MODELLING THE EFFECT OF STOCK MARKET DEVELOPMENT ON ECONOMIC GROWTH IN KENYA

BY

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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Sign: _____ Date: _____

I do hereby confirm that I have examined the master's dissertation of

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And have certified that all revisions that the panel and examiners recommended have been adequately addressed.

Sign: _____ Date: _____

Christine Nanjala

Dissertation Supervisor

ABSTRACT.

This study analyzed the effect of stock market development indicators namely market capitalization, total value of shares traded and NSE20 share index on economic growth in Kenya as measured by the gross domestic product for the period 2000 to 2015 on quarterly time series data. The results were reported using the Johansen cointegration test and vector error correction model (VECM) and causality which were analyzed on STATA statistical software. The general objective of the study was to analyze the effects of stock market development on economic growth in. The study found both short run and long run relationship between stock market development indicators used and economic. The cointegration results established that total value of shares traded and nse20 share index had a positive and significant long run relationship with economic growth, while market capitalization had a negative and significant long run relationship with economic growth. The VEC model results established that stock market development indicators had short run relationship with economic growth, and the model speed to adjustment to long term equilibrium was at 75.85%. In the long run market capitalization was negative and significant to economic growth both in the first and second lag while total value of shares traded was positive and significant to economic growth in the first lag while NSE20 share index positive and significant to economic growth in the second lag. The study recommended that capital markets regulators should formulate policies that that will ensure stability of capital markets liquidity, stock market performance as well as regulate allocation of funds to productive investments so as to ensure all pooled funds are allocated to productive investments, which would certainly lead to increased performance and efficiency of the stock markets and hence developing the stock markets which in the long run will foster economic.

Keywords: Stock Markets, NSE, Market Capitalization, Turnover, NSE20 share index, Vector Error Correction Model and Johansen Cointergration test.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
CDSE	Central Depository and Settlement Corporation
CDA	Central Depository Services
GDP	Gross Domestic Product
IPO	Initial Public Offering
MCR	Market Capitalization
NSE	Nairobi Securities Exchange
VR	Value of Shares Traded
VEC	Vector Error Correction
VAR	Vector Auto regression Model
NSE20	NSE20 Share Index

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Stock market plays a very crucial role in economic growth and development of a country. In principle, the key function of stock markets is trading securities and through trading securities there is flow of capital from savers to investors which fosters economic growth through efficient resource allocation and utilization. Due to this function, it is expected that a developed stock market will facilitate the availability of long term capital for economically productive investments (Anigbogu and Nduka, 2014). When stock markets mobilize savings from savers, they simultaneously allocate a bigger positon to the institutions with relatively high prospects as indicated by their returns and level of risk. The significance of this function is that capital resources are channeled by the mechanism of demand and supply to those institutions with relatively high and increasing productivity thus enhancing economic growth (Olweny and Kimani, 2011). In Kenya, the increased listing of companies in the Nairobi securities exchange over the years, is an indication of increased use of equity financing by many companies; this implies that stock market development affects economic growth as it is able to provide capital for investments and further financing to companies listed (Ikikii and Nzomoi, 2013).

There exist a number of literatures with conflicting views on the impact of stock market development on economic growth and development. Many models emphasize that well-functioning markets revolutionize information and transactions costs thereby fostering resource allocation and hence leading to long run growth (King and Levine, 1993; Beck and Levine, 2001). Levine (2005) on the other hand states that stock markets facilitates economic

growth through mobilizing and pooling of savings from surplus units to deficits units, acquiring acquiring and processing information about enterprises and possible investment projects thus allocating savings to the most productive use, monitoring investments and carrying out corporate corporate governance, diversifying risk and increasing liquidity. All this functions influence savings and investments hence in turn leads to economic growth and development. However, according to Beck and Levine (2001), these models also show that financial development can hurt economic growth, specifically by enhancing resource allocation and hence the returns to savings, may lower savings rates; that is if there are sufficiently large externalities associated with savings and investment, then financial development slows long run growth. Singh (1997) also argues that the inherent volatility and arbitrariness of stock market pricing in the developing developing countries make them a poor guide to efficient investment, in the wake of unfavorable unfavorable economic shocks, the interaction of stock and currency markets may worsen the macroeconomic stability and hence reduce the long term growth.

In principle, stock market development is also explained to affect economic growth in various various ways. For example, through wealth effect whereby if an investor holding shares in stock stock tend to believe that they are losing money on their shares they would be shy to spend their their money which will result into fall in consumer spending (Marco, 1993). This would therefore lead to a slow drive towards economic growth, as funds are being held as opposed to being efficiently apportioned to better investment options. Secondly, through pension, that is people with private pension or investment trust are normally affected by stock market performance because pension funds invest a substantial part of their funds in the stock market. Therefore, a substantial long term decline in the share prices reduces the value of the pension funds which translates to lower future pay outs or even rendering pension funds unable to meet

meet their future promises (Kunt and Levine, 1996). Thirdly, through investments, according Morck and Poterba (1990) the stock market is a source of business investment for example offering new shares to finance investments, which in turn fosters growth of the company and expansion of businesses which leads to more employment opportunities which in term leads economic growth. Therefore, declining share prices can hamper the firm's ability to raise on the stock market which is cheaper mode of financing hence slowing down the company's growth rate and eventually economic growth.

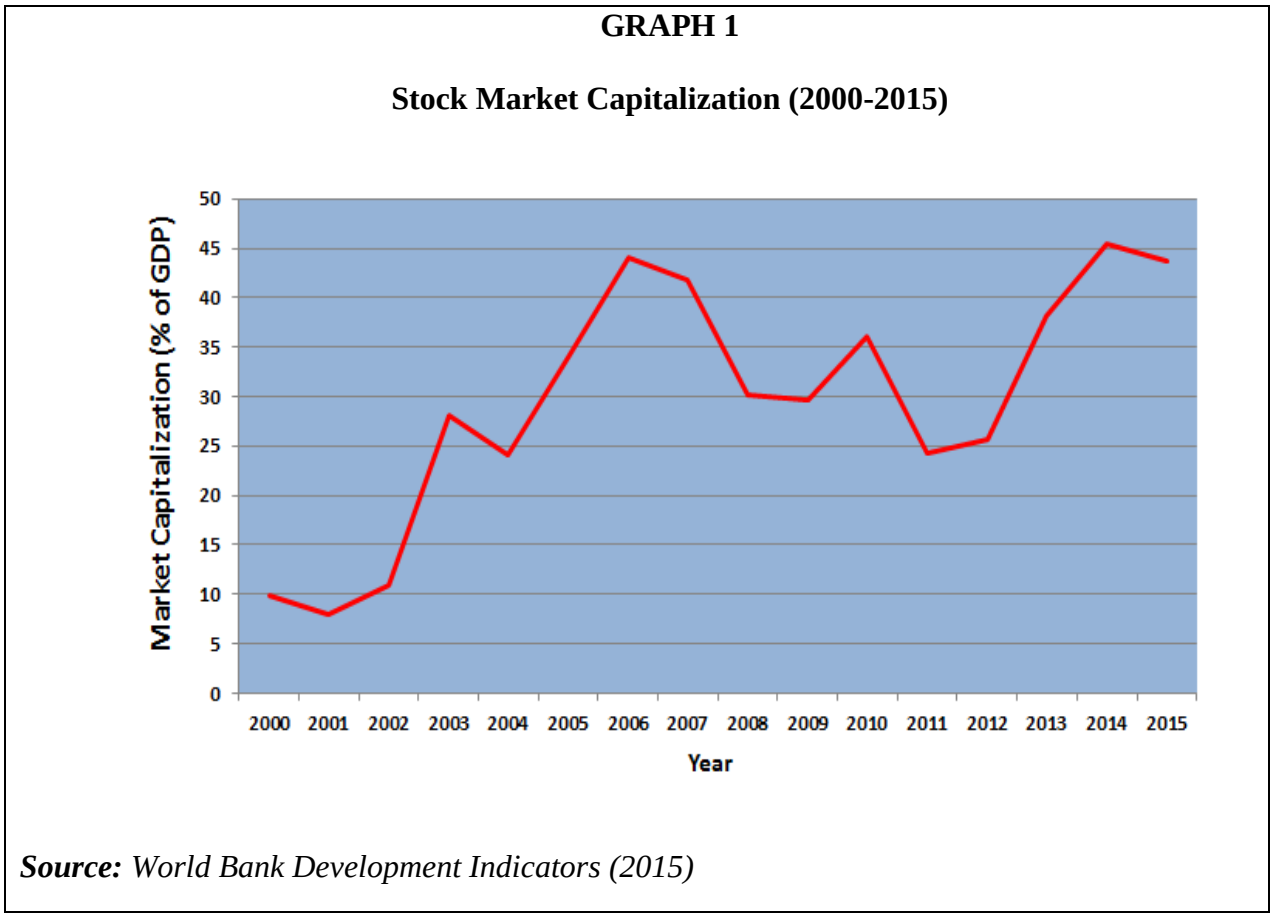
1.1.1 Overview of Stock Market Development

According to Garcia and Liu (1999) stock market development is a multi-dimensional concept. It is usually measured by stock market size, liquidity, volatility, performance, concentration, integration with world capital markets, and the legal rule (regulation and supervision) in the market. The basic feature of a well-developed stock market is liquidity, which is the ease of buying and selling of investments in a stock market without a drastic change in its price. This requires sufficient volume and size of transactions in the market (Yartey and Adjasi, 2007). Yartey (2008) also indicates that stock markets in emerging markets have seen considerable development since the early 1990's. He reports that the market capitalization of emerging countries has more than doubled over the past decade growing from less than $2 trillion in 1995 to about $ 5 trillion in 2015. Also according to Standard and Poor (2005) emerging markets are now more than 12% of the world market capitalization.

Stock markets development can be measured using stock market capitalization, total value shares traded and NSE 20 share index. Market capitalization is mainly used as a measure of stock market size. According to Sheila (2014) the Nairobi Securities Exchange market capitalization ratio was stagnant in the late 1980's and only started increasing in 1991

to 43% in 1994 before it deteriorated, creating a deep and wide trough between 1995 and 2006. 2006. Market capitalization increased vastly between 2001 and 2006, although in 2007 it registered stock market capitalization of 50% according to World Bank (2012) this was still low low compared to most of the high income countries. Figure 1 below shows Nairobi Securities Exchange stock market capitalization growth for the period 2000 to 2015.

Figure 1: Stock Market Capitalization (2000-2015)

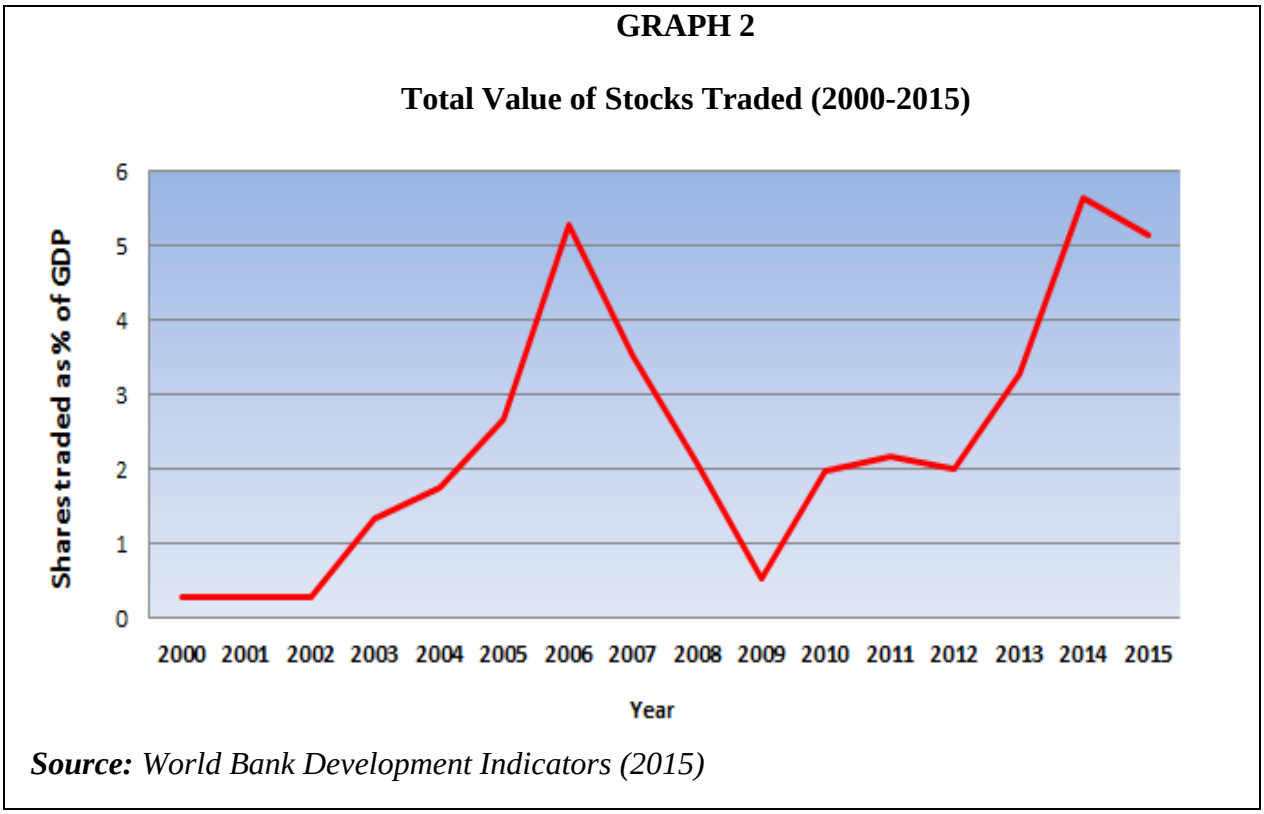


Source: *World Bank Development Indicators (2015)*

Total value of shares traded is a stock market development measure used to measure liquidity. liquidity. According to World Bank (2012) the total value of shares trade for the Nairobi Securities Exchange was below 2% between the year 1990 and early 2000, but later picked up over the years to 6% in 2006, before it dropped to 1% in 2009 which reflected lack of

information sharing among firm listed and hence negative impact to stock market (Aduda.J & Masila.J 2012). Later in the 2012 total value of shares traded increased to 6% mainly explained by the improvements on policies and regulations on trading at the stock exchange. From 2004 the total value traded started increasing reflecting an improvement on liquidity against the economic growth as shown in figure 2 below.

Figure 2: Total Value of Stocks Traded (2000-2015)

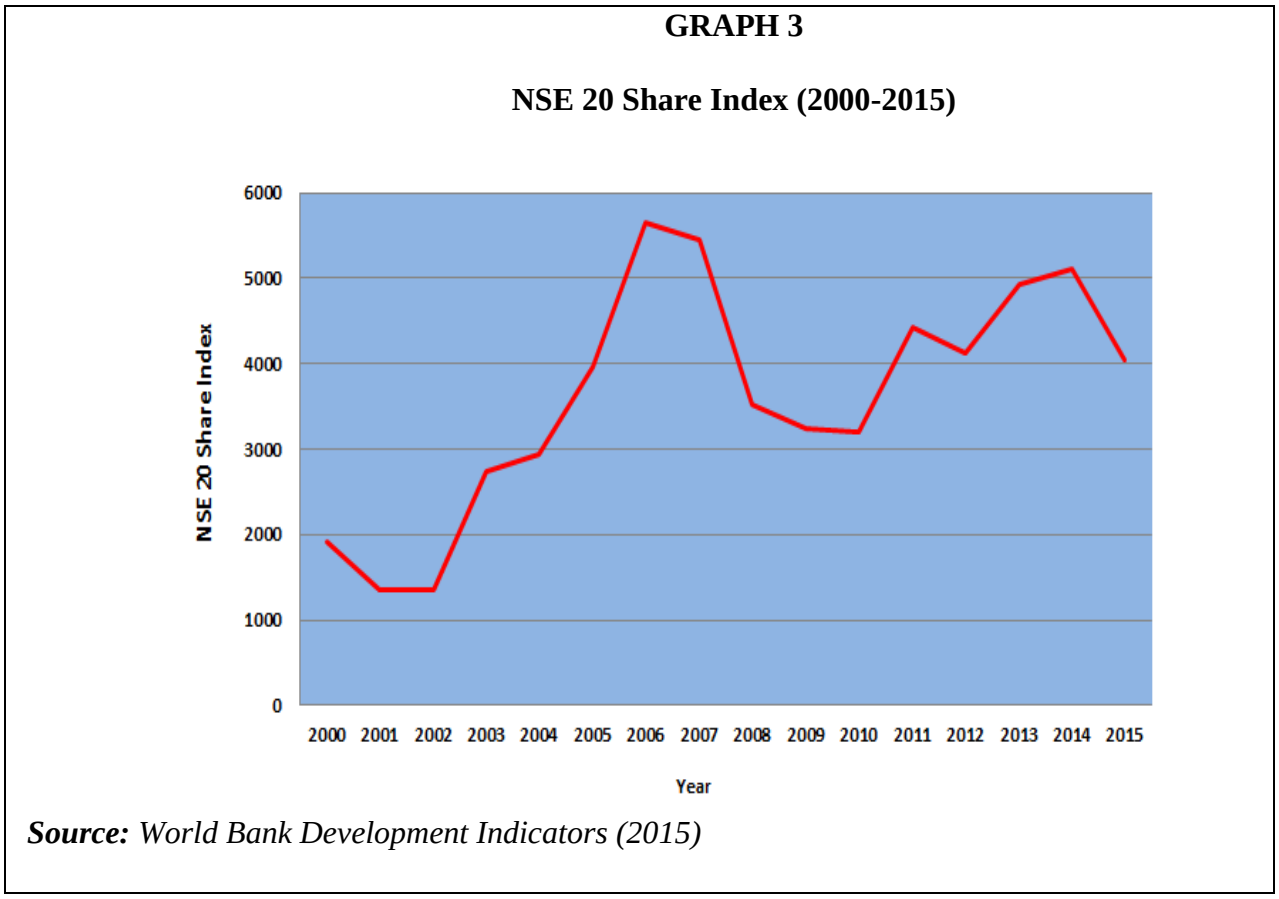


Source: *World Bank Development Indicators (2015)*

In principle NSE share index is a weighted average index that is used to measure at the Nairobi Securities Exchange. It measures the performance of 20 blue chip companies strong fundamentals and which have consistently reported positive results (NSE handbook manual, 2008). According to KNBS (2015) the NSE 20 share index was below 2000 points between the year 2000 and early 2003, but later picked up over the years to 5646 points in

before it started fluctuating between the year 2009 and 2014 which was mainly attributed to by by the post-election violence in 2008.. From 2004 the NSE 20 share index started increasing reflecting a well performing capital market shown in figure 3 below.

Figure 3: NSE 20 Share Index (2000-2015)



Source: *World Bank Development Indicators (2015)*

1.1.2 Outlook of Economic Growth in Kenya

After independence, the government of Kenya stimulated rapid economic growth through public investment, encouragement of small scale agriculture production and incentives for private often foreign industrial investment which led to the increase of the annual GDP to an average of 6.6% from 1963 to 1973 (Ikikii and Nzomoi, 2013). However, from 1974 to 1990 Kenya's economic performance declined due to the country's inward looking policy of import substitution and rising oil prices that the made the manufacturing sector uncompetitive as well as the lack of

export incentives, tight import controls and foreign exchange controls that made the domestic environment even less attractive (Odhiambo, 2004).

