

**THE IMPACT OF MACROECONOMIC RISK ON STOCK PRICES
IN KENYA, 2000-2005.**

BY

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A research paper submitted to the School of Economics, University of Nairobi, in partial fulfillment of the Requirements for the Award of the Degree of Master of Arts in Economics.

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DECLARATION

This research paper is my original work and has not been presented for a degree award in any other University.

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DEDICATION

To my parents: Mr. Stanley N Kibuthi and Mrs. Grace Wanjiru Ng'ang'a.

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However, the views expressed in this paper are my own and do not bear the views of the named persons or institutions. I bear the responsibility for any errors and/or omissions.

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ACRONYMS

ADF	Augmented Dickey Fuller
APT	Arbitrage Pricing Theory
ASE	Athens Stock Exchange
BAT	British American Tobacco
BBK	Barclays Bank of Kenya
CAPM	Capital Asset Pricing Model
CBK	Central Bank of Kenya
CMA	Capital Markets Authority
EMH	Efficient Market Hypothesis
GSE	Ghana Stock Exchange
Kenair	Kenya Airways
KPLC	Kenya Power and Lighting Company
LDC's	Less Developed Countries
NMG	Nation Media Group
NSE	Nairobi Stock Exchange
Stanchart	Standard Chartered Bank
US	United States

Abstract

This document examines the impact of macroeconomic risk on stock prices in the Nairobi Stock Exchange (NSE). One important factor which affects the determination of prices and the growth of capital markets is macroeconomic risk. Following works done on advanced stock markets, this study seeks to investigate the impact of macroeconomic risk factors on stock returns in various industrial classification; financial and investment, commercial and services, and industrial and allied sectors under the NSE for the period January 2000 to December 2005. Using the arbitrage pricing methodology developed by Ross (1976) and Chen et al (1986), the study revealed that investors in the NSE considered three main macroeconomic risk factors in the short run. That is, money demand, exchange rate and the risk premium in the determination of the various industrial stock prices during the period under consideration.

CHAPTER ONE

INTRODUCTION

1.0 Background

The economic development pattern has increasingly emphasized on the role of the financial sector and in particular, the development of efficient capital markets towards achieving sustainable growth and development. As a result, the financial sector is now considered as an essential aspect of the development process. As African economies attempt to develop their private sectors, it is becoming clear that the growth of the financial sector which includes the equity market can offer an important catalyst for sustainable growth and development. Levine (2004) explains that a well-functioning stock market is a core component of the financial sector. Furthermore, micro-economic based evidence is consistent with the view that better developed financial systems ease external financing constraints facing firms, which illuminates one mechanism through which financial development influences economic growth.

An economy is bound to benefit greatly from a developed equity market but to achieve its sustenance, the participants must be seen to benefit. Investors in the market get their benefits or returns from either capital gains or dividend payments. Dividends are usually paid during the end of the year and in some cases no dividends are paid at all. Due to these developments, many investors focus on the price movements to assess their returns from investments. Stock prices therefore become a vital indicator of risk to investors. Determination of factors that affect stock prices is therefore important. Stock prices are believed to react to economic news.

Chen, Ross and Roll (1986) posits that there is no satisfactory theory that would argue that the relation between financial markets and the macro economy is entirely in one direction, but stock prices are usually considered as responding to external forces (even though they may have a feedback on the other variables). There is thus general consensus among researchers that macro-economic news affect security prices. Ultimately, returns on stocks and bonds reflect real economic activity, and therefore in the long run we expect to see a relationship between macroeconomic activity and equity returns. In

capital markets, prices are information driven, in that stock prices are based on the demand and supply mechanism and on performance information documented in either periodic reports or briefs by any official of the listed companies to the dealing members of the market. Also, the ability to demand and supply securities on the market are informed largely by the performance of key macroeconomic indicators.

