposed by Borenszteineral (1998).

Figure 4.2: CUSUM Graph for Model 1



Source: Eviews result

The model represented by the line in the middle is within the upper and lower bounds which is an evidence of the stability of the model.

4.5.5 Coefficient Based Diagnostic Test.

4.5.5.1 Wald Test

Table 4.11: Wald Test

Test Statistic	Value	Probability
F-statistic	7.302837	0.0088
Chi-Square	51.11986	0.0000

Author's computation (extract from model 1 diagnostics in appendix 5)

The Wald test showed that all the variables are significant in explaining the dependent variable. The null hypothesis that the variables are not significant is rejected as the F-statistic and Chi square have probabilities that are less than 0.05. Hence, the model is parsimonious.

4.5.6 Test of Hypothesis Two

Restatement of Hypothesis in Null and Alternate Forms.

Ho_2: Stock Market liquidity did not have positive impact on Nigerian economic growth.

Ha_2: Stock market liquidity positively and significantly impacted on Nigeria's economic growth.

Decision Rule

Accept Ho and reject Ha if p-value of t-statistic is greater than 5% level of significance, ($p > 0.05$)

Reject Ho and accept Ha if p-value of t-statistics is less than 5% level of significance, ($p < 0.05$)

Test Statistic: Autoregressive Distributed Lag Model (ARDL Model).

Table 4.12: Summary of ARDL Estimates for Hypothesis 2

Variable	Coefficient	t-stat	Prob.
RGDPR(-1)	-0.712662	-2.947282	0.0215
RGDPR(-2)	0.311713	1.607499	0.1520
LNTR	7.445545	2.141980	0.0694
LNTR(-1)	15.67837	4.573772	0.0026
LNTR(-2)	3.407193	1.519906	0.1723
LNTVR	-5.740881	-1.583200	0.1574
LNTVR(-1)	-8.060453	-3.164392	0.0158
LNTVR(-2)	-9.318852	-3.093332	0.0175
LNBD	-1.359101	-0.497292	0.6342
LNINF	0.317015	0.382900	0.7132
LNTOP	-2.382213	-1.157024	0.2852

R^2 = 0.967927 Adjusted R^2 = 0.857963

Pro (F-Stat) = 0.003 DW Stat = 2.360760

Source: Author's computation (extract from the ARDL estimates in appendix 4).

Interpretation of Results.

From the table, turnover ratio is positively related with economic growth with a coefficient of 7.445545 indicating that a 1% increase in turnover resulted in 7.4% increase in economic growth. However, total value traded had negative relationship with the economic growth at the coefficient of -5.740881 indicating that as liquidity decreased, economic growth decreased by 5.7%. In terms of significance, the two measures are not significant at p-values of 0.06 (LNTR) and 0.15 (LNTVR). Banking development, inflation and trade openness were used as moderating variables.

For the model overall significance, goodness of fit and the model validity tests (i.e, coefficient, residual and stability diagnostics), the results of the hypothesis one applies here. This is because all the variables were pooled and regressed together. That is the market size and market liquidity were run in one regression. It therefore followed that with regard to the above tests, the two models have the same results. It therefore means that the overall regression is significant; there is a goodness of fit; no autocorrelation; the model is homoscedastic; the model is correctly specified, and the variables jointly significant.

It is always better to run a regression in a pooled form than breaking and running the models separately. When there are many variables in a model, there is high incidence of multicollinarity and redundancy; and any variable in the pool that survives them is undoubtedly a good inclusion in the model for explanation of the dependent variable. Further

in the face of many variables, it is rare to achieve model stability; and when it is achieved, it indicates that the model is good. In contrast, breaking the model will always produce good results and is ordinarily free from multicollinearity and redundancy. However, it may not suggest a strong model.

4.5.7 Test of Hypothesis Three

Restatement of Hypothesis in Null and Alternate Forms.

Ho_3: Stock market development did not have long run relationship with Nigeria's economic growth.

Ha_3: Stock market development had long-run relationship with Nigeria's economic growth.

Decision Rules

i. If the F-Statistic is greater than lower [1(0)] and upper [1(1)] bound, reject null hypothesis and conclude there is long-run relationship.

ii. If the F-statistic is less than the lower [1(0)] and upper [1(1)] bound, do not reject the null.

iii. If the F-Statistic falls within the lower [1(0)] and upper [1(1)] bound, the result becomes inconclusive.

Test Statistic: ARDL Long Run Form and Bounds Test

Table 4.13: Summary of ARDL Long-Run Bounds Test

Test Statistic	Value	Significant	I(0)	I(1)
F-Statistic	10.94	5%	2.5	3.5

Source: Author's computation (extract from ARDL Bounds Test in appendix 4)

Interpretation of Result

From the table, F-statistic of 10.94 at 5% is above lower bound of 2.5 and upper bound of 3.5. This means an existence of long run relationship. In other words, there is cointegrating relationship among the variables.

4.5.8 Hypothesis Four

4.5.8.1 Descriptive Statistics

Table 4.14: Summary of Basic Descriptive Statistics of the Nigerian stock returns

Mean	Median	Min	Max	Std Dev	Skewness	Kurtosis	JB	P.Value
15621.52	8762.000	102.000	219112.0	18280.82	3.839814	39.20515	39.205	0.0000

Source: Extract from the descriptive statistics of ASI for Egarch in appendix 6

Table 4.14 describes the summary statistics of the stock returns. The table shows a mean and median monthly return of 15621.52 and 8762.000 respectively. The standard deviation which measures the riskiness of the underlying assets is 18280.82. The high standard deviation is an indication of presence of high volatility in the Nigerian stock market. Also, the level of price variability in the stock trading is high; this is measured with difference between the minimum and maximum returns (219,010.00). Further, the high skewness of 3.83, kurtosis of 39.20, JB of 23286.42 and its corresponding p-value of 0.0000 indicate that the null of normality would be rejected for the data. These facts emanating from the descriptive statistics necessitated the subjection of the return series to volatility models.

4.5.8.2 Unit Root Test for ASI

Table 4.15: Summary of Zivot Andrews Unit Root Test for ASI

Variables	**Zivot Andrew's Stat**	**Critical values @1%**	**Critical values @ 5%**	**Critical values @10%**	**Order of Integration**
ASI	-5.97	-5.57	-5.08	-4.82	I(0)

Source: Author's computation (extract from the eviews Zivot Andrews unit root test results for ASI for Egarch in Appendix 6)

The return series was tested to determine the order of integration using Zivot Andrews unit root structural break-point test and the result in table 4.15 shows that the series is stationary at level.

4.5.8.3 Test of Hypothesis Four

Restatement of Hypothesis in Null and Alternate forms.

Ho_4: Nigerian stock market did not have volatility clustering.

Ha_4: Nigerian stock market had volatility clustering.

Decision Rules

i. If the F-statistic probability is less than 5%, reject the null hypothesis and conclude there is volatility clustering.
ii. If persistence parameter (summation of Arch and Garch terms) is greater than 1, conclude there is persistence effect.
iii. If assymetric parameter is negative, conclude that bad news has more impact on volatility than good news.
iv. If assymetric parameter is positive, conclude that good news has more impact on volatility than bad news.

Test Statistic: EGARCH (1.1) Model.

Table 4.16: Summary of the Heteroscedasticity Test

F-Statistic	41.59612	Prob.F(1,405)	0.0000
Obs R-Squared	37.90812	Prob.Chi Sq(1)	0.0000

Source: Extract from the Arch Effect estimates from appendix 6

Table 4.17: Summary of EGARCH (1,1) Model

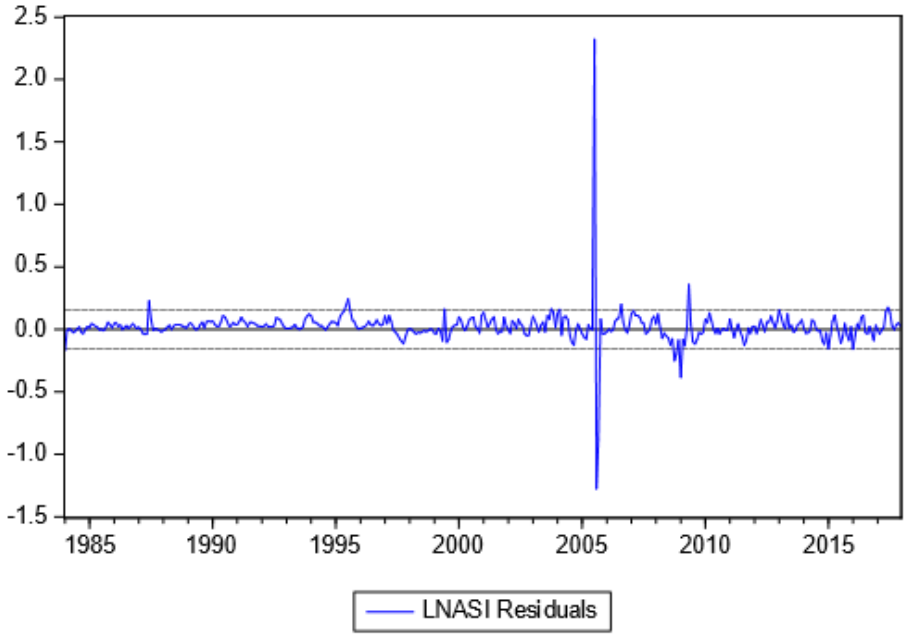
Model	Equations	Model Parameter	Coefficients	p-value
EGARCH	Mean	Intercept(C)	10.16730	0.0000
	Variance	Intercept C(2)	-1.838781	0.0000
		Arch C(3)	1.779578	0.0000
		Asymmetric C(4)	-0.483395	0.0013
		Garch C(5)	0.798416	0.0000

Source: Extract from the EGARCH Model estimates from appendix 6

Given the high values of the F and Chi–squared statistics and their corresponding small p-values in table 4.16, there is evidence to conclude that there was presence of ARCH effect in the return series. In other words, there was volatility clustering in the Nigerian stock market within the period under investigation.