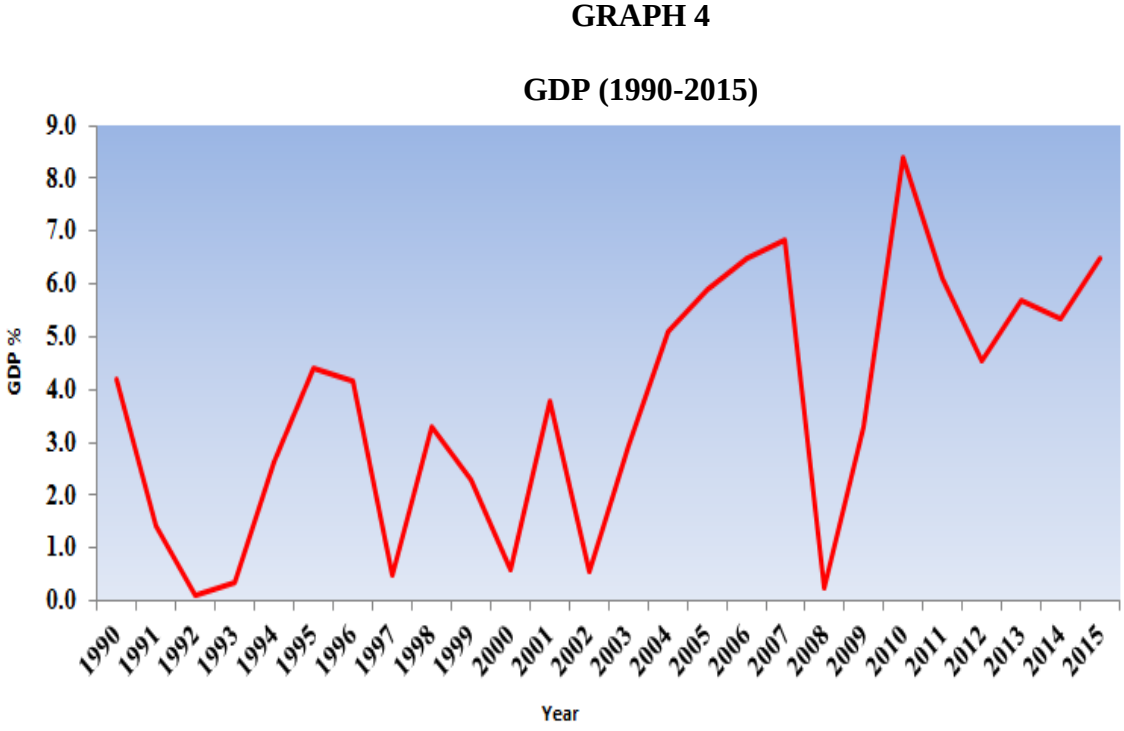
In 1991 bilateral and multilateral donors suspended program aid due to the fact that the government budget deficit was over 10% of the country's GDP which was mainly caused by the inflation rate hitting the 100% mark and the fact that agricultural production declined significantly. According to Odhiambo.N (2008) in 1993, the government of Kenya with the assistance of the World Bank and the International Monetary Fund, begun a major program of economic reform and liberalization, as part of the program the government eliminated price controls, import licensing, removed foreign exchange controls and introduced conservative fiscal and monetary policies, which led to the increase of the GDP to an average of 4% between 1994-1996.

In 1997 the economy went into a slow growth due the adverse weather conditions and political instability caused by the general elections in December 1997. This was followed by the stable improvement after the transition from the KANU government to the new coalition government. However in 2000, GDP growth rate slumped down following weak macroeconomic performance and governance-related problems that continue to pitch Kenya against the major international donors, thereby depriving the country of much needed external inflows (Gachie, 2010). The deteriorating economic performance is reflected in poor fiscal performance, rising inflation and a depreciating local currency.

In 2003, the country developed the economic recovery strategy for wealth and employment creation as a policy for setting back the growth path after a year of economic stagnation. The strategy was a shift from the previous planning documents that sort to reduce poverty, instead creating wealth and employment (Odhiambo, 2004). The implementation of this strategy was

viewed successful as the economy maintained a rapid growth from 2005 to 2007 of 5.9% to 7%. 7%. However, the growth recorded a major decline in 2008 of 1.6% and in response, the government put up measures to stimulate growth including restoring investor confidence, expansionary fiscal policy, monetary policy focusing on achieving and maintaining price stability within a single digit inflation rate. These reforms have been among the many contributors to the increase gross domestic product which stands at 6.5% in 2015.

Figure 4: GDP (1990-2015)



Source: *Author (2016)*

1.1.1 Development of Nairobi Securities Exchange

In Kenya the Nairobi Securities Exchange (NSE), acts as the country's stock market. It was formally established in 1954 and has experienced gradual growth with 63 companies being listed in the stock market to date. In 2002, the central depository and settlement corporation (CDSC) was established as a legal system which owns automated clearing, settlement and depository

registry system. Later on in 2006, the NSE saw the implementation of live trading on the automated trading system (Wambui, 2005). Later on 2011 the Nairobi Stock Exchange Limited, changed its name to Nairobi Securities Exchange Limited. The change of name reflected the strategic plan of the of the stock market to evolve into a full services securities exchange which supports trading, clearing and settlement of equities, debt derivatives and other associated instruments. In the same year the equity settlement cycle moved from the previous T+4 settlement cycle to the T+3 settlement cycle, this allowed investors who sell their shares to get their money 3 days after the sale, buyers of these share would have their CDS account credited with shares in the same time.

Recently in 2011 the FTSE NSE Kenya 15 and FTSE NSE Kenya 25 indices were launched, this launch gave investors the opportunity to access current information and provide indication of the Kenyan equity market's performance during trading hours. In 2008, the NSE All Share Index was introduced as an alternative index; its measure is an overall indicator of market performance. Later on 2011 the Nairobi Stock Exchange Limited, changed its name to Nairobi Securities Exchange Limited. The change of name reflected the strategic plan of the of the stock market to evolve into a full services securities exchange which supports trading, clearing and settlement of equities, debt derivatives and other associated instruments www.nse.co.ke. However, the stock market has also experienced challenges in its growth. For example, there was a decline in performance on the stock market from 1997 to 2002 which according to Gachie (2010), the poor performance was largely attributed to inappropriate policies relating to agriculture, land and industry coupled with poor balance of trade and weak governance. Besides the influence of the political environment, the Kenyan stock markets still faces inefficiencies that include recurrent poor macroeconomic events, low liquidity and inefficient flow of information (Abdallah, 2011).

In view of the above, knowledge on the empirical relationship between Stock Market development and Economic growth is critical. An understanding of the empirical relationship between the two especially in a developing country like Kenya would enable policy makers to understand the implications of decisions relating to the stock market development and management in order to boost the economic growth.

1.2 Statement of the Problem

Many models emphasize that well-functioning markets revolutionize information and transactions costs thereby fostering efficient resource allocation and hence leading to long run growth (King and Levine, 1993; and Beck and Levine, 2001). Kenya being a developing country is by all means researching ways through which to enhance and stabilize the country's economic growth and development which can be done through maintaining a well-functioning stock market. The link between stock market development and economic growth has provoked interest in a number of researchers across the world. However, most researches done in this area have concentrated in more developed countries and have researched both banks and stock market in regards to economic growth; even then the results have not been consistent. Various studies like one done by Levine (2005); Adjasi and Biekpe, (2006); Beck and Levine, (2004); and Levine and Zervos, (1996) have shown some significant positive relationship between stock market development and economic growth. However, Ake and Ognaligus, (2010); and Nagaraj, (1996) have indicated a negative relationship between the two variables. Other studies have found that stock market development has no effect on economic growth, for instance (Haque, 2013).

In Kenya Ikikii and Nzomoi (2013) investigated the effects of stock market development and and economic where they established a positive correlation between stock market development development and economic growth. However, the study only used stock market capitalization

and total value of shares traded as indicators of stock market development. Market measures the size of the stock market while total value of shares traded measures liquidity of stock market, therefore the current study will add NSE 20 share index as another stock market development indicator which is a measure of stock market performance which the previous left out. According to Downes and Goodman (2003), a stock index is a measure of of a group of stocks which may be seen as a representative of a stock market this justifies the of NSE20 share index as a stock market performance indicator. Again the study used linear regression to analyze the effect of stock market development on economic growth which was adequate enough to analyze the quantitative effects of stock market development on economic growth; therefore the current study will use time series econometric models to help describe empirical effect of stock market development on economic growth.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of our study is to establish the effect of stock market development on economic growth in Kenya from 2000 to 2015.

1.3.2 Specific Objectives

To expound on the effect of stock market development on economic growth this study specifically seeks:

i. To determine the effect of market capitalization on economic growth in Kenya.
ii. To assess the effect of total value of shares traded on economic growth in Kenya.
iii. To evaluate the effect of NSE 20 share index on economic growth in Kenya.

1.4 Research Questions

i. Does market capitalization have an effect on economic growth in Kenya?

ii. Does total value of shares traded have an effect on economic growth in Kenya?

iii. Does NSE 20 share index have an effect on economic growth in Kenya?

1.5 Significance of the Study

This study will be of great use to the government and the capital markets regulatory authorities as it will shed light on the importance of formulating and implementing strategic policies on the Stock Markets to ensure relative stability and consistent growth and development. The study will also contribute to existing literature in the field of financial markets and economic growth and shall subsequently serve as a source of reference material for future researchers interested in related topics.

1.6 Limitations of the study

The study used data from three different data sources Capital Markets Authority and Central Bank of Kenya and Kenya National Bureau of Statistics as opposed to one data source.

1.7 Scope of the Study

The research will analyze the effect of stock market development indicators on gross domestic product using quarterly data for the period 2000 to 2015. The study uses three indicators of stock market development namely market capitalization, total value of share traded and NSE 20 share index.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section of the study will seek to review academic research carried out on the effect of stock market development on economic growth. It will focus on theoretical review composed of the

finance growth theories as well as empirical review which will focus on stock market development and its interaction with economic growth.

2.2 Theoretical Review

This section shall focus on the three major theories that set to explain the how financial markets affect economic growth namely Neo-classical theory, Schumpeter Finance Growth Theory, McKinnon and Shaw Theory each emphasizes different aspects of the how financial markets affect economic development.

2.2.1 Neo-Classical Theory

Neo-classical theory explores economic activities from the perspective of single representative agent, comprising all private households and firms. The theory asserts that under certain assumptions: competitive markets, constant returns to scale, homogenous agents and goods, perfect foresight and information a precise analysis of the optimality conditions of the intertemporal resource transfer, which is the extent to which the representative agent should forgo consumption, accumulate capital, and allocate resources over time. This theory emphasizes on savings as a drive to economic growth through allocation of savings to productive investment projects. The theory helps this study explain the effect of market capitalization on economic growth through accumulation of savings, whereby an increase in savings in financial markets leads to availability of more funds to be allocated to firms in need of capital to fund their projects, this will therefore motivate more firms to be listed in the securities exchange which in turn leads to the growth of market capitalization. An increase in stock market capitalization translates to more funds being allocated to productive investment projects therefore enhancing economic growth (Odhiambo, 2004). According to Winkler (1998) this theory provides a

justification of differences in financial markets development and growth in different economies world-wide.

2.2.2 Schumpeter Finance Growth Theory

According to King and Levine (1993) Joseph Schumpeter was the first economist to illustrate the relationship between financial markets and economic development as the starting point of theory of economic development. Schumpeter (1912) asserts that in the form of credit and equity, the financial markets - personified by the ”banker” and the ”capitalist” ,place the capital at the disposal of entrepreneurs where the latter need to perform their function of introducing new combinations of products and means of production. Functioning financial markets are thus a central prerequisite for economic development because they furnish capital to those economic agents who can put capital to the most productive uses.

This theory emphasizes on the importance of financial markets development on economic growth as it elaborates that how financial markets help steer economic growth through the efficiency of the process of financial intermediation between ultimate lenders and by mobilizing savings, managing risk, screening and monitoring investment projects and reducing transaction costs. When efficiency of financial intermediation is maintained and transaction costs are reduced in a market, liquidity of the market as well is improved. This helps the study explain the effect of high market performance, increase market turnover and increase in total value of shares traded in a stock market to economic growth. The increase in market turnover and total value of shares traded implies that a market is liquid enough to increased trading activities at low transaction cost which means that resources are being mobilized from savers to investors efficiently which means translates to a well performing market.

2.2.3 McKinnon and Shaw Theory

McKinnon (1973) and Shaw (1973), in separate but identical works, provide a modern theoretical framework within which growth effects of financial-system development can be derived in the context of developing countries. In their theory they highlighted financial deepening, financial repression and liberalization of financial markets as the major propositions regarding finance and economic growth. They argued that financial deepening through growing financial intermediation and regulation of monetization of the economy, aids economic development. Secondly, that financial repression, whereby in many third world countries the governments hold the interest rates in the organized banking sector artificially low and provide subsidized credits either to favored sectors or to themselves, is inimical to long-term economic growth. Lastly, that liberalization of these repressed credit markets will foster development, since raising interest rates to their equilibrium levels leads not only to higher savings but also to more efficient use of investment resources.

This theory builds up on this study by emphasizing on financial deepening through growing growing financial intermediation as a drive towards economic growth. In principle financial intermediation in stock markets can only be achieved if there is availability of adequate savings savings to mobilize to investors, as well an efficient market that reduces transaction and information costs so as to enhance liquidity. This theory helps the study to explain the effect of of increase in market capitalization, high market turnover and increase in total value of shares traded to economic growth. The theory explains that an increase in available funds leads to an increase in market capitalization as more funds are available for investors to borrow. Secondly Secondly that transaction and information costs can only be reduced if the market has high liquidity, and increase in liquidity leads to an increase in turnover and total value of shares

traded. An increase in savings and an efficient market enables a smooth and effective intermediation which in turns drives economic growth.

2.3 Empirical Review

This section endeavors to review the literature on stock market development and economic growth. Stock market development indicators are market capitalization, NSE 20 share index and total value of shares traded. Literature cannot be separated as per the study's objectives as stock market development is measured by its size, liquidity and performance concurrently.

2.3.1 Empirical Review on Stock market Development and Economic Growth

In principle stock markets are expected to accelerate economic growth by providing a boost to domestic savings and increasing the quantity and quality of investments (Singh, 1997). The stock markets simulate growth through savings amongst individual, providing an opportunity for business financing and efficient resource allocation in the economy Osamwonyi and Kasimu, (2013). These functions of the stock market on the economy have led to an increased interest in research on the effect of stock markets development on economic growth. An extensive number of empirical investigations have been conducted aiming to test the theoretical effect of stock market development on economic growth using different techniques**.**

Wild and Lebdaoui, (2014) investigated the relationship between stock market and economic growth in Morocco using quarterly data from the period 2000 to 2013. They all market share index, total value of shares traded ratio, market capitalization ratio and based stock market development index as their stock market development indicators. Their exhibited that there exist a negative long run relationship between stock market development economic growth and no short run link between the variables. They also established a unidirectional causality from economic growth to all market share index, traded volume and

stock market index and no causality between market capitalization ratio and economic growth. growth. The study reported that stock market development does not stimulate economic growth growth in Morocco. This can be explained by the fact that high stock prices excludes strata from from partaking in the financial development and also that high stock prices do not necessarily enhance economic growth since high stock prices only translates to positive effects to companies companies if they issue new equity and increase their capital base which may not be warranted in warranted in an emerging market. Their results can also be explained by Kunt and Levine, (1996) argument that increased rate of return in investment accompanied by higher savings rates rates as consequences of the substitution effects undermines economic growth. The negative relationship between economic growth and stock market development is due to a threshold effect effect and that financial development is expected to reach certain levels before it is able to spur spur economic growth

Kolapo and Adaramola, (2012) examined the impact of Nigerian capital market on it economic growth from 1990 -2010. They used market capitalization ratio, total new issues, total total volume of shares traded ratio, total number of listed equities and government stocks as their their stock market indicators. They applied Johansen cointegration and granger causality test to to test the relationship between the capital markets and economic growth. The study established established that market capitalization, total listed equities and government stocks had a positive positive relationship with economic growth while total new issue and total value of transactions transactions had an inverse relationship with economic growth. The causality test results suggested bidirectional causality between economic growth and the total value of transactions and a unidirectional causality from market capitalization to economic growth. They also found found that there was no causation between economic growth and total new issues as well as

economic growth and total number of listed companies and government stocks. They that capital markets have a positive impact on economic growth of Nigeria but not due to low market capitalization, small market size, few listed companies in the stock low volume of transactions and illiquid markets among many others.

Nazir; Nawaz; and Gilani, (2010) studied the relationship between stock market development and economic growth in Pakistan for the period 1986 to 2008. Their study used market capitalization ratio and total value of traded shares ratio as their stock market development indicators while controlling for foreign direct investment. The study used annual data as opposed to quarterly data which could have led to more refined results due to the use of shorter intervals of data. They found that both market capitalization ratio and total value of shares traded ratio have a positive and significant impact on economic growth as measured by gross domestic product. However the impact of size is greater than the liquidity available in the stock market, which could be assessed by the greater value of the coefficient of size as compared to liquidity that is the level of significance of the variables. They concluded to have found a positive and significant relationship between market size, market liquidity and economic growth. Their results also revealed that economic growth in Pakistan can be achieved by increasing the size of the stock markets as well as market capitalization.

Mohtadi and Agarwal, (2000) examines the relationship between stock market and economic growth for 21 emerging markets from 1977 to1997 using dynamic panel The study used market capitalization ratio total value of shares traded ratio and turnover ratio stock market development indicators while controlling for foreign direct investment, and secondary school enrollment. The study found that turnover ratio is an important and statistically significant determinant of investments by firms and that these investments in turn

significant determinants of economic growth. The study also found that foreign direct investment investment has a strong positive influence on economic growth. Total value of shares traded is negatively and only marginally significant to economic growth and this can be explained by the the fact that total value of shares traded oscillates from period to period where and gross domestic product is more or less an increasing function causing total value of shares traded to be be negatively significant to economic growth. Their results also indicated that market capitalization ratio is positively significant to economic growth though turnover ratio has a higher impact due the fact that a stock market that is larger in size leads to higher investment opportunities rendering market capitalization a better instrument to represent investment. Generally this paper established that stock market development has a positive impact on economic growth both directly and indirectly, that is the direct channel where turnover ratio has has a positive impact on economic growth while indirectly market capitalization ratio affects investments which in turn affect economic growth.

Naik and Padhi, (2013) examined the impact of stock market development on economic growth using dynamic panel evidence from 27 emerging markets economies over the period 1995 -2012. They used market capitalization ratio, trade volume ratio and turnover ratio as stock stock market development indicators. They also constructed a 3 alternate composite indices of stock market development and used them in the growth regression each at a time while adjusting adjusting for foreign direct investment, trade openness, inflation rate, exchange rate and aggregate investments. Their study found that all the three indices had positive and significant impact on economic growth for the sample of 27 emerging economies. While analysis the results of the stock market development indicators individually they found that market capitalization had a positive and insignificant impact on economic growth implying that market

market capitalization may not be an effective channel to endorse economic growth this is due the fact that stock markets in emerging markets are small. However total value of shares and turnover ratio had positive and significant impact on economic growth this can be by the fact that liquid markets allow investors to alter their portfolio faster and chiefly making investment less risky by improving capital allocation which in turn enhances the prospect of economic growth. Foreign direct investment was found to be a significant variable towards enhancing economic growth while investment ratio and trade openness were positive and significant in explaining the level of economic growth. Exchange rate was found to be significant to economic growth denoting that a poorly managed exchange rate may inhibit the level of economic growth. The study concluded to have found a unidirectional causality that from stock market development to economic growth.

Alajekwu and Achugbu, (2011) investigated the role of stock market development on Nigeria's economic growth using a time series data from the period 1994 to 2008. The study used market capitalization ratio, total value of shares traded ratio and turnover ratio as their stock market development indicators. Their results found that there exist a negative correlation between market capitalization, total value of shares and economic growth while a strong positive correlation was established between turnover ratio and economic growth. This was interpreted to mean that liquidity as measured by turnover ratio is significant to economic growth but that does not establish for market size. They suggested with caution that stock market size is not a significant drive of economic growth since multicollinearity was present in their data used for analysis.

Levine and Zervos, (1998) examined the empirical association between stock market development, banking development and long run economic growth using pooled cross

times regression on 41 countries from the 1976 to 1993 while controlling for international integration. They used market capitalization ratio, total value of shares traded ratio and turnover turnover ratio as the study's stock market development indicators. The study found that market market capitalization and volatility and international integration were not robustly linked to economic growth, while stock market liquidity and banking development are positively and robustly correlated with future economic growth, capital accumulation and productivity growth. growth. Their findings also suggested that banks provided different financial services from those those delivered by stock markets. They suggested that theories were needed where both stock markets and banks arise and develop concurrently while providing different forms of financial services to the economy. Their study concluded that their exist a strong correlation between overall stock market development and long run economic growth, implying a positive relationship between stock market development and economic growth and that financial factors factors are an fundamental part of economic growth.

