THE RELATIONSHIP BETWEEN SELECTED MACROECONOMIC VARIABLES AND STOCK RETURN AT THE NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

I declare this research project is my original work and has not been previously published or presented for award of degree in any other university.

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The research project has been submitted for review with my approval as university supervisor.

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I would like to dedicate this project to all my family members

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LIST OF ABBREVIATIONS

APT-Arbitrage Pricing Theory

CAPM-Capital Asset Pricing Theory

CDSC-Central Depository and Settlement Corporation

CMA-Capital Market Authority

CPI-Consumer Price Index

DDM-Dividend discount Model

FEX-Foreign Exchange rate

IPI-Industrial Production Index

FIFO-First In First Out

GDP-Gross Domestic Product

KNBS-Kenya National Bureau of standards

MIR-Money Market Interest Rate

NSE-Nairobi Securities Exchange

NYSE-New York stock Exchange

ABSTRACT

The main aim of this study was to examine the relationship between selected macroeconomic variables and stock return at the Nairobi securities exchange. The study focused on Consumer price index (CPI), market interest rate, Industrial Production Index (IPI) and Foreign exchange rate (FEX) using monthly data for a nine year period between January 2003 and December 2011. Inferential statistical analysis such as regression, Analysis of the Variance (ANOVA) and the t tests were used to summarize, describe, analyze and present the study findings. The main findings were that Market interest rate, consumer price index and exchange rate have a negative relationship with stock return, while industrial production index exhibited a positive relationship.

CHAPTER ONE
INTRODUCTION

1.1Background Information

Stock market provides an exchange in which buyers and sellers interact for the purpose of trading in shares and other securities issued by publicly traded companies (Monther & Kaothar, 2010). In the course of exchange, stock market prices change according to the market activity as influenced by the forces of demand and supply. If there is a high demand for a given stock, its price will move upwards. Conversely if there are more people who want to sell than buy, the market experiences excess supply (sellers) than demand (buyers), and the effect of this will push the prices downwards presupposing that the market forces are allowed to operate freely.

Asset prices are thought to react sensitively to macroeconomic factors. But these factors are not precisely predicted by finance theories. Starting from the 1960s, the finance theory, however, sought to precise financial asset prices and their returns thus factors affecting them firstly using Capital Asset Pricing Model (CAPM) which was introduced by Sharpe (1964) building on Markowitz (1952) mean variance portfolio model and then developed by Lintner (1965), Mossin (1966) and Black (1972); and then the inter-temporal models of Merton (1973), Long (1974), Rubinstein (1976), Breeden (1979), Cox et al. (1985); and finally probably the most famous multi-factor model, the Arbitrage Pricing Theory (APT) of Ross (1976). Currently the best two theories providing a rigorous foundation for estimating trade-off between risk and return are the CAMP and the APT (Paalova, 2006). One of the most important critiques against CAPM is that it takes the market as a single indicator. The CAPM takes only one risk factor into consideration and its basis is mean-variance analysis. The criticisms against the CAPM are

mainly based on its unrealistic assumptions. In the 1970s such other theoretical works as Sharpe and Cooper (1972), Mayers (1976), Merton (1973), Gonedes (1976), Rubinstein (1976), Elton ve Gruber (1978), Breeden, Gibbons and Lizenberger (1989) tried to develop the model. Although the model retains an important role in the thoughts of scholars and of finance practitioners, related but different theories such as Hakansson (1971), Mayers (1972), Kraus and Litzenberger (1976) and Roll (1977) evidenced some critiques with the model. By adding other variables Multi Factor Models emerged (King 1966, Metron 1973) but the market continued to remain as the main indicator. These new variables, nevertheless, gave way to alternative theories such as APT (Arbitrage Pricing Theory) developed by Ross (1976) as an alternative to CAPM. Chen, Roll and Ross (1986) then tested the theory using macroeconomic variables of the USA and proved its validity. They investigated the sensitivity of such macroeconomic variables as term structure, industrial production, risk premium, inflation, market return, consumption and oil prices to stock returns and found a strong relationship between the macroeconomic variables and the expected stock returns. The APT takes more than one risk factor into consideration and its assumptions are more adequate to realities. It is based on the law of one price: two items that are the same can not sell at different prices. The APT states that the realized return on an asset is composed of the expected return on that asset at the beginning of a time period and the unexpected realization of k risk factors during that time period plus firm specific risk. In the APT, risk and returns concepts are developed in the assumptions of Efficient Market Hypothesis.

Besides, the model accepts additional assumptions such as all investors have the same investment terms, borrow and lend money with the same risk-free interest rate, get information instantly and freely, and have homogeneous expectations (Sharpe et al., 1995). According to the

APT, the expected return of a financial asset is the linear function of various macroeconomic factors where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. These macroeconomic factors can be predicted apriori. The model obtained indicates financial asset's return. If there emerge a difference between prices, they will be equalized by arbitrage (Chen et al. 1986). APT claims that although there are a few systematic variables affecting average returns of stocks in the long run, there are many variables affecting the returns of each single stock. The APT implies that the return of an asset can be broken down into an expected return and an unexpected or surprise component. Thus, the APT predicts that "general news" will affect the rate of return on all stocks but by different amounts. In this way the APT is more general than the CAPM, because it allows larger number of factors to affect the rate of return (Cuthbertson, 2004). While individuals will assess expected factors or events and reflect them to the prices, they won't reflect the effects of unexpected factors or events to the prices.

The Nairobi security exchange (NSE, 2012) was established in 1954 as a voluntary association of stock brokers with the objective to facilitate mobilization of resources to provide long term capital for financing investments. Through stringent listing requirements the market promotes higher standards of accounting, resource management and transparency in the management of business. The NSE is regulated by Capital Markets Authority (CMA, 2012) which provides surveillance for regulatory compliance. The exchange has continuously lobbied the government to create conducive policy framework to facilitate growth of the economy and the private sector to enhance growth of the stock market (Ngugi, 2005). The NSE is also supported by the Central Depository and Settlement Corporation (CDSC) which provides clearing, delivery and settlement services for securities traded at the Exchange. It oversees the

conduct of Central Depository Agents comprised of stockbrokers and investments banks which are members of NSE and Custodians (CDSC, 2004). These regulatory frameworks are aimed to sustain a robust stock market exchange that supports a cogent and efficient allocation of capital allowing price discovery to take place freely based on the market forces.

1.2 Problem Statement

The stock exchange provides investors with an efficient mechanism to liquidate or make investments in securities (Monther & Kaothar, 2010). The fact that investors are certain of the possibility of selling what they hold, as and when they want, is a major incentive for investment as it guarantees mobility of capital between the surplus spending units (SPUs) and deficit spending units (DSUs). The stock market gives an important platform for information sharing among investors, company valuation, and prospect for company fundamentals.

Volatility in stock return has been a concern in the financial sector around the world. Kenyan Security market has gained prominence in East Africa since the market has developed a step further to risk diversification apart from the primary role of providing an alternative source of capital for investment. High volatility of stock return is attributable to high risk, since most investors are risk averse; they tend to shy off from the market due to uncertainty in expected returns. High market volatility increases un-favorable market risk premium. Therefore, it is critical for policy makers to reduce the stock market volatility and ultimately enhance economy stability in order to improve the effectiveness of the asset allocation decisions (Poon and Tong, 2010).

Aroni, Joshua. M (2009) on the Factors influencing stock prices for firms listed in the Nairobi stock exchange found out that exchange rate fluctuation has an impact on stock return volatility. He also found out that interest rate also had a significant negative impact on the stock prices. When the interest rate rises, saving becomes more attractive, resulting in some of the money flow being channeled away from the stock market to bank deposits. This has the effect of depleting demand for the stock and naturally reduced stock prices. High interest rates also reduce the present value of future investments, and therefore reducing attractiveness of an investment option. The study confirms Dubravka & Petra (2010) findings. The variable of money supply had a positive impact which supports the finding of Cheng et al (2011). When money supply is decreased, interest rates increase, hence investors will save their money and reduce their desire for investing, reducing demand for stocks resulting in depressed stock prices.

Olweny,et al (2010) on the effect of macro-economic factors on stock return volatility in the Nairobi stock exchange, Kenya found out that the stock returns are symmetric but leptokurtic and not normally distributed. The results showed evidence that Foreign exchange rate, Interest rate and Inflation rate, affect stock return volatility.

