

**RELATIONSHIP BETWEEN STOCK MARKET PERFORMANCE AND
ECONOMIC PERFORMANCE IN KENYA**

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DEDICATION

I dedicate this study to my late Mother who taught me the virtues of determination, hardwork and persistence.

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ABSTRACT

Stock markets play a significant role as market intermediaries by providing a link between savers and investors. This is made possible by a growing economy which requires additional financing from markets whereas savers have surplus funds for investments. However, for the economy to grow there is a need for a vibrant stock market. Few studies have been done in Kenya to establish the relationship between the stock market performance and economic performance. This study therefore seeks to establish the relationship between these two factors.

In order to do this, the research was designed as a causal study where relationships were tested. The population comprised of companies listed at the NSE while the sample size was the companies forming the NSE 20 Share Index. Secondary data collected from the Kenya Bureau of Statistics and the Central Bank was used in the study. Data was then analysed using descriptive analysis, correlation analysis and regression analysis.

The findings of the study are that there is no correlation between economic performance and stock market performance. There is however a strong negative correlation between stock market performance and inflation and a strong positive correlation between stock market performance and exchange rates. GDP was affected by interest rate and inflation. The study concludes that there is no significant relationship between stock market performance and economic performance. The study therefore recommends that there is need to develop policies aimed at improving contribution of the NSI to economic development.

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ABBREVIATIONS

ATS:	- Automatic Trading Systems
CBK:	- Central Bank of Kenya
CPI:	- Consumer Price Index
GDP:	- Gross Domestic Product
KShs	- Kenya Shillings
IPO:	- Initial Public Offer
NASI	- NSF All-Share Index
NSF:	- Nairobi Securities Exchange
USD:	- United States Dollar

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

1.1.1 Stock Market Performance

Simiyu (1992) underscores the importance of deriving an objective measurement basis for the performance of the stock exchange. Whereas there has been no single conclusion on the measurement basis that should be used, most researchers concur that the use of stock market index is plausible given that it helps to assess the performance of the market over a period of time. He proposes the use of a weighted stock market index which reflects the market capitalization of stocks.

The Nairobi Securities Exchange, until recently was referred to as the Nairobi Stock Exchange, has been providing stock market indexes since its formation in 1953. The NSE 20-share index was developed to provide a review of weighted movement in price of major counters. The index was revised in year 2007 with an aim to ensure that it was a true barometer of the market since it was felt that the stocks which used to comprise the index had since lost their prominence in the market and that some sectors such as the telecommunication market segment were not represented. Further, NASI was introduced in the year 2008 as an alternative index which was an overall indicator of market performance since it includes all the shares quoted in the market provided that there was activity in the specific stock for the day. Obunde (2011) argues that NASI had not gained prominence since its launch and therefore the NSE 20-Share Index still remains as the main market index. This study makes use of the 20-Share index since its revision in July 2007 to July 2012 to measure stock market performance.

1.1.2 Economic Performance

The pace of economic growth in a country is very useful in assessing improvement in economic welfare such as rise in disposable income, expansion of infrastructure, growth in national income, reduction in unemployment as well as level of aggregate demand and supply (Lee, 1992). The rate of economic growth refers to the increase in aggregate demand and supply in an economy as measured using output, net income or expenditure approach. Conventionally, assessment of economic growth is done through the use of GDP. To measure economic growth, the percentage change in GDP is computed and the rate compared with the previous period growth. An economy is said to exhibit a growth trend where the rate of change in GDP is continuously rising. According to Labozi and Modigliani (1995), GDP will usually vary in the four economic cycles namely, expansion, crisis, recession and recovery. The economy therefore moves through the four cycles with high economic growth rates recorded during expansion and low growth rates experienced during recession. This study was based on GDP for the country from year 2007 to 2012 as a measure of economic performance. The pace of growth was compared with that of changes in the stock market index to assess whether there is any relationship between the two variables. Further, the impact of interest rates, inflation was also studied.

1.1.3 Relationship between Stock Market Performance and Economic Performance

The stock market is an institution which offers a platform for efficient allocation of capital. Howells and Keith (2000) observe that borrowers run to the market so as to access funds for long term projects whereas savers use the market to invest their capital. Stock markets offer individual corporations as well as the government the avenue to raise capital for use in financing long-term

project. Short term market segments in the exchange normally referred to as the money market on the other hand offers short-term capital to borrowers and equally short-term investment opportunities for investors. As such Vazakidis (2009) observed that performance of the economy as measured by GDP is boosted when adequate funds are available in the market for use by the government and private enterprises for development. The market therefore serves as a barometer of economic performance since as economies develop, funds will be required to expand increasing demand for securities traded in the securities exchange and thereby prices. Seyyed (2010) is of the view that there is a strong positive correlation between the efficiency of the stock market and economic performance of a country.

Stock markets are considered vital in economic development since they provide public companies that are quoted in the exchange an opportunity to raise necessary funds for investors as well as providing savers with an avenue to invest their funds for a gain. Gitobu (2000) observes that the main role of a securities exchange market is to intermediate between borrowers and savers for economic development. They encourage those with surplus funds to save by providing a better rate of return than commercial banks. The market is also attractive to those seeking to borrow to finance long term projects. Chakravarty (2005) argues that unlike commercial banks, stock market do not require collateral for borrowed funds, offers flexible financing options such as by issuing ordinary stocks, preference stocks, or debt. The cost of borrowing is also relatively low compared to the rates charged by commercial banks. The government also benefits from the exchange by having an avenue to raise funds for economic development. For instance, in Kenya the government issues the infrastructure bonds, treasury bonds and treasury bills to access funds for use in improvement of roads, provision of water as well as in funding social programmes such as education and health. Otuoke (2006) observes that

the government through the CBK carries out its responsibilities of ensuring a stable macroeconomic environment through the securities exchange. For instance, during recessionary periods characterized by low aggregate demand, low savings and investments, CBK increases supply of money in the economy by repurchasing treasury bills in the market. This helps to provide necessary cash flows for investment and to increase output. According to Nyamute (1998), performance of the stock market interests a number of parties such as investors, regulators, the government, borrowers just to mention a few. Kathurima (2010) found out that the market has gained increased popularity ever since the year 2007 after the Safaricom Company Limited's IPO. This caused the number of investors in the market to rise as well as increased interest among investors and financial institutions. Gitobu (2000) found out that performance of the market is affected by a number of factors such as government activities, availability of other investment assets, political factors, composition of investors, and economic performance

The causal relationship between economic performance and the performance of the stock market is an interesting one. Calderon (2002) argued that this relationship could be best described as an egg and hen problem since it is not clear whether changes in the stock market have an effect on economic growth or if the market is actually influenced by changes in the economy. A number of past researches are usually interested in how development in financial sector such as banks and insurance companies influence economic growth with little focus on the stock market. Kathurima (2010) however argues that having a well developed market would increase savings albeit from a theoretical base. Savings have been found out to be critical in economic development since according to Mauro (2000), they form the basis for investment. Therefore, by harnessing savings, stock markets spur investments which in turn lead to improvement in economic growth. Recent

evidence have confirmed this view where it was found that efficient and effective stock markets offer a big boost to economic development. Focus on economic growth has therefore become a new opening in the financial literature and though ignored in the past, the role played by stock markets in economic growth is recognized by most countries and thus the concerted efforts to ensure that these markets are operational. Regulators are currently seeking ways to improve their stock markets more so in developing countries.

(Juo, Liu and Chuan (2005) argued that sustaining well performing capital markets is an impetus to economic development by providing a smooth flow of finances for long term development. This however requires addressing issues which inhibit growth in stock markets in developing countries such as Kenya. Some of these challenges include; effects of political instability, poor macroeconomic environment, and weak corporate governance practices among market intermediaries, poor regulatory requirements and government interference. In addition, Kathurima (2010) criticizes the mode of operation for the NSE arguing the market is prone to corporate governance issues because of adopting a mutualised structure. There are however attempts to demutualise the market which is hoped to improve its efficiency and effectiveness in determining asset prices as well as in provision of market information.

This study was informed by the need to establish the relationship between performance of the stock market and that of the country. The reasoning was that to have a well performing stock market, the economy must be growing and thus investors must be carrying out expansionary strategies requiring additional financing from the market whereas savers would be having surplus funds for investment. On the other hand, for the economy to grow there is need for a vibrant stock market to provide necessary financing to fund the growth and at the same time provide

with incentives so as to provide needed funds. Having a strong stock market during periods of economic prosperity is also vital in ameliorating allocation problem. That is it ensures that borrowers get the surplus funds held by savers. Assessment of performance of both the stock market and the economy forms the heart of this study. The study seeks to establish the relationship between these two factors.

1.1.4 Nairobi Securities Exchange

The NSE was started in Kenya during the pre-colonial periods around 1920. The market was informal and there were no rules governing its practices. Its formal set up was officiated in July 1953 after London officials gave a nod to the exchange. This saw the market constituted as a voluntary association of stock brokers registered under the Societies Act. After independence in 1963, locals were allowed to take part in the market. The first major activity in the market took place in 1988 with the privatization of Kenya Commercial Bank where the government sold 20 percent of its shares in the company. In July 1994, a computerized delivery settlement system (DASS) was implemented leading to a growth of licensed brokers when 8 new brokers were licensed.