This is confirmed with figure 4.3 where the ASI monthly return series oscillated around the mean.

Figure 4.3: Volatility Graph



Persistence Effect

The Arch and Garch terms in the model explain the volatility persistence of stock market returns. From table 4.17, the persistence parameter of 2.56 is much greater than 1 and therefore indicates very explosive volatility persistence in Nigerian stock market. It means that the volatility of one period crossed over to another period; simply implying that shock to the market dies out very slowly.

Leverage Effect

The negative asymmetric parameter of 0.483 in the same table of 4.17 clearly indicates that bad news had more impact on volatility than good news in the Nigerian stock market; bad news had stronger effect than good news. It means investors were more prone to react to negative news that positive news of the same magnitude.

Diagnostic Test

We used Arch LM Test to determine whether there is still unexplained volatility in the series. At this moment the series is expected to be homoscedasticity. Again the test determined the validity of the EGARCH Model.

Table 4.18: Summary of Diagnostic Test Using ARCH LM

F-Statistic	0.018316	Prob. F (1,405)	0.8924
Obs R-Squared	0.018406	Prob. Chi-Square	0.8921

Source: Extract from the ARCH LM estimates in appendix 6.

The null hypothesis that there is no remaining arch effect in the series is not rejected as can been seen in table 4.18 where F-stat. probability of 0.8924 is greater than 5% significance level. The conformity of the residuals to homoscedasticity is an evidence of good volatility model because arch effect has been adequately accounted for.

4.5.9 Test of Hypothesis Five

Restatement of Hypothesis in Null and Alternate Forms.

Ho_5: There was no causal relationship between stock market development and Nigeria's economic growth.

Ha_5: There was causal relationship between stock market development and Nigeria's economic growth.

Test Statistic: Toda Yamamoto (TY) Granger Causality Test.

Toda Yamamoto (TY) approach involves three steps in estimation. The first step is the estimation of the maximum order of integration (dmax) in the system. The results of the unit root test in table 4.6 above show that the maximum order of integration is one, I(1); It implies dmax =1.

The next step involves determining the optimal lag length (P). This was selected based on different lag length criterions such as Akaike's information criterion (AIC), Schwarz Information criterion (SIC), Final Prediction Error (FPE) and the Hannan Quinn (HQ) information criterion. The results of the lag length selection criterion are shown in Table 4.19 below. The lag length selected indicated lag length of 3. Therefore the value of P in this study is equal to 3.

Table 4.19: VAR Lag length Selection Criteria.

LAG	LOGL	LR	FPE	AIC	SIC	HQ
0	-103.3541	NA	0.0007	6.9905	7.2218	7.0659
1	-6.0917	156.8748	7.24e-06	2.2384	3.7I62	2.7808
2	30.36912	47.0462	3.96e-06	1.5890	4.1332	2.4184
3	64.8860	33.4034	3.16e-06*	0.9750*	4.6757	2.1814*

Source: Extract from VAR lag order selection estimates in appendix 7
Notes: * Indicates lag order selected by the criterion.

Before going to the third step of estimation we carried out diagnostic test based on VAR optimal lag 3 to determine the appropriateness of the lag. The diagnostic tests are: normality of residuals, autocorrelation test and stability test.

Test for normality of Residuals.

Table 4.20 below shows the result of Jarque-Bera test for normality of the residuals. It is clear that we failed to reject the null hypothesis of normality of residuals of each of the equations as well as the joint equations at 5% significance level.

Table 4.20: Summary of VAR Jarque-Bera Normality Test Result

Equations	Chi-Square	DF	Prob(Chi-Square)
LNMCR	**0.094112**	**2**	**0.9540**
LNNLC	2.348978	2	0.3090
LNTR	0.423116	2	0.8093
LNTVR	1.503726	2	0.4715
RGDPR	1.389149	2	0.4993
JOINT	5.759081	10	0.8351

Source: Extract from VAR normality estimates in appendix 7

Autocorrelation Test

Table 4.21 below show langrange- multiplier (LM) test result for residual autocorrelation. The test revealed that from the first to fourth lags, we failed to reject the null hypothesis of no autocorrelation among the residuals in the model.

Table 4.21: Summary of VAR LM Test Result for Serial Correlation

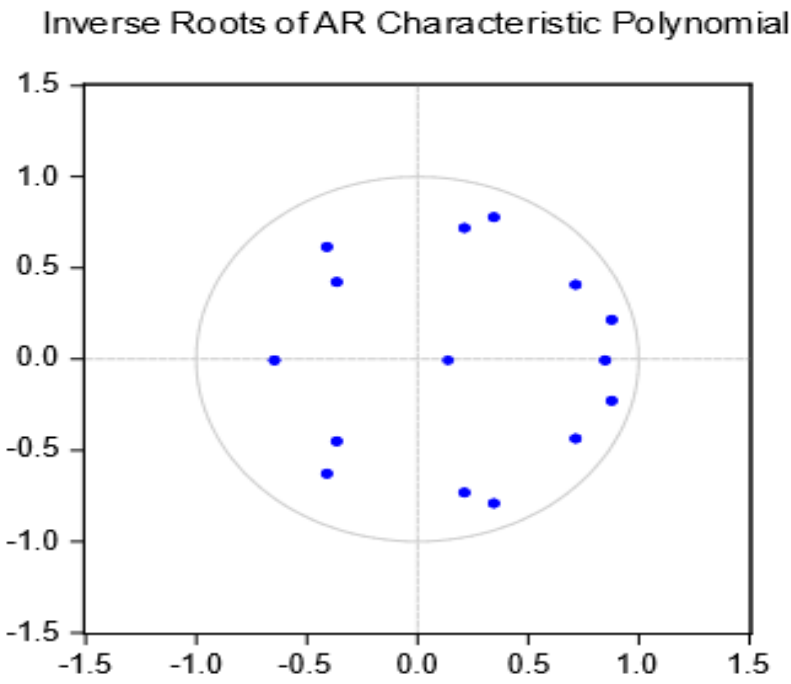
Lag	Chi-Square	DF	Prob.(Chi-Square)
1	27.3529	25	0.3385
2	31.1519	25	0.1840
3	20.3463	25	0.7284
4	29.5200	25	0.2428

Source: Extract from VAR LM estimates in appendix 7

Stability Test of the VAR

We tested for the stability of the VAR model by checking the results of the inverse roots of the characteristic AR Polynomial and found that the VAR is well behaved as all the values lie within the circle. This implies that the estimated model is dynamically stable.

Figure 4.4: AR Polynomial Graph



Since the estimated VAR (3) passed all the diagnostic tests, we re-estimated the VAR by including the dmax, that is P, we estimated a VAR (3 + dmax), or simply VAR (4). Therefore with VAR (4), we performed the Granger causality test using the modified Wald test. The results indicate that the test follows the Chi-square distribution with 3 degrees of freedom which is in accordance with appropriate lag length.