The NSE acts as the barometer to the Kenyan economy, therefore there is need determine the relationship between macroeconomic factors and stock return. Kenya being a small open economy engages in international trade and is susceptible to foreign exchange risk that might have impact on the economy, to be precise, the stock market return. Interest rate fluctuation in Kenya has been a concern and Central Bank of Kenya and has in the recent past chipped in reduction of interest rates so as to boost investment. According to Economic Survey highlights, (2012), the average interest rate on 91-day treasury bills increased to 18 % in December 2011

from 6.08% in December 2010.Inflation rate volatility has also been evident in the country in the past decade. The unpredictability of inflation rate moving from 16.2% in 2008 to 9.2% in 2009 and 5% in 2010 to 14 % in 2011 (KNBS, 2012). The Government has been unable to contain inflation as per its target of 5.0 per cent in 2011.The average annual inflation was 14 percent in 2011 up from a low of 4.1 percent recorded in 2010 (KNBS, 2012). During this period, the stock market experienced fluctuations with market capitalization declining from KSh 1,167 billion in 2010 to KSh 868 billion (NSE, 2011). The changes in stock prices and the trend of changes are always of interest in the capital market given their effect on the stock market stability and strategies adopted by investors (Wang, 2010).The variables selected will provide rational investors with accurate and current information and be able to track general and specific factors having a bearing in their investments instruments. The study therefore seeks to examine factors that drive the NSE bourse and can be used to provide a basis of decision making for both the investors and policy makers. Given the aforementioned background, this study seeks to answer the following questions: What is the relationship between the selected macroeconomic variables and the stock market returns? What is the relative effect of macroeconomic variables on the stock market returns?

1.3Objective of the study

- Examine the relationship between selected macroeconomic variables and stock returns.

1.4Importance of the study

The main aim of this study is to examine the relationship between selected macroeconomic variables and stock return at the Nairobi security exchange. This will be a benefit to both policy makers and investors to identify the specific factors affecting stock returns and can therefore be

used as basis for making decision on strategies to be adopted in making investment decisions in the capital market. The study will also assist investment managers in estimating the returns on the portfolio of financial assets held under their custody. The study will finally enrich the body of knowledge in regard to stock returns and form basis for further research.

CHAPTER TWO
2.0LITERATURE REVIEW

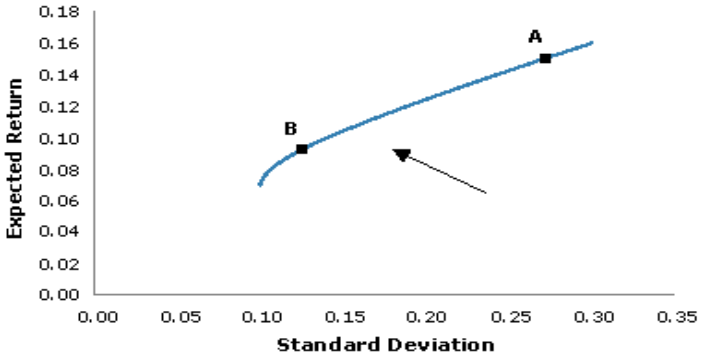
2.1Introduction

The literature review examines the two main theories related to stock return and studies that have been undertaken with theoretical orientation on the relationship between selected macroeconomic variables and stock returns.

2.2Markowitz and Portfolio Selection

The theory of stock price behavior began with Markowitz (1952, 1959). The Markowitz model is a single-period model, where an investor forms a portfolio at the beginning of the period. The investor's objective is to maximize the portfolio's expected return, subject to an acceptable level of risk (or minimize risk, subject to an acceptable expected return). The assumption of a single time period, coupled with assumptions about the investor's attitude toward risk, allows risk to be measured by the variance (or standard deviation) of the portfolio's return. Thus, as indicated by the arrow in Figure 1, the investor is trying to go as far northwest as possible.

Figure 2.1: Markowitz Portfolio Selection



As securities are added to a portfolio, the expected return and standard deviation change in very specific ways. This is based on the way in which the added securities co-vary with the other securities in the portfolio. The best that an investor can do (i.e., the furthest northwest a portfolio can be) is bounded by a curve that is the upper half of a hyperbola, as shown in Figure 1. This curve is known as the efficient frontier. According to the Markowitz model, investors select portfolios along this curve in respect to their tolerance for risk. An investor who can live with a lot of risk might choose portfolio A. On the other hand, a more risk-averse investor would be more likely to choose portfolio B. One of the major insights of the Markowitz model is that it is a security's expected return. This is coupled with how it co-varies with other securities, which determines how it is added to investor portfolios.

2.3Capital Asset Pricing Model

Building on the Markowitz framework, Sharpe (1964), Lintner (1965), and Mossin (1966) independently developed what has come to be known as the Capital Asset Pricing Model (CAPM). This model assumes that investors use the logic of Markowitz in forming portfolios. It further assumes that there is an asset (the risk-free asset) that has a certain return. With a risk-free asset, the efficient frontier in Figure 1 is no longer the best that investors can do. The straight line in Figure 2, which has the **risk-free rate** as its intercept and is tangent to the efficient frontier, is now the northwest boundary of the investment opportunity set. Investors choose portfolios along this line (the capital market line), which shows combinations of the risk-free asset and the risky portfolio M. In order for markets to be in equilibrium (quantity supplied

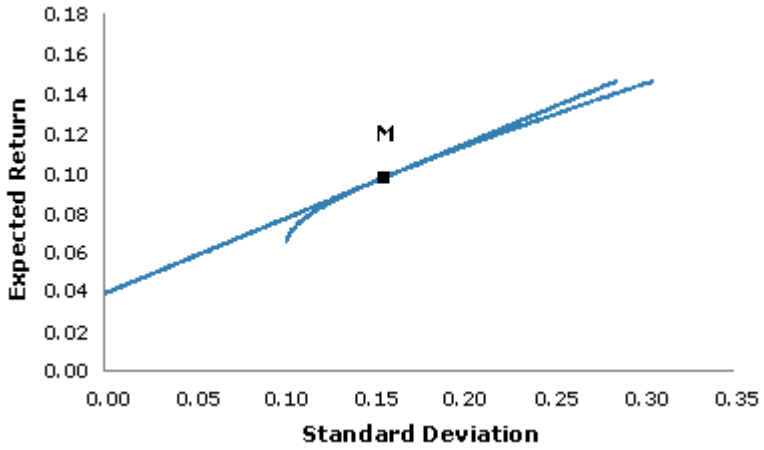
= quantity demanded), the portfolio M must be the market portfolio of all risky assets. So, all investors combine the market portfolio and the risk-free asset, and the only risk that investors are paid for bearing is the risk associated with the market portfolio. This leads to the CAPM equation:

CAPM

$E(R_j) = R_f + \beta_j [E(R_m) - R_f]$

$E(R_j)$ and $E(R_m)$ are the expected returns to asset j and the market portfolio respectively. R_f is the risk free rate and β_j is the beta coefficient for asset j. β_j measures the tendency of asset j to co-vary with the market portfolio. It represents the part of the asset's risk that cannot be diversified away, and this is the risk that investors are compensated for bearing. The CAPM equation says that the expected return of any risky asset is a linear function of its tendency to co-vary with the market portfolio. Therefore, if the CAPM is an accurate description of the way assets are priced, this positive linear relation should be observed when average portfolio returns are compared to portfolio betas. Further, when beta is included as an explanatory variable, no other variable should be able to explain cross-sectional differences in average returns. Beta should be all that matters in a CAPM world.

Figure 2.2: Capital Market Line



2.4Arbitrage Pricing Theory

Whereas the CAPM is a simple model that is based on sound reasoning, some of the assumptions that underlie the model are unrealistic. Some extensions of the basic CAPM were proposed that relaxed one or more of these assumptions (e.g., Black, 1972). Instead of simply extending an existing theory, Ross (1976a, 1976b) addressed this concern by developing a completely different model: the Arbitrage Pricing Theory (APT). Unlike the CAPM, which is a model of financial market equilibrium, the APT starts with the premise that arbitrage opportunities should not be present in efficient financial markets. This assumption is much less restrictive than those required to derive the CAPM.

The APT starts by assuming that there are n factors that cause asset returns to systematically deviate from their expected values. The theory does not specify how large the number n is, nor does it identify the factors. It simply assumes that these n factors cause returns

to vary together. There may be other firm-specific reasons for returns to differ from their expected values, but these firm-specific deviations are not related across stocks. Since the firm-specific deviations are not related to one another, all return variation not related to the n common factors can be diversified away. Based on these assumptions, Ross shows that, in order to prevent arbitrage, an asset's expected return must be a linear function of its sensitivity to the n common factors.

APT

$E(R_j) = R_f + \beta_{j1} \lambda_1 + \beta_{j2} \lambda_2 + ... + \beta_{jn} \lambda_n$

$E(R_j)$ and R_f are defined as before. Each β_{jk} coefficient represents the sensitivity of asset j to risk factor k, and λ_k represents the **risk premium** for factor k. As with the CAPM, we have an expression for expected return that is a linear function of the asset's sensitivity to systematic risk. Under the assumptions of APT, there are n sources of systematic risk, where there is only one in a CAPM world.