The Kenyan Government relaxed restrictions on foreign ownership in locally controlled companies and foreign investor participation was introduced in 1995. The entire Exchange control act was repealed in December 1995 seeing more stock brokers licensed to bring the number of licensed brokers to twenty. In 1996 the largest share issue in the then history of NSE, the privatization of Kenya Airways, came to the market and more than 110,000 shareholders acquired a stake in the airline. The Kenya Airways privatization team was awarded the World Bank award for Excellence in 1996 for being a success story in the divestiture of state owned enterprise. In 1998 the government expanded the scope for foreign investment by introducing incentives for capital markets growth

including the setting up of tax-free Venture Capital Funds, and removal of Capital Gains Tax. Subsequently, listed companies split their shares at NSI while others issued bonus shares.

The capital market authority in liaison with NSE commissioned a study in 2006 to spearhead the process of demutualization. Ernst & Young, a leading financial consulting firm was engaged to guide the market on the process of demutualization. These activities are ongoing and significant ground has been covered towards improving corporate governance practices in the exchange. Trading activities have also been heightened with the introduction of ATS in 2006 to replace the Open Outcry Trading Rules. In July 2007, the NSI index was revised which was aimed at ensuring that the index is a true barometer of the economy. In 2008, an alternative index, NASI was introduced. In September 2011 the Nairobi Securities Exchange converted from a company limited by guarantee to a company limited by shares and adopted a new Memorandum and Articles of Association reflecting the change. In October 2011, the Broker Back Office commenced operations. The system has the capability to facilitate internet trading which improved the integrity of the Exchange trading systems and facilitates greater access to our securities market. In November 2011 the FTSE NSE Kenya 15 and FTSE NSE Kenya 25 Indices were launched. The launch of the indices was the result of an extensive market consultation process with local asset owners and fund managers and reflects the growing interest in new domestic investment and diversification opportunities in the East African region. As of March 2012, the Nairobi Securities Exchange became a member of the Financial Information Services Division (FISD) of the Software and Information Industry Association (SIIA). In March 2012 FTSE NSE Kenya 15 Index and the FTSE NSE Kenya 25 Index were made available on the NSI website www.nse.co.ke. The new initiative gives investors the opportunity to access current information and provides a reliable indication of the Kenyan equity market's performance during trading hours.

1.2 Statement of the Problem

Stock markets play a significant role as market intermediaries by providing a link between savers and borrowers (Kith 2000). A number of studies have been undertaken to establish relationship between the performance of stock exchanges in the globe and economic performance. Most of these studies were carried out in developed stock exchanges.

The relationship between stock market performance and economic development has interested a number of researchers such as Scyyed (2010), Charkravarty (2005) and Calderon and Liu (2002). In the early studies such as Shaw (1973) and McKinnon (1973) the researchers independently observed that development in financial market is positively correlated to gross per capita income. It can therefore be concluded that financial markets are useful in advancing development in the economy. This is because financial markets are intermediaries providing a mechanism for borrowers to access finances as well as savers to invest surplus funds. A robust financial market is therefore critical in economical development. It would help to allocate capital to essential industries as well as encourage increased savings which would ultimately result to a rise in the rate of economic growth. There is however conflicting literature regarding the relationship between stock market and economic performance.

There is conflicting evidence on whether movement in share prices in stock markets could be an indicator of economic growth. For instance Gun, Liu and Chuan (2005) argues that whereas economists and financial professionals have spent much of their time reviewing whether economic growth rates as measured by GDP, across the globe are related to movement in stock market prices, historical data do not back up this association. He argued that the stock market does not reflect the full economy and therefore has no relationship with GDP which is a measure

of the performance of the whole economy. However, Kolapo and Adaramola (2012) found out that GDP and stock market index were correlated. They noted that stock market prices reflect future expectations of stock market prices. Therefore, countries which have strong long-term growth prospects are likely to offer attractive stock market returns than those with slower growth expectations. Thus where growth prospects are expected to be high, similarly market prices of stocks are likely to soar.

Research in the Nairobi Stock Exchange (currently, Nairobi Securities Exchange) have focused on understanding measures to improve performance of the stock market such as through maintaining a stable political environment (Kithinji and Ngugi, 2010), impact of macroeconomic indicators such as interest rates and inflation on the stock market (Gekone, 2011) and Kiptoo (2010), and impact of demutualization of the market (Kathurima, 2010). The impact of macroeconomic environment to the stock market cannot be overemphasized and thus the relevance of the various studies carried out to inform policy making. Past studies have however not looked at the stock exchange as an engine for economical growth which would cause policy makers to give its development more attention. Attention has been largely focused on the banking sector assuming the stock market which is very useful in allocation of long term capital and sharing of risk in the financial market. This study is informed by a need to carry out a study in the Nairobi Securities Exchange to understand whether there is a relationship between the performance of the stock market and economic growth so as to bridge the study gap as well as clear the research conflicts drawn from studies in other regions such as the study of the Pakistan stock market by Seyyed (2010) which concluded that there was no relationship between macro-economic indicators and stock market prices. Levine and Zervos (1996), Levine and Zervos

(1998) and Calderon and Liu (2002) however found a strong correlation between stock market performance and economic growth.

The following research questions were used to guide the study:

1. Is there a relationship between stock market performance and economic performance?
2. What is the nature of the relationship between stock market performance and economic performance?

1.3 Research objective

1.3.1 Main objective

To establish the relationship between stock market performance and economic performance.

1.3.2 Specific objectives

Specifically, this study seeks to find out to

- i. Investigate presence of relationship between stock market performance and economic performance; and
- ii. Examine whether there is a uni-directional or bi-directional relationship between economic performance and stock market performance.

1.4 Significance of the Study

The study of relationship between stock market performance and economic performance in Kenya is expected to be beneficial to a number of parties such as:

Policy makers

It is hoped that the study will provoke policy makers to give more attention to the stock market given its contribution to the economic performance.

Nairobi stock exchange

The study will provide information useful to the management of the Nairobi Stock Exchange which could be used to lobby for market improvement.

Academics

The study will contribute to the body of knowledge and hence will be of interest to both researchers and academics who seek to explore the relationship between stock market performance and economic growth.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to present a review of literature relating to the relationship between GDP and Stock Market Index using a case study of the Nairobi Securities Exchange. Although the stock market plays an important role in the economy, it has not attracted much attention from scholars since corporate finance literature has traditionally focused on the study of the contribution of commercial banks.

2.2 Theoretical review

2.2.1 Arbitrage Pricing Theory

The relationship between stock market returns and fundamental economic activities in developed economies and especially in the US have been documented in numerous studies (Iama, 1970, 1990). Arbitrage pricing theory (APT) has been extensively used in studies analyzing the relationship between stock market and macroeconomic indicators. An early theory of arbitrage pricing uses a functional form to test the relationship between stock index and macroeconomic variables. All individual stocks are affected by common factors. Market index can be affected by macroeconomic variables, such as changes in interest rate, money supply, economic growth, and inflation. However, the APT model has a drawback as it assumes the constant term to be a risk-free rate of return (Brahmasrene and Jiranyakul, 2007). Among the macroeconomic indicators, exchange rates have been displayed to influence stock prices through trade effect (Geske and Pohl, 1983). Further, whereas the model seeks to find out the impact of changes in macroeconomic activities on stock market returns, it does not help in establishing whether there

is any relationship between stock market index and GDP growth rates which is the heart of this study.

2.2.2 Life Cycle Theory

The relationship between stock prices and consumption expenditures is based on the life cycle theory, developed by Ando and Modigliani (1963), which states that individuals base their consumption decision on their expected lifetime wealth. Part of their wealth may be held in the form of stocks linking stock price changes to changes in consumption expenditure. Thus, an increase in stock prices will increase the expected wealth, which, in turn, will increase the consumption expenditures, suggesting the direction of causality from stock prices to consumption expenditures. On the other hand, an increase in consumption expenditures may result in an increase in the corporate sector's earnings, which will result in higher stock prices, implying causality from consumption expenditures to stock prices.

2.2.3 Q Theory

The relationship between stock prices and investment spending is based on the q theory by Tobin (1969), where q is the ratio of total market value of firms to the replacement cost of their existing capital stock at current prices. According to the theory, the firms would increase their capital stocks if q is greater than one, implying that the market value of firms is expected to rise by more than the cost of additional physical capital. Thus an increase in stock prices will result in an increase in the market value of firms, implying that firms would increase their capital stocks reflecting an increase in investment spending. Another link, though less direct, between stock prices and investment spending is based on the neoclassical or cost-of-capital model. The model assumes that firms first determine the desired stock of real capital on the basis of prices of

labour, capital, and expected sales and then determine the rate of investment depending on how fast they wish to reach the desired capital stock in the face of significant adjustment cost. Thus, the expected changes in sales and planned output are the major factors affecting investments. However, as noted by Bosworth (1975), if higher earnings are implied by higher expected output that increases stock prices, then the market valuation model implicitly accounts for the effect of expected output.

Finally, the relationship between stock prices and economic activity is investigated to examine the role of stock market, that is, whether it leads or lags economic activity. Moreover, the relationship of stock prices with the components of aggregate demand, consumption, and investment sometimes provide conflicting results, causing an ambiguity concerning the direction of causality between stock price changes and macro variables. As mentioned above, the economic activity is generally measured by GDP

2.3 General Literature

The following is a review of general literature on the impact of stock market performance on economic growth as well as the impact of economic growth on the stock market. The feedback effect between stock performance and economic growth has also been reviewed.