Table 4.22: Summary of the Toda Yamamoto Causality Test

Equation	Excluded	Chi-Square	DF	Prob(ChiSquare)
LNMCR	LNNLC	14.2972	3	0.0025
LNMCR	LNTR	5.3143	3	0.1502
LNMCR	LNTVR	3.6664	3	0.2998
LNMCR	RGDPR	8.0913	3	0.0442
LNMCR	ALL	30.3017	12	0.0025
LNNLC	LNMCR	3.6419	3	0.3028
LNNLC	LNTR	4.2747	3	0.2333
LNNLC	LNTVR	5.5893	3	0.1334
LNNLC	RGDPR	2.0786	3	0.5562
LNNLC	ALL	18.0949	12	0.1128
LNTR	LNMCR	35.0019	3	0.0000
LNTR	LNNLC	23.8754	3	0.0000
LNTR	LNTVR	36.0425	3	0.0000
LNTR	RGDPR	16.9249	3	0.0007
LNTR	ALL	99.2746	12	0.0000
LNTVR	LNMCR	11.6960	3	0.0085
LNTVR	LNNLC	18.7052	3	0.0003
LNTVR	LNTR	11.5042	3	0.0093
LNTVR	RGDPR	1.7708	3	0.6213
LNTVR	ALL	53.5940	12	0.0000
RGDPR	LNMCR	0.2013	3	0.9774
RGDPR	LNNLC	0.8302	3	0.8422
RGDPR	LNTR	0.4113	3	0.9379
RGDPR	LNTVR	0.2310	3	0.9724
RGDPR	ALL	2.7431	12	0.9971

Source: Extract from Yamamoto causality estimates in appendix 7

Interpretation of Results

Table 4.23

Null Hypothesis	Chi-Square	DF	Prob	Granger Causality
LNNLC does not granger cause LNMCR	14.2972	3	0.0025	Unidirectional causality LNNLC »» LNMCR
LNMCR does not ganger cause LNNLC	3.6419	3	0.3028	
LNTR does not granger cause LNMCR	5.3143	3	0.1502	Unidirectional Causality LNMCR »» LNTR
LNMCR does not granger cause LNTR	35.0019	3	0.0000	
LNTVR does not granger cause LNMCR	3.6664	3	0.2998	Unidirectional Causality LNMCR»»LNTVR
LNMCR does not granger cause LNTVR	11.6960	3	0.0085	
RGDPR does not granger cause LNMCR	8.0913	3	0.0442	Unidirectional Causality RGDPR»» LNMCR
LNMCR does not granger cause RGDPR	0.2013	3	0.9774	
LNTR does not granger cause LNNLC	4.2747	3	0.2333	Unidirectional Causality LNNLC »» LNTR
LNNLC does not granger cause LNTR	23.8754	3	0.0000	
LNTVR does not granger cause LNNLC	5.5893	3	0.1334	Unidirectional Causality LNNLC»»LNTVR
LNNLC does not granger cause LNTVR	18.7052	3	0.0003	
RGDPR does not granger cause LNNLC	2.0786	3	0.5562	No Causality
LNNLC does not granger cause RGDPR	0.8302	3	0.8422	
LNTVR does not granger cause LNTR	36.0425	3	0.0000	Bidirectional Causality LNTVR»»LNTR
LNTR does not granger cause LNTVR	11.5042	3	0.0093	
RGDPR does not granger cause LNTR	16,9249	3	0.0007	Unidirectional Causality RGDPR»»LNTR
LNTR does not granger cause RGDPR	0.4113	3	0.9397	
RGDPR does not granger cause LNTVR	1.7708	3	0.6213	No Causality
LNTVR does not granger RGDPR	0.2310	3	0.9721	

Source: Researcher's Analysis based on Table 4.22 Results

From the Table 4.23, the Yamamoto Granger causality results indicate that while we can reject the null hypothesis that the economic growth does not granger cause market capitalization ratio, we cannot reject the null hypothesis that market capitalization ratio does not granger cause economic growth. Therefore, we can conclude that there is unidirectional causality between market capitalization and economic growth running from the later to the former. For economic growth and number of listed companies, the results show there was no

causality between the two indicators; similarly there was no causality between economic growth and total value traded ratio. However, the results show that economic growth granger caused turnover ratio without feedback.

From Table 4.22, among other revelations, the results show that market capitalization ratio, number of listed companies, turnover ratio and total value traded ratio did not jointly (put together) granger cause RGDPR.

4.5.10 Findings & Discussions

This study analyzed the dynamics of stock market development and economic growth in Nigeria between 1984 and 2017. In order to uphold or disprove some earlier theoretical opinions and empirical findings, we carried out an in-depth verification of five research hypotheses. Corresponding with the study objectives, the following findings were made and discussed.

Objective One: To determine the impact of stock market size on Nigeria's economic growth.

Stock market size is represented by market capitalization ratio and number of listed companies. The coefficients of the exogenous variables are positive, that is market capitalization ratio (17.325) and number of listed companies (18.416). This means that stock market size positively impacted on Nigerian economic growth with number of listed companies having greater share.

Additionally, while market capitalization had a significant impact on Nigeria's economic growth with $p = 0.01 < 0.05$, the number of listed companies did not have significant impact with $p = 0.17 > 0.05$. Non-significant effect of listed companies means that number of companies on the Nigerian stock exchange is inadequate.

The result of market capitalization ratio is consistent with Levine and Zervous (1996), Levine and Zervous (1998), Mohtadi and Sumit (2004). Boopen, Rojid, Vinesh and Binesh (2010), and Ujunwa and Salami (2010) who had empirically found this indicator to be positive and significant. However our result slightly deviates from the finding of Niranjala (2015) who found the market capitalization ratio positive but non-significant to explain economic growth.

Objective Two: To determine the impact of stock market liquidity on Nigeria's economic growth.

Stock market liquidity is represented by total value traded ratio and turnover ratio. The coefficients of the exogenous variables had mixed signs; while the total value traded ratio had negative impact (-5.740) on Nigeria economic growth, turnover ratio had a positive impact (7.445). This implies that as total value traded ratio decreased, economic growth decreased whereas as turnover ratio increased, economic growth increased.

Additionally, in terms of significance, the two measures did not significantly impact on Nigerian economic growth with total value traded having $p = 0.15 > 0.05$ and turnover ratio having $p = 0.06 > 0.05$.

Our results contradict with Levine and Zervous (1996), Levine and Zervous (1998), Levine (2003), Niranjala (2015), and Mohtadi and Sumit (2004) who found total value traded and turnover ratio as positive and being able to explain economic growth. Further, our results slightly differ with Ujunwa and Salami(2010), and Mohtadi and Sumit(2004). These two studies found total value traded negative but significant.

Taken as a whole however, the total effect of stock market liquidity can be argued to be positive. Indeed the negative feature of total value traded is less as opposed to the positive feature of turnover ratio. Adding the coefficients of the two indicators together, they account for 0.0170 unit increase in economic growth. That is [(0.01x7.4455) + (0.01x-5.7409)]

Objective Three: To determine whether there was a long–run relationship between stock market development and Nigeria's economic growth.

F-statistic of 10.94 is above the lower bound of 2.5 and upper bound of 3.5. This means that stock market development has a long run relationship with Nigerian economic growth.

The result supports the findings of Niranjala (2015), Lei and Mishra (2015), Chee, Zukomain, Siong & Venus (2005), Srinivasan (2014), and Okodua and Ewetan (2013) which established long run relationship.

Objective Four: To determine whether there was volatility clustering in Nigerian stock market.

With 0.0000 p-value, there was volatility clustering in the Nigerian stock market. Further, the volatility was very explosive with volatility persistence parameter of 2.56, much greater than 1. This implies that shock to the Nigerian stock market died slowly; shock was persistent. Additionally, the negative asymmetric parameter of 0.483 indicates that bad news had more

impact on volatility than good news in the Nigerian stock market. It means investors were more prone to react to negative news than positive news of the same magnitude in the Nigerian market

The findings support the results of Osazerbaru (2014) which found volatility clustering in Nigerian Stock Exchange. Our findings are also in consonance with the work of Atoi (2014) which revealed that the NSE had a negative leverage effect. Also, to some degree, our work shares in the findings of the work of Yaya, Bada and Atoi (2016) which established the asymmetric nature of NSE.

Objective Five: To determine the nature of causality between stock market development and Nigeria's economic growth.

Stock market is unbundled into four indicators and their causal relationship with Nigerian economic growth was tested. Taking the variables individually, firstly, we find unidirectional causality where economic growth granger caused market capitalization ratio without a feedback. Secondly, we find again unidirectional causality running from economic growth to turnover ratio without a feedback. Thirdly, however, we find no causal relationship between economic growth and total value traded ratio.

Taking the exogenous variables jointly, we find that all the variables put together did not granger cause economic growth.

The results reveal that our study is in line with the demand following hypothesis, that is, it is the economy that catalyses development in the stock market. This is because causality direction runs from economic growth to the stock market indicators, namely market capitalization ratio and turnover ratio.

The results are in tandem with the theoretical views of Robinson (1952), Lucas (1988) and Gelb (1989).The results also support the empirical findings of Chee, Zulkormain, Siong, and Venus (2005), Onwumere, Imo, Okafor and Ugwuanyi (2012), Riman, Esso and Eyo (2008), Aye (2013), Ndako (2010) and Alley (2013).

4.5.11 Other Findings

Since there is a confirmed existence of long-run relationship between stock market development and economic growth, it becomes expedient to test for the speed of adjustment which indicates the length of time it would take for correction to equilibrium to be actualized.

Table 4.24 Summary of ARDL Error Correction Regression

Variable	Co-efficient	T-Stat	Prob.
D [RGDPR(-1)]	-0.311713	-5.044636	0.0015
D (LNBD)	-1.359101	-1.099391	0.3080
D (LNINF)	0.317015	0.900422	0.3978
D (LNMCR)	17.32517	9.487102	0.0000
D (LNNLC)	18.41626	3.204959	0.0150
D (LNTOP)	-2.382213	-3.379299	0.0118
D (LNTR)	7.445545	5.956806	0.0006
D (LNTVR)	-5.740881	-4.768053	0.0020
Cointeq(-1)	-1.400948	-14.52577	0.0000

Source: Author's computation (extract from ARDL Error Correction regression in Appendix 6).