2.5 Review of empirical studies

In an efficient capital market, stock prices rapidly adjust according to the new information available; therefore, the stock prices reflect all information about the stocks. This means that an investor cannot use the readily provided information to predict the stock prices movements and make profits by trading shares. In short, an efficient market incorporates new information quickly and completely. We also know that the stock prices reflect expectations of the future performances of corporate profit. As a result, if stock prices reflect these assumptions, then they should be used as indicators of economic activities. So, the dynamic relationship

between stock prices and macroeconomic variables can be used to guide a nation's macroeconomic policies (Maysami et al., 2004).

Prices of stocks are determined by the net earnings of a company. It depends on how much profit the company is likely to make in the long run or the near future. If it is reckoned that a company is likely to do well in the years to come, the stock price of the company will rise to reflect the positive expectation. On the other hand, if it is observed from trends that the company may not do well in the long run, the stock prices may decline. In other words, the prices of stocks are directly proportional to the performance of the company. In the event that inflation increases, the company earnings (worth) will also subside. This will adversely affect the stock prices and eventually the market returns.

Under the APT framework, the economic variables which impact future cash flows and required returns of a stock can be expected to influence share prices. A number of studies have investigated the relationship between stock returns and the state of the economy and several economic variables are found to be associated with the risk-return of stock (Gangemi et al., 2006). Notable among these studies is the one by Chen et al. (1986) on the US stock market. The study set the tone for a series of recent studies using the arbitrage pricing theory (APT) framework.

They studied the impact of economic forces on stock returns using APT. They revealed that variables such as interest rates, inflation rate, exchange rate, bond yield and industrial production have major impacts on the stock market. Nishat (2004) analyze the long-term relationship between macroeconomic variables and stock prices of Karachi stock exchange using a unit root technique. He found a causal relationship between the stock price and the

macroeconomic variables. Fama (1981) found a strong positive correlation between common stock returns and real variables (that is, industrial production, GDP, the money supply, lagged inflation and interest rate). Fama and Gibbon (1982) examine the relationship between inflation, real returns and capital investment.

Their results support the finding by Mundell (1963) and Tobin (1965) that the expected real returns on bills and expected inflation rate are negatively correlated. These authors suggest that this relationship arises with share return due to a positive relationship between expected returns on financial assets and real activity. Geske and Roll (1983) found that the US stock price is negatively related to inflation and positively related to the real economic activity. Gallager and Taylor (2002) analyze the relationship between macroeconomic variables and stock prices of US stocks and found that the stock returns are negatively affected by both expected and unexpected inflation. Using post-war data for the US, Canada, Germany and the UK, Kaul (1990) explains the relationship between stock returns and unanticipated changes in inflation under alternative monetary policy regimes. He found that countries where there is no change in the policy regime, negative relationship exist between stock returns and changes in inflation. Chatrath et al. (1997) examine the relationship between inflation and stock prices of India stocks. He found a negative relationship between stock return and inflation. Zhao (1999) found a strong relationship between inflation and stock prices of China stocks. Omran and Pointon (2001) studied how the inflation rate affects the performance of the market of Egypt and they found a negative relationship between them. Contrary to these studies, Choudhry (2000) found a positive relationship between stock returns and inflation in four high inflation countries. Maysami et al. (2004) find a positive relationship between inflation rate and stock returns. This is contrary to other studies that suggest

a negative relationship. The reason given by the authors is the active role of government in preventing price escalation after the economy continued to progress after the 1997 financial crises. Engsted and Tanggaard (2002) found a moderately positive relationship between expected stock returns and expected inflation for the US and a strong positive relation for Denmark.

According to the "Fisher effect" expected nominal rates of interest on financial assets should move one-toone with expected inflation (Fisher, 1930). Moreover, changes in both short-term and long-term rates are expected to affect the discount rate in the same direction through their effect on the nominal risk-free rate (Mukherjee and Naka, 1995). Therefore interest rates are expected to be negatively related to market returns either through the inflationary or discount factor effect (Abugri, 2008). Some previous studies have reported that it is not interest rate itself that is relevant but the yield and default spreads that are more likely to influence equity returns (Chen et al., 1986). However, the continued use of interest rates may be attributed to the absence of active secondary markets for bonds issues and government paper in many emerging markets (Bilson et al., 2001). An increase in interest rate would increase the required rate of return and the stock return would decrease with the increase in the interest rate. An increase rate would raise the opportunity costs of holding cash, and the trade off to holding other interest bearing securities would lead to a decrease in share price.

Theoretically, French et al. (1987) found negative relationship between stock returns and both long-term and short-term interest rate. Furthermore, Bulmash and Trivoli (1991) found that the US current stock price is positively correlated with the previous month's stock price, money supply, recent federal debt, recent tax-exempt government debt, long-term unemployment, the broad money supply and the federal rate. However, there was a negative relationship between

stock prices and the Treasury bill rate, the intermediate lagged Treasury bond rate, the longer lagged federal debt, and the recent monetary base. Abdullah and Hayworth (1983) found that stock returns are positively related with the money growth and inflation rate while interest rate reacts negatively on stock returns.

The link between exchange rates and equity returns is based on a simple financial theory. Exchange rate as an indicator of a currency is a monetary variable that affect the prices of stock in a way similar to inflation variables. When the domestic currency depreciates against foreign currencies, export product prices will decrease, and consequently, the volume of the country's export will increase, assuming that the demand for this product is elastic. The appreciation of a country's currency lowers the cost of imported goods, which in most cases constitute a large part of the production inputs for emerging market countries. According to Pebbles and Wilson (1996), an appreciating currency is generally accompanied by increases in reserves, money supply and a decline in interest rates. The resulting decline in cost of capital and/or imported inputs is expected to lead to an increase in local return. Such an expectation is also consistent with Bilson et al. (2001) conclusion that a devaluation of the domestic currency has a negative relationship with return. Mukherjee and Naka (1995) also confirmed that exchange rate positively relates to Japan and Indonesia stock prices, both two large export countries. Solnik (1987) employs monthly and quarterly data for eight industrial countries from 1973 to 1983 to examine the relation between real stock returns, exchange rates and reports a negative relation among variables. Soenen and Aggrawal (1989) re- assess this Solnik model using 1980 to 1987 data for the same industrial countries and report a positive relationship between stock returns and exchange rate for three countries and a negative correlation for five. Ajayi and Mougoue (1996)

also showed that an increase in stock price has a negative short-term effect on domestic currency values but in the long term this effect is positive, while currency depreciation has a negative short-term and long-term effect on the stock market. Employing monthly data, Aggarwal (1981) examines the relationship between stock market indexes and a trade weighted value of the dollar for the period 1974 to 1978 and found that the stock prices and exchange rates are positively correlated.

2.5.1The relationship between macroeconomic factors and stock returns

On the valuation process, economic and industry environment should be concerned, as well as analysis of individual companies or stocks. Psychologists suggest that success or failure of an individual can be caused as much by his or her social, economic, and family environment as by genetic gifts. Extending this idea to the valuation of securities means that a firm's economic and industry environment should be taken into account during the valuation process (Reilly and Brown, 2006, p. 361). Therefore, the top-down (the three-step) approach discerns the importance of the economic and industry environment on the valuation process contrast to the bottom-up approach.

The top-down approach holds that both the economy and industry significantly affect the total returns for individual stocks, regardless of the qualities of a firm. On the other hand, the bottom-up approach contends that it is possible to find stocks to provide superior returns, regardless of the economy and industry outlook. The results of several academic studies investigating the effects of economic variables on stock returns have supported the top-down investment process. In addition to a firm's individual quality and profit potential, it is also taken

into account that the economic environment and the performance of a firm's industry influence the value of a security and its rate of return. Thus, some macroeconomic variables would be regarded as a priori of risk that are common to all companies.

The relationship between stock prices and macroeconomic variables is well illustrated by theoretical stock valuation models such as Dividend Discount Model (DDM), Free Cash Flow Valuation, and Residual Income Valuation. According to the models, the current prices of an equity share are approximately equal to the present value of all future cash flows. Thus, any economic variable affecting cash flows and required rate of return in turn influences the share value too.

Additionally, it is theoretically postulated that the volatility of stock returns increase during economic contractions and decrease during recoveries. Schwert (1989) reported that stock market's volatility is higher during recessions. Nardari and Scruggs (2005) revealed that many, but not all episodes of high uncertainty regarding future returns are associated with recessions. Moore (1983) showed that in most cases, the general level of stock prices has been much higher at the top of a boom than at the bottom of a recession in the US. The study indicates that typically, the turn in stock prices occur prior to the turn in business activity. According the findings of Schwert (1989), there is weak evidence that macroeconomic volatility can help predict stock volatility. However, the evidence is somewhat strong that financial asset volatility helps predict future macroeconomic volatility. Hence, stock prices are stated to lead the swing in the business cycle, and stock price indices are "leading indicators." This means that stock prices have already started to decline at the peak of the business cycle; while at the bottom of the business cycle, stock prices have already started to rise.