2.3.1 Impacts of Stock Market Performance on Economic Growth

The stock exchange market is of very fundamental importance in an economy. As an institution it helps promote entrepreneurial growth in countries such as Kenya. With a wide economical growth and expansion it becomes impossible to limit business organizations to proprietorship or partnership. By giving people an option of credible institutions to invest their money in the stock markets help encourage and cultivate a deep culture of saving in any economy which is a vital

role of the stock exchange markets. People have the incentive to save more and consume less due to the fact that there are credible institution(s) where these people can safely invest their money and earn a return. As such, the stock market assists in the transfer of savings to investment in productive enterprises as an alternative to keeping the savings idle. The outcome of this is that the investor can earn investment income from the savings converted into investments.

In their research documentation, Demirguc-Kunt and Zervos (1996) argued that having strong markets offer financial services which would help to improve the economy. Therefore, improvement in stock market would create a momentum to investment. They argued that improvement in stock market could help to mobilize savings as well as lead to diversification of financing and investment risks. Therefore, they envisaged a stock market where different forms of securities are traded such as debt, equity and financial derivatives. This view was supported by Majid (2007) who noted that a strong financial sector offers savers an opportunity to invest their surplus funds whereas borrowers will access finances from the market to meet their deficit. Hicks (1969) held the view that giving investors an easy access to finances would promote the level of industrialization by offering funds to finance investment

Khan and Senhadji (1998) found out that the stock market plays a critical role in improvement of emerging economies. They observed that liquidity risks as well as investment risks are minimized by having strong markets. The researchers also noted that there is a relationship between developments of stock markets with economic development. For instance, they noted that liquid stock markets reduce transaction costs incurred when sourcing funds. Therefore governments in emerging economies such as Kenya should encourage increased liquidity in stock markets so as to facilitate an efficient and cost effective financing. Nyamute (2008)

observed that most business organizations in Kenya were facing challenges in accessing funds from the Nairobi Stock Exchange mainly due to legal bottlenecks and high cost of entry. This is therefore an impediment to investment in the country. Levine and Zervos (1996) noted that level of market activity is an indicator of real investment activity with the association even becoming strong for emerging economies.

Liquidity creation is one of the critical roles played by stock markets by ensuring that investors with deficiency in funds access the same from those having surplus. Investors are given an opportunity to sell securities in the market to meet their liquidity shortfall whereas savers buy such investment vehicles as an avenue to utilise their surplus funds. Whereas investors benefit from stock markets by getting the needed resources, Lee (1992) observe that savers also benefit from the markets since instead of holding idle funds, they are given an opportunity to gain a return by purchasing income earning assets from the market. An efficient market therefore should help to provide investors with cheap sources of funds and offer savers an opportunity to earn high returns for investments carried out. Rogers (2003) noted that having liquid markets offers attraction to investors by providing them a quick solution in case of liquidity deficits. Further, it assures savers that assets purchased could be sold as and when need arises. The need to hold liquid cash therefore reduces in countries where the stock market is liquid as savers prefer to hold income bearing assets rather than cash. Mauro (2000) argues that reducing the need for holding liquid cash balances for savers through efficient stock markets is a positive move in an economy since it would ensure that there are no idle resources held. Therefore, a well performing stock market is one that offers demand for money giving savers an attractive opportunity to invest their surplus funds as well as giving investors funds to meet liquidity deficits.

A number of researchers have also supported the idea of creating strong stock markets noting that such markets are a useful barometer for economic performance. Nasseh and Strauss (2000) argue that stock market trends are an indicator of the performance of the economy. For instance, a bullish market could be an indicator of growing economy whereas a bearish market might be an indicator of a decline. They observed that economic recession is usually characterized by low stock prices. Mauro (2000) pointed out that share prices in a stock market are based on investors' expectation of future economic performance. Therefore where the economy is expected to slump for instance due to political risks, demand for shares usually fall and thereby decline in stock prices. Therefore, movement in stock prices could be used to infer expected economic performance in a country.

Shleifer and Summers (1988) however disagreed with other researchers that the stock market has an impact on economic performance. They noted that the stock market only provides information for quoted companies which in emerging countries are an insignificant part of the whole economy. Stiglitz (1993) holds similar sentiments noting that movement in share prices is merely in response to changes in short term profits for commercial enterprises mainly based on accounting reports. However, financial reports are subject to manipulation and thus cannot be used to reflect the long term performance of the economy. He therefore observes that whereas GDP is a measure of the long-term performance of the economy, stock market index is a measure of movement in share prices which is based on fundamentals of quoted companies, their management as well as profitability. The two variables according to Stiglitz (1993) cannot and should not be compared.

2.3.2 Effects of GDP on Stock Market Index

There are a number of studies carried out on the impact of various macroeconomic variables on the stock market. For instance, Kithinji and Ngugi (2010) observed that political factors have an important impact on the stock market where market indexes are usually lower before elections and rise thereafter depending on the confidence that investors and savers have on the elected government. Kiptoo (2010) and Lee (1992) held similar views arguing that interest rates, inflation and exchange rates have an impact on the stock market. Ibrahim (1999) found out that prices of stocks are influenced by systematic factors due to their impact on expected returns. Fluctuations in macroeconomic variables therefore impact on expectations held in the market influencing stock prices. Singh (1997) argues that even when there are negative forecasts regarding the economy, there might be a rise in stock prices making the market to be very dynamic. Charkavarty (2005) however found out that stock market prices are very sensitive to changes in macroeconomic indicators such as changes in GDP. As the economy expands, there is a likelihood that demands for financial securities such as stocks and debt instruments increase. Growth in GDP complemented by an increase in GDP per capita and increase in disposable income will lead to increase in savings as well as investments. Further, it will also lead to increase in consumption expenditure which stimulates increase in aggregate output. Nieuwerburgh, Buelens and Cuyvers (2006) found out that growth in GDP has a direct impact on development in the stock market.

The stock market is likely to be vibrant where future prospects in returns are positive. Market prices will therefore rally where strong economic forecasts are made. Stock market prices are however mainly attributable to the forces of demand and supply which are dynamic thus causing stock prices to fluctuate over time. Movement in share prices is usually erratic and dependent on

changes in investors' perceptions as well as their expectations about the future. However since such expectations are dependent on the status of the economy, variation in macroeconomic variables are believed to have an impact on the performance of the stock market. Researchers argue that changes in macroeconomic forces influence stock prices though they are not the only factors responsible for movement in stock market index. This is because at times, stock prices change merely due to irrational behaviour and decision made on unreliable accounting information that is subject to manipulation.

There have been a number of studies in developed markets on the relationship between the stock market and other macroeconomic factors such as interest rates, inflation and exchange rates such as Lee (1992). However, such studies are scanty in developing markets. Markets in emerging economies such as Kenya, Uganda and Tanzania are viewed as still in their infancy stage suffering from unwarranted government influence and inadequate information regarding the quoted companies. Stock markets therefore suffer from significant influence from the government. Gekone (2011) determined that that interest rate ranks as one of the significant macroeconomic factor that influences stock market performance. For instance, he noted that if the CBK raises the base lending rate, the rate paid to treasury bills and treasury bonds (risk free rate) will increase and therefore causing the required rate of return for risky assets such as stock will also increase. As such, share prices are likely to fall in case interest rates rise. Gekone (2011) also noted that demand for stocks will fall in response to higher interest rates for treasury bonds since investors will be attracted by their higher returns per unit of risk as compared to stocks. Further, high interest rates reduce liquidity in the market by limiting credit creation ability of commercial banks thus resulting to a depressed demand for stocks. Therefore, there exists an inverse relationship between interest rates and stock market prices.

Phramann and Fratzscher (2004) however observed that not all stocks will react in a similar manner following upsurge in interest rates. Thus they recommended further research on the reasons why individual stocks respond in a different manner to changes in macroeconomic factors as well as monetary policy shocks. Bernanke and Kuttner (2003) were also skeptical of the influence of macroeconomic factors on stock performance. They reached a conclusion that there exists a very little, if any, impact of changes in monetary policy on real interest rates. Robinson (1952) supported this view arguing that stock market do not in any way spur growth in the economy but rather respond changes in the real sector. Economists therefore do not consider the stock market as an agent for economic growth. Another school of thought that has been presented by Hongbin (2007) is that there exists a bi-directional causality between GDP growth and performance of the stock market rather than a unidirectional relationship. The argument is stock market is likely to flourish during economic prosperity whereas a strong stock market contributes to economic growth by improving investments and savings. The concept is discussed in 2.3.3 here under

2.3.3 Interrelationship between GDP Growth and Stock Market Performance

Interrelationship between GDP and stock market performance has been assessed by a number of researchers. For instance, Luintel and Khan (1999) from a study of 10 countries observed that there exists a feedback effect between economic growth and stock market performance. This was also confirmed by Hongbin's (2007) study of the China's stock market performance and economic growth. The conclusion was that stock market does not only help to spur economic growth but growth in the economy also fosters development of the stock market. The effect of the stock market is largely felt in the long term since it mainly acts as a capital market which is a

market for long term investment securities. Singh (1997) argued that since the stock market is an undisputed barometer of the economy, it should be strengthened so as to remain a credible predictor of future economic performance. He observed that where a country has a well developed financial system, economic development could be achieved through innovation and investments financed in a cost effective and efficient manner. Majid (2007) holds similar view noting that stock market developments as well as economic growth are interdependent.