The error correction term (ECT) is rightly signed and significant. However it is more than 100%; therefore the error suffers from oscillation explosion; it is unpredictable. It should be noted that ECT should lie between 0% - 100% to have a meaningful interpretation (so that there can be correction).

Table 4.25 Summary of the ARDL Estimates for Individual Long–Run Relationship.

Variable	Coefficient	Std. Error	t-statistic	Prob
LNBD	12.8505	3.1226	4.1152	0.0045
LNINF	2.7969	1.1864	2.3574	0.0505
LNMCR	19.0795	4.9130	3.8834	0.0060
LNNLC	14.2766	7.3521	1.9418	0.0933
LNTOP	-4.1591	2.1694	-1.9171	0.0967
LNTR	18.9379	4.9796	3.8030	0.0067
LNTVR	-16.5032	5.0879	-3.2435	0.0142

Source: Author's computation (extract from ARDL Long-run relationship in appendix 6)

The results of the individual long run relationship are mixed. The relationship between economic growth and market size (market capitalization ratio and number of listed companies) is positive. However, whereas the former had a long run explanatory influence on economic growth, the latter did not have.

Further, the market liquidity (total value traded ratio and turnover ratio) had a long run significant impact on economic growth; however whereas the former had a negative influence, the latter had a positive influence. Aggregately, market liquidity had positive significant impact on the economic growth. Adding the coefficients of the two indicators together, they account for 0.0248 unit increase in economic growth, that is [(0.01x18.9379)+(0.01x-16.5032)].

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSSION AND RECOMMENDATIONS

5.1. SUMMARY OF FINDINGS

1. The stock market size had positive and significant impact on the economic growth within the period.
2. That stock market liquidity had a positive but non-significant impact on the economic growth within the period.
3. Long run relationship existed between stock market and economic growth within the period
4. There was volatility clustering; explosive persistence, and negative asymmetric parameter in the stock market.
5. Unidirectional causality existed between stock market development and economic growth running from the latter to the former.

5.2. CONCLUSION

Stock market occupies the central and strategic position in the process of economic growth. Arguments in favour of its nexus with economic growth have been postulated in the theoretical literature and empirical findings. Overwhelmingly, there are assertions that stock market influences economic growth. This study attempted to investigate this role in the Nigerian context between the period 1984 and 2017. Employing virtually all the important stock market development indicators, the expected relationship between stock market development and economic growth was found to be largely absent.

Though, most of the individual stock market indices have positive effect with the economic growth, none of them excepting market capitalization had significant impact on Nigeria's economic growth. It therefore means that the Nigerian stock market is growth inducing; however it is still relatively underdeveloped for market indices to exert significant impact on the growth of the economy. In other words, Nigerian stock market has not been developed to serve the Nigerian economy in achieving economic growth. The extremely high persistent volatility and negative asymmetric parameter are growth constraints; volatility has largely contributed in weakening the growth prospect. Specifically we assert that size of the market compared to the economy (particularly the number of listed companies), the low level of the

market liquidity and the high level of volatility in the market are serious constraining factors for the market to contribute to the economy. Further, it is Nigeria's economy that influences the stock market which aligns with demand following hypothesis.

5.3. RECOMMENDATIONS

Following our findings in 5.1, the following recommendations are made:

1. Security and Exchange Commission should through moral suasion bring private companies that have met certain financial thresholds to convert to public companies. This is part of the strategy used to get MTN listed on the Exchange, and AIRTEL is also being listed. Other telecommunication companies should be approached. This will increase the number of listed companies and go a long way in broadening and deepening the base of the market
2. Similarly Government should enact legislation that will compel some certain private companies to list on the Exchange. The Private Companies Conversion and Listing Bill (2013) at the national assembly which seeks to compel private companies that have shareholders' fund in excess of forty billion Naira to get listed is a step in a good direction. Efforts should be made to pass this bill into law. This will apply specifically to companies in telecommunication and oil sectors. This is necessary to expand and deepen the market.
3. Further, government should improve on the nation's trade policies and intensify efforts to enter into more bilateral and multilateral agreements so as to promote the inflow of foreign companies in the country.
4. Security and exchange commission should further relax the listing requirements in the stock market. It needs to make it easier and cheaper for companies to list on the exchange. This will in a long way increase the number of listed companies in the stock exchange.
5. To expand the market capitalization further and enhance liquidity, there is need for the market to continue to diversify investment instruments in the market such as derivatives, futures and swap options.
6. To increase the level of the liquidity in the market, more efforts should be geared by the Exchange towards improving the market trading infrastructure. This will facilitate the ease with which investors can purchase and sell shares.
7. Securities and Exchange Commission should once again review downwards the transaction costs of the market to encourage active trading.

8. Government should further provide enabling socio–economic infrastructure like roads, electricity, etc. to enhance further the ease of doing business. This will attract foreign companies to invest in the real sector of the economy which will subsequently enlist in the stock exchange.
9. The tax incentive policy by the Federal Government is commendable and should be implemented to a logical conclusion so as to attract more investors in the market.
10. To bring down the high level of volatility in the market, investors' awareness and education need to be enhanced to increase risk sensitivity and ensure positive risk taking behaviours. Government should as a matter of utmost importance tackle the prevalent activities of terrorist, herdsmen and kidnappers which engender uncertainty in the economy.
11. Further the extreme volatility in the market should be reduced by strengthening the market institutions such as the legal framework, effective corporate governance and bureaucratic quality. Institutional quality gives confidence to investors which help in stabilizing the market.

5.4 **CONTRIBUTIONS TO KNOWLEDGE**

5.4.1 **Contributions in Terms of Methodology**

- An overwhelmingly majority of the reviewed works in Nigerian context employed the ordinary least square (OLS) method; this study employed a different approach by adopting the Autoregressive Distributed Lag (ARDL) model. OLS assumptions are very stringent to comply with and this makes it difficult for the estimator to be able to enjoy all of its properties and therefore often failing to produce reliable results.

  For causality measures, pair-wise Granger causality test is quite common in the reviewed works. Yamamoto causality test which overcomes the requirement and weaknesses associated with the Granger causality was scarcely used in empirical literature. It is more strong and effective, and ensures credible results for valid decisions. To my knowledge, this is a novel approach in Nigeria context.
- This study used structural break unit root consistent test, as against the traditional unit root tests (ADF and PP) that were common in Nigerian context. There is a dearth of structural unit root test in the empirical works. Nigerian economy has witnessed structural changes and has been characterized with instability; thus this poses serious challenges to the traditional tests which inherently are low power tests. They find a unit

root even when none exists. Therefore to achieve valid results and ensure stationarity of the data, structurally consistent test becomes necessary.

- There is a dearth of empirical work which combined all the indicators of stock market development in investigating stock market and economic growth nexus. This study has employed nearly all the indicators (five indicators) as well as banking development, trade openness and inflation variables. This contributes to the robustness of the findings. Previous studies have used the average of three market indicators. Specifically, this study incorporated listed companies as a crucial independent variable which was ignored in virtually all the empirical works reviewed on the Nigerian economy. This makes the findings quite all inclusive and unique.
- The reviewed empirical works did not do much in improving the data characteristic and behavior of the time series. Standard and diagnostic tests of the dataset were in most cases not satisfactorily done or shown. Most of them in Nigerian context assumed away these tests and proceeded to perform their analyses. In this study, we carried out virtually these tests to ensure the reliability of the estimates for credible decisions.
- This study used longer period of observations than any other reviewed work. This is in terms of number of years (1984 – 2017) and currency of data. It was scarce to see reviewed works on Nigeria that went beyond 2014 as the endpoint of their sample period.

5.4.2 **Geographical Contribution**

The results obtained for any particular country cannot be generalized readily for another country and as Stulz (2000) highlights, issues relating to relationships are country specific. Thus this study makes a contribution by providing insight into the stock market and economic growth relationship for Nigeria. It contributes in using current and expended empirical evidence from Nigeria. The Nigerian stock market indices and other economic indicators constituted the variables of interest. The findings from this study can therefore be readily utilized as a reference for policy formulation for the Nigerian economy.

5.5 Suggestions for Further Studies

This work does not claim to be exhaustive and given the fact that research has always been described as a continuum, we recommend the following for further studies.

1. This study used the EGARCH variant of GARCH family models to measure volatility in the Nigerian stock market. Future research should extend it to a newer volatility model,

Generalized. Autoregressive Score (GAS) Models. They account for structural jumps and break in the economy, particularly common in developing countries.

2. This study used five market development indicators to analyze stock market development and economic growth nexus. The variables are market capitalization ratio, number of listed companies, total value traded ratio, turnover ratio and volatility; however, according to theoretical literature, market concentration is yet another important variable of market indicators which is missing in this study. We therefore suggest that future research should be done adding this variable so as to achieve greater all-inclusiveness and more robust analyses.