2.5.2Relationship between Interest Rate and Stock Price

In literature, a negative relationship between interest rates and stock prices is hypothesized due to several reasons. In an equity valuation process, at first, a discount rate is determined. A chosen discount rate reflects both the time value of money and the riskiness of the stock. The risk free rate represents the time value of money. A risk premium represents compensation for risk, which is measured relative to the risk free rate. A decided discount rate is perceived by an investor as a required rate of return (Stowe, et al. 2007, p. 47). The CAPM is one of methods to determine the required rate of return1.

$E(Ri) = RF + \beta i\ [E(RM) - RF]$

Where;

E(Ri) = the expected return on asset i given its beta

RF = the risk-free rate of return

E(RM) = the expected return of the market portfolio

βi = the asset's sensitivity to returns of the market portfolio.

The model describes the relationship between risk and expected return, and calculated required rate of return is applied to the pricing of risky securities. That is, it is very crucial to determine the required rate of return in the process of stock value. This is because changes in interest rates affect the theoretical value of shares by affecting the investor's required rate of return. DDM can be applied to determine the value of shares.

$$\boldsymbol{V0 = Dt\ 1+r\ t\infty t=1}$$ Equation (2)

V0 = the present value of dividends

r = the required rate of return

As the government adjusts key interest rates, the risk-free rate will change. If interest rate increases, the risk-free rate will rise too. This would result in the higher market rate. If nothing else changes, the stock's target price should drop due to the required higher rate of return. The reverse is true. If interest rates fall and everything else is held constant, the stock's target price should rise because the required rate of return has dropped. Furthermore, the required rate of return will rise if the risk premium increases.

In addition, interest rates have impact on a company's operations. Any increase in the interest rates, ceteris paribus, will raise the cost of capital. Therefore, a company has to work harder to generate higher returns in a high interest environment. Otherwise, the inflated interest expense will eat away at its profits. The lower profits, the lower cash inflows and the higher required rate of return for investors that all translate into depressed fair value of the company's stock. Moreover, if interest rate costs shoot up to such a level that the company has problems paying off its debt, then its survival may be threatened. In that case, investors will demand an even higher risk premium. As a result, the fair value will fall even further.

Interest rates are expected to be negatively related to market returns either through the inflationary or discount factor effect. Choi and Jen (1991) reported that the expected returns on common stocks are systematically related to the market risk and the interest-rate risk. The findings of the study indicate that the interest-rate risk for small firms is a significant source of investors' portfolio risk and the interest-rate risk for large firms is "negative". The study also shows that the interest-rate risk premium explains a significant portion of the difference in expected returns between the top quintile and the bottom quintile of the NYSE and the MEX

firms. Humpe and Macmillan (2007) also indicated that both the US and Japan stock prices are negatively correlated to a long term interest rate.

The effect of interest rate on stock returns has been studied over emerging markets as well. Al-Sharkas (2004) for Jordan and Adam and Tweneboah (2008) for Ghana indicate the relationship between stock prices and interest rates is negative and statistically significant. Maysami et al. (2004) revealed that short and long term interest rates have significant positive and negative relations with the Singapore's stock market respectively. According to the results by Abugri (2008), the responses of stock returns to interest rate are negative and significant in Brazil, Argentina, and Chile. However, the response of returns in Mexico to interest rates appears to be insignificant in explaining the movement of returns (Abugri, 2008).

As for the Turkey's case, the empirical results of Muradoglu and Metin (1996) indicated that growth rates of interest rates affect stock returns negatively with a significant lag in short run dynamic model. Yildirtan (2007) indicated the real interest rate on deposits and interest rate differential variables have an extremely weak, negative relation with stock returns. Analysis of Kandir (2008), based on stock portfolios rather than single stocks, point out interest rate seems to negatively affect all of the portfolio returns. On the other hand, the regression results of Tursoy et al (2008) indicated that there is no significant pricing relationship between the stock return and interest rate. Ozturk (2008) reported that only the lagged overnight interest rate does Granger cause stock returns, while stock returns do Granger causes treasury interest rate and overnight interest rate. The studies for both developed and emerging markets report negative relationship between stock returns and interest rate, which is consistent with the theory.

2.5.3 Relationship between Inflation and Stock Price

At the process of stock valuation, it is important to consider the effects of inflation on stock prices because inflation rates vary around the world and over time. In theory, stocks should be inflation neutral, and rising inflation should have no impact on stock valuations. Fisher (1930) noted that the nominal interest rate r can be expressed as the sum of expected real return and expected inflation rate E(I).

Linear approximation: r=p +E(I)

Exact methodology: (1+r) = (1+p)*(1+(E(1))

The nominal interest rate is observed in the marketplace, and is usually referred as the interest rate. On the other hand, the real interest rate is calculated from the observed interest rate and the forecasted inflation. It is argued that real interest rates are stable over time. Therefore, fluctuations in interest rates are caused by revision in inflationary expectations, not by movements in real interest rates. As Irving Fisher (1930) noted, nominal interest rate is decomposed into an expected real rate and an expected inflation component. Fisher (1930) argued that the expected real return is determined by real factors, and is unrelated to expected inflation. That is, real rates of return on common stocks and expected inflation rates are independent and that nominal stock returns vary in a one-to-one correspondence with expected inflation. Gultekin (1983), while testing the generalized Fisher hypothesis for 26 countries between 1947 and 1979, could not find a reliable positive relation between nominal stock returns and inflation rates. Moreover, the finding of the study reveals that regression coefficients are predominantly negative.

A negative relationship between inflation and stock prices is contended in literature. This is because an increase in the rate of inflation is accompanied by both lower expected earnings growth and higher required real returns. In the US, there is substantial empirical evidence that high inflation is associated with a high equity risk premium and declining stock prices (Hoguet, 2008). Rising inflation is apt to restrictive economic policies. In turn, this increases the nominal risk-free rate and hence raises the required rate of return in valuation models.

Additionally, inflation has a distorting effect on reporting earnings when historical costs are used in accounting. Reported earnings based on depreciation recorded at historical cost as an estimate of replacement costs gives an overstatement of earnings. Similarly, a first-in-first-out (FIFO) inventory system leads to understatement on inventory costs and an overstatement of reported earnings. Consequently, a company operating in a high-inflation environment will be penalized if it cannot pass through inflation (Solnik and McLeavey, 2009, pp. 242-244). Sharpe (1999) argued that "A one percentage point increase in expected inflation is estimated to raise required real returns about one percentage point, which amounts to about a 20% decrease in stock prices." Fama and Schwert (1977) show that the US common stock returns are negatively correlated to the expected component of the inflation rate, and probably also to the unexpected component. Fama (1981) hypothesized that the negative relations between real stock returns and inflation observed during the post-1953 period were the consequence of proxy effects. Stock returns are determined by forecasts of more relevant real variables. On the contrary, the negative stock return-inflation relations are induced by negative relations between inflation and real activity. Saunders and Tress (1981) indicate that Australian nominal stock returns and inflation are related in a significantly negative fashion. This implies that stocks are extremely poor

inflationary hedges for the investor. In addition, the study indicates a mainly unidirectional relationship between inflation and stock returns, with price level charges leading the equity index in time. Flannery and Protopapadakis (2001) indicated that the CPI and the PPI are strong risk factor candidates for NYSE-AMEX-NASD. Humpe and Macmillan (2007) reported that both the US and Japan stock prices are negatively related to the consumer price index.

Similar to developed markets, Naka, Mukherjee, and Tufte (1998) for India and Nishat and Shaheen (2004) for Pakistan indicated that inflation is the largest negative determinant of stock prices. Additionally, Nishat and Shaheen (2004) indicated inflation does Granger-causes stock price movements in Pakistan. Maghayereh (2002) and Al-Sharkas (2004) also show reliable negative relationship between Jordanian stock prices and inflation.