Chen et al (1986) are of the view that a one-directional relationship between economic growth and stock market performance cannot be supported. They observe that stock prices are responsive to external shocks. Some of these shocks include natural calamities such as floods and earthquakes as well as impacts of government policies for instance exchange rate and interest rates. In emerging economies, impact of some of these macroeconomic variables might however not have the expected causal effects on the stock market due to inefficiencies. For instance, Sifujo et al (2008) noted that foreign exchange market in Kenya is not efficient and therefore, movement in foreign exchange rates might not be responsive to fundamental changes in the economy. Chen et al (1986) opposes the view that there exists a bidirectional relationship between stock market development and economic growth arguing that the two variables are endogenous. Other studies reviewed earlier point to a two-way causation between the two variables whereas others do not even establish existence of any relationship between the two variables. It is important however to note that most researchers agree that development of the stock market as a source of finances for capital development is very critical. In addition, ensuring that a stable macroeconomic environment is maintained is equally important to bolster investor confidence in the market.

Developed economies are characterized by having strong and efficient markets pointing to the critical role played by stock markets in economic development. Markets in such economies are also very efficient offering investors a quick and low cost source of finances. Savers are also accorded an opportunity to generate returns on their surplus funds. Kolapo and Adaramola (2012) observe that emerging economies have inefficient and highly regulated stock markets inhibiting economic growth. For instance, the regulatory bottlenecks faced hinder investors from sourcing funds from these markets whereas savers are not motivated to invest their surplus funds in such markets. Kiptoo (2010) noted that the mutual structure of the Nairobi Stock Exchange is detrimental to investor confidence due to its corporate governance issues. He recommended a revision of the structure so as to move ownership of the market from the market intermediaries to independent shareholders. This he argues would ensure that market intermediaries do not have any personal interest on the exchange which could be in conflict with their roles. Other improvement measures recommended for the market include reduction in transaction costs both for investors (savers) as well as borrowers. Researchers have also noted that provision of real time and quality information regarding the market is also very important in minimizing speculation which is detrimental for the long run success of the market.

2.4 Empirical Evidence

Researchers in developed economies have carried out extensive research on the relationship between the stock market development and economic trends. Some of these studies include Levine and Zervos (1996), Levine and Zervos (1998) and Calderon and Liu (2002). The researchers have evaluated the contribution of stock market to economic growth as well as whether there is a casual relationship between economic development and the stock market. The main findings from these studies point to a positive relationship between economic growth and

stock market development. The level of development in stock market has also been found to be positively correlated to that of other financial markets such as banking institutions leading to economic growth. Other researchers in developed countries such as Seyyed (2010) have however found out that there is no relationship between economic growth and stock market performance more so in developing countries where government influence is usually significant. This hypothesis therefore deserves investigation in the context of Kenya's market which is the main focus of this study to fill this knowledge gap.

Adjasi and Biekepe (2006) in their study of the selected African countries found out that markets in these countries are undeveloped and suffer from significant government influence. This negatively influences efficiency of these markets as well as reducing their liquidity. This study was confirmed by Seyyed (2010) who observed that level of macroeconomic activity was the main cause of movement in stock prices albeit in the long run. The stock market was also found to play a critical role as an indicator for future economic growth. Kolapo and Adaramola (2012) held similar studies in Nigeria where they found a correlation between market capitalization and GDP ratio. They found out that development in stock market spurs economic growth in the country. Therefore, they recommended that the government should consider reducing regulatory bottlenecks, transaction costs and legal barriers which are detriment for a smooth running market. Vazakidis (2009) carried out a similar study in France investigating the relationship between economic growth and development in the stock exchange. The study established that economic growth was a contributory factor to the development of France stock market. Mauro (2001) noted that in emerging and advanced economies as well, there is a positive correlation between stock returns and output growth.

Levine and Zervos (1998) analyzed the empirical relationship between the measures of the stock market development and long-run growth rates. They produced indexes of the overall stock market development that bring together information on stock market size, liquidity, and international integration. Levine and Zervos used instrumental variables procedures, and controls for many other variables related to economic growth, to estimate the strength of the empirical relationship between economic growth and stock market development. After controlling the initial level of GDP per capita, initial investment in human capital, political stability, the level of banking development, and measures of the monetary, fiscal, and exchange rate policy, the predetermined component of stock market development remains positively and significantly correlated with long-term economic growth.

Levine and Zervos (1998) claim that the stock market encourages savings by providing individuals with an additional financial instrument that may better meet their risk preferences and liquidity needs. Better savings mobilization may increase the savings rate (Levine and Zervos, 1998). Stock markets also provide an avenue for growing companies to raise capital at lower costs. In addition, companies in countries with developed stock markets are less dependent on bank financing, which can reduce the risk of a credit crunch. Stock markets therefore are able to positively influence economic growth through encouraging savings amongst individuals, and by providing avenues for firm financing. Looks like Kwon and Shin (1999) announced that for a long-term perspective, stock markets are playing several crucial roles. First, by spreading the risks of long-term investment projects, the growth of stock markets can lead to a lower cost of equity capital, and thereby strengthening investment and growth. Second, by imposing a degree of control over the investment behavior of companies through the continuous monitoring of their share prices, and thereby of the implied possibility of merger and takeover, stock markets can

contribute to more efficient investments. Third, by pulling foreign portfolio capital inward, the enlargement of stock markets can serve to increase the supply of investable resources in developing countries. Stock markets also have a role in domestic resource mobilization and provision of fresh equity capital to the corporate sector. This is particularly important in emerging capital markets, where the early enlargement of stock markets is often characterized by an increase in the number of companies going public, or by enhanced offerings of seasoned shares by listed companies.

Levine (1997) also asserts that the reduction of international investment barriers significantly increase the liquidity of stock markets, with positive effects on economic growth. Although stock market volatility tends to rise for a few years after financial liberalization, a greater openness to international capital has been associated with lower stock return volatility in the long term. Moreover, stock return volatility does not appear detrimental to long-term growth. Thus, if policymakers have the patience to weather some short-term volatility, liberalizing restrictions on international portfolio flows offers expanded opportunities for economic development.

In the literature, amidst the factors affecting economic growth of countries in the aftermath of financial liberalization, it is evident that a comparison can be made between the banking system and stock markets. In relation to this subject Levine (1997) claims that countries with both liquid stock markets and well-developed banks grew faster than countries with both liquid markets and underdeveloped banks. More interestingly, greater stock market liquidity implies faster growth no matter what the level of banking development. Similarly, greater banking development implies faster growth regardless of the level of stock market liquidity. Thus, it is not stock markets versus banks; it is stock markets and banks. Each of these components of the financial

system is an independently strong predictor of growth. Related to this subject also Brahmastene and Jiranyakul (2007) state that stock market liquidity has been a catalyst for long-term growth in developing countries. Also, they conclude that stock markets produce higher growths than banks. On the other hand Maun (2000) examines the role that the stock-market can play in the economic and industrial development of newly industrializing countries, taking into account their particular circumstances and drawing on the experience of the countries with well-functioning markets. The main conclusion of the study is that, to the extent that developing countries do have a choice, they should attempt to promote bank-based financial systems rather than to establish and encourage stock markets.

Enisan and Olufisayo (2009) examined the long-term and causal relationship between stock market development and economic growth for seven countries in sub-Saharan Africa. Using the autoregressive distributed lag (ARDL) bounds test, the study found that the stock market development is co-integrated with the economic growth in Egypt and South Africa. Moreover, this test suggests that stock market development has a significantly positive long term impact on economic growth. The Granger causality test based on the vector error correction model (VECM) further shows that the stock market development Granger causes economic growth in Egypt and South Africa. However, Granger causality in the context of VAR shows evidence of a bidirectional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe. This implies that the stock market helps to induce economic growth and in turn economic growth stimulates stock market development.

Awabachew and Odit (2009) examine the impact of stock market development on growth in Mauritius. They performed a time series econometric investigation for the period 1989-2006.

Two measures of stock market development, namely size and liquidity are used. They define size as the share of market capitalization over the GDP and liquidity as the volume of the share traded over GDP. They found that stock market development positively affect economic growth in Mauritius, both in the short- and long-term

Deh and Mukherjee (2008) used the Granger causality test to find the causal relationship between stock market development and economic growth in the Indian economy for the period 1996-2007. The study primarily revolved around two major questions: first whether at all any relationship exists between stock market development and economic growth, and secondly, what could be the nature and direction of the causal relationship, if any i.e. does development of stock market promote economic growth or vice versa? They concluded two main findings. First, the results showed bidirectional causality between the real GDP growth rate and the real market capitalization ratio. Secondly, the results suggested unidirectional causality from both stock market activity and volatility to the real GDP growth in the Indian economy.

Shahbaz et al (2008) conducted analysis to find the dynamic relationship between stock market development and economic growth in the case of Pakistan by using annual time series data from 1971-2006. They found that there is a long-term relationship between stock market development and economic growth. The results indicated that stock market development is an important wheel for economic growth. The Engle-Granger-Causality estimation confirms the bi-directional causality between stock markets development and economic growth in the case of Pakistan in the long-term. However, in the short-term, the causality goes only one way, i.e., from stock markets development to economic growth.