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Appendix 1 Correlation Matrix

Correlation

	BD	INF	MCR	NLC	RGDPR	TOP	TR
BD	1.000000	-0.289429	0.511182	0.392900	-0.007730	-0.139906	0.503032
INF	-0.289429	1.000000	-0.319126	-0.213144	-0.307738	0.062210	-0.361226
MCR	0.511182	-0.319126	1.000000	0.659888	0.233173	0.292805	0.775654
NLC	0.392900	-0.213144	0.659888	1.000000	0.150126	0.678510	0.617785
RGDPR	-0.007730	-0.307738	0.233173	0.150126	1.000000	0.140174	0.308912
TOP	-0.139906	0.062210	0.292805	0.678510	0.140174	1.000000	0.235797
TR	0.503032	-0.361226	0.775654	0.617785	0.308912	0.235797	1.000000
TVR	0.376171	-0.274191	0.873403	0.487547	0.255958	0.187381	0.909107

	TVR
BD	0.376171
INF	-0.274191
MCR	0.873403
NLC	0.487547
RGDPR	0.255958
TOP	0.187381
TR	0.909107
TVR	1.000000

Appendix 2 Augmented Dickey-fuller unit root Test

Augmented Dickey-Fuller Unit Root Test on RGDPR

Null Hypothesis: RGDPR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.666118	0.0037
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDPR)
Method: Least Squares
Date: 12/04/18 Time: 15:26
Sample (adjusted): 1985 2017
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDPR(-1)	-0.823937	0.176579	-4.666118	0.0001
C	3.933557	1.347162	2.919884	0.0066
@TREND("1984")	-0.014598	0.061142	-0.238749	0.8129

R-squared	0.428210	Mean dependent var	0.057576
Adjusted R-squared	0.390090	S.D. dependent var	4.248311
S.E. of regression	3.317791	Akaike info criterion	5.322983
Sum squared resid	330.2321	Schwarz criterion	5.459030
Log likelihood	-84.82923	Hannan-Quinn criter.	5.368759
F-statistic	11.23340	Durbin-Watson stat	1.693690
Prob(F-statistic)	0.000228		

Augmented Dickey-Fuller Unit Root Test on D(MCR)

Null Hypothesis: D(MCR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.964451	0.0002
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MCR,2)
Method: Least Squares
Date: 12/05/18 Time: 05:54
Sample (adjusted): 1987 2017
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MCR(-1))	-1.649259	0.276515	-5.964451	0.0000
D(MCR(-1),2)	0.383118	0.179454	2.134913	0.0420
C	1.071141	1.726130	0.620545	0.5401
@TREND("1984")	-0.037034	0.085659	-0.432342	0.6689

R-squared	0.651984	Mean dependent var	0.077419
Adjusted R-squared	0.613316	S.D. dependent var	6.825380
S.E. of regression	4.244291	Akaike info criterion	5.848941
Sum squared resid	486.3781	Schwarz criterion	6.033971
Log likelihood	-86.65858	Hannan-Quinn criter.	5.909256
F-statistic	16.86088	Durbin-Watson stat	1.976988
Prob(F-statistic)	0.000002		

Augmented Dickey-Fuller Unit Root Test on D(INF)

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 8 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.700200	0.0001
Test critical values:	1% level	-4.394309	
	5% level	-3.612199	
	10% level	-3.243079	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF,2)
Method: Least Squares
Date: 12/05/18 Time: 05:49
Sample (adjusted): 1994 2017
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-3.059434	0.456618	-6.700200	0.0000
D(INF(-1),2)	1.398538	0.376021	3.719305	0.0026
D(INF(-2),2)	1.329649	0.336457	3.951913	0.0017
D(INF(-3),2)	1.401396	0.319710	4.383328	0.0007
D(INF(-4),2)	0.950317	0.267301	3.555239	0.0035
D(INF(-5),2)	0.345959	0.208629	1.658255	0.1212
D(INF(-6),2)	0.294736	0.154753	1.904555	0.0792
D(INF(-7),2)	0.366484	0.112824	3.248293	0.0063
D(INF(-8),2)	0.314059	0.093679	3.352490	0.0052
C	-19.08474	4.126339	-4.625102	0.0005
@TREND("1984")	0.698135	0.179328	3.893050	0.0019

R-squared	0.935278	Mean dependent var	-0.658333
Adjusted R-squared	0.885493	S.D. dependent var	16.25642
S.E. of regression	5.501000	Akaike info criterion	6.551299
Sum squared resid	393.3929	Schwarz criterion	7.091240
Log likelihood	-67.61559	Hannan-Quinn criter.	6.694545
F-statistic	18.78605	Durbin-Watson stat	2.204469
Prob(F-statistic)	0.000004		

Augmented Dickey-Fuller Unit Root Test on D(NLC)

Null Hypothesis: D(NLC) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.931424	0.0020
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NLC,2)
Method: Least Squares
Date: 12/05/18 Time: 05:50
Sample (adjusted): 1986 2017
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NLC(-1))	-0.894225	0.181332	-4.931424	0.0000
C	10.19744	3.227151	3.159889	0.0037
@TREND("1984")	-0.470469	0.156104	-3.013827	0.0053

R-squared	0.456564	Mean dependent var	-0.187500
Adjusted R-squared	0.419085	S.D. dependent var	8.745275
S.E. of regression	6.665453	Akaike info criterion	6.720813
Sum squared resid	1288.420	Schwarz criterion	6.858225
Log likelihood	-104.5330	Hannan-Quinn criter.	6.766361
F-statistic	12.18206	Durbin-Watson stat	2.033580
Prob(F-statistic)	0.000144		

Augmented Dickey-Fuller Unit Root Test on D(TOP)

Null Hypothesis: D(TOP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.689801	0.0003
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TOP,2)
Method: Least Squares
Date: 12/05/18 Time: 05:50
Sample (adjusted): 1988 2017
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TOP(-1))	-2.423263	0.425896	-5.689801	0.0000
D(TOP(-1),2)	0.857929	0.315530	2.719015	0.0117
D(TOP(-2),2)	0.410607	0.179709	2.284843	0.0311
C	10.78430	4.231688	2.548463	0.0173
@TREND("1984")	-0.548384	0.207703	-2.640228	0.0141

R-squared	0.754845	Mean dependent var	-0.316667
Adjusted R-squared	0.715620	S.D. dependent var	15.94259
S.E. of regression	8.501751	Akaike info criterion	7.269433
Sum squared resid	1806.994	Schwarz criterion	7.502966
Log likelihood	-104.0415	Hannan-Quinn criter.	7.344142
F-statistic	19.24407	Durbin-Watson stat	2.160696
Prob(F-statistic)	0.000000		

Augmented Dickey-Fuller Unit Root Test on D(TR)

Null Hypothesis: D(TR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.550367	0.0004
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TR,2)
Method: Least Squares
Date: 12/05/18 Time: 05:51
Sample (adjusted): 1987 2017
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TR(-1))	-1.493619	0.269103	-5.550367	0.0000
D(TR(-1),2)	0.352617	0.182457	1.932602	0.0638
C	1.309169	2.092739	0.625577	0.5368
@TREND("1984")	-0.049197	0.103903	-0.473490	0.6397

R-squared	0.605311	Mean dependent var	0.103226
Adjusted R-squared	0.561456	S.D. dependent var	7.774295
S.E. of regression	5.148342	Akaike info criterion	6.235141
Sum squared resid	715.6465	Schwarz criterion	6.420171
Log likelihood	-92.64468	Hannan-Quinn criter.	6.295456
F-statistic	13.80275	Durbin-Watson stat	2.043638
Prob(F-statistic)	0.000012		

Augmented Dickey-Fuller Unit Root Test on D(TVR)

Null Hypothesis: D(TVR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.999673	0.0001
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TVR,2)
Method: Least Squares
Date: 12/04/18 Time: 15:22
Sample (adjusted): 1987 2017
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TVR(-1))	-1.407425	0.234584	-5.999673	0.0000
D(TVR(-1),2)	0.476241	0.170233	2.797577	0.0094
C	0.183238	0.465243	0.393854	0.6968
@TREND("1984")	-0.007454	0.023139	-0.322156	0.7498

R-squared	0.593597	Mean dependent var	0.016129
Adjusted R-squared	0.548441	S.D. dependent var	1.710485
S.E. of regression	1.149413	Akaike info criterion	3.236295
Sum squared resid	35.67108	Schwarz criterion	3.421325
Log likelihood	-46.16257	Hannan-Quinn criter.	3.296610
F-statistic	13.14552	Durbin-Watson stat	1.916807
Prob(F-statistic)	0.000018		

Appendix 3: Zivot Andrews Unit Root Test

Zivot-Andrews Unit Root Test
Date: 01/30/19 Time: 01:01
Sample: 1984 2017
Included observations: 34
Null Hypothesis: MCR has a unit root with a structural break in both the intercept and trend
Chosen lag length: 0 (maximum lags: 4)
Chosen break point: 2007

	t-Statistic	Prob. *
Zivot-Andrews test statistic	-5.842792	0.002614
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	

* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process

Zivot-Andrews Unit Root Test
Date: 01/30/19 Time: 01:01
Sample: 1984 2017
Included observations: 34
Null Hypothesis: BD has a unit root with a structural break in both the intercept and trend
Chosen lag length: 0 (maximum lags: 4)
Chosen break point: 2008

	t-Statistic	Prob. *
Zivot-Andrews test statistic	-6.459367	9.27E-07
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	

* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process

Zivot-Andrews Unit Root Test
Date: 01/30/19 Time: 01:01
Sample: 1984 2017
Included observations: 34
Null Hypothesis: TOP has a unit root with a structural break in both the intercept and trend
Chosen lag length: 0 (maximum lags: 4)
Chosen break point: 1995

	t-Statistic	Prob. *
Zivot-Andrews test statistic	-5.864541	0.001578
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	

* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process

Zivot-Andrews Unit Root Test
Date: 01/30/19 Time: 01:01
Sample: 1984 2017
Included observations: 34
Null Hypothesis: TVR has a unit root with a structural break in both the intercept and trend
Chosen lag length: 3 (maximum lags: 4)
Chosen break point: 2007

	t-Statistic	Prob. *
Zivot-Andrews test statistic	-10.72801	7.58E-08
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	

* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process

Zivot-Andrews Unit Root Test
Date: 01/30/19 Time: 01:01
Sample: 1984 2017
Included observations: 34
Null Hypothesis: DTR has a unit root with a structural break in both the intercept and trend
Chosen lag length: 1 (maximum lags: 4)
Chosen break point: 2009

	t-Statistic	Prob. *
Zivot-Andrews test statistic	-8.333773	1.01E-05
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	

* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process

RGDP

Multiple breakpoint tests
Bai-Perron tests of L+1 vs. L sequentially determined breaks
Date: 05/11/19 Time: 21:33
Sample: 1984 2017
Included observations: 34
Breaking variables: C
Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05

Sequential F-statistic determined breaks:			0
Break Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1	2.298994	2.298994	8.58

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Appendix 4 ARDLM Estimates

Dependent Variable: RGDPR
Method: ARDL
Date: 01/29/19 Time: 08:55
Sample (adjusted): 1986 2017
Included observations: 32 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): LNBD LNINF LNMCR LNNLC LNTOP LNTR LNTVR
Fixed regressors: C @TREND
Number of models evalulated: 4374
Selected Model: ARDL(2, 2, 2, 2, 2, 2, 2, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDPR(-1)	-0.712662	0.241803	-2.947286	0.0215
RGDPR(-2)	0.311713	0.193912	1.607499	0.1520
LNBD	-1.359101	2.733002	-0.497292	0.6342
LNBD(-1)	3.684373	3.368194	1.093872	0.3102
LNBD(-2)	15.67771	3.777688	4.150081	0.0043
LNINF	0.317015	0.827932	0.382900	0.7132
LNINF(-1)	1.907782	0.778129	2.451755	0.0440
LNINF(-2)	1.693573	0.770049	2.199305	0.0638
LNMCR	17.32517	5.545461	3.124207	0.0167
LNMCR(-1)	2.903192	2.598505	1.117255	0.3008
LNMCR(-2)	6.501144	2.665048	2.439410	0.0448
LNNLC	18.41626	12.31184	1.495817	0.1784
LNNLC(-1)	64.56277	20.61694	3.131541	0.0166
LNNLC(-2)	-62.97823	16.32531	-3.857705	0.0062
LNTOP	-2.382213	2.058914	-1.157024	0.2852
LNTOP(-1)	3.030063	1.393034	2.175153	0.0661
LNTOP(-2)	-6.474638	1.648153	-3.928420	0.0057
LNTR	7.445545	3.476011	2.141980	0.0694
LNTR(-1)	15.67837	3.427885	4.573772	0.0026
LNTR(-2)	3.407193	2.241713	1.519906	0.1723
LNTVR	-5.740881	3.626125	-1.583200	0.1574
LNTVR(-1)	-8.060453	2.547236	-3.164392	0.0158
LNTVR(-2)	-9.318852	3.012561	-3.093332	0.0175
C	-227.7898	62.94578	-3.618825	0.0085
@TREND	-1.139328	0.234944	-4.849363	0.0019

R-squared	0.967927	Mean dependent var	4.303125
Adjusted R-squared	0.857963	S.D. dependent var	3.188334
S.E. of regression	1.201611	Akaike info criterion	3.247878
Sum squared resid	10.10708	Schwarz criterion	4.392984
Log likelihood	-26.96604	Hannan-Quinn criter.	3.627448
F-statistic	8.802236	Durbin-Watson stat	2.360760
Prob(F-statistic)	0.003233		

*Note: p-values and any subsequent tests do not account for model

ARDL Long Run Form and Bounds Test
Dependent Variable: D(RGDPR)
Selected Model: ARDL(2, 2, 2, 2, 2, 2, 2, 2)
Case 4: Unrestricted Constant and Restricted Trend
Date: 01/29/19 Time: 09:02
Sample: 1984 2017
Included observations: 32

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-227.7898	62.94578	-3.618825	0.0085
@TREND	-1.139328	0.234944	-4.849363	0.0019
RGDPR(-1)*	-1.400948	0.242359	-5.780464	0.0007
LNBD(-1)	18.00299	3.528925	5.101549	0.0014
LNINF(-1)	3.918370	1.513361	2.589183	0.0360
LNMCR(-1)	26.72950	7.263637	3.679906	0.0079
LNNLC(-1)	20.00081	8.377875	2.387337	0.0484
LNTOP(-1)	-5.826789	2.554773	-2.280746	0.0566
LNTR(-1)	26.53110	6.718702	3.948844	0.0055
LNTVR(-1)	-23.12019	6.868226	-3.366253	0.0120
D(RGDPR(-1))	-0.311713	0.193912	-1.607499	0.1520
D(LNBD)	-1.359101	2.733002	-0.497292	0.6342
D(LNBD(-1))	-15.67771	3.777688	-4.150081	0.0043
D(LNINF)	0.317015	0.827932	0.382900	0.7132
D(LNINF(-1))	-1.693573	0.770049	-2.199305	0.0638
D(LNMCR)	17.32517	5.545461	3.124207	0.0167
D(LNMCR(-1))	-6.501144	2.665048	-2.439410	0.0448
D(LNNLC)	18.41626	12.31184	1.495817	0.1784
D(LNNLC(-1))	62.97823	16.32531	3.857705	0.0062
D(LNTOP)	-2.382213	2.058914	-1.157024	0.2852
D(LNTOP(-1))	6.474638	1.648153	3.928420	0.0057
D(LNTR)	7.445545	3.476011	2.141980	0.0694
D(LNTR(-1))	-3.407193	2.241713	-1.519906	0.1723
D(LNTVR)	-5.740881	3.626125	-1.583200	0.1574
D(LNTVR(-1))	9.318852	3.012561	3.093332	0.0175

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 4: Unrestricted Constant and Restricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNBD	12.85057	3.122672	4.115248	0.0045
LNINF	2.796941	1.186433	2.357438	0.0505
LNMCR	19.07958	4.913034	3.883461	0.0060
LNNLC	14.27662	7.352122	1.941837	0.0933
LNTOP	-4.159174	2.169498	-1.917114	0.0967
LNTR	18.93796	4.979634	3.803083	0.0067
LNTVR	-16.50324	5.087969	-3.243580	0.0142
@TREND	-0.813255	0.186055	-4.371038	0.0033

			Asymptotic: n=1000	
F-statistic	10.94063	10%	2.22	3.17
k	7	5%	2.5	3.5
		2.5%	2.76	3.81
		1%	3.07	4.23
Actual Sample Size	32		Finite Sample: n=35	
		10%	2.578	3.71
		5%	3.057	4.319
		1%	4.489	5.064
			Finite Sample: n=30	
		10%	2.681	3.887
		5%	3.194	4.604
		1%	4.49	6.328

ARDL Error Correction Regression
Dependent Variable: D(RGDPR)
Selected Model: ARDL(2, 2, 2, 2, 2, 2, 2, 2)
Case 4: Unrestricted Constant and Restricted Trend
Date: 01/29/19 Time: 09:04
Sample: 1984 2017
Included observations: 32

ECM Regression
Case 4: Unrestricted Constant and Restricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-228.9291	15.71939	-14.56348	0.0000
D(RGDPR(-1))	-0.311713	0.061791	-5.044636	0.0015
D(LNBD)	-1.359101	1.236231	-1.099391	0.3080
D(LNBD(-1))	-15.67771	1.815700	-8.634527	0.0001
D(LNINF)	0.317015	0.352074	0.900422	0.3978
D(LNINF(-1))	-1.693573	0.361521	-4.684578	0.0022
D(LNMCR)	17.32517	1.826181	9.487102	0.0000
D(LNMCR(-1))	-6.501144	1.132643	-5.739798	0.0007
D(LNNLC)	18.41626	5.746177	3.204959	0.0150
D(LNNLC(-1))	62.97823	7.336790	8.583894	0.0001
D(LNTOP)	-2.382213	0.704943	-3.379299	0.0118
D(LNTOP(-1))	6.474638	0.747781	8.658465	0.0001
D(LNTR)	7.445545	1.249922	5.956806	0.0006
D(LNTR(-1))	-3.407193	0.885658	-3.847073	0.0063
D(LNTVR)	-5.740881	1.204031	-4.768053	0.0020
D(LNTVR(-1))	9.318852	1.113518	8.368838	0.0001
CointEq(-1)*	-1.400948	0.096446	-14.52577	0.0000