However, Firth (1979) for UK, Maysami et al (2004) for Singapore, and Adam and Tweneboah (2008) for Ghana reported a significant positive relationship between inflation (CPI) and stock returns. These results of provides a sharp contrast to empirical works that have found a significant negative relationship between stock returns and expected inflation. As for Turkey's case, the long-run steady state results of Muradoglu and Metin (1996) indicated that the negative relation between stock prices and inflation persists when other monetary variables are included in the model. Ozturk (2008) showed that there is no causal relationship between inflation and stock returns. Analysis of Kandir (2008) points out that inflation rate is significant for only three of the twelve portfolios. On the other hand, the regression results of Tursoy et al (2008) indicated that there is no significant pricing relationship between the stock return and inflation. Erbaykal et al (2008) investigating the relationship under "Proxy hypothesis" developed by Fama (1981) reveal a negative long term relationship between the stock prices and inflation. The study

concludes that under the light of this evidence, Proxy hypothesis developed by Fama (1981) is valid for Turkey. Also, the variables, which are the indicators of real economic activity such as industrial production index, employment level and fixed investments, are effective on stock prices through inflation. Rjoub et al (2009) indicated that the unanticipated inflation has a positive effect on the returns of the constructed portfolios. As Gultekin (1983) indicated the relationship between stock returns and inflation is not stable over time and that there are differences among countries regardless of either developed or emerging markets.

2.5.4 Relationship between Exchange Rate and Stock Price

There is no theoretical consensus either on the existence of relationship between stock prices and exchange rates or on the direction of the relationship. However, in the literature, two approaches have been asserted to establish a relationship between exchange rate and stock prices: the goods market model and the portfolio balance model. First approach is referred to by Dornbusch and Fisher (1980) while focusing on the association between the current account and the exchange rate. Dornbusch and Fisher (1980) developed a model of exchange rate determination that integrates the roles of relative prices, expectations, and the assets markets. This model also emphasized on the relationship between the behavior of the exchange rate and the current account. Dornbusch and Fisher (1980) argue that there is an association between the current account and the behavior of the exchange rate. It is assumed that the exchange rate is determined largely by a country's current account or trade balance performance. These models posit that changes in exchange rates affect international competitiveness and trade balance, thereby influencing real economic variables such as real income and output. That is, goods market model suggests that changes in exchange rates affect the competitiveness of a firm, which

in turn influence the firm's earnings or its cost of funds and hence its stock price. On a macro level, then, the impact of exchange rate fluctuations on stock market would depend on both the degree of openness of domestic economy and the degree of the trade imbalance. Thus, goods market models represent a positive relationship between stock prices and exchanges rates with direction of causation running from exchange rates to stock prices4. The conclusion of a positive relationship stems from the assumption of using direct exchange rate quotation5 (Stavarek, 2004).

On the other hand, portfolio balance models put much more stress on the role of capital account transactions (Tahir and Ghani, 2004). Portfolio balance model assumes a negative relationship between stock prices and exchange rates. A rise in domestic stocks prices would attract capital flows, which increase the demand for domestic currency and cause exchange rate to appreciate. A rising stock market leads to the appreciation of domestic currency through direct and indirect channels. A rise in prices encourages investors to buy more domestic assets simultaneously selling foreign assets to obtain domestic currency indispensable for buying new domestic stocks. The described shifts in demand and supply of currencies cause domestic currency appreciation. The indirect channel grounds in the following causality chain. An increase in domestic assets prices results in growth of wealth that leads investors to increase their demand for money. In turn, this raises domestic interest rates. Higher interest rates attract foreign capital and initiate an increase in foreign demand for domestic currency and its subsequent appreciation (Stavarek, 2004).

Actually, changes in exchange rate affect exporter and importer firms conversely. In case of a depreciation of the domestic currency, imported products suddenly become more expensive

in terms of the home currency. If this price increase can be passed through to customers, earnings will not suffer from the currency adjustment. However, this is often not the case. First, the price increase will tend to reduce demand for these imported products. Second, locally produced goods will become more attractive than important goods, and some substitution will take place (Solnik and McLeavey 2009, p. 244). Therefore, the shares of importer firms will decrease, whereas the shares of exporter become more valuable.

Stavarek (2004) reported that neither the intensity nor direction of causal relationship is similar among the developed economies and the new EU-member countries. Obben et al. (2006) imply that there is bidirectional causality in the foreign exchange and New Zealand stock markets both in the short run and in the long run. As to emerging markets, the results of Abugri (2008) reveal that the response of Brazilian and Mexican stock returns to an exchange rate shock are negative and significant, while neither in Argentina nor Chile stock returns responded significantly to exchange rates. Adam and Tweneboah (2008) show that there is negative relationship between Ghana stock market and exchange rate, while the results of Maysami et al. (2004) for Singapore support the hypothesis of a positive relationship between exchange rate and stock returns.

Tabak (2006) indicates that there is no long-run relationship, but there is linear Granger causality from stock prices to exchange rates. This is in line with the portfolio approach Brazilian stock prices to exchange rates with a negative correlation. Furthermore, the study shows evidence of nonlinear Granger causality from exchange rates to stock prices. The study of Horobet and Ilie (2007) offered contradictory results for Romania. While the application of the Engle-Granger methodology indicates no co-integration between the exchange rates and the

stock prices, the use of the Johansen-Juselius procedure suggests the presence of co-integration between the two stock market indices and the exchange rates, either nominal bilateral, nominal effective or real effective rates.

As for Turkey's case, the empirical results of Muradoglu and Metin (1996) indicate stock returns are expected to increase as exchange rates increase. The findings of the Yucel and Kurt (2003) reveal that export companies' mean exposure coefficient is higher than non-export companies' mean exposure. This indicates that exposure pattern of export and non-export companies are different. Furthermore a depreciation of domestic currency (TL) leads to an increase in the value of export firms. The results of Kasman (2003) provide evidences that a long-run stable relationship between stock indices and exchange rates ($) exists. Furthermore, the study reports inconclusive evidence where causality relationship exists for both ways between the composite index and exchange rates, financial sector index and exchange rates, and service sector index and exchange rate. Additionally, causality relationship exists from the exchange rate to the industry index in a unique direction.

Karamustafa and Kucukkale (2003) point out that the relations between stock returns and exchange rate is uncertain. This indicates that the ISE is neither the result variable nor the cause variable of exchange rate variable. Likewise, the findings of Ozturk (2008) point out there are no causal relationship between stock returns and exchange rate. The empirical results of Aydemir and Demirhan (2009) indicate that there is bidirectional causal relationship between exchange rate and all stock market indices. While the negative causality exists from the ISE-100, services, financials, and industrials indices to exchange rate, there is a positive causal relationship from technology indices to exchange rate. On the other hand, negative causal relationship from

exchange rate to all stock market indices is showed. Yildirtan (2007) shows that there is no relation between the deviations of real exchange rate from trend, average deviation of real exchange rate variables and the ISE-100. The real exchange rate also point out an extremely weak, negative relation. Analysis of Kandir (2008) points out that exchange rate seems to affect all of the portfolio returns. On the other hand, the regression results of Tursoy et al. (2008) indicate that there is no significant pricing relation between the stock return and exchange rate. Like money supply and inflation, the relationship between stock returns and exchange rate is not stable over time and that there are differences among countries regardless of either developed or emerging markets.

2.5.5 Relationship between oil prices and Stock Price

Crude oil is an essential input for production and so the price of oil is included as a proxy for real economic activity. An increase in the price of oil in the international market means lower real economic activity in all sectors, which will cause stock returns to fall. It is theoretically shown that the industrial production increases during economic expansion and decreases during a recession. Therefore, a change in industrial production would signal a change in economy. The productive capacity of an economy indeed rises during economic growth, which in turn contributes to the ability of firms to generate cash flows. That is why the industrial production would be expected to act beneficially on expected future cash flows, hence a positive relationship between real economy and stock prices exist. Furthermore, the volatility of stock returns increases during economic contractions and decreases during recoveries. Fama (1981) indicates that the growth rate of industrial production had a strong contemporaneous relation

with stock returns. Many studies show that large fractions, often more than 50% of annual stock-return variances, can be traced to forecasts of variables such as real GNP, industrial production, and investment that are important determinants of the cash flows to firms (Fama, 1990).

Foresti (2007) indicates that stock market prices can be used in order to predict growth, but the opposite is not true. Fama (1990) reports that a large fraction of the variation of stock returns (the NYSE) can be explained primarily by time-varying expected returns and forecasts of real activity. Nardari and Scruggs (2005) reported that stock market (CRSP NYSE) volatility changes over time primarily because of changes in the volatility of "news about future returns." Errunza and Hogan (1998) show that industrial growth rate volatility does Granger cause return volatility for Italy and the Netherlands but not for Germany, France, UK, Switzerland and Belgium.