In Kenya for instance financial analysts rely on government policies in their analysis. Business operations factor in government macroeconomic targets in each financial period and this analysis feeds into the determination of stock prices listed on the Nairobi stock exchange (NSE). Government macroeconomic targets at the beginning of the year are factored into business operations, which invariably feed into the determination of stock prices of listed companies on the NSE. These indicators include, the Gross Domestic Product (GDP) growth rate, inflation, interest rates among others.

Table I below shows the trend of the GDP growth vis a vis some of the market highlights that are indicators of the performance of the NSE:

Table 1: A comparison of the GDP growth rate and the stock market performance

	2004	2005	2006
GDP growth at constant price (percent)	5.1	5.7	6.1
NSE 20 share index (Kshs.Million)	2826.790	3655.080	4597.100
Annual Turnover (Kshs.Million)	22323.702	36568.676	94953.053
Market capitalization of equities (Kshs.Million)	302436.486	402238.773	628365.436

Source: KNBS-2007.

NSE Secretariat

From the above table, the GDP growth rate is seen to be moving in the same direction with the performance of the stock exchange market. As the GDP increases, the stock market also grows.

Key macroeconomic factors lead to cyclical trends in cash flows, which affect stock prices on the market. If stock prices are negatively affected by macroeconomic movements such that investors get capital losses, this ultimately results in the channeling of resources to other areas to the disadvantage of Kenya's capital market and this

indirectly affect companies' ability to raise long-term capital for investments, thus the need for a stable macroeconomic environment.

The government has been making efforts to create a stable macroeconomic environment for private investors in fulfillment of its 'vision 2030'. One way to achieve this is to formulate and implement sound macroeconomic policies that would improve the operations of the NSE, which acts as a mobilization centre for capital. Evidently, such policies will require prior knowledge on the impact of changes in macroeconomic factors on returns of companies listed on the NSE. Unfortunately, very little quantitative research exists with regard to the relationship between the macroeconomic factors and the stock prices. Investigation of the effects of macroeconomic changes (risk) on asset pricing (returns) becomes very necessary because of the impact it could have on policy formulation in the area of mobilizing long-term capital for investment and development. In addition policy makers require an understanding of the capital market and particularly the benefits that accrue to an economy from a developed stock market. Without the understanding of these benefits, the policy makers may not prioritize formulation of policies for the enhancement of a proper working stock exchange market.

1.2 The Stock Exchange Market and its benefits

The Stock Exchange is a market that deals with the exchange of securities issued by publicly quoted companies and the Government. It was established in 1954 and is regulated by the Capital Markets Authority of Kenya CMA (K). The CMA was set up in 1989 through an Act of Parliament (Cap 485A, Laws of Kenya) to promote, regulate and facilitate the development of a fair and efficient capital markets in Kenya. The Authority was eventually constituted in January 1990 and inaugurated on 7th March 1990. The Authority is a body corporate with perpetual succession and a common seal. The capital market is part of the financial system that provides funds for long-term development. This is a market that brings together lenders (investors) of capital and borrowers (companies that sell securities to the public) of capital and is thus seen to be playing an important role in the development of the economy.

The major role that the stock exchange has played, and continues to play in many economies is that it promotes a culture of thrift, or saving. The very fact that institutions exist where savers can safely invest their money and in addition earn a return, is an incentive to people to consume less and save more. The stock exchange also assists in the transfer of savings to investment in productive enterprises as an alternative to keeping the savings idle. It should be appreciated that in as much as an economy can have savings, the lack of established mechanisms for channeling those savings into activities that create wealth would lead to mis-allocation or waste of those savings. Therefore, even if a culture of saving were to be encouraged, the lack of developed financial markets may lead to economic stagnation.

A robust stock market assists in the rational and efficient allocation of capital, which is a scarce resource. The fact that capital is scarce means systems have to be developed where capital goes to the most deserving user. An efficient stock market will have the expertise, the institutions and the means to prioritize access to capital by competing users so that an economy can realize maximum output at least cost. This is what economists refer to as the optimum production level. If an economy does not have efficient financial markets, there is always the risk that scarce capital could be channeled to non-productive investments as opposed to productive ones, leading to wastage of resources and economic decline.