Arestis and Demetriades, (2010) examined the relationship between stock market development and economic growth in five developed countries (Germany, United States, United United Kingdom, Japan and France) while controlling for banking systems using time series analysis. The study used quarterly data for a period of 1973 to 1997 for Germany, 1972 to 1998 1998 for US, 1974 to 1998 for Japan, 1968 to 1997 for UK and 1974 to 1998 for France. They used market capitalization ratio and total value of shares trades as stock market development indicators. They found that banking system had a positive influence on economic growth in Germany, Japan and France and the absence or weakness of a positive causal link from financial financial development to economic growth in United Kingdom and United states. In the case of of Germany and Japan they found that both banking system and stock market development have

have a positive influence on the long run economic growth. Country Specific findings that the link between financial development and economic growth in UK and US was weak if anything run from growth to financial development. In Japan and France findings proposed that stock market volatility had a negative effect on both countries while in Germany the stock market volatility was found to be insignificant. They concluded that while stock markets are to contribute to economic growth their influence is a small fraction as compared to that of banking system.

Capoasso, (2006) examines the relationship between stock market development and economic growth using an optimal capital structure model to provide a link between components of stock markets and long term economic growth He used market capitalization ratio, number of listed companies, total value of shares traded ratio turnover ratio as the study's stock market development indicators while controlling for institutional and regulatory framework and concentration. He indicates a strong positive relationship between stock market development and economic growth with firms showing greater pre direction towards issuing equity than debt as capital continues to accumulate. That is as economies continue to grow, information costs continue to decrease as well as the cost of equity relative to debt financing which promotes the development of stock markets.

Baboo Nowbutsing, (2009) investigated the impact of stock market development on growth in Mauritius using time series econometrics models for the period 1989 to 2006. He analyzed both short run and long run relationship between the variables using error correction model. His study used market capitalization ratio and total volume of shares traded ratio as market development indicators, while controlling for foreign direct investment and human capital. The study resolved to have found that there exist a positive and significant

between market capitalization ratio and liquidity as measure by total value of shares traded ratio. ratio. He also found that liquidity had a greater impact on economic growth as compared to the the stock market size. He also found that his control variable, foreign direct investments and human capital were crucial determinants of economic growth in Mauritius.

Aboudou Tachiwou, (2010) examined the impact of stock market development in West African Monetary Union (Benin, Burkina-Faso, Ivory Coast, Mali, Niger, Senegal and Togo). The study used a time series econometric investigation over the period of 1995-2006. The study analyzed both short run and long run relationship using error correction model. He used market capitalization ratio and volume of share traded ratio as stock market development indicators while controlling for foreign direct investment and human capital. The study established that market capitalization and market liquidity were positively and significantly correlated with economic growth but in the short run and long run, but stock market liquidity had more impact as compare to stock market size. He has also concluded that foreign direct investments and human capitals are crucial determinants of economic growth and that the impact of foreign direct investment on economic growth depends on the local conditions and absorptive capacities.

Mohtadi and Agarwal, (2000) examines the relationship between stock market development and economic growth for 21 emerging markets from 1977 to1997 using dynamic panel method. The study used market capitalization ratio total value of shares traded ratio and turnover ratio as stock market development indicators while controlling for foreign direct investment, investment and secondary school enrollment. The study found that foreign direct investment has a strong positive influence on economic growth. As the study found foreign direct investment to be positively and significant related to economic growth.

2.3.3 Summary of the Literature

Recent researchers as discussed above have established varied views and used different methodologies in establishing the effect of between stock market developments on economic growth. In Kenya Ikikii and Nzomoi, (2013) investigated the effects of stock market development and economic where they established a positive correlation between stock market development and economic growth. However, the study only used stock market capitalization and total value of shares traded as indicators of stock market development which measure market size and liquidity. The current study will add NSE 20 share index as another stock market development indicator which will measure performance. Also their study used linear regression to analyze the effect of stock market development on economic growth which was not adequate enough to analyze the quantitative effects of stock market development on economic growth; therefore the current study will use time series econometric models to help describe the empirical effect of stock market development on economic growth. This study seeks to contribute to the existing literature by focusing on the effect of stock market development on economic growth from a developing economy perspective; the study is limited to Kenya as a developing country due to data unavailability. The studies done on the effect of stock market development on economic growth have mainly adopted market capitalization, value of total shares traded and market share index as stock market development indicators, which this study will also adapted.

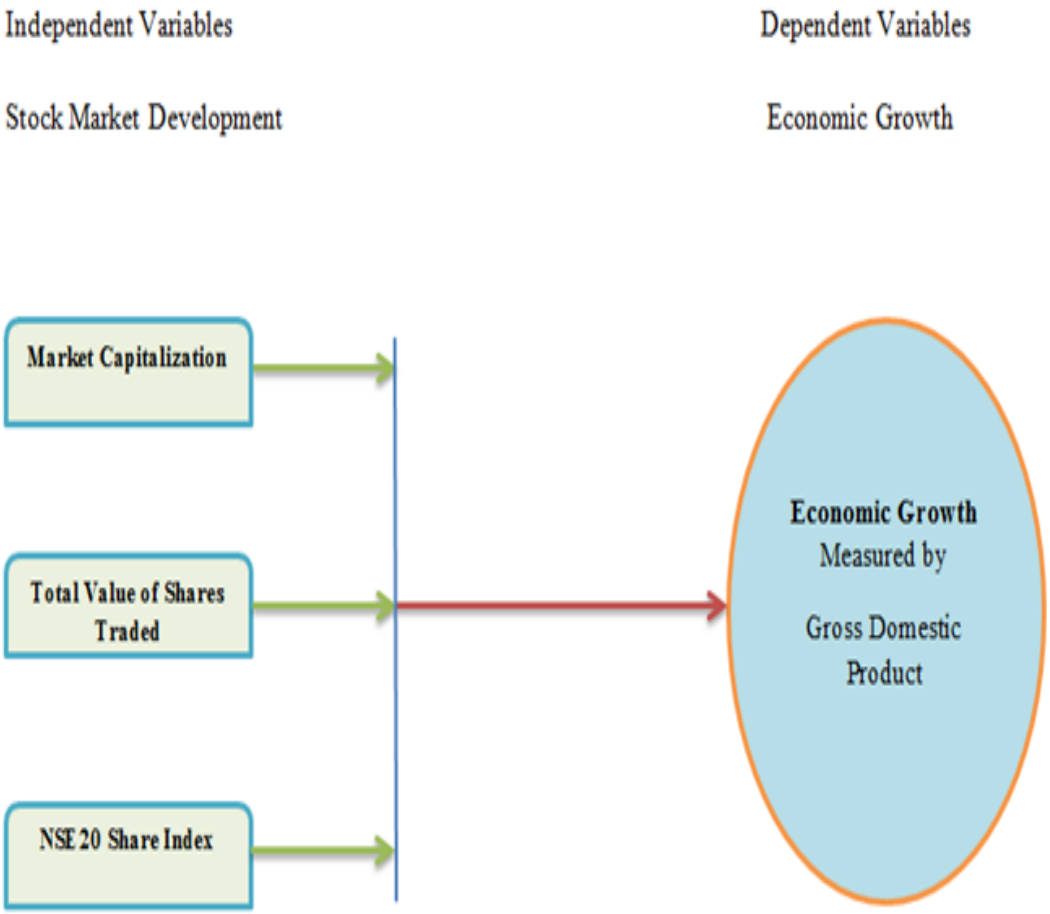
2.4 Conceptual Framework

The study seeks to explore the effect of stock market development on economic growth using quarterly data for the period 2000-2015. The independent variable is stock market development measured by market capitalization, total values of shares traded and NSE 20 share index, while the dependent variable is economic growth measured by gross domestic product.

Figure 5: Conceptual Framework

Diagram 1

Conceptual Framework



Data Source: *Author (2016)*

2.4.1 Description and Measurement of Variables

Table 1: Description of Variables

Table 1

Description of Variables

Variable	Abbreviation	Definition
Market Capitalization	MCR	This is the value of market capitalization of listed shares. It is the size based measure which provides opportunities for risk diversification, and has the capabilities of capital allocation to investment projects. MC = Log MC
Total Value of shares traded	TV	This is the measure of the total value of shares traded on the stock market. It is a liquidity based measure which provides the value of organized trading of the firm equity. TV = Log TV
NSE 20 Share Index	NSE 20	This is a weighted average index that is used to measure Nairobi Securities Exchange performance. It is an indicator of performance that captures performance of 20 blue chip companies with strong fundamentals. NSE20 = LogNSE20
Economic Growth	EGt	This is the increase in capacity of an economy to product goods and services. In this study it is measured by GDP which is the monetary value of all finished goods and services produced within a country. EGt = Log EGt

Data Source: *Author (2016)*

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methods used in conducting the study. It will focus on the research design, the population of study, the sample as well as the procedures used in data collection.

3.2. Research Design

The study is a descriptive study that aims to model the effect of stock market development on economic growth. A descriptive study seek to answer 'why' 'how' 'when' questions and its findings help a researcher to understand the characteristics of an individual or group in a given situation. A descriptive study was deemed most suitable for answering the 'how' questions that will be asked by the researcher with regard to how stock market development affects economic growth.

3.3. Target Population

According to Cooper et al, (2000) a population is the total collection of elements about which the researcher wishes to make some inference. For purposes of the study, the target population will comprise all 56 firms listed in the Nairobi Securities Exchange in 2000 to 65 firms listed in 2015. (See appendix 1).

3.4 Sample Size and Sampling Technique

All firms listed in NSE for each year from the year 2000 to 2015 shall be used in this study. The population shall comprise the 56 firms listed in NSE in 2000 to the 63 listed as at the end of 2015. The study uses census as the sampling technique, market capitalization, and total value of

shares traded and NSE 20 share index of the firms in the target population shall be calculated quarterly from the year 2000 to 2015 which equates to 64 observations and their impact analyzed on the economic growth as measured by the gross domestic product.

3.5 Data Collection

The study will use time series quarterly data of stock market development indicators and economic growth indicator for the period between 2000-2015.The data is obtained from Capital Markets Authority, Kenya National Bureau of Statistics.

3.6 Data Analysis

The study will use econometric models to examine the effect of the stock market development indicators on Economic growth. For the purpose of this study, Johansens' (1988) test for cointegration will be used to establish if there is any long term equilibrium relationship among variables. If a cointegration relationship is established between the variables, then vector error correction model is applied in order to evaluate the short run properties of the cointegrated series. On the other hand if no cointegration relationship is established between the stock market development indicators and economic growth, then vector auto regression model (VAR) is used to analyze the relationship. STATA will be the statistical software to be used.

3.6.1 Growth Model

To analyze the short and long run relationships between the stock market development and economic growth the below model was adopted:

$EGt = f\ (SMDt) + \mu t$

Where;

EGt is the economic growth indicator

SMDt is the stock market development indicators

μt is the error term

The growth model in the equation will be analyzed using the following steps:

Step 1

Test for Stationarity

When non-stationary time series data is used for analysis, one may end up with spurious results because estimates obtained from such data will possess non-constant mean and variance Dimitrova, (2005), that is test statistics may often show significant relationship between variables in regression models even when such relationship do not exist between them. To avoid spurious regression it is important to test for stationarity as time series data are often assumed to be non-stationary. A time series is said to be stationary when its mean, variance and covariance are time invariant. There are two tests used to test for stationarity the Augmented Dickey Fuller Test and the Philips Perron test. When using the ADF the test statistic does not follow the usual "t"-distribution under the null since the null is one of non-stationarity but rather follows a non-standard distribution, critical values are derived from Monte-Carlo experiments (Fuller, 1976). It is however be noted that such critical values have been incorporated in STATA as used in this research. Philips and Perron (P-P) test on the other hand have developed a more comprehensive theory of unit root non-stationarity. The tests are similar to ADF tests but they incorporate an automatic correction to the DF procedure to allow for auto-correlated residuals. For the purpose of this research, Augmented Dickey Fuller Dickey and Fuller, (1981) unit root tests will be applied to test for the stationarity of the above mentioned series. Using the augmented Dickey Fuller (ADF) test, the problem of non-stationarity is examined and solved as below.

A unit root test is used to test for stationarity; in this case Augmented Dickey Fuller (1979) test was used.

The ADF involves the estimation of the following regression:

$$\Delta Y_t = \alpha + \beta Y_{t-1} + \sum_{j=1}^{k} \lambda j \ \Delta Y_{t-j} + e_t \quad \text{..... (1)}$$

Where $\triangle$ is the difference operator, Y_t is the series being tested, k is the number of lag differences and e_t is the error term. α is the constant term, β is the vector coefficient on Y_{t-1} λ_j is the lag, Y_{t-j} are the lagged changes.

The following hypothesis is tested in the stationarity tests:

$H_0 : \beta = 1$ (Non- stationarity)

$H_1 : \beta < 1$ (Stationary)

Step 2

Lag Selection

It is important to select an appropriate lag length as it ensures that the error term is not misspecified (Enders, 1995). The lag length is selected by using information selection criteria such as Akaike Information Criterion (AIC), Final Prediction Error (FPE) criterion, Sequential modified Likelihood ratio (LR) criterion, Schwarz Bayesian Information Criterion (SBIC) and Hannan –Quinn Information criterion (HQC) ensuring that the residuals are white noise. There is no unanimous agreement on which criterion to use in case of conflicting results among the above methods. However the decision rule is to choose the model with the lowest value of information criteria.

Step 3

3.7 Cointegration Test

In order to investigate the long run relationship between the stock market performance indicators and economic growth, we test the series for cointegration. If the series is cointegrated, the granger representation theorem states that there is a corresponding error correction term and an error correction model must be constructed. After obtaining results of the unit root test above, if the series is integrated of the same order, Johansen's procedure is used to determine whether there exists a cointegrating vector among variables (Johansen, 1988). However if the series is not integrated to order one, it is not possible to test for causality using Cointegration test (Aydemir and Demirhan, 2009). In such an event the Toda – Yamamoto (1995) is used in establishing the casual relationship between series. The integrating property is not important in the Toda – Yamamoto as long as the order is clearly specified; the casual relationship can be established between the series which are integrated with different orders.

As proposed by Johansen and Juselius (1990), we compute the trace (λtrace) and maximum eigenvalue (λmax) statistics that are used in determining the number of cointegrating vectors.

$$\mathbf{Y_t = A_0 + \sum_{j=1}^{k} Aj\ Yt + \varepsilon_t} \quad \textbf{(2)}$$

Where A_0 is an (n x 1) vector of constants, y_t is an (nx1) vector of non-stationary I (1) variables, k is the number of lags, A_j is an (n x n) matrix of coefficients and ε_t is assumed to be a (nx1) vector of Gaussian error terms. Since the above is based on VAR, it is further transformed and turned into a VECM model in order to use Johansen and Juselius test below;

$$\boldsymbol{\Delta\, Yt = A0 + \sum_{j=1}^{k-1} \Gamma j\, \Delta\, t - j + \Pi yt - k + \varepsilon t} \quad \textbf{(3)}$$

Where;

$$\Gamma \mathbf{j} = -\sum_{\mathbf{I=j+1}}^{\mathbf{k-1}} \mathbf{Aj}\ \ \Delta\ \mathbf{yt-j} \text{ and } \quad \Pi = -\mathbf{I} + \sum_{\mathbf{I=j+1}}^{\mathbf{k}} \mathbf{Aj}$$

In this case I, is an (n x n) identity matrix, and Δ is the difference operator. The stock market development indicators are cointegrated to economic growth if the error term is stationary.

Step 4: Choosing between VAR and VECM

3.8 Vector Error Correction Model

If a cointegration relationship is established between the variables, it holds that there exists a long term equilibrium relationship between the variables but in the short run they may exhibit some level of deviation from such equilibrium. To correct such deviation a vector error correction model is fitted and such models take the general form;

$$\Delta\, \boldsymbol{EGt} = \boldsymbol{\alpha\, \beta\, EG\, t-1+\varepsilon t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(4)}$$

Where;

EGt = $\begin{pmatrix} EG1t \\ EG2t \end{pmatrix}$ α is the adjustment coefficient, β= the cointegrating vector and

εt = $\begin{pmatrix} \varepsilon 1t \\ \varepsilon\ 2t \end{pmatrix}$ determines the shocks or deviations from long run equilibrium

In this case therefore, α determines the speed of adjustment back to equilibrium while β specifies the integrating equations. A negative and significant coefficient of the error correction term that is ε_t indicates that any short- term fluctuations between the independent variable and the dependent variable will give rise to a long run stable relationship between the variable.

3.9 Vector Auto Regression Model

If cointegration relationship is not established between the stock market development and economic growth, the Vector Auto regression model (VAR) is used to analyze the relationship. The use of VAR is justified since it is possible to simulate the response over time of any variable in a set to either an own innovations or innovations to any other variables in a system of equations (Sichei, 2002). VAR entails estimating regression equations in which current values of each variable is expressed as a function of lagged values of itself and of each of the selected variables (Orden, 1986). In this study we shall employ the reduced form VAR which models every endogenous variable in the system, as a function of the lagged values of itself and all the endogenous variable in the system (Engle and Granger, 1987) A reduced form VAR in a system of equations is written in matrix form as:

$$\mathbf{EG_t = A_0 + A_1 EG_{t-1} + A_2 EG_{t-2} + \ldots\ldots\ldots + A_k EG_{t-k} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)}$$

Where A_0 is a n x1 vector of the constant terms, A_1 , A_2 , A_3 ……..A_k are nxn matrices of the coefficients, EG_t is a nx1 vector of the endogenous variables (economic growth) and e_t is a vector of serially uncorrelated error terms that are assumed to have a mean of zero and a covariance matrix Ω.

Step 5: Description of the results

3.10 Impulse response functions

In principle, the coefficient estimates of VAR are meaningless because of a lack of theoretical underpinning therefore impulse-response functions (IRFs) are used measure the dynamic marginal effects of each shock on all of the variables over time. The impulse response traces out the responsiveness of dependent variables in the VAR to shocks to each of the variables. That is for each variable from each equation separately, a unit shock is applied to the error and the effects upon the VAR system over time are noted. That is if there four variables in the system, a total of 4^2 impulse responses will be generated. This is achieved through expressing the VAR model that is vector autoregressive model as a vector moving average. Provided the system is stable, the shock should gradually dies down. The implied thought experiment of changing one error while holding the others constant makes most sense when the errors are uncorrelated across equations, so impulse responses are typically calculated for recursive and structural VARs.

3.11 Variance Decomposition

Variance decompositions examine how important each of the shocks is as a component of the overall (unpredictable) variance of each of the variables over time. This is an alternative method to the impulse response functions for examining the effects of shocks to the dependent variables. This technique determines how much of the forecast error variance for any variable in a system, is explained by innovations to each explanatory variable, over a series of time horizons. Usually own series shocks explain most of the error variance, although the shock will also affect other variables in the system. It is also important to consider the ordering of the variables when conducting these tests, as in practice the error terms of the equations in the VAR will be correlated, so the result will be dependent on the order in which the equations are estimated in the model.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the results of data analysis, where we analyse the characteristics of the data using visual aids and descriptive statistics before analysis of data using multiple regression. Thereafter we check the data for stationarity and cointegration and model the data using multivariate time series.