The findings of Flannery and Protopapadakis (2001) indicate that three real factor variables (Balance of Trade, Employment/Unemployment, and Housing Starts) are strong risk factor candidates, and these real factor candidates affect only the returns' conditional volatility for NYSE-AMEX-NASD. Furthermore, it is reported that remarkably, two popular measures of aggregate economic activity (Real GNP and Industrial Production) do not appear as risk factors. Also, the Real GNP announcements are associated with lower rather than higher return volatility. Humpe and Macmillan (2007) indicate both the US and Japanese stock prices are positively related to industrial production. As to emerging markets, Nishat and Shaheen (2004) infer that industrial production is the largest positive determinant of stock prices in Pakistan, as well as bilateral Granger-cause between industrial production and stock prices. Naka, Mukherjee and Tufte (1998) indicate that industrial production is the largest positive determinant of Indian stock

prices. Additionally, domestic output growth is its predominant driving force to Indian stock market performance. Maghayereh (2002) and Al-Sharkas (2004) for Jordan and Maysami et al. (2004) for Singapore indicate that industrial production is positively and significantly related to the stock returns. Abugri (2008) reports that the response of stock returns to industrial production are positive and significant in Brazil and Chile, while industrial productions do not appear to exert a significant impact on the expected stock returns in Argentina and Mexico.

CHAPTER THREE
3.0RESEARCH METHODOLOGY

3.1Introduction

The chapter presents the research design; target population, data sampling and sample size, variable selection and justification with the econometric model that will be adopted to address the issue/problem delineated in chapter 1.

3.2Research design

The NSE all-share index is selected as the proxy representing the overall stock performance. The share index reflects the change in different types of asset securities in the security exchange representing all the segments in the in the market (Berk et al, 2009). The NSE all-share index is a representative of the different industries and the general change in performance in line with Dubravka & Petra (2010) finding that the market index had the largest statistical significance in explaining stock returns.

3.3Target Population

The study population of interest for this study will be the performance of the companies listed at the Nairobi Security Exchange between January, 2003 to December 2011, measured by market all share indexes.

3.4Data Sampling and sample size

The sample is the related monthly market level data covering the period January, 2003 to December 2011 for the companies listed in the Nairobi stock exchange. The period is selected so as to use the most recent data, to make the findings more current. The study uses secondary data as the main source of which is available at the NSE and the Central Bank of Kenya .

3.4.1Variable Selection

The aim of this study is to explain the relationship between selected macro-economic variables and the stock returns in Nairobi Securities Exchange using monthly data from January, 2003 to December 2011. Nairobi Security Exchange All Share Index will be used as a proxy for the performance of the Nairobi Security market. NSE All Share Index which is the broad market indicator of the stock market measures the overall performance of the stock market. This index is computed by the Nairobi Security Exchange every trading day.

Four macroeconomic variables, that are hypothesized to influence stock returns, will be examined. These macroeconomic variables are Consumer price index, Money Market interest rate, industrial production and foreign exchange rate. The dependent variable used will be Nairobi Security Exchange All Share Index returns.

The source used for the dependent variable will be Nairobi Security Exchange. The data for the explanatory variables, namely consumer price index, industrial production index money market interest rate, foreign exchange rate is obtained from the database of Central Bank of Republic of Kenya and Kenya national Bureau of statistics.

3.5Variables Justification and Hypothesis

3.5.1 NSE all share Index

This variable captures the performance of the market and it is the dependent variable in the regression model. It is computed on daily basis by Nairobi Security Exchange. Its selection is also motivated by data availability

3.5.2 Money Market Interest Rate (MIR)

The relationship between interest rates and stock return is well established. An increase in interest rate will increase the opportunity cost of holding money and investors substitute holdings interest bearing securities for share hence falling stock returns. The Treasury bill rate is used as a measure of interest rate in this study because investing in Treasury bill is seen as opportunity cost for holding shares. High-treasury bill rates encourage investors to purchase more government instruments. Treasury bills thus tend to compete with stocks and bonds for the resources of investors. The expected relationship between stock prices and Treasury bill rates is thus negative.

Hypothesis 1: There is a negative effect of money market interest rate on NSE All share Index.

3.5.3 Industrial Production Index(IPI)

Industrial production index rises during economic expansion and falls during a recession. It is typically used as a proxy for the level of real economic activity, that is, a rise in industrial production would signal economic growth. The productive capacity of an economy indeed depends directly on the accumulation of real assets, which in turn contributes to the ability of firms to generate cash flow. Chen, Roll and Ross' (1986) findings based on a US stock portfolio, indicated that future growth in industrial production was a significant factor in explaining stock returns. Hence, suggesting a positive relationship between real economic activities and stock return.

Hypothesis 2: There is a positive effect of industrial production index on NSE All share Index.

3.5.4 Foreign Exchange Rate (FEX)

In this study end of month US Dollars/Kenya Shillings exchange rate is employed as foreign exchange rate. Kenya is an import dominated country. For an import dominated country; currency depreciation will have an unfavorable impact on a domestic stock market. As the Kenya's currency depreciates against the U.S. dollar, products imported become more expensive. As a result, if the demand for these goods is elastic, the volume of imports would increase, which in turn causes lower cash flows, profits and the stock returns of the domestic companies. Ibrahim and Aziz (2003) found a negative sign. Thus, a negative relationship is expected between foreign exchange rate and stock returns.

Hypothesis 3: There is a negative effect of foreign exchange rate on NSE All share Index.

3.5.5 Consumer Price Index (CPI)

Consumer Price Index is used as a proxy of inflation rate. CPI is chosen as it is a broad base measure to calculate average change in prices of goods and services during a specific period. High rates of inflation increase the cost of living and a shift of resources from investments to consumption. This leads to a fall in the demand for market instruments which lead to reduction in the volume of stock traded. Also the monetary policy responds to the increase in the rate of inflation with economic tightening policies, which in turn increases the nominal risk-free rate and hence raises the discount rate in the valuation model. DeFina (1991) agues that nominal contracts that disallow the immediate adjustment of the firm's revenues and costs prevent cash flow to grow at the same rate as Inflation. We therefore expect negative relationship between inflation and stock market. **Hypothesis 4:** There is a negative effect of Consumer price Index on NSE All share Index.

3.6 Econometric Model

Different methods have been employed to test the relationships between macroeconomic variables and stock prices. This study intends to examine the impact of macroeconomic variables on NSE All share Index by using a multiple regression model. This model is useful and suitable because the research focus relies on examining the contemporaneous relationships between stock returns and changes in macroeconomic variables.

Based on both theoretical and empirical literature reviewed, this study hypothesize the model between NSE All share Index and four macroeconomic variables, namely consumer price index (CPI), money market interest rate (MIR), industrial production index (IPI) and foreign exchange rate (FEX) The hypothesized model is represented as follows:

NSE = f (CPI, MIR, IPI,, FEX)

In order to see whether the above identified macroeconomic factors could explain NSE All share Index returns, the multiple regression models is formed:

$t\ NSE = \beta_o + \beta_1 CPI + \beta_2\ MIR\ + \beta_3\ IPI + \beta_4 FEX + t\varepsilon$

In the above equation 0β is constant and β is coefficient of variables while $t\ \varepsilon$ is the residual Error of the regression. The ordinary least squares (OLS) method will be used to compute the estimates of the regression model stated above and all estimations will be performed in the econometrical software program SPSS, whereas the ordinary calculations will be in Excel.

CHAPTER FOUR
4.0DATA ANALYSIS, STUDY FINDINGS AND INTERPRETATIONS

4.1 Introduction

This chapter presents the analysis of data collected from various sources including: the Central Bank of Kenya, the Kenya national Bureau of Statistics, and the Nairobi Securities Exchange. The research sought to establish the relationship between selected macroeconomic variables and stock returns.

4.2 Data Analysis and Presentation

The data was cleaned, and entered into SPSS to build a database that was subjected to statistical computations. Inferential statistical analysis such as regression, Analysis of the Variance (ANOVA) and the t tests were extensively used to summarize, describe, analyze and present the study findings.

4.2.1 Validation of the study Econometric Model

The study was modeled using an econometric model as presented below

NSE = f (CPI, MIR, IPI, FEX).

This model implies that the dependent variable or the predicted variable is the NSE all-share index. The model stipulates that variations in the NSE will be attributable to the four model predictor variables; namely the Consumer Price Index (CPI), the Money market return (MIR), the Industrial Production Index (IPI) and the Foreign Exchange Rate (FEX).

In order to validate if the above identified macroeconomic factors and model explanatory variables could explain variations in the NSE all-share Index returns, the multiple regression models is formed and validated as below:

$t\ NSE = \beta_o + \beta_1 CPI + \beta_2\ MIR\ + \beta_3\ IPI + \beta_4 FEX + t\varepsilon$

In the above equation β_o is constant and β_1 - β_4 are model coefficients of variables of study identified above while $t\ \varepsilon$ is the residual Error of the regression. The ordinary least squares (OLS) method was used to compute the estimates of the regression model stated above and all estimations computed using SPSS software program SPSS, and presented the results below.