Ake and Dehuan (2010) used the Granger Causality Test to find the causal relationship between stock market proxies through market capitalization, total trade value, turnover ratio and economic growth (GDP and IPI). The results of the study suggest positive links between the stock market and economic growth for some countries (France and United Kingdom) for which the stock market is liquid and highly active. However, the causality relationship is rejected for the countries (Belgium and Portugal) in which the stock market is small and less liquid.

Contrary to the general aim of the literature, Shleifer and Vishnev (1997) claim that very liquid markets hurt economic development. By allowing investors to sell stocks quickly, liquid markets may reduce investor commitment, and discourage stock owners to exert corporate control by monitoring the performance of managers and firms. In other words, dissatisfied owners sell their shares instead of working to make the firm operate better. According to this view, greater stock market liquidity may obstruct economic growth by disturbing corporate governance.

Harris (1997) examines the empirical relationship between stock markets and economic growth. Contrary to studies by Randal et al (1999) it reveals no strong evidence that the level of stock market activity helps to explain growth in per capita output. The sample is divided into developed and less developed countries. For the less developed sample, the stock market effect, as with the full sample, is at best very weak. For developed countries, however, stock market activity does have some explanatory power. As can be seen, is not a full consensus amidst the studies focusing on the relationship between the stock market development and economic growth. However in a great number of studies it has been detected that there still exists either a one-way relationship from the stock market towards economic growth, or from economic growth towards the stock market, or a mutual relationship. These different findings reveal that the

research analyzing the relationship between the stock market and economic growth must be explored respectively for every single country. However, there has been scanty research on the impact of economic growth on stock market development in Kenya.

Gitohu (2000) and Kipton (2010) found out performance of the stock market is influenced by a number of macroeconomic factors. Kithinji and Ngugi (2010) most specifically identified the impact of political factors where they established that the stock market is usually depressed before elections and flourishes just after elections. They recommended an enhanced stability in the political environment so as to stabilize stock markets. Kathurima (2010) recommended for a review of the mutual structure of the market to boost investor confidence and enhance corporate governance. Nyamute (1998) investigated the relationship between stock prices and exchange rates, interest rates, money supply and inflation. She ascertained that there exists a strong relationship between these macroeconomic variables and the stock prices. For instance stock prices have an inverse relationship with inflation and interest rates. The relationship between exchange rates and stock market prices was however found to be very weak which could be explained by Sifujo et al (2008) findings that the foreign exchange market in Kenya is quite under developed and inefficient. The relationship between the stock market index and economic growth usually measured by GDP despite attracting numerous research in developed countries have not gained any notable attention by researchers in Kenya. This study seeks to bridge this gap by finding out the relationship between GDP and stock market index. It is motivated by the need to gain more understanding on the role played by the stock market in economic development.

2.5 Conclusion

A number of researchers have been interested in whether there is relationship between stock market performance and economic performance. As noted from the empirical evidence above, stock markets play a critical role in fostering economic growth by creating an avenue for financing of economic activities, encouraging savings which could be used in investment, allowing investors spread their risks, and creating efficiency and liquidity in investment. There is however contradictory evidence which shows that there is no relationship between economic growth and stock market performance since stock markets only represent quoted companies. Further, stock markets encourage liquidity which might hurt economic growth. Other researchers have found out that where markets are characterized by significant government influence, movement in stock market prices is simply dependent on government policies with little impact on economic performance. This study is motivated by the need to understand whether the NSI plays any significant role in influencing economic development in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the research design, population, sample, data collection and data analysis, which describes the firms and variables included in the study and applied statistical techniques in investigating the relationship between stock market performance and economic performance.

3.2 Research Design

The main purpose of this research is to assess whether there exist a relationship between stock market performance and economic performance. Cooper and Schindler (2000) observe that a causal research design is less explicit in business studies and therefore was the most appropriate design for this study. Therefore, the study focuses on the causal relationship study between stock market performance and economic performance.

3.3 Population

According to Cooper and Schindler (2000), a population is the total collection of elements about which we wish to make inferences. The population in the study is all companies listed in the Nairobi Securities Exchange.

3.4 Sample

Data was drawn from companies forming the NSE 20 Share index for the period between July 2007 and July 2012, thus covering a period of five years. The NSE 20 Share index has been used since it is a weighted price index of 20 companies representing all sectors of the economy. The

five years period has been chosen because other studies have considered such a period to be adequate. Further, the index was revised in July 2007 and thus use of prior indexes would be unrepresentative.

3.5 Data Collection

The study will use secondary data obtained from the Nairobi Securities Exchange for stock market index data, Kenya Bureau of Statistics for GDP growth rates and Central Bank of Kenya for exchange rates, interest rates and inflation rates from the second quarter of 2007 to the first quarter of 2012. Due to the change of the NSE 20-share index in July 2007, the indexes for period before 2007 are considered unreliable.

3.6 Data Analysis

Data was analyzed with the help of Statistical package for social scientists (SPSS version 17) Descriptive statistics such as mean, maximum and minimum were computed and tabulated using frequency distribution tables. In order to test the relationship between the variables the inferential tests including the Pearson Product-Moment Correlation Coefficient and regression analysis were used. First, Pearson Product-Moment Correlation Coefficient as measures of association was used to examine the relationship between the independent and dependent variables. The relations were explored with the use of Pearson's correlation coefficient. Pearson's correlation coefficient calculates a relationship between two variables. Correlation co-efficient is a measure of the strength of linear association between two variables. Correlation ranges between -1.0 and +1.0. If the correlation is positive, a positive relationship is inferred. If it is negative, the relationship is negative. Secondly, regression analysis was used to analyze the relationship between stock market index and GDP growth rates in Kenya between July 2007 and July 2012.

Further, a relationship between GDP and stock market index vis-a-vis inflation and interest rates was also tested. Given the five-year panel structure of the sample data gathered, regression analysis was conducted to investigate the relationship between stock market prices and on economic performance. The regression model that was evaluated is represented as follows:

$$X_t = \beta_1 \text{GDP}_t + \beta_2 \text{Int}_t + \beta_3 \text{Exch}_t + \beta_4 \text{Infl}_t + \dots \dots \dots \text{equation 1}$$

Equation 1 defines the regression equation used in this study where: X is the stock market index, GDP is GDP growth rates, Int refers to interest rates, Exch relates to Exchange rates whereas Infl refers to inflation rate. On the other hand, β is the slope coefficients whose sign depict the relationship between stock market performance and various factors GDP, interest rate (Int), exchange rate (Exch), and inflation (Infl).

3.7 Data Reliability and Validity

Mugenda and Mugenda (2004) asserted that, the accuracy of data largely depended on the data collection instruments in terms of validity and reliability. Validity as denoted by Robinson (2002) is the degree to which results obtained from the analysis of the data actually represents the phenomenon under study. Validity was ensured by having objective data. This was achieved by collaborating the data from various sources. Reliability on the other hand refers to a measure of the degree to which research instruments yield consistent results (Mugenda and Mugenda 2003). In this study, reliability was ensured by collecting information from reliable sources only such as from Kenya Bureau of Statistics and Central Bank of Kenya.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND PRESENTATION

This chapter presents the results of the study. The chapter is organized as follows. First, the descriptive results are shown in section 4.1. Section 4.2 provides the results on OLS regression assumption tests while sections 4.3 and 4.4 provide the results of regression analysis.

4.1 Introduction

The study collected and used secondary data. Data relating to GDP growth rates for each quarter from year 2007 to quarter 1 of 2012 were collected from the Kenya Bureau of Statistics as summarized by Appendix 1 to this report. Further, monthly data in relation to inflation rates, NSE 20 Share index, 91 treasury bill rates, and the USD exchange rate for the same period was also collected from the CBK's Monthly Economic Review reports (please see appendix 4 to this report). Further, quarterly averages were computed for each of the four variables as summarized in appendix 5.

The variables in the study were as follows. First, stock market performance was evaluated through the use of quarterly average for NSE 20 share index. Independent variables used include inflation rates which were determined as an average of four monthly inflation rates. Quarterly inflation rates in percentage were computed for years 2007 to 2012. Secondly, short term interest rates were determined using the average benchmark 91 Treasury bill rates as reported by CBK. An average interest rate was computed for each quarter for years 2007 to 2012.

Thirdly, exchange rates were determined using the exchange rate for most common currency in Kenya, the USD. According to Sifujio et al (2008) a significant portion of Kenya's international

trade is conducted in terms of USD and thus the importance of the USD as an indicator of movement in exchange rate. The monthly average rate of KShs to USD was collected from the CBK's Monthly Economic Review Reports. Monthly exchange rates were used to compute quarterly rates which were used in this analysis.

Monthly overall inflation rates were also sourced from the CBK Monthly Economic Review reports. Quarterly rates were computed as an average for the respective 4 months inflation rates from May 2007 to April 2012.