4.2 Descriptive Statistics

The descriptive statistics for the data is as illustrated on table 2 below. Histograms for the study are presented in Figure 12 in Appendix 1. From the histograms, the distribution of Economic Growth appears to be skewed to the right whereas Market Capitalization, Total Value of Shares Traded and NSE share index appears to be slightly skewed to the to the left which agrees with the descriptive statistics in Table 2 below that indicates the data has a significant deviation from the normal distribution, our visual inspection of the data and given the size of our data indicate that this may not cause much problems to our analysis

Table 2: Descriptive Statistics

Table 2

Descriptive Statistics

Variable	Obs	Mean	Std.Dev	Variance	Skewness	Kurtosis	Min	Max
Log EGt	64	11.66408	0.2457073	0.0603721	0.2346638	1.212824	11.3832	12.0219
Log MC	64	11.7444	0.4610261	0.2125451	-0.5318652	2.051956	10.9132	12.3896
Log TV	64	9.520706	0.6485959	0.4206767	-0.6800336	2.533064	8.1214	10.6637
Log NSE	64	3.51498	0.1974423	0.0389834	-0.9674665	2.915054	3.0116	3.7517

Data Source: *Author (2016)*

4.3 Regression Analysis

Some studies have used regression analysis to investigate the effect of stock market development on economic growth (see for example Ikikii & Nzomoi, 2013). In this section, we model our data using regression models and discourse the aptness of using such models which some previous studies have used. We fit a regression model by regressing Economic Growth as the response and the Market Capitalization, Total Value of Shares Traded and NSE Share Index as the predictor variables as indicated on equation 9 below.

$$y = a_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + e_t \quad \text{.....9}$$

Table 3 below indicates that p- value =0.0000 which is less than 0.05 which is the level of significance, therefore indicating that the model is useful in explaining the variance of economic growth.

Table 3: Regression Analysis

Table 3

Regression Analysis

Source	SS	df	MS		
Model	3.45185755	3	1.15061918	Number of obs =	64
Residual	.351583184	60	.00585972	F(3, 60) =	196.36
Total	3.80344073	63	.060372075	Prob > F =	0.0000
				R-squared =	0.9076
				Adj R-squared =	0.9029
				Root MSE =	.07655

LogEGt	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LogMC	1.160778	.0793643	14.63	0.000	1.002026	1.31953
LogTV	-.2527908	.062518	-4.04	0.000	-.3778454	-.1277361
LogNSE20	-.952289	.1262882	-7.54	0.000	-1.204903	-.6996749
_cons	3.785457	.4372982	8.66	0.000	2.91073	4.660184

Data Source: *Author (2016)*

Our theoretical expectation of the model coefficients was mainly positive coefficient for all the independent variables but also negative coefficients were expected mainly because financial development can hurt economic growth, specifically by enhancing resource allocation and hence the returns to savings, may lower savings rates; that is if there are sufficiently large externalities associated with savings and investment, then financial development slows long run growth (Beck and Levine ,2001). Secondly Singh (1997) argues that the inherent volatility and arbitrariness of stock market pricing in the developing countries such as Kenya make them a poor guide to efficient investment, in the wake of unfavorable economic shocks, the interaction of stock and currency markets may worsen the macroeconomic stability and hence reduce the long term growth. Negative coefficient on Total Value of Shares Traded and NSE -20 Share Index implies

that a unit increase in Turnover and NSE -20 share index would have a negative impact on economic growth, while positive coefficient on Market Capitalization implies that a unit increase on Market Capitalization would have a positive impact on economic growth. Consequently, we sought to investigate the adequacy of the fitted regression model using model diagnostic tests.

In order to test for adequacy of the model, we check whether the assumptions of OLS estimates have been met through residual analysis. The OLS assumptions to be checked are as mentioned; residuals should be random, there should be a linear relationship between dependent and independent variables, there should be no serial correlation among the residuals and that residuals should be homoscedastic. Scatter plots of response vs predictor of MC, TV and NSE20 shows an approximately linear relationship between the response and predictor as illustrated in figure 13 Appendix III. Histogram for the residual revealed the distribution is slightly skewed to the right which is an indication of non-normal distribution as shown in figure 14 Appendix III. Linearity of the variables is also indicated by the correlation coefficient table 11 in Appendix III. The correlations between variables are not close to zero indicating linearity. Secondly we used a scatter plot of residuals vs fitted values to inspect the randomness of the residuals. If the model is a good fit, the residual plot should not have any apparent pattern. The residual plot shown in figure 15 Appendix III indicates model is a good fit as the residuals have no discernable pattern. Thirdly, we used residual scatter plots to check for correlation of predictors and residuals. The plots are presented in Figure 16 in the Appendix III. The residual plots exhibits no specific pattern which was an indication that the predictors are not correlated to the residuals.

We later, used Durbin Watson test to check for serial correlation of the residuals. We tested the null hypothesis of no first order autocorrelation, under null d=2. The Durbin Watson d statistic of the data is 0.6623836 which is less than two; this indicates that there is no problem of

serial autocorrelation. We then examined the data for residual variance stability, variance of residuals should be constant otherwise they exhibit heteroscedasticity. The study used the Breusch-Pagan to test the null hypothesis that residuals have constant variance. The results of the autocorrelation and homoscedasticity tests are presented in table 12 and 13 in appendix III respectively. From the results, we reject the null hypothesis since $p>0.05$ and concluded that the residuals are heteroscedastic. Lastly we test for multi-collinearity of independent variables using the variance inflation factor for independent variable, all independent variable indicate a VIF of greater 10 which is an indication of multi-collinearity as shown in table 14 in appendix III.

The regression output in Table 3 above indicates the regression model is statistically significant, but not all the OLS assumptions have been met. This compromises the aptness of fitting a regression model to data of this nature. Moreover, we observe that the data is time series and a regression model may not be able to capture the dynamic relationships of such data. Additionally, non-stationarity problems may cause spurious regression. Given these inadequacies, we chose to fit time series models that are more robust in capturing the dynamic structure of time series data.

4.4 Time Series Analysis

In this section, we perform a preliminary analysis of the data by testing for stationarity. The study uses time series plots, correlogram plots and the Augmented Dickey Fuller (ADF) test to check for stationarity. If the data is found to be non-stationary, the study shall proceed to determine the order of integration, before deciding on the appropriate time series model to fit.

4.4.1 Testing for Stationarity

When non-stationary time series data is used for analysis, one may end up with spurious results, therefore to avoid spurious regression it is important to test for stationarity as time series data are often assumed to be non-stationary. The simplest way to check for stationarity is to use time series graphs. The time series plots for the study variables are presented on figure 17, appendix IV. The results indicate possible non stationarity since their movement for all variables exhibit a trend. The correlograms in figure 18 also indicate that the variables may be non-stationary since they die away slowly. To confirm empirically the stationarity of the data we use Augmented Dickey Fuller (ADF) unit root tests, in these case stationarity is declared if the absolute test statistic is greater than the absolute critical value at 5%, which is not the case for our data as illustrated on table 15 in appendix IV where for all variables the absolute test statistic is less than the absolute critical value at 5%. We therefore difference the data to achieve stationarity. Table 15 in appendix IV displays the results of the ADF test after the data is differenced once, after first differencing the absolute t- statistic for all variables is greater than the absolute critical value at 5% hence the data is declared stationary, therefore all variables become stationary after the first difference indicating that the variables are integrated to order one, I (1). Time series plots and correlogram plots in figure 19 and 20 in appendix IV also indicate stationarity of data after the first difference since there is no indication of trending on the time series plots for all the variables as well as the correlograms do not die away. Having established that the variables are integrated to order one, the study will fit a multivariate time series models to our data.

4.4.2 VAR and VECM Models

The study established that the series is integrated to order one; therefore we have to establish whether to fit a VAR model to the differenced series or to use the VECM to model the series. In

order to determine the appropriate model to use, we first have to establish if the series is cointergrated. If the series is cointegrated then fitting VAR models to the differenced data would lead to misspecification of the model. In such a case the appropriate action would be to fit VEC models which will be able to capture both short-term and long-term relationships of the variables.

Therefore we first determine whether there is a cointegrating vector among the variables using the Johanson cointegration test. Cointegration is used to establish the long run relationship between the variables. If the series is cointergrated we use the error correction model to establish the short run equilibrium between the variables. On the other hand if the series is not cointergrated, the VEC model is reduced to a basic VAR. In order to test for cointegration we have to select the optimal lag length, and then we identify the cointergrating rank before we specify the model and test it for adequacy.

4.4.3 Lag Selection

It is important to select an appropriate lag length as it ensures that the error term is not misspecified (Enders, 1995). The lag length is selected by using information selection criteria such as Akaike Information Criterion (AIC), Final Prediction Error (FPE) criterion, Sequential modified Likelihood ratio (LR) criterion, Schwarz Bayesian Information Criterion (SBIC) and Hannan –Quinn Information criterion (HQC) ensuring that the residuals are white noise. There is no unanimous agreement on which criterion to use in case of conflicting results among the above methods. However the decision rule is to choose the model with the lowest value of information criteria. In our case lag selection information criteria are shown in table 4 below. The lowest information criterion for LR, FPE and AIC is lag 3 whereas for HQIC and SBIC is lag 1.

In the event of conflict in lag length selection, the appropriate way is to plot the correlogram of residuals and select the lag length as one where the correlograms are statistically insignificant. That is where all the autocorrelations fit within the given limit. The correlograms for our time series are shown in Figure 15, Appendix IV from these results, we identified the optimal lag length to be 3.

Table 4: Results of VAR Lag Selection

Table 4

Results of VAR Lag Selection

Selection-order criteria

Sample: 2001-Q2 - 2015-Q4 Number of obs = 59

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	340.894				1.3e-10	-11.4201	-11.3652*	-11.2793*
1	361.924	42.059	16	0.000	1.1e-10	-11.5906	-11.3157	-10.8864
2	381.125	38.403	16	0.001	9.8e-11	-11.6992	-11.2043	-10.4315
3	402.712	43.174*	16	0.000	8.3e-11*	-11.8886*	-11.1738	-10.0575
4	412.399	19.373	16	0.250	1.1e-10	-11.6745	-10.7398	-9.28008

Data Source: *Author (2016)*

4.4.4 Cointegration Test

In order to investigate the long run relationship between the stock market development indicators and economic growth, we test the series for cointegration. If the series is cointegrated, the granger representation theorem states that there is a corresponding error correction term and an error correction model must be constructed. The first step is to examine the order of integration of each variable. In the event that series are integrated of order one, Johansen procedure should be used to determine whether any cointegrating vector among variables exist or not (Amalendu, 2012). In our study, the series is I (1), we therefore proceed to test for cointegration using the Johansen cointegration test. As proposed by Johansen and Juselius (1990), we compute the trace (λtrace) and maximum eigenvalue (λmax) statistics. We test the null hypothesis that there are r=0 cointegrating vectors against the alternate that there is at least one cointegrating vectors. Having established earlier the appropriate lag length to be three, we proceed to determine the number of cointegrating equations. When the trace statistic is smaller than the critical value, we accept the null hypothesis of no cointegration otherwise we reject the null hypothesis. From table 5 below, we determine our series to have a cointegration rank of order three since three is the last order where the trace statistics is greater than its critical value therefore we reject the null hypothesis. The results show that there is a cointegrating vector and eventually long run relationship between the stock development and economic growth. Hence an error correction term is required.

Table 5: Johansen Cointergration Test

Table 5

Johansen Cointegration Test

Johansen tests for cointegration

Trend: constant — Number of obs = 60

Sample: 2001-Q1 - 2015-Q4 — Lags = 3

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	36	360.82367	.	99.0354	47.21
1	43	380.02255	0.47269	60.6377	29.68
2	48	396.364	0.41999	27.9548	15.41
3	51	404.00152	0.22476	12.6797	3.76
4	52	410.34138	0.19049		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	36	360.82367	.	38.3977	27.07
1	43	380.02255	0.47269	32.6829	20.97
2	48	396.364	0.41999	15.2750	14.07
3	51	404.00152	0.22476	12.6797	3.76
4	52	410.34138	0.19049		

Data Source: *Author (2016)*

4.4.5 Vector Error Correction Model

If a cointegration relationship is established between the variables, it holds that there exists a long term equilibrium relationship between the variables but in the short run they may exhibit some level of deviation from such equilibrium. The study therefore fits an error correction model where the error correction term represents the adjustment speed of deviations back to the long run equilibrium (Brooks, 2008) in order to correct such deviation. Table 16 in appendix IV illustrates the results of the error correction model. The coefficients; ce1, ce2 and ce1 represent the speeds adjustment of the model towards the long term equilibrium. The second part on the

model represents the short run equation. The study chose to run the VEC model again with one cointergrating equation after the first model did not converge to produce the normalized short term equation. Table 17 in appendix IV represents the new VEC model, table 6 below represents the first part of the model. The VEC model on table 17 below indicates that the long run relationships are established as the coefficient ce1 is negative and significant which agrees with the test of cointergration of the study. The coefficient ce1 represents the speed of adjustment of the model to towards long term equilibrium the results of the vecm model indicate that the model is below equilibrium and will adjust upwards at the speed 75.85% towards long term equilibrium. In the long run market capitalization is negative and significant to economic growth both in lag 1 and 2 while total value of shares traded is positive and significant to economic growth in lag one and lastly NSE20 share index positive and significant to economic growth in the second lag.

Table 6: Part 1 of VEC Model

Table 6

Part 1 of VEC Model

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_LogEGt_D1						
_ce1						
L1.	-.7585417	.1904303	-3.98	0.000	-1.131778	-.3853052
LogEGt_D1						
LD.	-.2104812	.1476142	-1.43	0.154	-.4997998	.0788374
L2D.	-.1678869	.1117117	-1.50	0.133	-.3868379	.051064
LogMC_D1						
LD.	-.6443919	.2084732	-3.09	0.002	-1.052992	-.2357919
L2D.	-.6150224	.1360499	-4.52	0.000	-.8816753	-.3483695
LogTV_D1						
LD.	.1801594	.054811	3.29	0.001	.0727319	.2875869
L2D.	.0447504	.0324117	1.38	0.167	-.0187754	.1082762
LogNSE20_D1						
LD.	.3314915	.1841391	1.80	0.072	-.0294145	.6923976
L2D.	.433257	.1632686	2.65	0.008	.1132565	.7532575
_cons	-.0005264	.0045212	-0.12	0.907	-.0093877	.008335

Data Source: *Author (2016)*

In table 7 below all variables are significant as for all variables P<0.05, the table represent the speed of adjustment speed back to long run equilibriums of each individual variable as illustrated in the short term equation in 10 below.

$$LogEGt\_D1 = 0.0011961 - 1.221855LogMC\_D1 + 0.3501941LogTV\_D1 + 0.6227031\ LogNSE20\_D1 \ldots\ldots 10$$

Table 7: Part 3 of VEC Model

Table 7

Part 3 of VEC Model

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	3	26.76581	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
LogEGt_D1	1	.	.	.	.	.
LogMC_D1	-1.221855	.2700644	-4.52	0.000	-1.751171	-.6925385
LogTV_D1	.3501941	.07888	4.44	0.000	.1955921	.504796
LogNSE20_D1	.6227031	.2339362	2.66	0.008	.1641967	1.08121
_cons	.0011961	.	.	.	.	.

.

Data Source: *Author (2016)*

4.4.5.1 Post estimation specification testing – Stability Test

The study performs post estimation analysis of the model to check for robustness of the model in modeling the relationship between the stock market development and economic growth. First we check for autocorrelation in residuals of VEC model using the Lagrange multiplier test. Then we

check for the stability condition of VEC estimates. After fitting a VEC model, it is required that variables be covariance stationary. If VEC is stable, the impulse response functions have known interpretations. The results of the autocorrelation test and stability of variance are shown in table 8 and 9 below. Figure 6 also indicates that eigenvalues lie inside the unit circle.

Table 8: Lagrange - multiplier Test

Table 8

Lagrange – multiplier test

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	19.5166	16	0.24279
2	17.1175	16	0.37804

H0: no autocorrelation at lag order

Data Source: *Author (2016)*

From the above table we conclude that the VEC model has no autocorrelation at all lags since P> 0.05 at all lags therefore we accept the null hypothesis that the model has no autocorrelation.

Table 9: Stability of Variance

Table 9

Stability of Variance test

Eigenvalue	Modulus
1	1
1	1
1	1
-.7960491	.796049
-.351324 + .6284707i	.720003
-.351324 - .6284707i	.720003
-.5342437 + .4546347i	.701505
-.5342437 - .4546347i	.701505
.01132221 + .692033i	.692126
.01132221 - .692033i	.692126
.1104404 + .1911285i	.220742
.1104404 - .1911285i	.220742

The VECM specification imposes 3 unit moduli.

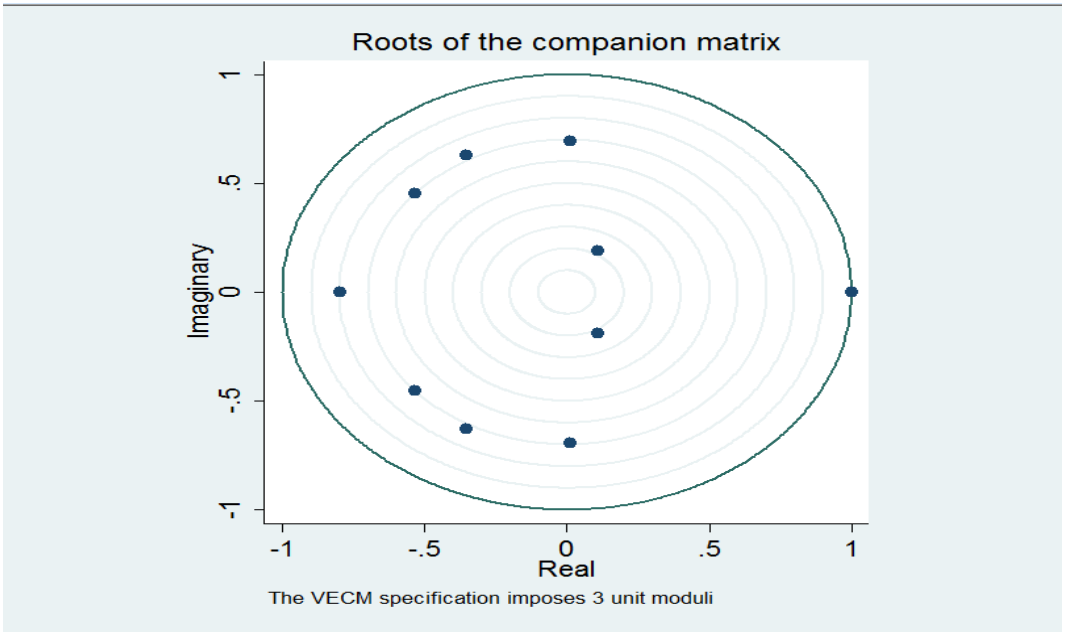
Data Source: *Author (2016)*

The process is stable, if the moduli of the remaining r eigenvalues are strictly less than one, as illustrated on table 9 above the model is stable as all the moduli of the remaining eigenvalues are less than 1.

Figure 6: Stability of Variance

Diagram 2

Stability of Variance test



Data Source: *Author (2016)*

The graph of the eigenvalues shows that none of the remaining eigenvalues appears outside to the unit circle. The stability check does not indicate that our model is miss-specified.

4.4.6 Impulse Response Functions

In principle, the coefficient estimates of VAR are meaningless because of a lack of theoretical underpinning therefore impulse-response functions (IRFs) are used measure the dynamic marginal effects of each shock on all of the variables over time. The impulse response traces out the responsiveness of dependent variables in the VAR to shocks to each of the variables. We will therefore focus on the response of economic growth to shocks on the independent variables. Figure 7-10 below shows the impulse response functions results for all the variables, but the

study shall discuss the impulse response results that in line with the objectives of the study, that is the impact of one standard deviation shock on Market Capitalization, Total Value of Shares Traded and NSE20 Share Index on Economic Growth.

One standard deviation shock on the market capitalization results into an immediate decrease in the economic growth for the first period but later followed by to an increase on economic growth from the 2nd period after which it fluctuates until the 10th period then forms a constant trend from the 11th period onwards which persistent which means the shock is permanent. On the other hand, a shock on the total value of shares traded results into a decrease on the economic growth for the first 2 periods which are then followed by an increase on economic growth on the 3rd period but later breaks into a decrease on economic growth from the 4th period after which it fluctuates until the 10th period then forms a constant trend that is persistent hence meaning the shock is permanent. Lastly, a shock to the NSE20 share index results into an increase on to economic growth for the first 10 periods but on a fluctuating mode, on the 11th period onwards the shocks become persistent and do not die out which means that the shock is permanent.