Further, stock markets promote high standards of accounting, resource management and transparency in the management of business. This is because financial markets encourage the separation of owners of capital, on one hand, and managers of capital, on the other. This separation is important because we recognize that people who have the money may not necessarily have the best business ideas, and people with the best ideas may not have the money. And because the two need each other, the stock exchange becomes the all-important link.

The stock exchange improves the access to finance for different types of users by providing the flexibility for customization. This is made possible as the financial sector allows the different users of capital to raise capital in ways that are suited to meeting their

specific needs. For example, established companies can raise short term finance through commercial paper; small companies can raise long term capital by selling shares and the Government and municipal councils can raise funds by floating various types of bonds as an alternative to foreign borrowing.

Lastly, the stock exchange provides investors with an efficient mechanism to liquidate their investments in securities. The very fact that investors are certain of the possibility of selling out what they hold, as and when they want, is a major incentive for investment as it guarantees mobility of capital in the purchase of assets. The performance of the stock market is therefore very fundamental to the growth of an economy.

1.3 Statement of the problem

In the recent past, the NSE has greatly grown; this is indicated by increase in market capitalization as Kenyans are increasingly realizing benefits of investing in the stock market assets and especially shares. The economy reaps lots of benefits from the growth of the stock market. Like any other business cycle for any economy, there is fear that such enormous growth of the stock market could be followed by a down fall of the same hence decline in economic growth as the advantages from a grown stock market seize. To ensure that the stock market continues to grow, the participants and specifically the investors must be seen to benefit through capital gains. Any significant and continued losses would cause investors to withdraw their money from the capital markets thus the need to guarantee investors positive returns. Such returns are affected by many factors among them macroeconomic factors. The relationship between the macroeconomic factors and the stock returns is supported by the work of Fama (1981), Chen Ross and Roll (1986) among others. Due to the effect that the returns from investment in stocks could have on the economy, the question of how the macroeconomic variables affect the stock returns must be answered.

1.4 Objectives

1. To investigate how risk exposures and returns of the country's equity indexes are related to the country's specific macroeconomic factors.
2. To identify the information that stock prices contain about fundamental shocks affecting the economy.
3. To give recommendations to policy makers based on 1 and 2 above.

1.5 Justification of the study

The government has been making efforts to create a stable macroeconomic environment for private investors. One way to achieve this is to formulate and implement sound macroeconomic policies that would improve the operations of the NSE, which acts as a mobilization centre for capital. Understanding the impact of changes in macroeconomic factors on stock prices of companies listed on the NSE is thus very important. Identifying the information that stock prices contain about the macro economy is also important to stockbrokers, financial analysts, portfolio and fund managers in advising and managing their clients' resources. One way of linking macroeconomic variables and stock market returns is through arbitrage pricing theory (APT), where multiple risk factors can explain asset returns.

Very little quantitative research exists in Kenya with regard to the macroeconomic factors which affect stock prices. Studies that have examined the relationship between the macroeconomic variables and stock prices include Kibicho (1998). In this study, the main focus was the test on weak-form efficiency of the NSE. That is, whether the stock market is efficient in terms of past information. The current study however goes further to identify the impact of macroeconomic risk on stock prices in Kenya thus whether the macroeconomic factors are reflected in the stock returns.

The changes in macroeconomic factors in the economy may be an indication of changes in stock prices which the investors would make use of to hedge against losses as well as make arbitrage profits through fundamental analysis of the macro economy. The study therefore adds to general knowledge about the securities market behavior. Although the

study uses data from the Nairobi Stock exchange Market, the results can be generalized for all emerging markets with similar characteristics especially in the African context.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews existing theoretical and empirical works in relation to the factors affecting the stock returns as well as various estimation techniques that have been used to estimate stock returns.