4.2 Descriptive analysis

The descriptive results are shown in table 1. The results show that GDP growth rates ranged from a minimum of negative 1 percent to a maximum of 7.1 percent. The mean GDP growth rates were 3.93 percent with a standard deviation of 2.39 percent. Inflation rates ranged from 3.54 percent to 28.73 percent with a mean rate of 13.99 percent. Standard deviation of inflation was 8.74 percent. The minimum exchange rate was KShs 65.02 to USD whereas the maximum quarterly exchange rate was 94.49 with a standard deviation of 8.67. The quarterly NSF 20 share index ranged from a minimum of 2,819.71 to a maximum of 5,215.08 with a mean index of 4,016.02 and a standard deviation of 823.41.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GDP	15	-1.00%	7.10%	3.9333%	2.38617%
Inflation	15	3.54%	28.73%	13.9913%	8.73553%
Interest Rate	15	2.16%	18.52%	7.6387%	4.31296%
Exchange Rate	15	65.02	94.49	77.3593	8.67418
Stock Market Index	15	2,819.71	5,215.08	4,016.0167	823.40873
Valid N (listwise)	15				

The analysis was based on a total of 15 quarters from 2007 to the first quarter of 2012. The stock market index was revised with effect from July 2007 and thus indices for prior periods were considered unrepresentative. Data collected was subjected to regression and correlation analysis after rigorous tests were carried out on the assumption of regression analysis in 4.3 hereunder.

4.3 Testing Assumptions for Multiple Regression

In order to run a multiple regression analysis, Cooper and Schindler (2000) advise that a number of assumptions for the same should be checked. These assumptions include; test for normality, non-multicollinearity, homoscedasticity of variance, independence of errors, and outliers. These tests are carried out as follows.

4.3.1 Normality of Distribution

Normality of distribution is usually tested using either Kolmogorov-Smirnov or Shapiro-Wilk test. Cooper and Schindler (2000) observe that Shapiro-Wilk test is suitable for a sample of 50 or less. As such, this test is used to test normality of distribution in this study. The test evaluates the hypothesis that the distribution is not normal and therefore a significant value should lead to acceptance of the hypothesis.

As shown in table 2, the results showed that the GDP was significant at 5 percent level. This therefore leads to the acceptance of the null hypothesis that the data is not normally distributed. The data must therefore be transformed for regression.

Table 2: Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
GDP	.113	15	.200 [*]	.948	15	.500
Inflation	.144	15	.200 [*]	.917	15	.173
Interest Rate	.321	15	.000	.815	15	.006
Exchange Rate	.152	15	.200 [*]	.943	15	.419
Stock Market Index	.174	15	.200 [*]	.919	15	.188

^a Lilliefors Significance Correction

* This is a lower bound of the true significance

4.3.2 Non-multicollinearity

Non-multicollinearity is tested using correlation analysis as shown in table 3. There was a strong correlation between stock market index and exchange rate. As such the data must be transformed for regression analysis to be undertaken. GDP was negatively correlated with inflation indicating that increase in inflation has a negative impact on GDP. Similarly, interest rate had a negative correlation with GDP. There was however a positive correlation between exchange rate and stock market index as well as with GDP. On the other hand, stock market index had a negative correlation with inflation and interest rate.

Table 3: Tests of Non-multicollinearity

	GDP	Inflation	Interest Rate	Exchange Rate	Stock Market Index
GDP	1	-.297	-.062	.212	.301
Inflation	-.297	1	.422	-.158	-.084
Interest Rate	-.062	.422	1	.323	-.390
Exchange Rate	.212	-.158	.323	1	-.643 ^{**}
Stock Market Index	.301	-.084	-.390	-.643 ^{**}	1

4.3.3 Homoscedasticity

Homoscedasticity of variance refers to residuals at each level of the independent variable being similar. This was tested using Levene's test and since the Levene's test was insignificant at ($P < 0.05$) for all of the variables, then the assumption of homogeneity of variance between the groups is rejected. Cooper and Schindler (2000) observes that homoscedasticity of variance is related to the assumption of normality. As such, the assumption of normality is not met, the assumption of homoscedasticity was not met either. The data must therefore be transformed for regression.

Table 4: Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
GDP	6.142	1	15	.017
Inflation	18.773	1	15	.002
Interest Rate	19.798	1	15	.024
Exchange Rate	5.387	1	15	.014
Stock Market Index	12.718	1	15	.086

4.3.4 Serial Autocorrelation

The independence of errors also referred to as autocorrelation is usually tested using the Durbin-Watson test. The test statistic varies between 0 and 4, and a value of 2 indicates no autocorrelation of errors. The Durbin-Watson statistic was 2.202 and thus there were no autocorrelation errors in the data since the statistic was close to 2.0. This means that data needs not be transformed.

Table 5: Test for serial autocorrelation

Model	R	R Square	Adjusted R ²	Std. Error of the Est.	Durbin-Watson
1	.627 ^a	.393	.150	2.19862%	2.202

a Predictors: (Constant), Stock Market Index, Inflation, Interest Rate, Exchange Rate

b Dependent Variable: GDP

4.3.6 Outliers

Outliers are the values that can have a remarkable influence on the correlation coefficient particularly in small samples because they are significantly lower or higher than other values in the data set (Cooper and Schindler, 2000). The standard deviations of residual statistics were 0.845 which shows that there were no outliers in the sample. Cooper and Schindler (2000) observe that having residual statistics higher than 3 is an indication of existence of outliers.

Table 6: Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.2589%	5.7738%	3.9340%	1.49512%	15
Residual	-4.70685%	2.64108%	.00000%	1.85817%	15
Std. Predicted Value	-1.789	1.231	.000	1.000	15
Std. Residual	-2.141	1.201	.000	.845	15

a. Dependent Variable: GDP

4.3.6 Transformation of data

A number of assumptions of multiple regressions were not met and thus the need to transform the data through ranks and then using Ordinary Least Squares (OLS) on the transformed data. Data was transformed into normal scores and rank scores. Transformation of data was done using Van der Waerden's formula and then the ranked data subjected to OLS regression analysis.

4.4 Correlation and Regression Analysis

4.4.1 Correlation Analysis

Table 7 below presents the correlation results for the independent variable and dependent variables. These initial results reveal that at a significance of 0.05, there is a weak relationship between GDP and stock market index. There was a negative relationship between the NSF. 20 Shares index and exchange rates and a positive relationship between interest rates and inflation.

Table 7: Full Rank Correlation Analysis

		Rank of GDP	Rank of Infl	Rank of Int	Rank of Exch	Rank of Index
Rank of GDP	Pearson Correlation	1	-.357	-.193	.243	.418
	Sig. (1-tailed)		.095	.245	.191	.060
	N	15	15	15	15	15
Rank of Infl	Pearson Correlation	-.357	1	.732**	-.221	-.100
	Sig. (1-tailed)	.095		.001	.211	.361
	N	15	15	15	15	15
Rank of Int	Pearson Correlation	-.193	.732**	1	.182	-.414
	Sig. (1-tailed)	.245	.001		.248	.062
	N	15	15	15	15	15
Rank of Exch	Pearson Correlation	.243	-.221	.182	1	-.189
	Sig. (1-tailed)	.191	.214	.258		.032
	N	15	15	15	15	15
Rank of Index	Pearson Correlation	.418	-.100	-.414	-.189	1
	Sig. (1-tailed)	.060	.361	.062	.032	
	N	15	15	15	15	15

** Correlation is significant at the 0.01 level (1-tailed)

* Correlation is significant at the 0.05 level (1-tailed)

4.4.2 Full Rank Score OLS Regression Analysis

From table 8 below, the ranked score regression of GDP explained 50.7 percent, measured by R^2 with an F Ratio of 2.57 which was significant at 5 percent. The regression model accounted for 50.7 percent of the variance in changes in GDP.

Table 8: Full Rank Regression Analysis: GDP determinants – model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1.	.712 ^a	.507	.310	1.712345	.507	2.570	4	10	.103

a. Predictors: (Constant), Rank of Index, Rank of Infl, Rank of Exch, Rank of Int

b. Dependent Variable: Rank of GDP

Table 9 below provides results of Full Rank OLS regression of the rank of changes in GDP as the dependent variable and ranks of inflation, interest rates, exchanges rates and NSF 20 share index as the predictor variables. Based on the OLS Regression Analysis at 95 percent confidence level, stock market index was not a significant determinant of GDP. However, interest rates and inflation had an influence on GDP

Table 9: Full Rank Regression analysis for determinants of GDP

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.682	4.802		-.142	.890	-11.182	10.018
Rank of Infl	-.455	.386	-.455	-1.178	.266	-1.316	.406
Rank of Int	.366	.401	.367	.913	.383	-.528	1.261
Rank of Exch	.136	.285	.137	1.530	.157	-.199	1.072
Rank of Index	.738	.227	.738	2.667	.024	.121	1.354

a. Dependent Variable: Rank of GDP

Table 10: Full Rank Regression analysis for determinants of Stock Market index

Table 10 below provides a summary of the ranked score regression model for stock market index. The model explained 62.4 percent, measured by R² with an F Ratio of 4.15 which though this was not significant at 5 percent, the regression model accounted for 62.4 percent of the variance in changes in Stock Market Index.

Table 10: Full Rank Regression Analysis: stock market index determinants – model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.700 ^a	.624	.474	3.244507	.624	4.150	4	10	.031

a. Predictors: (Constant), Rank of I sch, Rank of Int, Rank of GDP, Rank of Infl

b. Dependent Variable: Rank of Index

Based on the normal score OLS Regression Analysis using Blom's formula as presented by Table 11 below, at 95 percent confidence level, inflation was the only significant determinant of stock market index. Exchange rates, GDP and interest rates were not significant factors influencing stock market index.