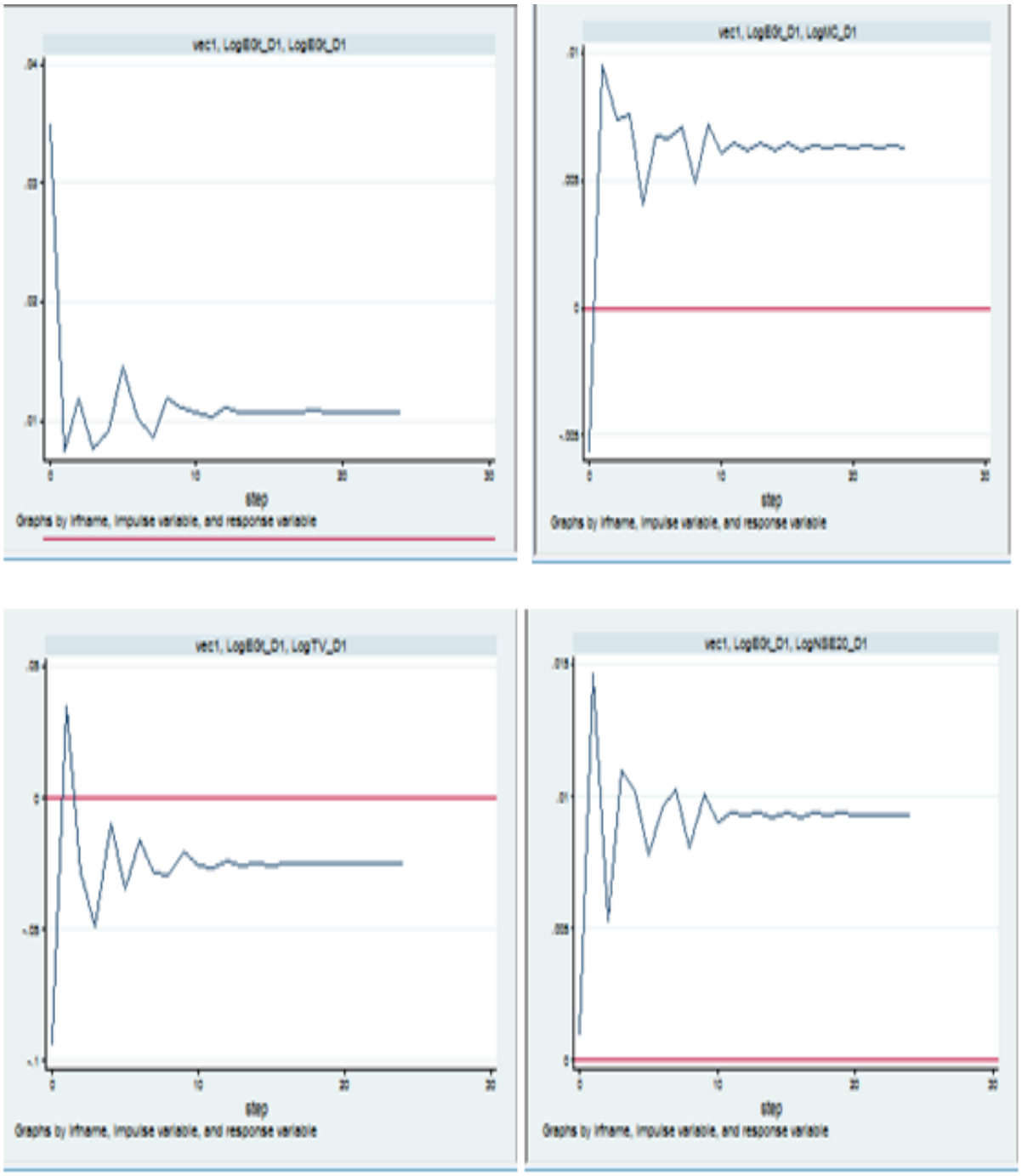
The impulse response analysis established that a shock introduced on market capitalization innovation will cause a negative initial reaction but the reaction adjusts back to its original position on the 2nd period, but later causes a positive reaction from the 2nd period onwards, the reaction stabilizes from the 11th period forming a constant trend which means that it has established a long run relationship with economic growth in Kenya. Secondly a shock introduced on total value of shares traded causes a negative reaction on the first 2 periods but the reaction adjusts to its original position but later on the 3rd period causes a positive reaction which adjusts back to its original position on the 4th period which then breaks to a cause a negative reaction on the 5th period but this reaction fluctuates until the 10th period where it forms a constant trend but

does not restore to its original position which means that there is a long run relationship with economic growth. Lastly a shock introduced on NSE20 share index causes a positive reaction on economic growth from the initial period but keeps fluctuating until the 11^{th} period onwards where the shocks forms a constant trend but does not go back to its original position which indicates that there is a long run relationship with economic growth. The establishment of steady and constant positions after initial shock effects on the regressors indicated that the fitted model was stable.

Figure 7: Impulse Response Functions

Graph 1

Impulse Response Functions

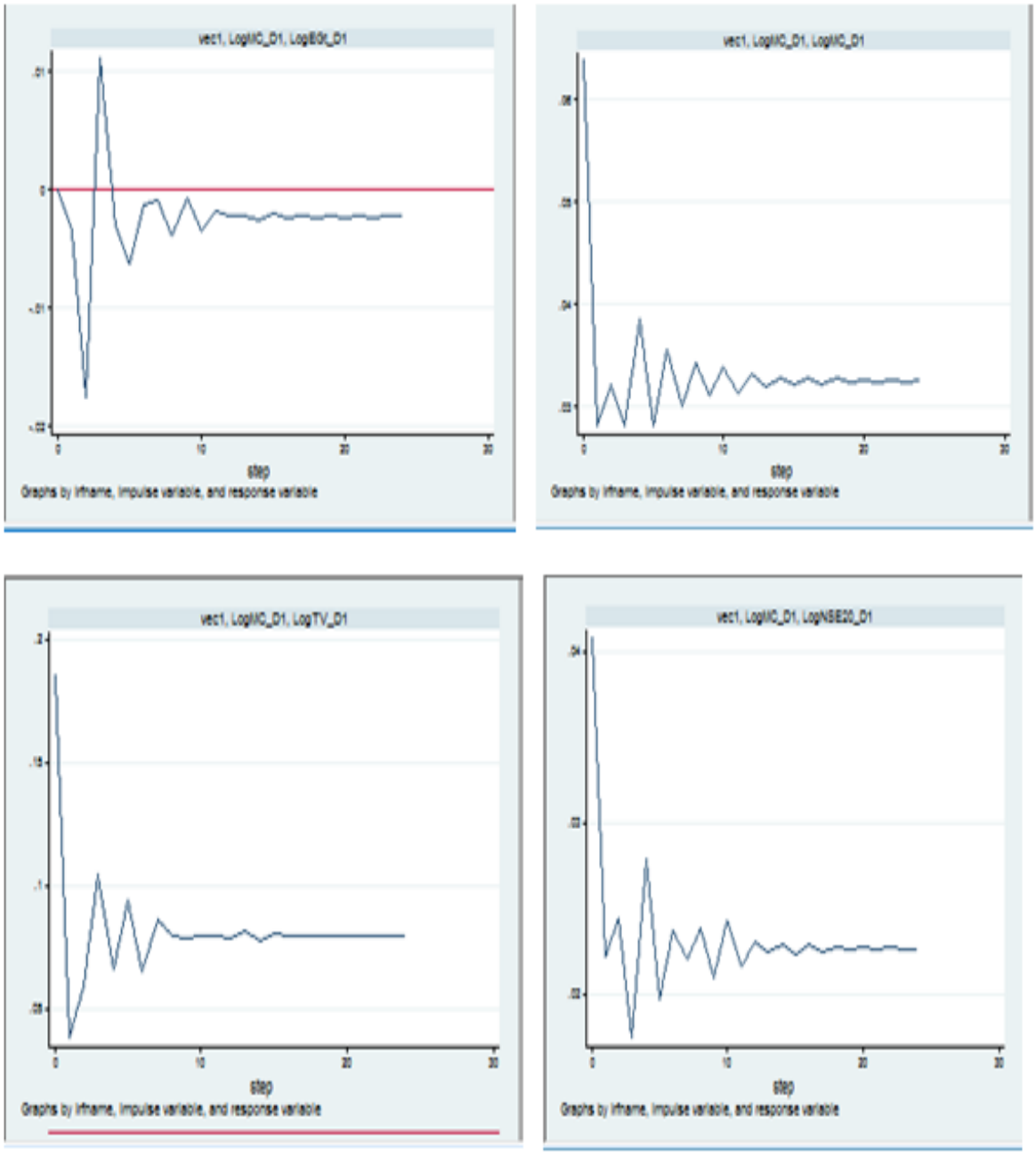


Data Source: *Author (2016)*

Figure 8: Impulse Response Functions

Graph 2

Impulse Response Functions

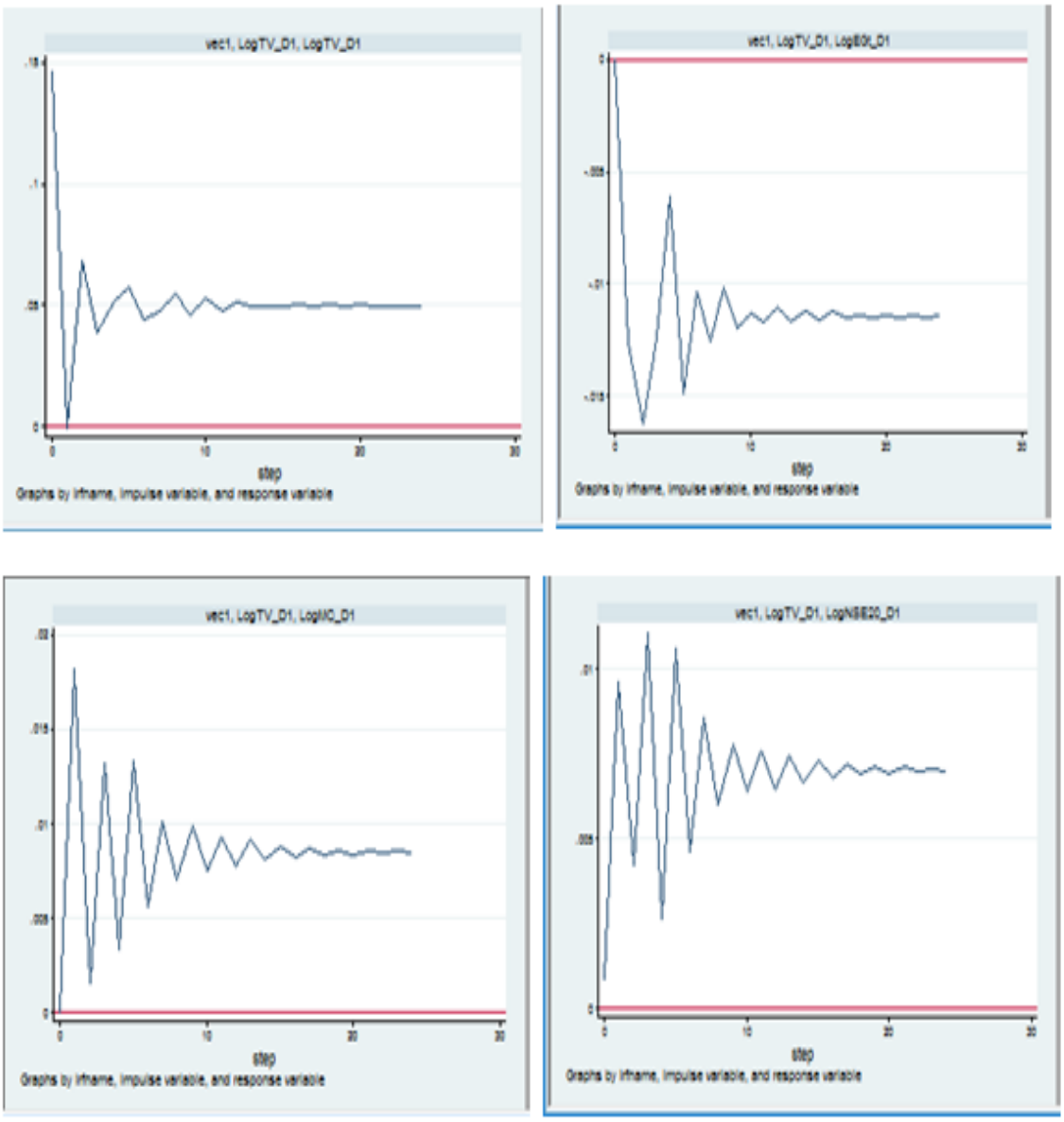


Data Source: *Author (2016)*

Figure 9: Impulse Response Functions

Graph 3

Impulse Response Functions

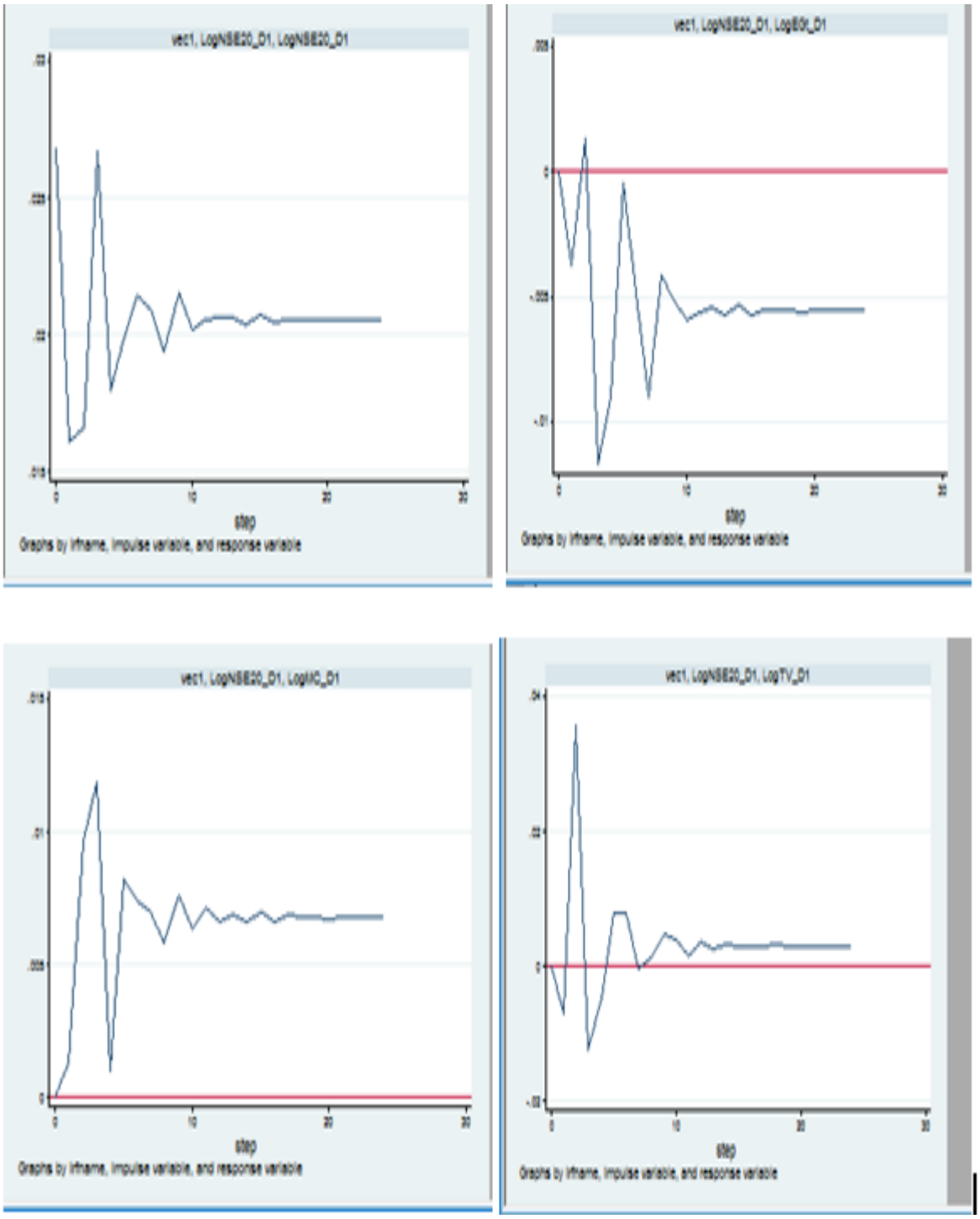


Data Source: *Author (2016)*

Figure 10: Impulse Response Functions

Graph 4

Impulse Response Functions



Data Source: *Author (2016)*

4.4.7 Variance Decomposition Test

Variance decomposition examines the model dynamics by giving the proportion of the movements in the dependent variable that are due to their own shocks and shocks of the other variables. A shock on a variable will affect its own course and is also transmitted to all other variables in the model. Variance decomposition determines how much of the period steps ahead, a forecast error variance of a given variable are explained by innovations of each explanatory variables. In variance decomposition an error term of one variable is introduced to a shock while holding all other error terms constant (Brooks, 2008). The procedure breaks down variance of the forecast error for each of the variables into components such that each variable is explained as a linear combination of its own current innovations value and lagged innovation values of all the variables in the system (Hossain, 2008).

The results for variance decomposition test are presented in table 10, in the 2nd quarter the results indicated that changes in economic growth were largely due to its own variations which stood at 87.23%, Market Capitalization explained only 2.3% while Total Value of Shares Traded explained 14.8% and lastly NSE20 share index explained 6.3% changes in economic growth. During the 8th quarter the changes in economic growth were as well mainly attributed by its own variations which stood at 50.23%, while market capitalization only explained 3.05% being the lowest amongst other variables just like in the second quarter, the NSE20 share index and Total Value of Shares Traded attribute 7.2% and 11.9% changes to economic growth respectively.

The results were also observed at the 15th quarter and the findings were similar to those observed in the 10th quarter though with minor deviations. Economic Growth changes were explained at 47.56%, by its own variations, while market capitalization, total value of shares traded, and NSE20 share index explained 3.09%, 10.16% and 7.6% % respectively. The final

variance decomposition observations were carried out on 24th quarter, the results still reviewed that much of the economic growth changes was explained by its own variations at 45.56% while market capitalization, total value of shares traded and NSE20 share index explained 3.17%, 9.12% and 7.75% respectively.