2.1 Theoretical Literature

The two most common models that are used to calculate stock returns are the Capital Asset Pricing Model and the Arbitrage Pricing Theory.

2.1.1 The Capital Asset Pricing Model (CAPM)

The CAPM provides an elegant model of the determinants of the equilibrium expected returns $E(R_{it})$ on any individual risky asset in the market. It is based on simple assumptions that: all investors are rational mean-variance optimizers hence they attempt to construct an efficient portfolio, have homogeneous expectations about expected returns, have identical holding periods, unlimited access to unlimited risk free lending and borrowing opportunities, absence of transaction costs, free flow of information and that all marketable securities are infinitely divisible.

The CAPM states that the only relevant measure of a portfolio risk is the portfolio's beta which is a measure of the market risk. It predicts that the expected return on an individual risky asset is directly related to the expected excess return on the market portfolio with the constant of proportionality given by the beta of the individual risky asset. CAPM therefore expresses expected return on an asset as the sum of the return on the risk free asset plus an expected premium for risk, where the risk premium is a function of the asset covariance with the market return (beta).

$$E(R_{it}) = R_f + \beta_i E[(R_{mt}) - R_f]$$

The risk of a stock can be decomposed into two components. That is, the systematic risk (beta), which is related to the overall market and the non-systematic risk which is specific to the individual stock. The fundamental premise of the CAPM is that the market will reward only the holding of the systematic risk as the non-systematic risk can be diversified away by holding a diversified portfolio of assets.

Although CAPM provides a useful framework for thinking rigorously about the relationship between security risk and return, some limitations stemming from its assumptions render the model imperfect. These include the fact that beta is measured against the market portfolio, which is assumed to be efficient, any regression analysis between average returns and betas would, therefore give a perfectly linear relationship. Moreover, if the market index, which is used as a proxy for the market portfolio, is not efficient, return on each share will be only approximately related to the betas as measured on that index.

2.1.2 Arbitrage Price Theory (APT)

In response to the apparent inadequacy of the CAPM to adequately test for market efficiency, Ross (1976) developed the APT model based on the premises that arbitrage possibilities should not be available in the market. The APT shares the CAPM's principal feature: only non-diversifiable risk is priced, but it deviates from the CAPM by allowing for multiple causes of such risks such that multiple factors affect the observed time series of returns. Indeed, the existence of multiple factors predates Ross (1976) discovery of the arbitrage conditions underlying the linear APT return risk model.

The significance of economic fundamentals using the Arbitrage Pricing Theory (APT) of Ross (1976) has been well documented. Chen, Roll and Ross (1986) was the first study to identify macroeconomic factors to estimate the APT model. The factors considered most likely to have an effect on the return of common stocks were inflation, interest rates, industrial production, value weighted stock indices, bond risk premiums, consumption and oil prices. APT like CAPM acknowledges the influence of risk in determining return but unlike CAPM, it does not restrict risk to market risk but argues that expected return can depend on many risk factors. APT argues that the return of a risky asset is a linear

function of a number of macroeconomic variables and financial factors. Based on the law of one price, APT posits that securities with identical risk factors should sell for similar prices hence precluding arbitrage.

The key difference with CAPM is that instead of constructing mean-variance efficient portfolios, APT calculates relations among expected rates of return that rule out riskless arbitrage profits. The APT allows a large number of factors to affect the rate of return on particular security, making it more general than the CAPM.

APT may be used in an aggregate stock market framework, where a change in a given macroeconomic variable could be seen as reflecting a change in an underlying systematic risk factor influencing future returns. Systematic risk is the variability in all risky assets caused by macroeconomic variables which can be measured by the variability of returns of the market portfolio and can change overtime. Some macroeconomic variables affecting systematic risk include variability in growth of money supply, interest rates volatility and variability in industrial production among others.