Table 11: Rank Regression Analysis for stock market index^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	8.224	3.300		2.492	.032	.872	15.575
Rank of GDP	.563	.211	.563	2.667	.024	.093	1.074
Rank of Infl	.746	.343	.746	1.009	.337	-.418	1.111
Rank of Int	-.175	.333	-.175	-1.427	.184	-1.217	.267
Rank of I sch	-.463	.235	-.463	-1.970	.077	-.987	.061

a. Dependent Variable: Rank of Index

4.4.2 Normal score OLS Regression Analysis

From table 12 below, the normal score regression of GDP explained 25.4 percent, measured by adjusted R2 with an F Ratio of 4.567 which was significant at 5 percent, the regression model accounted for 32.5 percent of the variance in GDP

Table 12: Model Summary for Normal OLS Regression Analysis for GDP

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.570 ^a	.325	.254	4.973642	.325	4.567	4	38	.004

a. Predictors: (Constant), Normal Score of Assets, Normal Score of Debt, Normal Score of Fees, Normal Score of Listed

Based on the normal score OLS Regression Analysis using Blom's formula as presented by Table 13 below, at 95 percent confidence level, interest rates and inflation were the only significant determinant of GDP. Exchange rates and stock market index were not significant factors influencing GDP.

Table 13: Normal Score Regression Analysis for GDP

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	.001	.197		.007	.998	-.177	.438
Normal Score of Infl	-.331	.402	-.333	-.828	.427	-1.228	.561
Normal Score of Int	.241	.403	.244	.603	.559	-.654	1.141
Normal Score of Exch	-.406	.318	-.407	-1.276	.231	-.803	1.115
Normal Score of Index	.678	.381	.679	1.787	.037	.050	1.305

a. Dependent Variable: Normal Score of GDP

Table 14: Model Summary for Normal OLS Regression Analysis for Stock Market Index

Table 14 below provides a summary of the normal score regression model for stock market index. The model explained 56.2 percent, measured by R^2 with an F Ratio of 3.208 which though this was not significant at 5 percent, the regression model accounted for 56.2 percent of the variance in changes in Stock Market Index.

Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.750 ^a	.562	.387	.6803188	.562	3.208	1	10	.061

a. Predictors: (Constant), Normal Score of Exch., Normal Score of Int., Normal Score of GDP, Normal Score of Infl.

b. Dependent Variable: Normal Score of Index

Table 15: Normal Score Regression Analysis for stock market index

Based on the normal score OLS Regression Analysis using Blom's formula as presented by Table 15 below, at 95 percent confidence level, inflation was the only significant determinant of

Stock Market Index. Exchange rates, GDP and interest rates were not significant factors influencing Stock market index.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0%. Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	.000	.176		-.002	.990	-.392	.391
Normal Score of GDP	.541	.224	.540	2.407	.037	.040	1.041
Normal Score of Infl	.162	.368	.162	.411	.668	-.617	.982
Normal Score of Int	-.296	.354	-.296	-.836	.422	-1.086	.493
Normal Score of Exch	-.496	.764	-.196	-1.841	.080	-1.083	.092

a. Dependent Variable: Normal Score of Index

4.5 Summary and Interpretation of Findings

The study intended to determine the relationship between GDP and stock market index. Quarterly data in relation to GDP growth rate percent, quarterly inflation rates, quarterly average interest rates for 91 Treasury bills and quarterly average stock market index were used to carry out the analysis. Since a multiple regression analysis was to be carried out, conditions for the same were tested before data was transformed using rank and normal scores and the regression run on the transformed data.

The results from the correlation analysis showed that stock market index had no relationship with GDP contrary to the findings of Khan and Senhadji (1998) who had found out that stock market development has an impact on GDP. Further, it contradicted Mauro (2000) research findings that stock market trends influences performance of the economy. Vazakidis (2009) findings that economic growth contributes to development in the stock exchange were also not confirmed in this study. These findings however confirmed Shleifer and Summers who found out that stock market index has no impact on economic performance since they argued that the market only

provides information for quoted companies which only form an insignificant part of the whole economy. Similarly, it confirmed Stiglitz (1993) findings that there is no relationship between the stock market index and GDP since the two variables are different since whereas GDP is a measure of long-term performance, stock market index is responsive to short term profitability of a company.

The study identified a significant negative relationship between stock market index and inflation. This was in line with the findings of Kiptoo (2010) who held that inflation reduces marginal propensity to save and invest thus reducing level of stock market activities. This also confirmed Charkavarty (2005) findings that stock market prices are very sensitive to changes in macroeconomic indicators. GDP was however not a significant influence of stock market prices as argued by Charkavarty (2005). Similar to the findings of Eframann and Fratzscher (2004) that prices of stocks react differently to changes in interest rates, the study found out that there was no significant relationship between stock market prices and interest rates. Further, it supported Robinson (1952) views that stock market prices do not in any way spur growth in the economy. Further, the strong correlation found in Nigeria stock market by Adaramola (2011) was not confirmed in this study.

There was a significant correlation between interest rates and GDP which could be explained by Gekone (2011) findings that interest rates ranks as one of the significant macroeconomic factors that influence GDP. However, the impact of interest rates noted by Gekone (2011) was not confirmed in this study. A correlation analysis between interest rates and stock market index at 95 percent confidence level did not identify any significant relationship between stock market index and interest rates.

The study did not confirm interrelationship between GDP and stock market since at 95 percent confidence level, correlation analysis for the two variables did not identify significant relationship. This was a contrast to Luintel and Khan (1999) findings that there exists a feedback effect between economic growth and stock market index. The study also contradicted Hongbin's findings that stock market performance is related to economic growth. However, this confirmed Chen et al (1986) arguments that stock market index and GDP growth rates are endogenous factors. As such, the two variables are not interrelated as confirmed by this study.

A correlation analysis at 95 percent confidence level between movement in exchange rates and stock market index indicated a significant negative correlation between the two variables. This contradicted Silujo et al (2008) findings that movement in foreign exchange rates has no impact on the stock market. This could be explained by the significant role played by foreigners and Kenyans in the Diaspora in the NSI in the recent past. As such, depreciation of the local currency KShs against major currencies such as the USD is likely to discourage foreign investments in stock market thus reducing demand of shares and thereby a decline in share prices.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study intends to establish whether there is a relationship between stock market performance and economic performance in Kenya. In order to do this, the research was designed as a causal study where relationships were tested. The population comprised of 60 companies listed at the NSE, while the sample comprised of 20 companies forming the NSE 20 share index. The NSE 20 share Index was used as a measure of stock market performance while the GDP was used as a measure of economic performance. Other variables used were inflation, interest rates and exchange rates. Secondary data was used in the study where data on GDP were obtained from the Kenya Bureau of Statistics while data on NSE 20 Share Index, Inflation rates, Interest rates and exchange rates were obtained from the Central Bank. Data was analysed using correlation and regression analysis.

The study found that there is no significant relationship between stock market performance and economic performance. However, stock market index was negatively affected by inflation thus indicating that an increase in inflation would cause a decline in stock market index. Exchange rates on the other hand had a positive impact on GDP whereas inflation and interest rates impacted negatively on GDP.

From the correlation analysis, there was a significant negative relationship between exchange rates and stock market index, significant positive relationship between interest rates and inflation at a significance level of 0.01

5.2 Conclusion

The study reaches a conclusion that GDP is unaffected by movement in stock market index. Further, there exists no strong correlation between GDP and stock market index since the two are exogenous factors. There is however a strong negative correlation between stock market index and inflation indicating that increase in inflationary pressure would hamper investment in the stock market and thus its performance. There was a significant negative relationship between stock market index and exchange rates. GDP was mainly affected by interest rates and inflation. A significant positive relationship existed between interest rates and GDP indicating that investments are likely to increase in such a case and thereby resulting to growth in GDP. However, inflation has a negative impact on GDP growth rate since it hampers investments and savings.

5.3 Policy Recommendations

The study makes a number of recommendations. Theoretically, there exists a strong positive correlation between stock market performance and GDP growth rate. From this study however, this relationship could not be confirmed. Therefore there is need for policy makers to develop policies aimed at improving contribution of the NSI to economic development. This could be achieved by relaxing listing rules to attract more companies to list their stocks in the market and attraction of more investors to the market through improvement of corporate governance practices in the market.

Management of the stock exchange should be cognizant of the critical role played by the NSE and thus focus on areas which could improve its impact on GDP. The proposed demutualization of the stock market for instance should be supported so as to improve market activity. Another

improvement could be in terms of increasing the popularity of the market through publicity and advertisement. This would help to create awareness and interest among investors as well as companies that could list their stocks. The importance of foreign investors should also be considered and thus policies put in place to even increase their participation in the market. Popularizing the market internationally should therefore be done as well as creation of a platform that would help to mobilize investments from global investors.

5.4 Limitations of the study

The study faced a number of limitations. The first limitation is in the explanatory power of the model. The model explained between 32.5 percent and 56.2 percent of the variance. This suggests that there are a number of variables that were left out of the model which would improve the explanatory power of the model.

Secondly, the study only focused on the NSE 20 share index as a basis for measurement of stock market performance. Other indices such as the NASI and ITSE Kenya were not used due to unavailability of data. NASI was introduced in year 2008 and had not gained prominence as at the time of this study. Further, ITSE NSI Kenya 15 and 25 indices were introduced in November 2011 and therefore could not be used in the analysis due to the limited data available.