Table 10: Variance Decomposition

Table 10

Variance Decomposition

step	(1) fevd	(2) fevd	(3) fevd	(4) fevd
0	0	0	0	0
1	.007738	.135114	.000462	1
2	.022894	.148035	.062812	.872258
3	.027138	.138759	.055998	.650309
4	.030421	.141849	.065007	.556343
5	.027183	.132612	.068737	.544891
6	.028749	.127546	.068086	.531633
7	.029116	.122757	.069739	.52606
8	.030521	.118972	.072689	.502705
9	.029443	.116326	.071705	.50324
10	.030571	.112417	.073779	.497375
11	.03041	.109728	.073739	.491202
12	.03078	.107714	.07451	.48532
13	.030753	.105327	.07486	.482794
14	.030976	.103413	.075338	.47843
15	.030995	.101636	.075572	.475595
16	.031201	.100068	.075987	.472136
17	.031196	.098615	.076175	.469685
18	.031329	.097272	.076479	.46704
19	.031368	.096043	.07665	.464939
20	.031461	.09492	.076889	.462619
21	.031496	.093873	.077042	.46078
22	.031568	.092905	.077226	.458918
23	.031607	.091996	.077367	.457266
24	.031663	.09116	.077516	.45564

(1) irfname = vec1, impulse = LogEGt_D1, and response = LogMC_D1
(2) irfname = vec1, impulse = LogEGt_D1, and response = LogTV_D1
(3) irfname = vec1, impulse = LogEGt_D1, and response = LogNSE20_D1
(4) irfname = vec1, impulse = LogEGt_D1, and response = LogEGt_D1

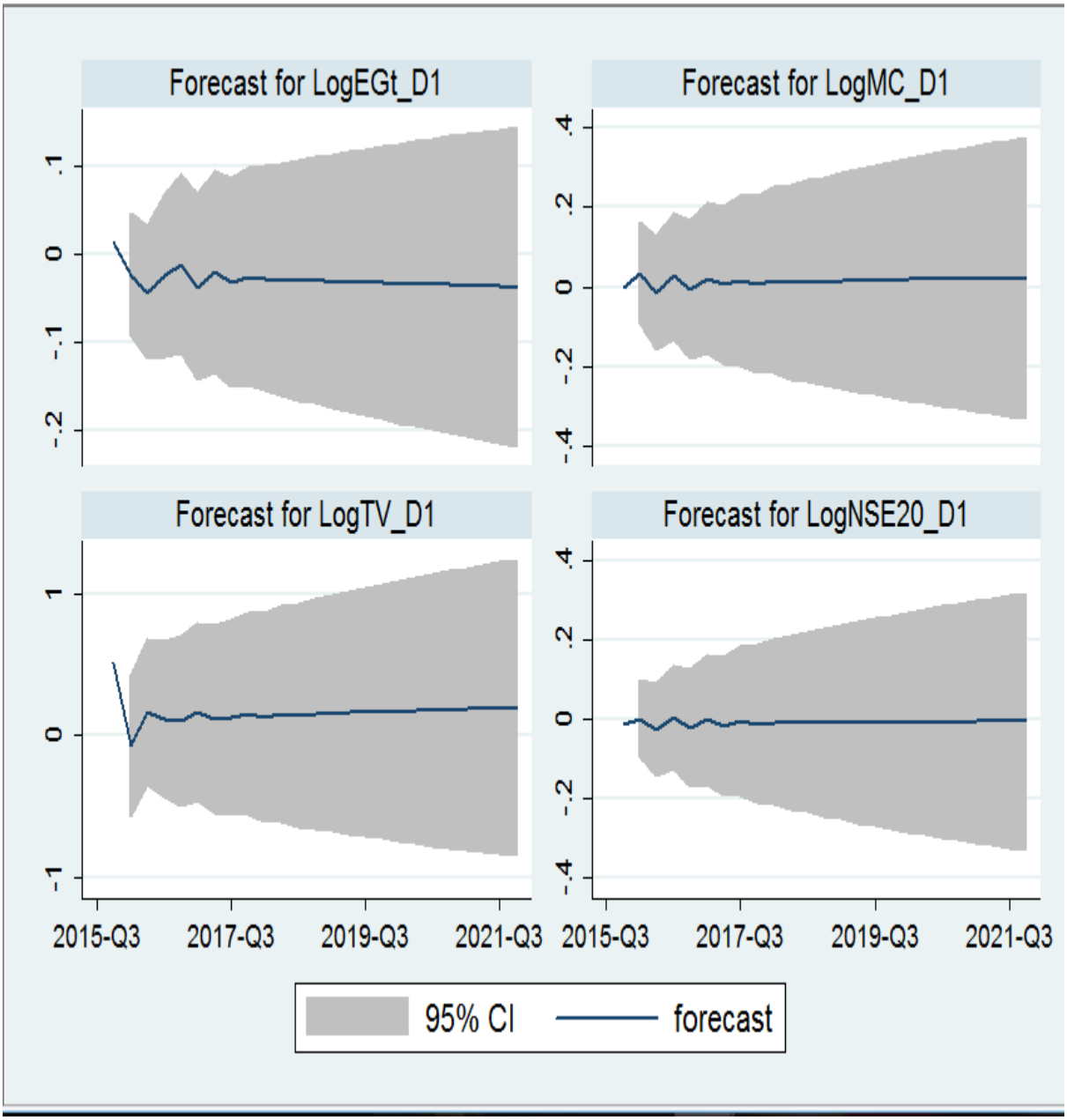
Data Source: *Author (2016)*

The variance decomposition conclusions were confirmed by variance decomposition graph whose findings were presented in figure 11 below:

Figure 11: Variance Decomposition

Graph 5

Variance Decomposition Graphs



Data Source: *Author (2016)*

The results from variance decomposition analyzed above indicate that all independent variables have significant effect on economic growth in Kenya. Although significant relationship was established the extent to which they influence economic growth in Kenya was found to be quite low. In the 24th quarter index was explained 45.67% of the changes by its own variations, variations on market capitalization, total value of shares traded and NSE20 share index was found to only explain 3.17%, 9.12% and 7.75% respectively.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussions and conclusions based on the findings of the study, recommendations and areas for further research.

5.2 Discussions

The main objective of this study was to determine the effect of stock market development on economic growth. To achieve this objective, quartely time series data was collected from 2000 to 2015. Data were tested for stationarity and then analyzed using inferential statistics. The specific objectives of the study were to determine the effect of market capitalization, total value of shares traded and NSE20 share index on economic growth. The study employs Vector Error Correction model. Justification for the use of VECM is that it is possible to simulate the response over time of an own disturbance of a variable and also disturbance on the other variables in a system of equations. To establish the long run relationship between stock market development on economic growth, the study employed the Johansen cointegration test.

A VEC model with one lag was estimated and results analyzed using impulse response functions. Empirical results from the impulse response analysis were found to agree to be in agreement with the VEC model results

The first specific objective of this study was to determine the effect of market capitalization on economic growth. The cointegration results established that market capitalization had a long run negative and significant influence on economic growth. VECM results established that there

is a short run relationship between market capitalization and economc growth. These findings from this study on the first specific objective were consistent with previous studies by Wild and Lebdaoui (2014) in their study on the relationship between Morrocco stock market and the country's economic growth where they established a negative long run relationship between market capitalization and economic growth. Alajekwu and Achugbu (2011) study on the role of stock market development on Nigeria's economic growth established a negative correlation between market capitalization and economic growth which was as well consistent with the findings of this study.

The second specific objective of this study was to determine the effect of total value shares traded on economic growth in Kenya. The long run relationship between these variables were analysed through cointegration test and the results established that total value of shares traded has a positive and significant influence on economic growth in Kenya. Short run relationship revealed by VECM indicates that there exists a short run relationship between total value of shares traded and economic growth in Kenya. This study concluded that total value of shares traded and economic growth had a positive and significant relationship. These findings from this study on the second specific objective were consistent with previous studies by Nawaz and Gilan (2010) on their study on relationship between Pakistan stock market the the country's economic growth where the study established that total value of shares traded ratio had a positive and significant relationship with economic growth. Other studies that were consistent with this study were; Nail and Padhi (2013) study which investigated the impact of stock market of 27 emerging economies and established that that total value of shares traded was positively and significantly correlated to economic growth, Aboadou Tachiwou (2010) study which examined the impact of

stock market on west african countries and established that total value of shares traded were positively and significantly correlated to economic growth.

The third specific objective of this study was to determine the effect of NSE20 share index on economic growth in Kenya. The study used cointegration test results found that NSE20 share index had a positive long run relationship with economic growth in Kenya. VECM results established existence of short run relationship between NSE20 share index and economic growth in Kenya. This study concluded that NSE20 share index and economic growth have a positive and significant relationship. These findings from this study on the third specific objective were consistent with previous studies by Olweny and Kimani (2011) on the relationship of Kenya stock market performance and economic growth whethere they established that NSE20 share index has a positve and significant effect on economic.

The study concluded that by studying the past values of market capitalization, total value of shares traded ratio and NSE20 share index it is possible to predict the current and future changes on economic growth in Kenya.

The results from this study give mixed results with those of the theories adopted by the study, the results that market capitalization has a negative and signifcant effect on economic growth are inconsistent with the Neo classical theory that emphasize on savings as a drive to economic growth through allocation of savings to productive investment projects but Siong Law & Singh (2014) established that financial development can harm economic growth if the pulled resources from savers are misallocated. On the other hand the findings of the study that total value of shares traded and NSE20 share have a positve and significant relationship with economic growth is consistent with the Schumpert Finance growth theory and Mckinnon and shawn theory that

both emphasise on well functioning and efficient markets as drive towards economic growth in the long run.

5.3 Limitations of the study

The study concentrated on the effect of stock market development on economic growth and did not look at the effect of economic growth on stock market development, and therefore the results of this study can be only be used to enhancing stock market development only. Secondly the study used data from the year 2000 to 2015 as opposed to data from the 1998 when the first company in Kenya was listed, this was mainly because of data unavailability, therefore we do not get to see a clear picture of the all the stages of development of the stock market development and its effect on economic growth.

5.4 Conclusion

In this study, we investigated the effect of stock market development on economic growth in Kenya using quarterly time series data from 2000 to 2015. First we applied the unit root test to establish stationarity of the data series. Results indicate that the data of the variables are stationary after first differencing and integrated of order one. Then we applied the Johansen Cointegration test to determine the long run relationship between the two variables. Results show that there is cointegrating relationship, that is there is long-term co-movement between the variables. In the presence of a long run relationship, we employed the error correction model to correct the short run deviation from equilibrium. Results indicate that stock size as measured by market capitalization has a negative and significant impact on economic growth while stock market liquidity and performance as measured by total value of shares trade and nse20 share index have a positve signifcant effect on economic growth.

5.5 Recommendation

Given the significant and positive relationships between total value of shares traded, NSE20 share index on economic growth in Kenya the capital markets regulators should formulate policies that that will ensure stability of the two stock market variables. Stability of these two variables will certainly lead to increased performance and efficiency of the stock markets and hence developing the stock markets which in the long run will foster economic growth have positive and significant impact on economic growth.

Secondly the capital markets regulators should ensure that funds are allocated to productive investments which yield positive returns so as to ensure that increase in market capitalization can lead to increased economic growth.

Suggested areas for further research include identification of macro-economic factors that significantly affect stock markets resulting into poor performing stock markets. These include monetary policy and inflation. This will assist in making rational investment decisions and aid in policy formulation.

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APPENDICES

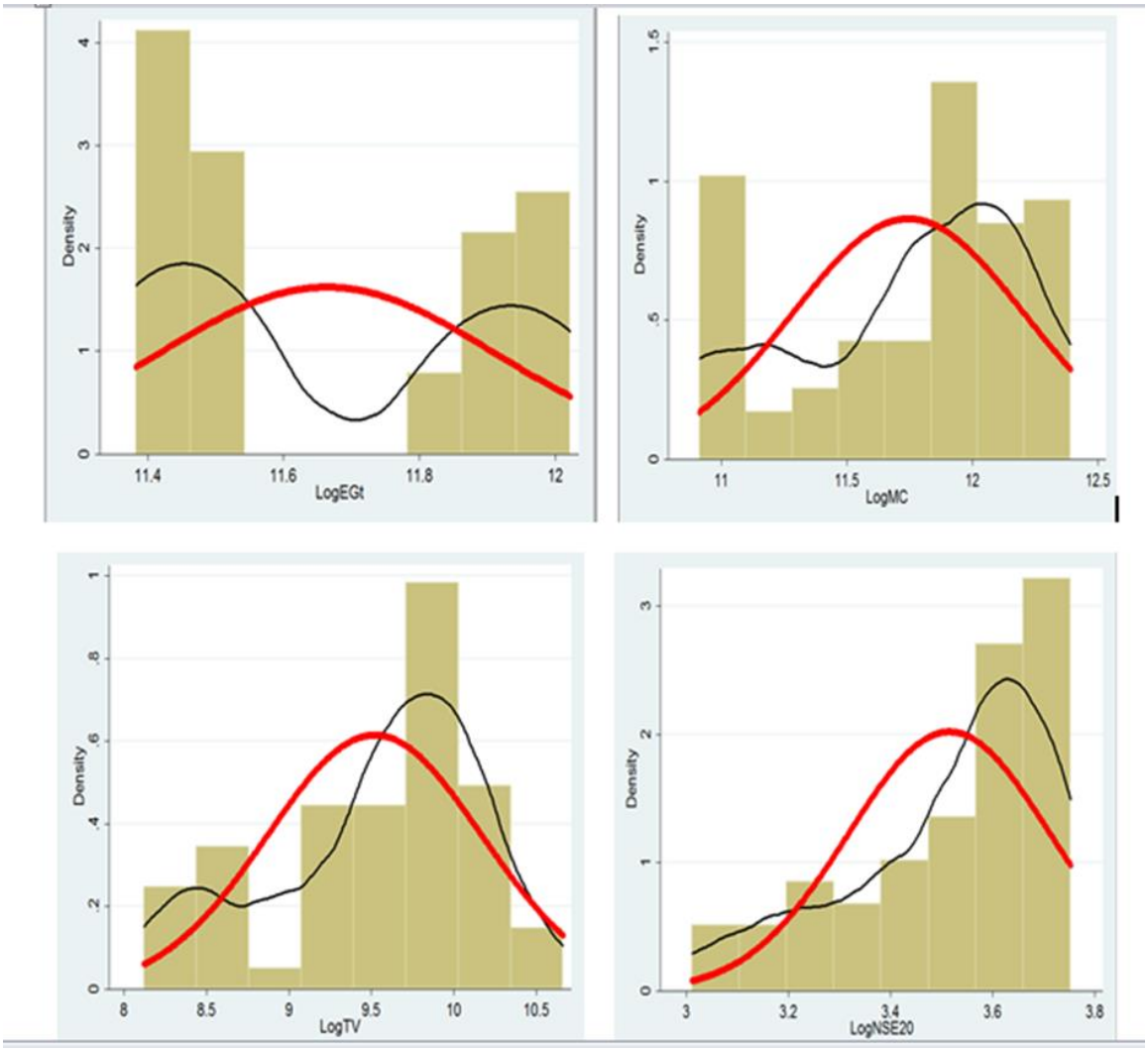
Appendix I: *Firms Listed at the NSE*

Firms Listed at the NSE	
AGRICULTURAL	**ENERGY & PETROLEUM**
Eaagads Ltd	KenGen Co. Ltd
Kakuzi Ltd	KenolKobil Ltd
Kapchorua Tea Co. Ltd	Kenya Power & Lighting Co Ltd
The Limuru Tea Co. Ltd	Total Kenya Ltd
Rea Vipingo Plantations Ltd	Umeme Ltd
Sasini Ltd	
Williamson Tea Kenya Ltd	
AUTOMOBILES & ACCESSORIES	**INSURANCE**
Car & General (K) Ltd	British-American Investments Co.(Kenya) Ltd
CMC Holdings Ltd	CIC Insurance Group Ltd
Marshalls (E.A.) Ltd	Jubilee Holdings Ltd
Sameer Africa Ltd	Kenya Re Insurance Corporation Ltd
	Liberty Kenya Holdings Ltd
BANKING	Pan Africa Insurance Holdings Ltd
Barclays Bank of Kenya Ltd	
CFC Stanbic of Kenya Holdings Ltd	**INVESTMENT**
Diamond Trust Bank Kenya Ltd	Centum Investment Co Ltd
Equity Bank Ltd	Olympia Capital Holdings Ltd
Housing Finance Co.Kenya Ltd	Trans-Century Ltd
I&M Holdings Ltd	
Kenya Commercial Bank Ltd	**MANUFACTURING & ALLIED**
National Bank of Kenya Ltd	A.Baumann& Co Ltd
NIC Bank Ltd	B.O.C Kenya Ltd

Standard Chartered Bank Kenya Ltd	British American Tobacco Kenya Ltd
The Co-operative Bank of Kenya Ltd	Carbacid Investments Ltd
	East African Breweries Ltd
COMMERCIAL AND SERVICES	Eveready East Africa Ltd
Express Kenya Ltd	Kenya Orchards Ltd
Hutchings Biemer Ltd	Mumias Sugar Co. Ltd
Kenya Airways Ltd	Unga Group Ltd
Longhorn Kenya Ltd	
Nation Media Group Ltd	**TELECOMMUNICATION & TECHNOLOGY**
Scan Group Ltd	Safaricom Ltd
Standard Group Ltd	Atlas Development and Support Services
TPS Eastern Africa Ltd	**GROWTH ENTERPRISE MARKET SEGMENT (GEMS)**
Uchumi Supermarket Ltd	Home Afrika Ltd
	Flame Tree Group Holdings Ltd Ord
CONSTRUCTION & ALLIED	KurwituVentures
ARM Cement Ltd	
Bamburi Cement Ltd	**INVESTMENT SERVICES**
Crown Paints Kenya Ltd	Nairobi Securities Exchange
E.A.Cables Ltd	
E.A.Portland Cement Co. Ltd	

Appendix II: *Descriptive Characteristic*

Figure 12: Descriptive Statistics



Appendix III: *Model Diagnostics*

Figure 13: Linearity Test

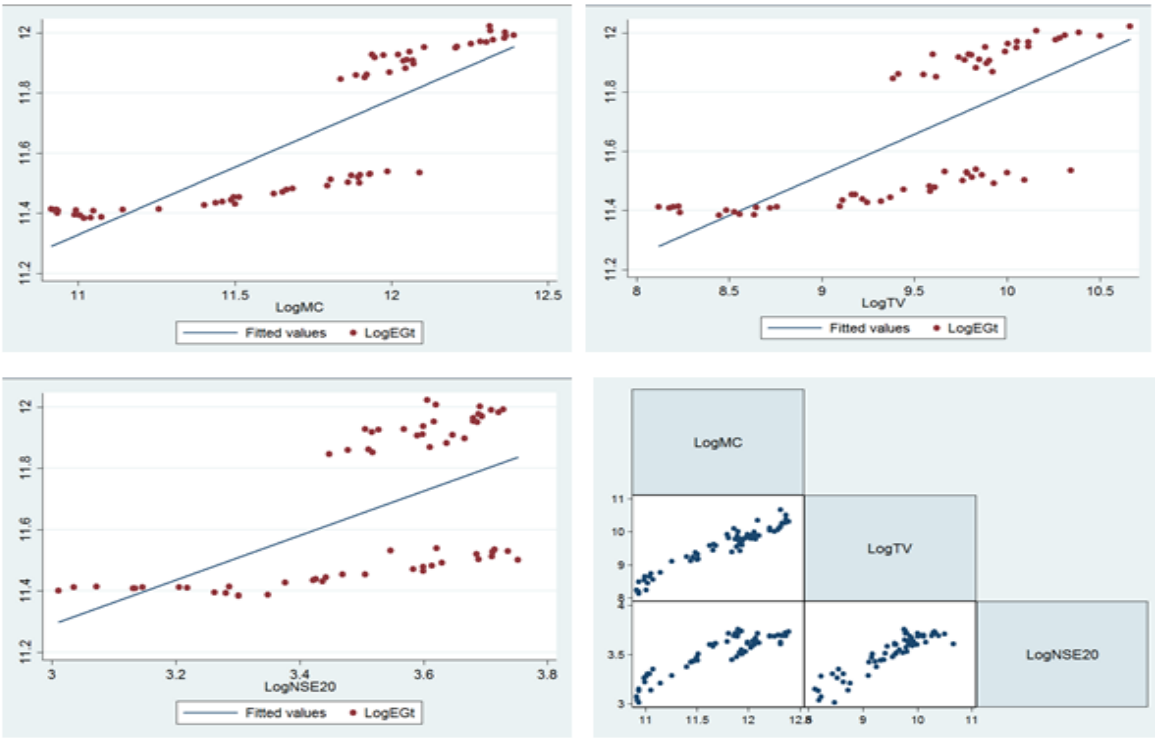


Figure 14: Normality Test

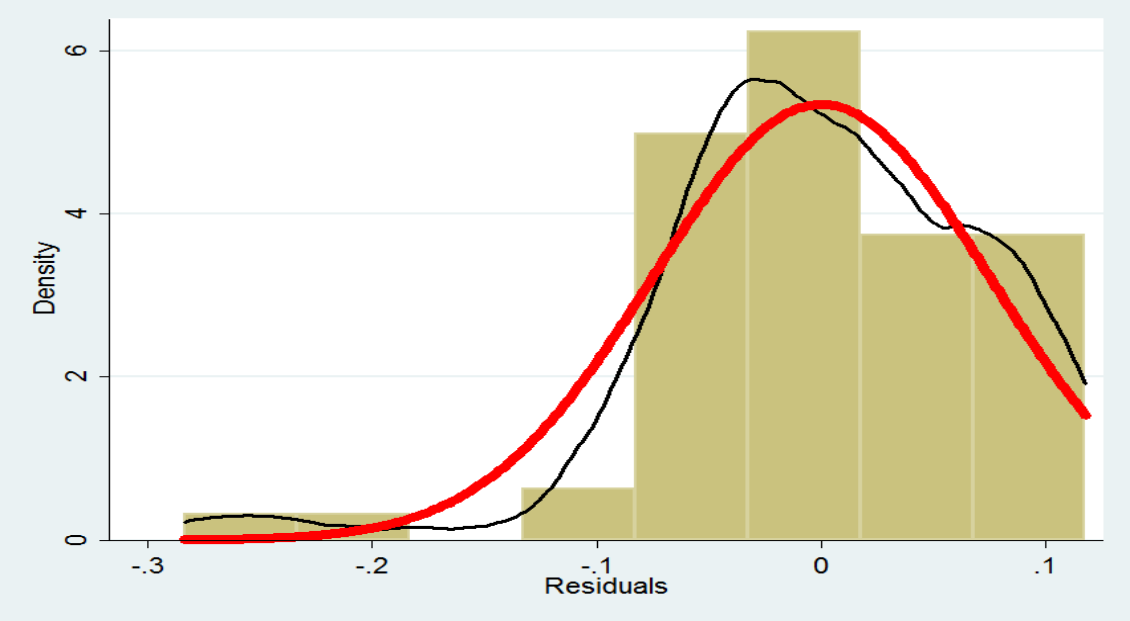


Table 11: Correlation of Variables

	LogEGt	LogMC	LogTV	LogNSE20
LogEGt	1.0000			
LogMC	0.9652 0.0000	1.0000		
LogTV	0.8824 0.0000	0.9315 0.0000	1.0000	
LogNSE20	0.7083 0.0000	0.7968 0.0000	0.8712 0.0000	1.0000