Most of the empirical studies based on APT theory, linking the state of the macro economy to stock market returns, are characterized by modeling a short run relationship between macroeconomic variables and the stock price in terms of first differences, assuming trend stationarity. All macroeconomic factors that influence future expected cash flows or the discount rate by which these cash flows are discounted should have an influence on the stock price.

It is important to know what sorts of shocks move equity prices. Theory suggests that asset or stock prices represent the present value of future income to be derived from the underlying asset. So equity prices might move when either expected future income or dividend growth changes, or when the discount factor applied to them changes. The discount factor, in turn, will be the sum of the equity risk premium and the risk-free interest rate. Alternatively, equity prices might not be accounted for by any of those 'fundamental' reasons, but rather reflects irrational responses to market sentiment, or noise.

2.1.3 Efficient Market Hypothesis (EMH)

An efficient capital market is one that is efficient in processing information. In an efficient market, prices 'fully reflect' available information (Fama 1970). In the broadest terms of EMH, there are three types of market efficiency. First, in weak form efficiency, the information set is that the market index reflects only the history of prices or returns themselves. Secondly, in semi-strong form efficiency, the information set includes most information known to all market participants. Finally, in strong form efficiency, the information set includes all information known to any market participant.

Efficiency in this case therefore means that the value of the equilibrium expected return $E(r_{j,t+1} | \phi_t)$ projected on the basis of the information ϕ_t would be determined from the particular expected return theory at hand. For market efficiency, the information ϕ_t is fully utilized in determining equilibrium expected returns. That is, ϕ_t is "fully reflected" in the formation of the price as well as the returns of the asset. This rule out the possibility of trading systems based only on information in ϕ_t that have expected profits or returns in excess of equilibrium expected profits or returns.

So long as the market players take account of all available information, even large transaction costs that inhibit the flow of transactions do not in themselves imply that when transactions do take place, prices will not "fully reflect" available information. Similarly, according to Fama (1970), the market may be efficient if "sufficient numbers" of investors have ready access to available information. And disagreement among investors about the implications of given information does not in itself imply market inefficiency unless there are investors who can consistently make better evaluations of available information than is implicit in market prices. Although transactions costs, information that is not freely available to all investors and disagreement among investors about the implications of given information are not necessarily sources of market inefficiency, they are potential sources. And all the three exist to some extent in real world markets.

In the absence of arbitrage profits as a result of market inefficiency, the valuation of returns from treasury bills is such that returns are inclusive of a liquidity premium L_{jt} which could be positive or negative.

According to the "liquidity preference" hypothesis, investors must always be paid a positive premium for bearing interest rate uncertainty, so that the L_{jt} is always positive.

On the test of a multiple security return model, while judging whether differences between average returns are "appropriate", an economic theory of equilibrium expected returns is required. Fama (1970) concludes that the expected one-period return on a security is the one-period riskless rate of interest ($r_{f,t+1}$) plus a "risk premium". This justifies the analysis of the impact of macroeconomic risk on stock prices even in the presence of an efficient market. Each investor holds some combination of the riskless asset and the market portfolio, so that, given a mean-standard deviation framework, the risk of an individual asset can be measured by its contribution to the standard deviation of the return on the market portfolio.

2.2 Empirical Literature

Gallagher et al (2002) outlined a simple macro model to investigate how the temporary and permanent components of stock price movements may be related to aggregate macroeconomic supply and demand disturbances even in the presence of an efficient market using US stock prices. They showed that aggregate demand shocks have only temporary effects on real stock prices, while supply shocks may affect the level of real stock prices permanently. They demonstrate that changes in real stock prices may be serially correlated even under the assumption of fully efficient markets in the sense that there are no profitable arbitrage opportunities between current and expected stock price movements. This evidence supports the mean-reversion hypothesis that stock prices are not pure random walks. The findings supports the hypothesis that, even if stock markets are efficient, real stock returns are serially correlated hence the argument that mean reversion in stock prices may result from the workings of efficient markets and may not be only the result of ill-informed speculation or other noise trader activity.