Interest rates were determined as an average of four months 91 treasury bills rate and thus other rates of interest such as Central Bank Lending Rate, Bank Rate and 181 treasury bills' rates were not considered in this study. Use of such rates might cause a variation in changes.

This study covered a period of only five years. However, studies of this nature span for periods of several decades. This is because economic performance and stock market performance cover a long period of time. Accordingly, the results may not be conclusive.

5.5 Suggestions for Further Research

This is need for more research on this area in order to provide an analysis of the relationship between exchange rates and economic growth. This should be done by using more independent variables in the model so as to improve the explanatory power of the model.

Further studies should also be carried out by finding out the reasons for identified relationship between stock market index and foreign exchange. It is also imperative to study the reason behind the identified strong negative correlation between inflation and interest rates. In-depth analysis is equally important to understand the reasons for the lack of a significant correlation between GDP and stock market index. Another study should have a similar strategy though covering periods subsequent to the second quarter of 2012. This would help to collaborate with findings in this study.

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APPENDICES

Appendix 1: Companies Listed at the NSE

1. A.Baumann Company Limited
2. AccessKenya Group Limited
3. Athi River Mining
4. B.O.C Kenya Limited
5. Bamburi Cement Limited
6. Barclays Bank Limited
7. British American Tobacco Kenya Limited
8. British-American Investments Company (Kenya) Limited
9. Car and General (K) Limited
10. Carbacid Investments Limited
11. Centum Investment Co Limited
12. CFC Insurance Holdings
13. CFC Stanbic Holdings Limited
14. CIC Insurance Group Limited
15. City Trust Limited
16. CMC Holdings Limited
17. Crown Berger Limited
18. Diamond Trust Bank Kenya Limited
19. E.A.Cables Limited
20. E.A.Portland Cement Limited
21. Luagads Limited
22. East African Breweries Limited
23. Equity Bank Limited
24. Eveready East Africa Limited
25. Express Limited
26. Housing Finance Co Limited
27. Hutchings Biemer Limited
28. Jubilee Holdings Limited
29. Kakuzi

30. Kapchorua Tea Company Limited
31. KenGen Limited
32. KenolKobil Limited
33. Kenya Airways Limited
34. Kenya Commercial Bank Limited
35. Kenya Orchards Limited
36. Kenya Power & Lighting Company Limited
37. Kenya Re-Insurance Corporation Limited
38. Limuru Tea Company Limited
39. Longhorn Kenya Limited
40. Marshalls (E.A.) Limited
41. Mumias Sugar Company Limited
42. Nation Media Group
43. National Bank of Kenya Limited
44. NIC Bank Limited
45. Olympia Capital Holdings Limited
46. Pan Africa Insurance Holdings Limited
47. Rea Vipingo Plantations Limited
48. Safaricom Limited
49. Sameer Africa Limited
50. Sasini Limited
51. Scangroup Limited
52. Standard Chartered Bank Limited
53. Standard Group Limited
54. The Co-operative Bank of Kenya Limited
55. Total Kenya Limited
56. TPS Eastern Africa (Serena) Limited
57. Trans-Century Limited
58. Uchumi Supermarket Limited
59. Unga Group Limited
60. Williamson Tea Kenya Limited

Appendix 2: Companies Forming the NSE-20 Share Index

1. Mumias Sugar
2. Express Kenya
3. Reu Vipingo
4. Sasini Tea
5. CMC Holdings
6. Kenya Airways
7. Safaricom
8. Nation Media Group
9. Barclays Bank Kenya
10. Equity Bank
11. Kenya Commercial Bank
12. Standard Chartered Bank
13. Bamburi Cement
14. British American Tobacco
15. Kengen
16. Centum Investment Company
17. East African Breweries
18. I A Cables
19. Kenya Power & Lighting Company Ltd
20. Athi River Mining

Appendix 3: Quarterly GDP Growth Rates

Year	Quarter	GDP
2007	2	7.1%
	3	6.9%
	1	-1.0%
2008	2	3.2%
	3	2.1%
	1	3.9%
2009	2	2.1%
	3	0.0%
	1	4.4%
2010	2	5.4%
	3	6.1%
	1	4.9%
2011	2	4.1%
	3	6.30%
	1	3.50%
2012	1	3.4%

Source: Kenya National Bureau of Statistics

Appendix 4: Monthly Interest Rate, Inflation, Exchange Rates and Stock Market Index

	Inflation rates	91 T-Bill Rate	KShs / USD Rate	NSE 20 Share Index	
2007	9.70%	6.00%	66.90	5,774.24	
	6.80%	6.20%	69.60	5,387.28	
	5.90%	6.30%	69.30	5,133.67	
	5.70%	6.70%	68.60	5,199.44	
	6.30%	6.80%	67.20	5,001.77	
	11.10%	6.53%	66.60	5,146.73	
	13.60%	6.52%	67.10	5,340.08	
	12.40%	7.30%	66.90	5,371.72	
	11.70%	7.49%	67.00	5,146.46	
	10.60%	7.60%	66.80	4,971.04	
	11.80%	7.50%	65.50	5,215.36	
	12.00%	6.87%	63.30	5,444.83	
	2008	18.20%	6.95%	68.10	4,712.71
		19.10%	7.18%	70.50	5,072.41
21.80%		6.35%	64.90	4,843.17	
26.60%		6.59%	62.30	5,336.03	
31.50%		7.76%	61.90	5,175.83	
29.30%		7.72%	63.80	5,185.56	
26.50%		8.03%	66.70	4,868.27	
27.60%		8.02%	67.68	4,648.78	
28.20%		7.69%	71.41	3,386.70	
28.40%		7.75%	76.50	3,341.00	
29.40%		8.39%	78.18	3,341.00	
27.72%		8.59%	78.22	3,521.18	

Appendix 4: Monthly Interest Rate, Inflation, Exchange Rates and Stock Market Index (continued)

	Inflation rates	91 1-Bill Rate	KShs / USD Rate	NSE 20 Share Index
2009	21.87%	8.46%	78.96	3,198.90
	25.09%	7.56%	79.53	2,474.75
	25.80%	7.31%	80.26	2,805.08
	26.07%	7.33%	78.66	2,800.10
	9.61%	7.45%	79.63	2,852.60
	8.60%	7.33%	77.85	3,294.60
	8.44%	7.22%	76.75	3,273.10
	7.36%	7.25%	76.37	3,102.68
	6.74%	7.29%	75.60	3,005.41
	6.62%	7.26%	75.34	3,089.63
	5.00%	7.22%	74.70	3,189.55
	5.32%	6.82%	75.40	3,247.44
2010	5.95%	6.56%	75.79	3,565.28
	5.18%	6.21%	76.69	3,629.31
	3.97%	5.96%	76.95	4,072.93
	3.65%	5.17%	77.25	4,233.24
	3.88%	4.21%	78.54	4,241.81
	3.49%	3.06%	81.02	4,339.28
	3.57%	1.63%	81.41	4,438.58
	3.22%	1.83%	80.44	4,451.59
	3.21%	2.04%	80.91	4,629.80
	3.18%	2.12%	80.71	4,659.56
2011	3.84%	2.21%	80.46	4,795.17
	4.51%	2.28%	80.57	4,432.60
	5.42%	2.46%	81.03	4,464.92
	6.54%	2.59%	81.47	4,240.18
	9.19%	2.77%	84.21	3,887.07
	12.05%	3.26%	83.90	4,029.23
	12.95%	5.35%	85.40	4,078.10
	14.49%	8.95%	89.00	3,968.12
	15.53%	8.99%	89.90	3,738.46
	16.67%	9.23%	92.79	3,465.02
2012	17.32%	11.93%	96.36	3,284.06
	18.91%	14.80%	101.27	3,507.34
	19.70%	16.14%	93.68	3,155.46
	18.93%	18.30%	86.66	3,205.02
	18.31%	20.56%	86.34	3,224.00
	16.69%	19.70%	83.18	3,303.75
	15.61%	17.80%	82.90	3,366.89
	13.06%	16.01%	83.19	3,546.66

Source: CBK Monthly Economic Review reports

Appendix 5: Quarterly Interest Rate, Inflation, Exchange Rates and Stock Market Index

Year	Quarter	GDP	Inflation	Interest rates	Exchange rate	Stock market index
2007	2	7.1%	10.85%	6.79%	66.95	5,215.08
	3	6.9%	11.53%	7.37%	65.65	5,194.42
2008	1	-1.0%	21.43%	6.77%	66.45	4,991.08
	2	3.2%	28.73%	7.88%	65.02	4,969.61
2009	3	2.1%	28.43%	8.11%	76.08	3,397.47
	1	3.9%	24.71%	7.67%	79.35	2,819.71
	2	2.1%	8.50%	7.31%	77.65	3,130.75
2010	3	0.0%	5.92%	7.15%	75.24	3,133.01
	1	4.4%	4.69%	5.98%	76.67	3,875.19
	2	5.4%	3.54%	2.68%	80.16	4,168.57
2011	3	6.1%	3.69%	2.16%	80.66	4,529.28
	1	4.9%	8.30%	2.77%	82.65	4,155.35
	2	4.1%	14.91%	8.13%	89.27	3,812.13
2012	3	6.30%	18.72%	15.29%	94.49	3,287.97
	1	3.50%	15.92%	18.52%	81.90	3,160.33