$t\ NSE = \beta_0 + \beta_1 CPI + \beta_2\ MIR + \beta_3\ IPI + \beta_4 FEX + t\varepsilon$

The validated econometric model

t NSE = 13236.377 + -3660.622 CPI + -172.957 MIR + 72.874 IPI + -169.751 FEX

From the above validated model, β_o which is the model constant was established to be 13236.377. This is the level of Stock return that is not dependent on any level of the model explanatory variables namely the consumer price index, money market rate, industrial production index and the foreign exchange rate. This is the autonomous NSE all share index. The study findings further established that the β_1 was established by the study at -3660.622. This coefficient shows the explanatory power the consumer price index has over variations on the NSE all-share index. The study findings also estimated the coefficient of β_2 at -172.957. This coefficient shows the explanatory power the Money market rate (MIR) has over the predicted variable; the NSE all-share index.

Similarly, the study established the coefficient β3 to be 72.874. This coefficient measures the variations in the NSE attributable only to the Industrial Production Index. The coefficient β_4 was established by the study to be at -169.75. This is the specific measure on variability of the NSE only attributable to the foreign exchange rate. With these model coefficients, given any level of the explanatory variables, the NSE can be predicted in this econometric model.

The error term tε that is used to lamp up together all the effects of other factors having explanatory power over the predicted variable the NSE outside the regression model was established at 1.055E7

4.2.2 Analysis of the variance

The analysis of the variance was used by this study to test the overall fitness of the regression model in estimating NSE all share index as explained by the selected predictor variables of consumer price index (CPI), Money Market rate (MIR), Industrial Production Index (IPI) and the Foreign exchange rate (FEX).

Table 4.1: Analysis of the variance

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.829E7	4	4573686.568	1.735	.303[a]
	Residual	1.055E7	4	2636258.574		
	Total	2.884E7	8			

a. Predictors: (Constant), Foreign Exchange Rate (FEX), Industrial Production Index (IPI), Money Market Interest Rates (MIR), Consumer Price Index (CPI)

b. Dependent Variable: NSE All Share Index

From table 4.1 above, the computed F statistic (1.735) is greater than the critical or significant F (0.303). This implies that the overall regression model is fit. It also implies that the regression model explains variations in the predicted variable of the model which is the NSE all-share index.

4.2.3 Model Statistical Summary

The above regression model summary established that, the spearman' correlation coefficient was estimated at 0.796 implying that the strength of the associativity between the predicted

variable (the NSE all-share Index and the four predictor variables is very a strong at 79.6 percent. The coefficient of determination R^2 was established at 0.634 implying that the regression variables explains 63.4% variations in the predicted variable – the NSE and the residual error term explains 36.6 % variations in the predicted variable.

The Durbin – Watson statistic of the model was estimated at 2.173.

The Durbin - Watson statistic was computed by the econometric model as;

$$d = \frac{\sum_{t=2}^{T}(e_t - e_{t-1})^2}{\sum_{t=1}^{T} e_t^2},$$

And was established to be more than two ($d > 2$), implying that there is no cause for alarm since successive error terms are, on average, much different in value to one another, i.e., negatively correlated.

4.2.4 The correlation matrix

NSE 20 Index (NSE)	1				
Consumer Price Index (CPI)	-0.5	1			
Money market Interest Rates (MIR)	-0.3	0.6	1		
Industrial Production Interest rate (IPI)	0.4	-0.6	-0.69	1	
Foreign exchange rate (FEX)	0.3	-0.9	-0.6	0.6	1

From the correlation matrix above, the study established is a negative 50% association between the consumer price index (CPI) and the NSE all-share Index. The study further established that the association between the NSE all-share index and MIR is a positive weak relationship of 30% while that with IPI was a fairly strong positive relationship of 40% while that of Foreign exchange was a weak relationship of 30%

4.2.5 Hypothesis Testing

Hypotheses 1:

There is a negative effect of money market interest rate on NSE All share index. The study established a negative relationship between money market interest rate and the NSE share index. The inferential statistics of Analysis of the Variance, and student t tests; The F statistic (1.735) is greater than the F critical value (0.303) thereby signifying significance of the model in accepting

the null hypothesis. The student t test shows that the computed t statistic (0.241) is less than t critical value (0.821). Hence the study failed to reject the null hypothesis.

Hypotheses 2:

There is a positive effect of industrial production index on NSE All share Index. The study established a positive relationship between IPI and the NSE share index. The inferential statistics of Analysis of the Variance, and student t tests; The F statistic (1.735) is greater than the F critical value (0.303) thereby signifying significance of the model in accepting the null hypothesis. The student t test shows that the computed t statistic (0.863) is more than t critical value (0.437). Hence the study failed to reject the null hypothesis.

Hypotheses 3:

There is a negative effect of foreign exchange rate on NSE all share Index. The study established a negative relationship between FEX and the NSE share index. The inferential statistics of Analysis of the Variance, and student t tests; The F statistic (1.735) is greater than the F critical value (0.303) thereby signifying significance of the model in accepting the null hypothesis. The student t test shows that the computed t statistic (-1.939) though negative indicating the directions of the movements is more than t critical value (0.124). Hence the study accepted the null hypothesis.

Hypotheses 4:

There is a negative effect of Consumer Price Index on NSE All share Index. The study established a negative relationship between CPI and the NSE share index. The inferential

statistics of Analysis of the Variance, and student t tests; The F statistic (1.735) is greater than the F critical value (0.303) thereby signifying significance of the model in rejecting the null hypothesis. The student t test shows that the computed t statistic (-2.212) though negative indicating the directions of the movements is more than t critical value (0.091). Hence the study failed to reject the null hypothesis.

4.3 Discussion of Findings

The study established that the Consumer price index (CPI),market interest rate, Industrial Production Index (IPI) and Foreign exchange rate (FEX) had significantly explanatory power over variations in the NSE share index. The money market interest rate was established by the study has not having significant explanatory power over the NSE share index.

Interest rates are expected to be negatively related to market returns either through the inflationary or discount factor effect. Choi and Jen (1991) reported that the expected returns on common stocks are systematically related to the market risk and the interest-rate risk. . The productive capacity of an economy indeed rises during economic growth, which in turn contributes to the ability of firms to generate cash flows. That is why the industrial production would be expected to act beneficially on expected future cash flows, hence a positive relationship between real economy and stock prices exist. Furthermore, the volatility of stock returns increases during economic contractions and decreases during recoveries. Fama (1981) indicates that the growth rate of industrial production had a strong contemporaneous relation with stock returns.

CHAPTER FIVE
5.0SUMMARY, CONCLUSION & RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the study, discussions and conclusions. The researchers then present the major limitations of the study and the recommendations for both the research and for the policy and practice.

5.2 Summary

The objective of this research was to establish the relationship between selected macroeconomic variables and stock returns. The researchers found out that the return on the macroeconomic variables could explain the return on market portfolio to a great extent hence a positive relationship.

5.3 Discussions

The research found that there was a strong relationship of the various macroeconomic variables and the stock return at the NSE. The selected macroeconomic variables included the money market interest rates, industrial production index, foreign exchange rate and the consumer price index. This implied that the selected macro-economic variables were better placed to explain the stock return at the NSE.

However of the four macroeconomic variables, the money market interest rates were superior in explaining the stock return at the NSE then followed by the Industrial Production Index. Foreign exchange rates and consumer price indexes then follow respectively.

Maysami et al., 2004, proposes that in an efficient capital market, stock prices rapidly adjust according to the new information available; therefore, the stock prices reflect all information

about the stocks. This means that an investor cannot use the readily provided information to predict the stock prices movements and make profits by trading shares. So, the dynamic relationship between stock prices and macroeconomic variables can be used to guide a nation's macroeconomic policies

The study findings are similar with that of Chen et al. (1986) on the US stock market which established that variables such as interest rates, inflation rate, exchange rate, bond yield and industrial production have major impacts on the stock market. Nishat (2004) also analyzed the long-term relationship between macroeconomic variables and stock prices of Karachi stock exchange using a unit root technique. He found a causal relationship between the stock price and the macroeconomic variables. Fama (1981) found a strong positive correlation between common stock returns and real variables (that is, industrial production, GDP, the money supply, lagged inflation and interest rate). Fama and Gibbon (1982) examine the relationship between inflation, real returns and capital investment.