R-squared	0.978167	Mean dependent var	-0.271875
Adjusted R-squared	0.954878	S.D. dependent var	3.864331
S.E. of regression	0.820857	Akaike info criterion	2.747878
Sum squared resid	10.10708	Schwarz criterion	3.526550
Log likelihood	-26.96604	Hannan-Quinn criter.	3.005985
F-statistic	42.00188	Durbin-Watson stat	2.360760
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	10.94063	10%	2.22	3.17
k	7	5%	2.5	3.5
		2.5%	2.76	3.81
		1%	3.07	4.23

Appendix 5 ARDl Model Diagnostics

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.805677	Prob. F(2,5)	0.4974
Obs*R-squared	7.799209	Prob. Chi-Square(2)	0.0202

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 01/29/19 Time: 09:07
Sample: 1986 2017
Included observations: 32
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDPR(-1)	0.041244	0.256628	0.160717	0.8786
RGDPR(-2)	0.117350	0.222233	0.528047	0.6201
LNBD	-2.693952	3.553142	-0.758189	0.4825
LNBD(-1)	-1.200685	4.658818	-0.257723	0.8069
LNBD(-2)	2.830012	4.883333	0.579525	0.5874
LNINF	0.728717	1.041584	0.699623	0.5154
LNINF(-1)	0.117301	0.823092	0.142513	0.8922
LNINF(-2)	0.194992	0.841614	0.231688	0.8260
LNMCR	0.640323	5.790196	0.110587	0.9162
LNMCR(-1)	1.577986	3.100628	0.508925	0.6325
LNMCR(-2)	2.046698	3.257008	0.628398	0.5573
LNNLC	8.664555	16.21291	0.534423	0.6159
LNNLC(-1)	6.528074	25.26335	0.258401	0.8064
LNNLC(-2)	-11.81274	20.22883	-0.583956	0.5846
LNTOP	-1.124327	2.309184	-0.486893	0.6469
LNTOP(-1)	-0.745394	1.589404	-0.468977	0.6588
LNTOP(-2)	-0.016486	1.715852	-0.009608	0.9927
LNTR	1.532590	3.795494	0.403792	0.7031
LNTR(-1)	1.133430	3.737765	0.303237	0.7739
LNTR(-2)	0.636318	2.429332	0.261931	0.8038
LNTVR	-1.004165	3.840068	-0.261497	0.8041
LNTVR(-1)	-1.269102	2.840196	-0.446836	0.6737
LNTVR(-2)	-1.480385	3.370253	-0.439250	0.6788
C	-31.28983	69.36558	-0.451086	0.6708
@TREND	0.098192	0.253830	0.386844	0.7148
RESID(-1)	-0.909003	0.743701	-1.222269	0.2761
RESID(-2)	-0.932034	0.967238	-0.963603	0.3795

R-squared	0.243725	Mean dependent var	-1.18E-14
Adjusted R-squared	-3.688903	S.D. dependent var	0.570995
S.E. of regression	1.236425	Akaike info criterion	3.093527
Sum squared resid	7.643731	Schwarz criterion	4.330242
Log likelihood	-22.49643	Hannan-Quinn criter.	3.503463
F-statistic	0.061975	Durbin-Watson stat	2.001948

Correlogram of Residuals

Date: 01/29/19 Time: 09:08
Sample: 1984 2017
Included observations: 32
Q-statistic probabilities adjusted for 2 dynamic regressors

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.202	-0.202	1.4330	0.231
		2	-0.064	-0.110	1.5836	0.453
		3	-0.017	-0.057	1.5943	0.661
		4	-0.233	-0.271	3.7081	0.447
		5	-0.014	-0.156	3.7161	0.591
		6	0.002	-0.113	3.7163	0.715
		7	-0.123	-0.241	4.3735	0.736
		8	0.095	-0.125	4.7817	0.781
		9	-0.105	-0.281	5.3036	0.807
		10	0.091	-0.150	5.7153	0.839
		11	0.170	-0.024	7.2137	0.782
		12	-0.057	-0.120	7.3906	0.831
		13	0.164	0.079	8.9330	0.778
		14	-0.207	-0.205	11.524	0.644
		15	-0.083	-0.149	11.966	0.682
		16	0.105	-0.031	12.720	0.693

*Probabilities may not be valid for this equation specification.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.446775	Prob. F(24,7)	0.9333
Obs*R-squared	19.36078	Prob. Chi-Square(24)	0.7325
Scaled explained SS	1.355126	Prob. Chi-Square(24)	1.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 01/29/19 Time: 09:17
Sample: 1986 2017
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.108930	38.02639	0.055460	0.9573
RGDPR(-1)	-0.077332	0.146076	-0.529394	0.6129
RGDPR(-2)	0.008578	0.117145	0.073226	0.9437
LNBD	-1.231431	1.651043	-0.745850	0.4800
LNBD(-1)	-1.515768	2.034771	-0.744933	0.4806
LNBD(-2)	3.756315	2.282152	1.645953	0.1438
LNINF	-0.262905	0.500165	-0.525637	0.6154
LNINF(-1)	-0.372983	0.470078	-0.793449	0.4536
LNINF(-2)	-0.156107	0.465197	-0.335573	0.7470
LNMCR	-0.712386	3.350087	-0.212647	0.8377
LNMCR(-1)	1.401587	1.569792	0.892849	0.4016
LNMCR(-2)	-0.773067	1.609991	-0.480169	0.6457
LNNLC	7.085610	7.437750	0.952655	0.3725
LNNLC(-1)	-3.443101	12.45497	-0.276444	0.7902
LNNLC(-2)	-2.755363	9.862338	-0.279382	0.7880
LNTOP	-1.176285	1.243817	-0.945705	0.3758
LNTOP(-1)	-0.547232	0.841551	-0.650266	0.5363
LNTOP(-2)	1.120719	0.995671	1.125591	0.2974
LNTR	0.927034	2.099905	0.441465	0.6722
LNTR(-1)	-1.193303	2.070831	-0.576243	0.5825
LNTR(-2)	-0.500422	1.354249	-0.369520	0.7227
LNTVR	-0.259831	2.190591	-0.118612	0.9089
LNTVR(-1)	0.482457	1.538819	0.313524	0.7630
LNTVR(-2)	0.846768	1.819928	0.465275	0.6559
@TREND	-0.100583	0.141933	-0.708666	0.5014

R-squared	0.605024	Mean dependent var	0.315846
Adjusted R-squared	-0.749178	S.D. dependent var	0.548865
S.E. of regression	0.725909	Akaike info criterion	2.239891
Sum squared resid	3.688610	Schwarz criterion	3.384997
Log likelihood	-10.83825	Hannan-Quinn criter.	2.619461
F-statistic	0.446775	Durbin-Watson stat	2.767438
Prob(F-statistic)	0.933252		

Ramsey RESET Test
Equation: UNTITLED
Specification: RGDPR RGDPR(-1) RGDPR(-2) LNBD LNBD(-1) LNBD(-
LNINF LNINF(-1) LNINF(-2) LNMCR LNMCR(-1) LNMCR(-2) LNNLC
LNNLC(-1) LNNLC(-2) LNTOP LNTOP(-1) LNTOP(-2) LNTR LNTR(
LNTR(-2) LNTVR LNTVR(-1) LNTVR(-2) C @TREND
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.160297	6	0.2900
F-statistic	1.346290	(1, 6)	0.2900

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	1.852236	1	1.852236
Restricted SSR	10.10708	7	1.443869
Unrestricted SSR	8.254846	6	1.375808

Unrestricted Test Equation:
Dependent Variable: RGDPR
Method: ARDL
Date: 01/29/19 Time: 09:22
Sample: 1986 2017
Included observations: 32
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic):
Fixed regressors: C @TREND