Figure 15: Randomness of Residual

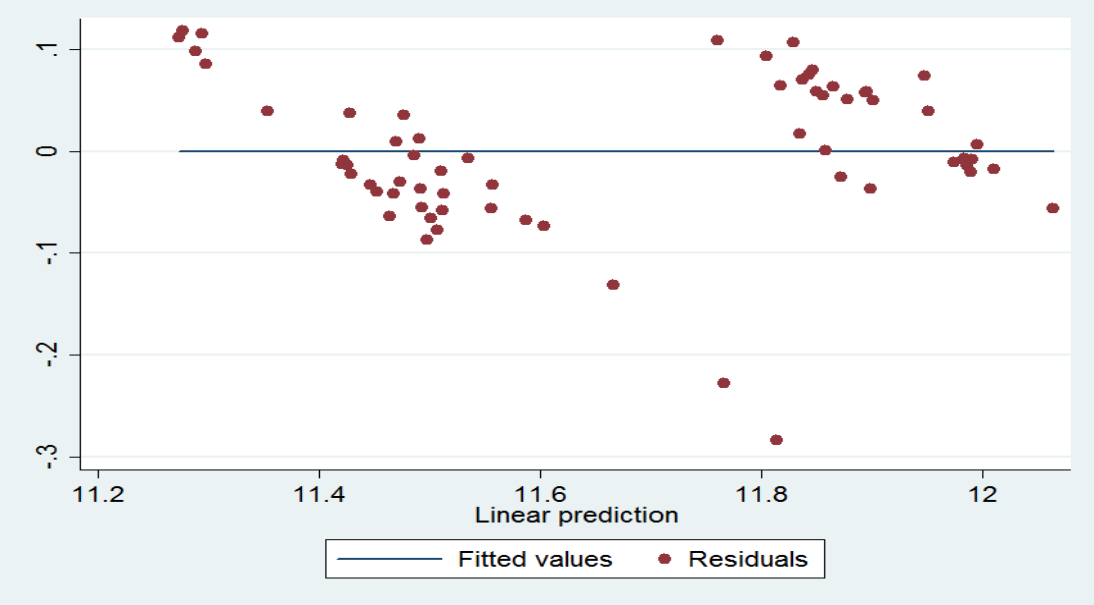


Figure 16: Correlation of Predictors and Residuals

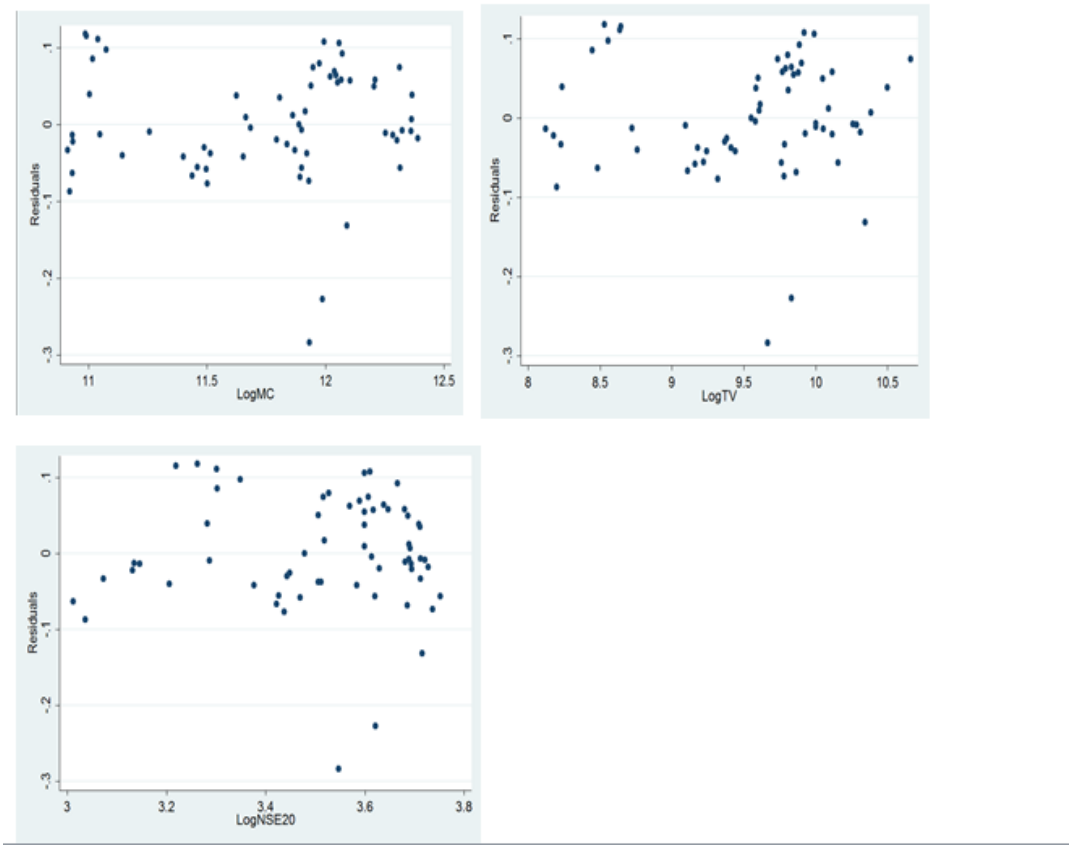


Table 12: Residual Autocorrelation Test

```
urbin-Watson d-statistic(  4,     64) =  .6623836
```