Their results support the finding by Mundell (1963) and Tobin (1965) that the expected real returns on bills and expected inflation rate are negatively correlated. These authors suggest that this relationship arises with share return due to a positive relationship between expected returns on financial assets and real activity. Geske and Roll (1983) found that the US stock price is negatively related to inflation and positively related to the real economic activity. Gallager and Taylor (2002) analyze the relationship between macroeconomic variables and stock prices of US stocks and found that the stock returns are negatively affected by both expected and unexpected inflation. Using post-war data for the US, Canada, Germany and the UK, Kaul (1990) explains

the relationship between stock returns and unanticipated changes in inflation under alternative monetary policy regimes. He found that countries where there is no change in the policy regime, negative relationship exist between stock returns and changes in inflation. Chatrath et al. (1997) examine the relationship between inflation and stock prices of India stocks. He found a negative relationship between stock return and inflation. Zhao (1999) found a strong relationship between inflation and stock prices of China stocks. Omran and Pointon (2001) studied how the inflation rate affects the performance of the market of Egypt and they found a negative relationship between them. Contrary to these studies, Choudhry (2000) found a positive relationship between stock returns and inflation in four high inflation countries. Maysami et al. (2004) find a positive relationship between inflation rate and stock returns. This is contrary to other studies that suggest a negative relationship. The reason given by the authors is the active role of government in preventing price escalation after the economy continued to progress after the 1997 financial crises. Engsted and Tanggaard (2002) found a moderately positive relationship between expected stock returns and expected inflation for the US and a strong positive relation for Denmark.

According to the "Fisher effect" expected nominal rates of interest on financial assets should move one-toone with expected inflation (Fisher, 1930). Moreover, changes in both short-term and long-term rates are expected to affect the discount rate in the same direction through their effect on the nominal risk-free rate (Mukherjee and Naka, 1995). Therefore interest rates are expected to be negatively related to market returns either through the inflationary or discount factor effect (Abugri, 2008). Some previous studies have reported that it is not interest rate itself that is relevant but the yield and default spreads that are more likely to influence equity returns

(Chen et al., 1986). However, the continued use of interest rates may be attributed to the absence of active secondary markets for bonds issues and government paper in many emerging markets (Bilson et al., 2001). An increase in interest rate would increase the required rate of return and the stock return would decrease with the increase in the interest rate. An increase rate would raise the opportunity costs of holding cash, and the trade off to holding other interest bearing securities would lead to a decrease in share price.

Theoretically, French et al. (1987) found negative relationship between stock returns and both long-term and short-term interest rate. Furthermore, Bulmash and Trivoli (1991) found that the US current stock price is positively correlated with the previous month's stock price, money supply, recent federal debt, recent tax-exempt government debt, long-term unemployment, the broad money supply and the federal rate. However, there was a negative relationship between stock prices and the Treasury bill rate, the intermediate lagged Treasury bond rate, the longer lagged federal debt, and the recent monetary base. Abdullah and Hayworth (1983) found that stock returns are positively related with the money growth and inflation rate while interest rate reacts negatively on stock returns.

The link between exchange rates and equity returns is based on a simple financial theory. Exchange rate as an indicator of a currency is a monetary variable that affect the prices of stock in a way similar to inflation variables. When the domestic currency depreciates against foreign currencies, export product prices will decrease, and consequently, the volume of the country's export will increase, assuming that the demand for this product is elastic. The appreciation of a

country's currency lowers the cost of imported goods, which in most cases constitute a large part of the production inputs for emerging market countries. According to Pebbles and Wilson (1996), an appreciating currency is generally accompanied by increases in reserves, money supply and a decline in interest rates. The resulting decline in cost of capital and/or imported inputs is expected to lead to an increase in local return. Such an expectation is also consistent with Bilson et al. (2001) conclusion that a devaluation of the domestic currency has a negative relationship with return. Mukherjee and Naka (1995) also confirmed that exchange rate positively relates to Japan and Indonesia stock prices, both two large export countries. Solnik (1987) employs monthly and quarterly data for eight industrial countries from 1973 to 1983 to examine the relation between real stock returns, exchange rates and reports a negative relation among variables. Soenen and Aggrawal (1989) re- assess this Solnik model using 1980 to 1987 data for the same industrial countries and report a positive relationship between stock returns and exchange rate for three countries and a negative correlation for five. Ajayi and Mougoue (1996) also showed that an increase in stock price has a negative short-term effect on domestic currency values but in the long term this effect is positive, while currency depreciation has a negative short-term and long-term effect on the stock market. Employing monthly data, Aggarwal (1981) examines the relationship between stock market indexes and a trade weighted value of the dollar for the period 1974 to 1978 and found that the stock prices and exchange rates are positively correlated.

Generally, the findings of this study are similar to those of similar researches hence confirming the fact that there exists a strong relationship between selected macro economic variables and stock return at the NSE.

5.4 Conclusion

From the study findings it can be concluded that macro economic variables like money market interest rate, industrial production index, foreign exchange rate and consumer price index investment have a strong relationship on the return on securities at the NSE. This conclusion is supported by both the various inferential statistics findings as presented.

5.5 Recommendations

With due regard to the ever increasing desire to have better return on stock markets, there is need to invest in policies regulating macroeconomic variables so as to meet these expectations. This should be done in a manner in which all the stakeholders are happy. This therefore calls for adopting proper policies which are acceptable, accessible, ethically sound, have a positive perceived impact, relevant, appropriate, innovative, efficient, sustainable and replicable.

5.6 Suggestions for Future Research

Some areas for future research are evident from the analysis of these results. Although a rich set of macroeconomic variables are used in this study, the macroeconomic variable set employed is not exhaustive. Some other macroeconomic variables would provide more information about the stock return. Further study would also consider other firm characteristics in order to obtain a better insight about the return generation process.

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APPENDICES

Appendix I: Introductory Letter

THE CEO,

NAIROBI SECURITIES EXCHANGE,

P.O. BOX,

NAIROBI.

Dear Sir/Madam,

RE: PERMISSION TO CARRY OUT A RESEARCH ON RELATIONSHIP BETWEEN SELECTED MACROECONOMIC VARIABLES AND STOCK RETURNS IN THE NSE

I am a student at the University of Nairobi and in partial fulfilment of a Master's degree in business administration (MBA), I intend to carry out research in bourse. The topic of the research will be 'Relationship between selected Macroeconomic variables on stock returns' by taking a case of companies listed at the Nairobi Securities Exchange.

Your company is, thus, one of the main focuses for the study and the choice is based on fact that data on daily trading is readily available at the company's offices. I kindly request your assistance by allowing me to access the company's daily trading results of companies that are listed. Any documentations, reports or journals that you may have that are relevant to this topic of study may, thus, be availed to me at your discretion.

I will be glad if you kindly introduce me to the management. The research information will be confidential and will only be used for academic purpose. Thank you in anticipation

Yours Faithfully,

.....

Ronald Songole

Appendix II: Companies Listed on NSE

MAIN INVESTMENT MARKET SEGMENT

Agriculture

1. Rea Vipingo Ltd.
2. Sasini Tea & Coffee Ltd.
3. Kakuzi Ltd.

Commercial and Services

1. Access Kenya Group
2. Marshalls E.A. Ltd.
3. Car & General Ltd.
4. Hutchings Biemer Ltd.
5. Kenya Airways Ltd.
6. CMC Holdings Ltd.
7. Uchumi Supermarkets Ltd.
8. Nation Media Group Ltd.
9. TPS (Serena) Ltd.

10. ScanGroup Ltd.

11. Standard Group Ltd.

12. Safaricom Ltd.

Finance and Investment

1. Barclays Bank of Kenya Ltd.

2. CFC Stanbic Bank Ltd.

3. Housing Finance Company of Kenya Ltd.

4. Centum Investment Ltd.

5. Kenya Commercial Bank Ltd.

6. National Bank of Kenya Ltd.

7. Pan Africa Insurance Holdings Co. Ltd

8. Diamond Trust Bank of Kenya Ltd.

9. Jubilee Insurance Co. Ltd

10. Standard Chartered Bank Ltd.

11. NIC Bank Ltd.

12. Equity Bank Ltd.

13. The Co-operative Bank of Kenya Ltd.

Industrial and Allied

1. Athi River Mining Ltd.
2. BOC Kenya Ltd.
3. British American Tobacco Kenya Ltd.
4. Carbacid Investments Ltd.
5. Olympia Capital Holdings Ltd.
6. E.A. Cables Ltd.
7. E.A. Breweries Ltd.
8. Sameer Africa Ltd.
9. Kenya Oil Ltd.
10. Mumias Sugar Company Ltd.
11. Unga Group Ltd.
12. Bamburi Cement Ltd.

13. Crown berger (K) Ltd.

14. E.A Portland Cement Co. Ltd.

15. Kenya Power & Lighting Co. Ltd.

16. Total Kenya Ltd.

17. Eveready East Africa Ltd.

18. Kengen Ltd.

ALTERNATIVE INVESTMENTS MARKET SEGMENT

1. A.Baumann & Co.Ltd
2. City Trust Ltd
3. Eaagads Ltd
4. Express Ltd
5. Williamson Tea Kenya Ltd
6. Kapchorua Tea Co. Ltd
7. Kenya Orchards Ltd
8. Limuru Tea Co. Ltd