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDPR(-1)	-0.342383	0.396929	-0.862582	0.4215
RGDPR(-2)	0.032713	0.306020	0.106899	0.9184
LNBD	-3.176436	3.093607	-1.026774	0.3441
LNBD(-1)	4.327758	3.334281	1.297958	0.2420
LNBD(-2)	8.726365	7.034939	1.240432	0.2611
LNINF	0.644154	0.855951	0.752559	0.4802
LNINF(-1)	0.565424	1.383973	0.408551	0.6971
LNINF(-2)	0.163298	1.518033	0.107572	0.9178
LNMCR	11.98922	7.102903	1.687933	0.1424
LNMCR(-1)	2.947998	2.536816	1.162086	0.2893
LNMCR(-2)	4.049108	3.351663	1.208089	0.2725
LNNLC	16.51241	12.12966	1.361325	0.2223
LNNLC(-1)	29.87844	36.03596	0.829129	0.4388
LNNLC(-2)	-35.10517	28.82751	-1.217766	0.2690
LNTOP	-0.870527	2.395141	-0.363455	0.7287
LNTOP(-1)	2.756610	1.380077	1.997432	0.0928
LNTOP(-2)	-3.364516	3.126210	-1.076229	0.3232
LNTR	5.025343	3.982945	1.261715	0.2539
LNTR(-1)	9.534849	6.263480	1.522293	0.1788
LNTR(-2)	1.182889	2.909180	0.406606	0.6984
LNTVR	-4.709605	3.649513	-1.290475	0.2444
LNTVR(-1)	-5.449253	3.353672	-1.624861	0.1553
LNTVR(-2)	-5.019095	4.730772	-1.060946	0.3295
C	-143.1734	95.36075	-1.501387	0.1839
@TREND	-0.597496	0.520254	-1.148469	0.2945

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	7.302837	(7, 7)	0.0088
Chi-square	51.11986	7	0.0000

Null Hypothesis: C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=C(8)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2)	0.311713	0.193912
C(3)	-1.359101	2.733002
C(4)	3.684373	3.368194
C(5)	15.67771	3.777688
C(6)	0.317015	0.827932
C(7)	1.907782	0.778129
C(8)	1.693573	0.770049

Restrictions are linear in coefficients.

Appendix 6 EGARCH Tests

Date: 02/15/19 Time: 07:34
Sample: 1984M01 2017M12

	ASI
Mean	15621.52
Median	8762.000
Maximum	219112.0
Minimum	102.0000
Std. Dev.	18280.82
Skewness	3.839814
Kurtosis	39.20515
Jarque-Bera	23286.42
Probability	0.000000
Sum	6373581.
Sum Sq. Dev.	1.36E+11
Observations	408

Heteroskedasticity Test: ARCH

F-statistic	41.59612	Prob. F(1,405)	0.0000
Obs*R-squared	37.90812	Prob. Chi-Square(1)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 02/13/19 Time: 14:24
Sample (adjusted): 1984M02 2017M12
Included observations: 407 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.016750	0.013354	1.254304	0.2105
RESID^2(-1)	0.305192	0.047320	6.449505	0.0000

R-squared	0.093140	Mean dependent var	0.024138
Adjusted R-squared	0.090901	S.D. dependent var	0.281506
S.E. of regression	0.268407	Akaike info criterion	0.212277
Sum squared resid	29.17713	Schwarz criterion	0.231977
Log likelihood	-41.19841	Hannan-Quinn criter.	0.220073
F-statistic	41.59612	Durbin-Watson stat	2.019598
Prob(F-statistic)	0.000000		

Heteroskedasticity Test: ARCH			
F-statistic	0.018316	Prob. F(1,405)	0.8924
Obs*R-squared	0.018406	Prob. Chi-Square(1)	0.8921

Test Equation:
Dependent Variable: WGT_RESID^2
Method: Least Squares
Date: 02/15/19 Time: 12:32
Sample (adjusted): 1984M02 2017M12
Included observations: 407 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.002351	0.126380	7.931231	0.0000
WGT_RESID^2(-1)	-0.006719	0.049645	-0.135338	0.8924

R-squared	0.000045	Mean dependent var	0.995632
Adjusted R-squared	-0.002424	S.D. dependent var	2.341847
S.E. of regression	2.344684	Akaike info criterion	4.547080
Sum squared resid	2226.504	Schwarz criterion	4.566779
Log likelihood	-923.3308	Hannan-Quinn criter.	4.554876
F-statistic	0.018316	Durbin-Watson stat	1.999347
Prob(F-statistic)	0.892412		

Zivot-Andrews Unit Root Test
Date: 02/14/19 Time: 10:02
Sample: 1984M01 2017M12
Included observations: 408
Null Hypothesis: ASI has a unit root with a structural break in both the intercept and trend
Chosen lag length: 4 (maximum lags: 4)
Chosen break point: 2005M07

	t-Statistic	Prob. *
Zivot-Andrews test statistic	-5.968458	0.000891
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	

* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process

Dependent Variable: LNASI
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 02/15/19 Time: 12:20
Sample: 1984M01 2017M12
Included observations: 408
Failure to improve likelihood (non-zero gradients) after 35 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(2) + C(3)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(4)
*RESID(-1)/@SQRT(GARCH(-1)) + C(5)*LOG(GARCH(-1))

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	10.16730	0.006334	1605.229	0.0000
Variance Equation				
C(2)	-1.838781	0.350185	-5.250891	0.0000
C(3)	1.779578	0.300293	5.926143	0.0000
C(4)	-0.483395	0.150363	-3.214851	0.0013
C(5)	0.798416	0.064221	12.43235	0.0000

R-squared	-0.687551	Mean dependent var	8.504516
Adjusted R-squared	-0.687551	S.D. dependent var	2.007781
S.E. of regression	2.608223	Akaike info criterion	2.723959
Sum squared resid	2768.750	Schwarz criterion	2.773116
Log likelihood	-550.6876	Hannan-Quinn criter.	2.743411
Durbin-Watson stat	0.004323		

Appendix 7: Yamamoto Estimates

VAR Lag Order Selection Criteria
Endogenous variables: LNMCR LNNLC LNTR LNTVR RGDPR
Exogenous variables: C
Date: 03/16/19 Time: 02:44
Sample: 1984 2017
Included observations: 31

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-103.3541	NA	0.000748	6.990589	7.221877	7.065983
1	-6.091728	156.8748	7.24e-06	2.328499	3.716228*	2.780864
2	30.36912	47.04626*	3.96e-06	1.589089	4.133260	2.418425
3	64.88600	33.40343	3.16e-06*	0.975097*	4.675709	2.181404*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

VAR Residual Serial Correlation LM Tests
Date: 03/16/19 Time: 02:53
Sample: 1984 2017
Included observations: 31

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	27.35294	25	0.3385	1.114124	(25, 23.8)	0.3972
2	31.15193	25	0.1840	1.348909	(25, 23.8)	0.2340
3	20.34633	25	0.7284	0.742138	(25, 23.8)	0.7678
4	29.52005	25	0.2428	1.244952	(25, 23.8)	0.2977

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	27.35294	25	0.3385	1.114124	(25, 23.8)	0.3972
2	86.57790	50	0.0010	2.228201	(50, 7.9)	0.1158
3	1115.475	75	0.0000	NA	(75, NA)	NA
4	NA	100	NA	NA	(100, NA)	NA

*Edgeworth expansion corrected likelihood ratio statistic.

Date: 03/16/19 Time: 03:20
Sample: 1984 2017
Included observations: 30

Dependent variable: LNMCR

Excluded	Chi-sq	df	Prob.
LNNLC	14.29728	3	0.0025
LNTR	5.314388	3	0.1502
LNTVR	3.666430	3	0.2998
RGDPR	8.091342	3	0.0442
All	30.30174	12	0.0025

Dependent variable: LNNLC

Excluded	Chi-sq	df	Prob.
LNMCR	3.641960	3	0.3028
LNTR	4.274752	3	0.2333
LNTVR	5.589365	3	0.1334
RGDPR	2.078679	3	0.5562
All	18.09496	12	0.1128

Dependent variable: LNTR

Excluded	Chi-sq	df	Prob.
LNMCR	35.00198	3	0.0000
LNNLC	23.87545	3	0.0000
LNTVR	36.04257	3	0.0000
RGDPR	16.92491	3	0.0007
All	99.27463	12	0.0000

Dependent variable: LNTVR

Excluded	Chi-sq	df	Prob.
LNMCR	11.69603	3	0.0085
LNNLC	18.70529	3	0.0003
LNTR	11.50425	3	0.0093
RGDPR	1.770806	3	0.6213
All	53.59401	12	0.0000

Dependent variable: RGDPR

Excluded	Chi-sq	df	Prob.

VAR Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: Residuals are multivariate normal
Date: 03/16/19 Time: 02:54
Sample: 1984 2017
Included observations: 31

Component	Skewness	Chi-sq	df	Prob.*
1	0.132449	0.090637	1	0.7634
2	-0.664029	2.278160	1	0.1312
3	0.230738	0.275073	1	0.5999
4	-0.534433	1.475697	1	0.2244
5	0.045466	0.010680	1	0.9177
Joint		4.130247	5	0.5308

Component	Kurtosis	Chi-sq	df	Prob.
1	3.051869	0.003475	1	0.9530
2	3.234151	0.070818	1	0.7901
3	3.338547	0.148043	1	0.7004
4	2.852690	0.028029	1	0.8670
5	1.966946	1.378469	1	0.2404
Joint		1.628835	5	0.8977

Component	Jarque-Bera	df	Prob.
1	0.094112	2	0.9540
2	2.348978	2	0.3090
3	0.423116	2	0.8093
4	1.503726	2	0.4715
5	1.389149	2	0.4993
Joint	5.759081	10	0.8351

*Approximate p-values do not account for coefficient estimation