Table 13: Heteroscedasticity Test

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of LogEGt

         chi2(1)      =     0.08
         Prob > chi2  =   0.7823
```

Table 14: Test for Multicollinearity

Variable	VIF	1/VIF
LogTV	17.68	0.056569
LogMC	14.39	0.069476
LogNSE20	6.68	0.149600
Mean VIF	12.92	

Appendix IV: *Time Series Analysis*

Figure 17: Time Series Plots

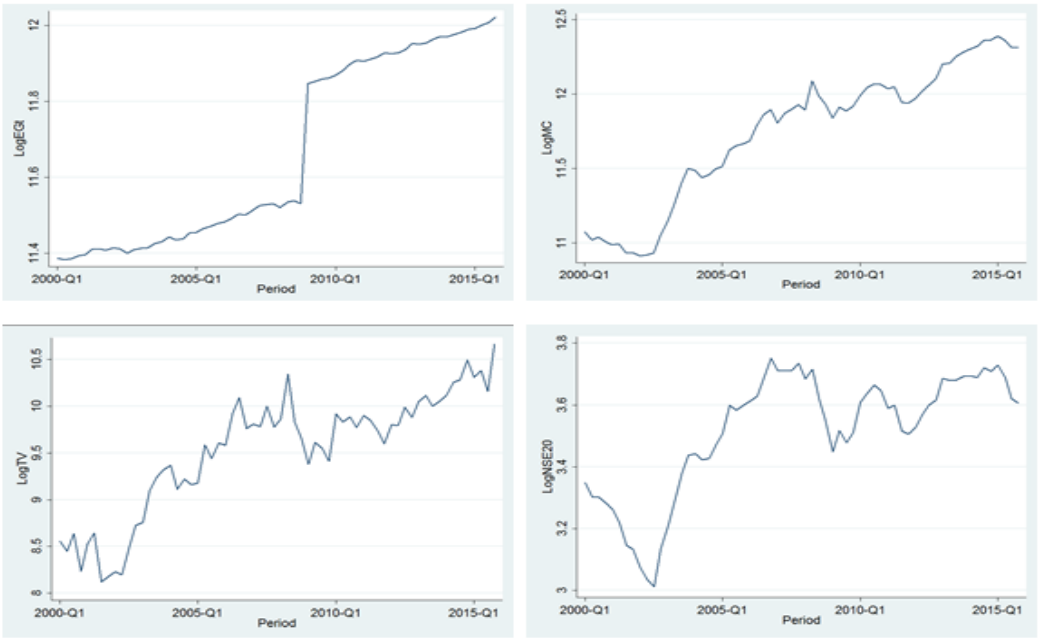


Figure 18: Correlograms Plots

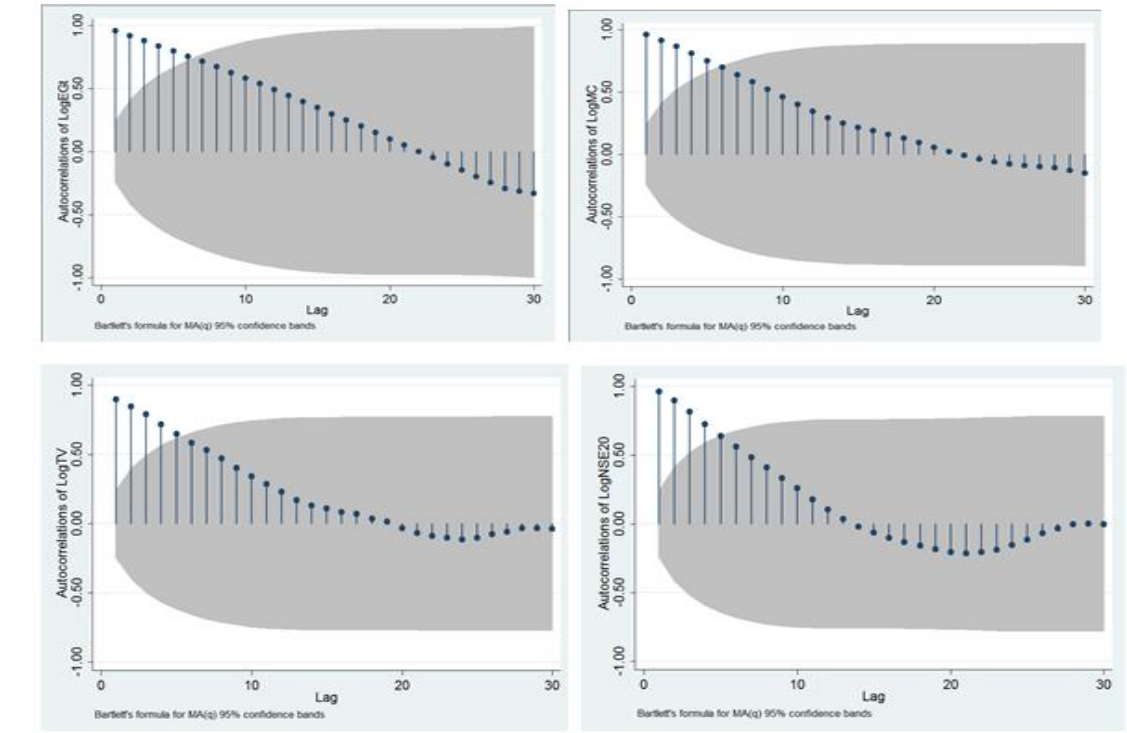


Table 15: Unit Root Tests - ADF

	ADF TEST			ADF TEST AFTER FIRST DIFFERENCE		
Variable	**ADF Test**	**T – Statistic 5%**	**P - Value**	**ADF Test**	**T – Statistic 5%**	**P - Value**
Log EGt						
Random Walk	-0.298	-2.920	0.9258	-8.235	-2.920	0.0000
With trend	-2.212	-3.487	0.4830	-8.187	-3.488	0.0000
With Drift	-0.298	-1.670	0.3834	-8.235	-1.671	0.0000
Log MC						
Random Walk	-0.803	-2.920	0.8182	-6.833	-2.920	0.0000
With trend	-1.475	-3.487	0.8376	-6.819	-3.488	0.0000
With Drift	-0.803	-1.670	0.2125	-6.833	-1.671	0.0000
Log TV						
Random Walk	-1.200	-2.920	0.6737	-10.458	-2.920	0.0000
With trend	-2.933	-3.487	0.1518	-10.365	-3.488	0.0000
With Drift	-1.200	-1.670	0.1174	-10.458	-1.671	0.0000
Log NSE20						
Random Walk	-1.103	-2.920	0.7138	-5.583	-2.920	0.0000
With trend	-1.285	-3.487	0.8917	-5.563	-3.488	0.0000
With Drift	-1.103	-1.670	0.1372	-5.583	-1.671	0.0000

Figure 19: Time Series Plots after First Difference

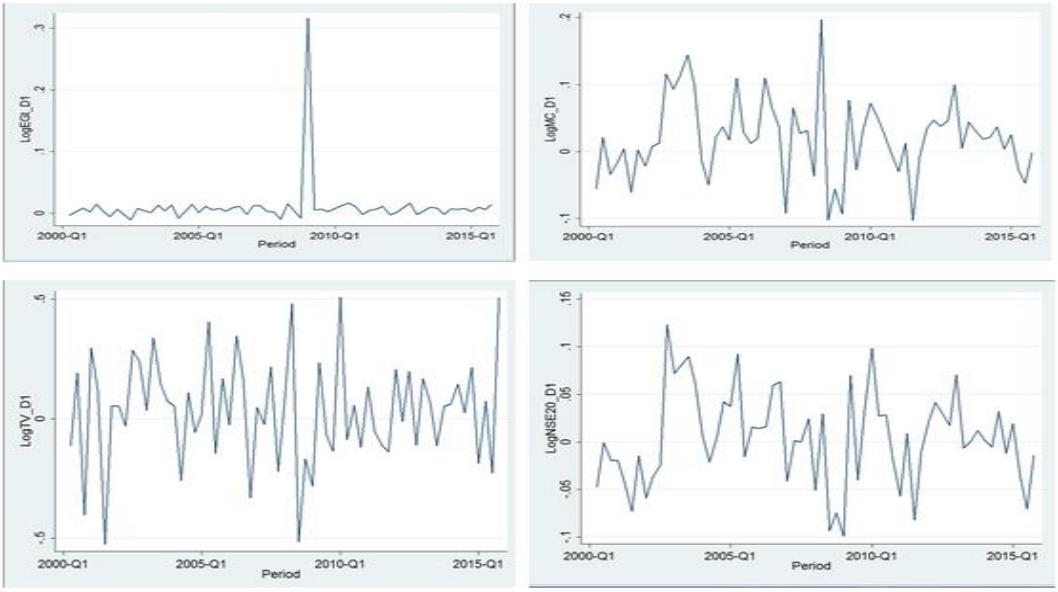


Figure 20: Correlograms Plots after First Difference

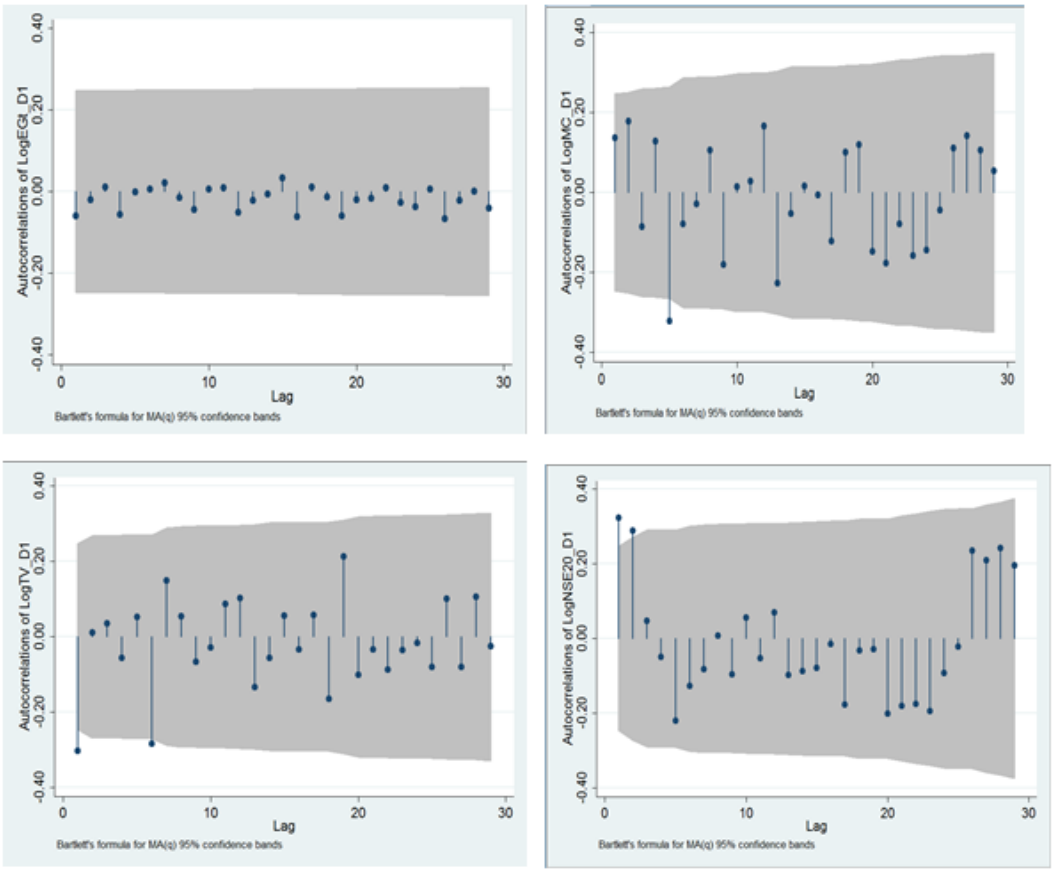


Figure 21: Correlogram of Residual for VAR Lag Selection

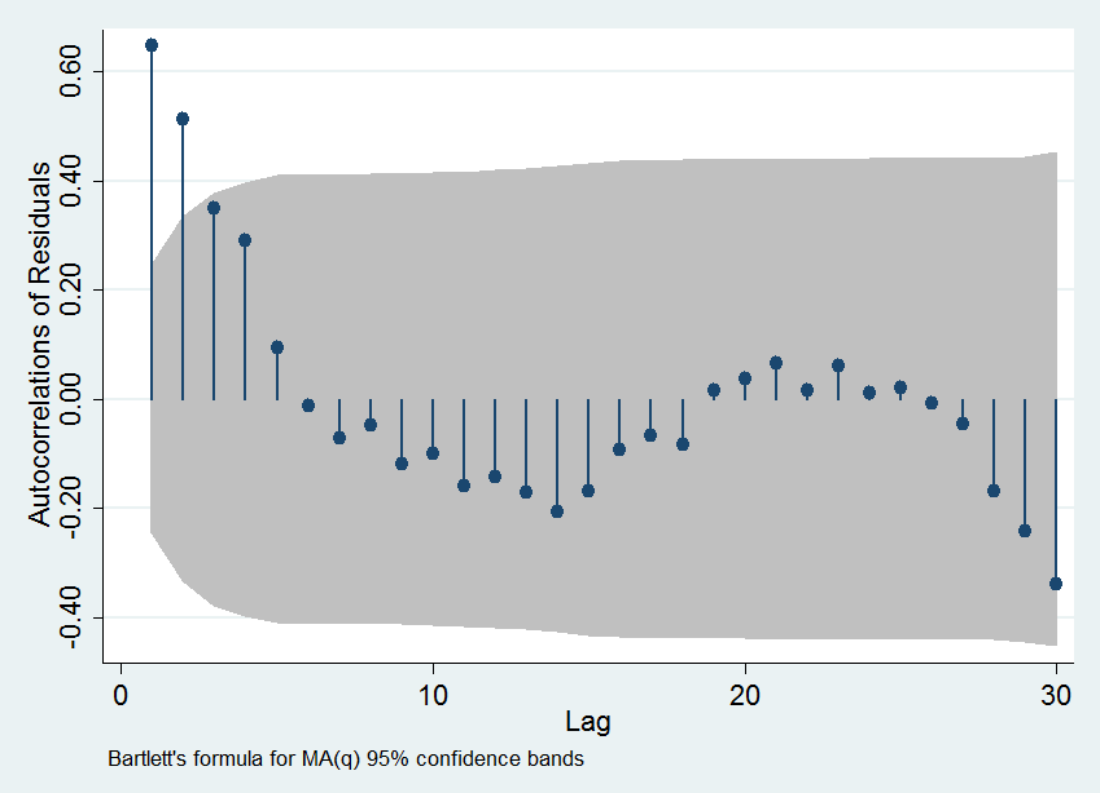


Table 16: Vector Error Correction Model

Vector error-correction model

Sample: 2001-Q2 - 2015-Q4		No. of obs	= 59
		AIC	= -11.51541
Log likelihood = 406.7047		HQIC	= -10.59446
Det(Sigma_ml) = 1.21e-11		SBIC	= -9.156175

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_LogEGt_D1	16	.032709	0.7776	150.3168	0.0000
D_LogMC_D1	16	.060455	0.5646	55.75207	0.0000
D_LogTV_D1	16	.21278	0.7113	105.9361	0.0000
D_LogNSE20_D1	16	.045447	0.5498	52.50452	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_LogEGt_D1						
_ce1						
L1.	-.9553565	.2901599	-3.29	0.001	-1.524059	-.3866536
_ce2						
L1.	.5090373	.2271626	2.24	0.025	.0638067	.9542678
_ce3						
L1.	-.0162787	.1286581	-0.13	0.899	-.2684439	.2358864
LogEGt_D1						
LD.	.1011363	.2318814	0.44	0.663	-.3533429	.5556155
L2D.	.03183	.1660253	0.19	0.848	-.2935736	.3572336
L3D.	.0766677	.1189598	0.64	0.519	-.1564893	.3098247
LogMC_D1						
LD.	-.3937392	.2402435	-1.64	0.101	-.8646077	.0771294
L2D.	-.578038	.2060334	-2.81	0.005	-.981856	-.1742201
L3D.	.1720045	.177341	0.97	0.332	-.1755775	.5195864
LogTV_D1						
LD.	.0264259	.1084433	0.24	0.807	-.1861192	.2389709
L2D.	-.0006434	.0760865	-0.01	0.993	-.1497702	.1484833
L3D.	.0135243	.038034	0.36	0.722	-.061021	.0880695
LogNSE20_D1						
LD.	.4159448	.2833444	1.47	0.142	-.1394	.9712896
L2D.	.5116639	.2335376	2.19	0.028	.0539386	.9693893
L3D.	-.1135376	.2114361	-0.54	0.591	-.5279447	.3008695
_cons	-.0000182	.004273	-0.00	0.997	-.0083931	.0083568
D_LogMC_D1						
_ce1						
L1.	-.0310787	.5362836	-0.06	0.954	-1.082175	1.020018
_ce2						
L1.	.5024599	.4198498	1.20	0.231	-.3204306	1.32535
_ce3						
L1.	-.1468664	.2377903	-0.62	0.537	-.6129269	.3191941
LogEGt_D1						
LD.	-.1343294	.4285713	-0.31	0.754	-.9743137	.7056548
L2D.	-.216578	.3068537	-0.71	0.480	-.8180002	.3848442
L3D.	-.239615	.2198657	-1.09	0.276	-.6705438	.1913139
LogMC_D1						
LD.	-1.326874	.4440263	-2.99	0.003	-2.197149	-.4565982
L2D.	-1.001728	.380798	-2.63	0.009	-1.748079	-.2553777
L3D.	-1.099221	.3277678	-3.35	0.001	-1.741634	-.4568079
LogTV_D1						
LD.	.1491421	.2004288	0.74	0.457	-.243691	.5419753
L2D.	.0675996	.1406257	0.48	0.631	-.2080216	.3432209
L3D.	.0342996	.0702958	0.49	0.626	-.1034776	.1720767
LogNSE20_D1						
LD.	.8212096	.523687	1.57	0.117	-.205198	1.847617
L2D.	1.074016	.4316324	2.49	0.013	.2280317	1.92
L3D.	1.123156	.3907835	2.87	0.004	.3572342	1.889078
_cons	.0001163	.0078975	0.01	0.988	-.0153626	.0155952

D_LogTV_D1						
_ce1						
L1.	-1.02639	1.88754	-0.54	0.587	-4.7259	2.673121
_ce2						
L1.	3.837599	1.477732	2.60	0.009	.9412977	6.7339
_ce3						
L1.	-2.693716	.8369429	-3.22	0.001	-4.334094	-1.053338
LogEGt_D1						
LD.	.2542213	1.508428	0.17	0.866	-2.702244	3.210687
L2D.	-.1839636	1.080023	-0.17	0.865	-2.30077	1.932843
L3D.	-1.088952	.7738541	-1.41	0.159	-2.605678	.4277747
LogMC_D1						
LD.	-2.257215	1.562825	-1.44	0.149	-5.320296	.8058659
L2D.	-2.175812	1.340282	-1.62	0.105	-4.802717	.4510937
L3D.	-2.150627	1.153634	-1.86	0.062	-4.411708	.1104532
LogTV_D1						
LD.	.9475748	.7054426	1.34	0.179	-.4350674	2.330217
L2D.	.4014924	.4949557	0.81	0.417	-.5686029	1.371588
L3D.	.1425213	.2474177	0.58	0.565	-.3424085	.627451
LogNSE20_D1						
LD.	1.02826	1.843204	0.56	0.577	-2.584353	4.640874
L2D.	2.616425	1.519203	1.72	0.085	-.3611572	5.594007
L3D.	2.539841	1.375428	1.85	0.065	-.1559491	5.23563
_cons	-6.68e-06	.0277967	-0.00	1.000	-.0544873	.0544739
D_LogNSE20_D1						
_ce1						
L1.	.3701423	.4031536	0.92	0.359	-.4200241	1.160309
_ce2						
L1.	.4235637	.315624	1.34	0.180	-.1950479	1.042175
_ce3						
L1.	.0216848	.1787599	0.12	0.903	-.3286782	.3720478
LogEGt_D1						
LD.	-.2246176	.3221803	-0.70	0.486	-.8560794	.4068443
L2D.	-.3647169	.2306786	-1.58	0.114	-.8168387	.0874049
L3D.	-.2813298	.165285	-1.70	0.089	-.6052824	.0426229
LogMC_D1						
LD.	-.4574476	.3337988	-1.37	0.171	-1.111681	.1967859
L2D.	-.3731078	.2862666	-1.30	0.192	-.93418	.1879644
L3D.	-.6113059	.2464009	-2.48	0.013	-1.094243	-.128369
LogTV_D1						
LD.	-.0013106	.1506732	-0.01	0.993	-.2966247	.2940034
L2D.	.0064837	.105716	0.06	0.951	-.2007158	.2136832
L3D.	.0319317	.0528451	0.60	0.546	-.0716429	.1355063
LogNSE20_D1						
LD.	.3493223	.393684	0.89	0.375	-.4222842	1.120929
L2D.	.4958444	.3244815	1.53	0.126	-.1401277	1.131817
L3D.	.6342648	.2937733	2.16	0.031	.0584798	1.21005
_cons	-.0000556	.005937	-0.01	0.993	-.011692	.0115807

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	1	2.176232	0.1402
_ce2	1	48.25848	0.0000
_ce3	1	39.27648	0.0000

Identification: beta is exactly identified

Johansen normalization restrictions imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
LogEGt_D1	1	.	.	.	.	.
LogMC_D1	-2.78e-17	.	.	.	.	.
LogTV_D1	0	(omitted)				
LogNSE20_D1	-.2232182	.1513133	-1.48	0.140	-.5197868	.0733504
_cons	-.0087463	.	.	.	.	.
_ce2						
LogEGt_D1	2.22e-16	.	.	.	.	.
LogMC_D1	1	.	.	.	.	.
LogTV_D1	0	(omitted)				
LogNSE20_D1	-1.808008	.2602637	-6.95	0.000	-2.318115	-1.297901
_cons	-.0107623	.	.	.	.	.
_ce3						
LogEGt_D1	0	(omitted)				
LogMC_D1	0	(omitted)				
LogTV_D1	1	.	.	.	.	.
LogNSE20_D1	-2.332198	.3721339	-6.27	0.000	-3.061567	-1.602829
_cons	-.0187152	.	.	.	.	.

Table 17: Vector Error Correction Model (Order 1 lag 2)

Vector error-correction model

Sample: 2001-Q1 - 2015-Q4 — No. of obs = 60

Log likelihood = 380.0225 — AIC = -11.23408

Det(Sigma_ml) = 3.70e-11 — HQIC = -10.64698

SBIC = -9.733138

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_LogEGt_D1	10	.034967	0.7045	119.199	0.0000
D_LogMC_D1	10	.064157	0.4302	37.75322	0.0000
D_LogTV_D1	10	.254001	0.5537	62.03512	0.0000
D_LogNSE20_D1	10	.048813	0.3960	32.78727	0.0003

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_LogEGt_D1						
_ce1						
L1.	-.7585417	.1904303	-3.98	0.000	-1.131778	-.3853052
LogEGt_D1						
LD.	-.2104812	.1476142	-1.43	0.154	-.4997998	.0788374
L2D.	-.1678869	.1117117	-1.50	0.133	-.3868379	.051064
LogMC_D1						
LD.	-.6443919	.2084732	-3.09	0.002	-1.052992	-.2357919
L2D.	-.6150224	.1360499	-4.52	0.000	-.8816753	-.3483695
LogTV_D1						
LD.	.1801594	.054811	3.29	0.001	.0727319	.2875869
L2D.	.0447504	.0324117	1.38	0.167	-.0187754	.1082762
LogNSE20_D1						
LD.	.3314915	.1841391	1.80	0.072	-.0294145	.6923976
L2D.	.433257	.1632686	2.65	0.008	.1132565	.7532575
_cons	-.0005264	.0045212	-0.12	0.907	-.0093877	.008335

D_LogMC_D1						
_ce1						
L1.	.7195308	.3494043	2.06	0.039	.0347109	1.404351
LogEGt_D1						
LD.	-.1103853	.2708448	-0.41	0.684	-.6412314	.4204608
L2D.	-.0594806	.2049703	-0.29	0.772	-.4612151	.3422538
LogMC_D1						
LD.	-.0714901	.3825098	-0.19	0.852	-.8211955	.6782152
L2D.	-.0834536	.2496264	-0.33	0.738	-.5727124	.4058052
LogTV_D1						
LD.	-.1279893	.100568	-1.27	0.203	-.3250989	.0691203
L2D.	-.0754013	.0594695	-1.27	0.205	-.1919594	.0411567
LogNSE20_D1						
LD.	-.3991186	.3378612	-1.18	0.237	-1.061314	.2630772
L2D.	.04884	.2995676	0.16	0.870	-.5383018	.6359817
_cons	.0009498	.0082955	0.11	0.909	-.0153091	.0172087

D_LogTV_D1						
_ce1						
L1.	-.1191811	1.383308	-0.09	0.931	-2.830415	2.592052
LogEGt_D1						
LD.	1.245097	1.072287	1.16	0.246	-.8565475	3.346741
L2D.	1.053029	.8114869	1.30	0.194	-.537456	2.643514
LogMC_D1						
LD.	.6356074	1.514374	0.42	0.675	-2.332511	3.603725
L2D.	-1.026632	.9882825	-1.04	0.299	-2.96363	.9103665
LogTV_D1						
LD.	-.9636942	.3981533	-2.42	0.016	-1.74406	-.1833281
L2D.	-.4884996	.2354425	-2.07	0.038	-.9499583	-.0270408
LogNSE20_D1						
LD.	-.1941683	1.337608	-0.15	0.885	-2.815832	2.427495
L2D.	1.422495	1.186002	1.20	0.230	-.9020265	3.747016
_cons	.0100871	.0328423	0.31	0.759	-.0542826	.0744569

D_LogNSE20_D1						
_ce1						
L1.	.5640614	.2658394	2.12	0.034	.0430258	1.085097
LogEGt_D1						
LD.	-.0329423	.2060685	-0.16	0.873	-.4368291	.3709445
L2D.	-.1216381	.1559488	-0.78	0.435	-.4272922	.1840159
LogMC_D1						
LD.	.4727259	.2910272	1.62	0.104	-.0976769	1.043129
L2D.	.3280619	.1899248	1.73	0.084	-.0441838	.7003076
LogTV_D1						
LD.	-.1357823	.0765157	-1.77	0.076	-.2857504	.0141858
L2D.	-.0754552	.0452465	-1.67	0.095	-.1641368	.0132263
LogNSE20_D1						
LD.	-.749796	.257057	-2.92	0.004	-1.253618	-.2459736
L2D.	-.387983	.2279218	-1.70	0.089	-.8347015	.0587356
_cons	.0002119	.0063115	0.03	0.973	-.0121585	.0125822

Appendix V: *Data*

Period	GDP Seasonally adjusted	Total Value of Shares Traded (Kshs)	NSE 20 Share Index (Base Jan 1966=100)	Market Capitalization (Kshs)
2000Quarter 1	243,752,000,000	359,960,031	2,233	118,870,000,000
2000Quarter 2	241,638,000,000	278,162,267	2,003	104,550,000,000
2000Quarter 3	242,983,000,000	432,572,921	2,001	109,800,000,000
2000Quarter 4	247,685,000,000	171,476,659	1,913	101,422,000,000
2001Quarter 1	248,728,000,000	337,842,335	1,831	97,400,000,000
2001Quarter 2	257,072,000,000	442,202,541	1,657	98,400,000,000
2001Quarter 3	258,538,000,000	132,246,395	1,401	85,560,000,000
2001Quarter 4	255,451,000,000	149,901,104	1,355	86,097,430,618
2002Quarter 1	259,351,000,000	168,562,667	1,183	81,890,452,097
2002Quarter 2	257,943,000,000	157,385,089	1,087	83,302,175,638
2002Quarter 3	251,622,000,000	304,622,404	1,027	85,784,834,266
2002Quarter 4	256,376,000,000	528,261,971	1,363	112,054,538,357
2003Quarter 1	258,579,000,000	572,998,857	1,608	138,880,759,042
2003Quarter 2	259,355,000,000	1,247,328,265	1,935	180,655,567,242
2003Quarter 3	267,178,000,000	1,746,990,179	2,380	252,140,270,461
2003Quarter 4	269,408,000,000	2,081,224,902	2,738	317,530,174,004
2004Quarter 1	277,750,000,000	2,340,154,694	2,771	307,550,000,000
2004Quarter 2	272,473,000,000	1,290,000,000	2,640	274,410,000,000
2004Quarter 3	274,332,000,000	1,660,000,000	2,671	288,300,000,000
2004Quarter 4	283,949,000,000	1,450,000,000	2,946	314,150,000,000
2005Quarter 1	284,684,000,000	1,510,000,000	3,209	326,920,000,000
2005Quarter 2	292,349,000,000	3,840,000,000	3,972	420,730,000,000
2005Quarter 3	295,714,000,000	2,760,000,000	3,833	449,800,000,000
2005Quarter 4	301,332,000,000	4,060,000,000	3,973	462,500,000,000
2006Quarter 1	303,324,000,000	3,820,000,000	4,102	484,200,000,000
2006Quarter 2	310,006,000,000	8,450,000,000	4,260	623,200,000,000
2006Quarter 3	318,374,000,000	12,350,000,000	4,880	727,000,000,000
2006Quarter 4	316,887,000,000	5,770,669,367	5,646	791,580,000,000
2007Quarter 1	325,726,000,000	6,430,000,000	5,134	640,500,000,000
2007Quarter 2	335,014,000,000	6,080,000,000	5,147	743,900,000,000
2007Quarter 3	337,379,000,000	10,000,000,000	5,146	791,700,000,000
2007Quarter 4	338,979,000,000	6,020,000,000	5,445	851,390,000,000
2008Quarter 1	330,942,000,000	7,320,000,000	4,843	782,000,000,000
2008Quarter 2	342,875,000,000	22,130,000,000	5,186	1,231,000,000,000
2008Quarter 3	345,924,000,000	6,790,000,000	4,180	972,000,000,000
2008Quarter 4	339,596,000,000	4,620,000,000	3,521	854,000,000,000
2009Quarter 1	702,855,000,000	2,410,000,000	2,805	689,000,000,000
2009Quarter 2	711,723,000,000	4,130,000,000	3,295	822,000,000,000
2009Quarter 3	722,388,000,000	3,550,000,000	3,005	772,000,000,000
2009Quarter 4	726,699,000,000	2,590,000,000	3,247	832,000,000,000
2010Quarter 1	739,896,000,000	8,320,000,000	4,073	983,000,000,000
2010Quarter 2	761,606,000,000	6,800,000,000	4,339	1,109,000,000,000
2010Quarter 3	790,837,000,000	7,740,000,000	4,630	1,173,700,000,000
2010Quarter 4	809,998,000,000	5,880,000,000	4,433	1,166,990,000,000
2011Quarter 1	806,377,000,000	7,984,120,162	3,887	1,090,229,247,670
2011Quarter 2	814,748,000,000	7,047,501,483	3,968	1,121,440,312,032
2011Quarter 3	827,188,000,000	5,452,737,754	3,284	884,761,770,855
2011Quarter 4	848,757,000,000	3,972,916,252	3,205	868,241,593,937
2012Quarter 1	843,933,000,000	6,386,100,092	3,367	940,796,061,883
2012Quarter 2	846,617,000,000	6,214,235,430	3,704	1,048,717,424,424
2012Quarter 3	863,924,000,000	9,781,502,241	3,972	1,143,936,395,991
2012Quarter 4	897,047,000,000	7,582,423,925	4,133	1,272,002,228,798
2013Quarter 1	892,137,000,000	11,182,646,867	4,861	1,599,798,462,547
2013Quarter 2	899,618,000,000	13,021,293,444	4,790	1,618,270,227,288
2013Quarter 3	920,000,000,000	10,062,496,841	4,793	1,790,854,212,992
2013Quarter 4	937,505,000,000	11,329,229,681	4,927	1,920,718,607,628
2014Quarter 1	932,363,000,000	13,042,505,660	4,946	2,003,515,106,325
2014Quarter 2	947,744,000,000	18,190,023,459	4,885	2,106,691,082,765
2014Quarter 3	960,310,000,000	19,241,275,342	5,256	2,293,489,997,468
2014Quarter 4	977,719,000,000	31,583,302,408	5,113	2,312,103,196,287
2015Quarter 1	982,717,000,000	20,516,570,189	5,346	2,452,466,965,554
2015Quarter 2	1,004,755,000,000	24,250,866,761	4,906	2,301,879,997,548
2015Quarter 3	1,019,196,000,000	14,375,440,716	4,173	2,063,644,004,632
2015Quarter 4	1,051,810,000,000	46,095,265,448	4,040	2,053,520,513,780