Karanikas et al (2006) investigated the sources of risks priced in the Athens Stock Exchange (ASE) from year 1991 to 2004. They sought the relationship between the stock market return, macroeconomic factors, such as the short term interests, inflation and exchange rates and the industrial production, plus some firm-specific characteristics, such as the firm size, book-to-market ratio and dividend yield. The results of the paper show that there are two factors which can explain an important proportion of the cross-sectional variation of the ASE individual returns. These are: the changes in short term interest rates and the firm size effects. The paper finds that the significance of the interest rates changes as source of risk can be attributed to the changes in the Greek monetary policy in the nineties, which has been shifted from targeting monetary aggregates to interest rates. These results support the view that changes in monetary policy rules can critically affect the stock market sources of risk and ignoring these changes can lead to erroneous inference about the sources of risk determining expected stock returns, and can thus have serious implications on indexed portfolio management strategies.

Hu (2007) tested the applicability of the Fama and French three factor model in predicting future returns. The model is important in the estimation of risk premium which is a component of the discount factor by which the cash flows are discounted in order to get the returns on a stock. An alternative way to estimate factor premiums was suggested by using several structural variables, such as term premium, default risk premium, and dividend yield. Instead of imposing a fixed model in forecasting risk premiums, an assumption was made that investors do not know the model specification but search for the optimal specification according to some model selection criteria. To see whether the predictability of portfolio excess returns can be exploited successfully, a trading strategy was used in the study: to hold the portfolio(s) with the highest expected excess return and to sell the portfolio(s) with the lowest expected excess return then a calculation of the realized excess returns for long and short positions, and the excess profits for a zero-investment strategy (long minus short) was done. Without consideration of transaction costs, almost all the trading strategies generate significant positive zero-investment profits. Although the transaction costs can reduce the profit, by imposing a transaction cost strain, investors can still earn significant positive profits from most of their trading

strategies. Moreover, a risk analysis study shows that the excess returns from trading strategies cannot be explained by risk factors. An alternative way to estimate factor premiums is proposed. That is, by using the structural variables that are important predictors of future asset returns. All results in the study demonstrate that the three-factor model with factor premiums estimated from structural variables is more reliable in forecasting portfolio returns.

He et al (1994), investigated whether size and book-to-market values of equity are proxies for macroeconomic risks found in Chen, Roll, and Ross's (1986) multifactor model or are measures of stocks' risk exposure to relative distress. They conclude that size plays a role in stocks' risk exposures associated with the CRR factors and that the CRR multifactor model does not explain the book-to-market value effect. Using the APT model, they conclude that that size and book-to-market value are related to relative distress and that relative distress can explain the size effect, but only partially the effect of book-to-market value, on average stock returns hence the need to include both the size and book-to-market value in the estimation of risk premium.

According to Moolman (2004), risk premium for different assets may differ, reflecting the different risk or uncertainty of their returns. A premium compensates for the uncertainty in returns and timing of the returns and can be categorized into firm specific risk which differs between the securities of different firms and general risk that is common across all securities of the firms in a particular country. Although the firm's specific risk is relevant in pricing of a particular security, it becomes redundant in the pricing of the general stock market hence the incorporation of risks that are not firm specific only. Such homogeneous risks include the interest rate risk which poses uncertainty regarding the correct valuation of share prices thus the possibility of a loss or gain to the extent that the valuation differs from the intrinsic value of the shares. Second, the inflation risk associated with changes in inflation introduces uncertainty regarding the required rate of return as well as the risk that purchasing power of the investment will deteriorate due to future increases in inflation. Last is the exchange rate risk involved when investing in a foreign currency. The return on investment on a foreign currency has to be converted to the domestic currency to calculate the return to the investor thus the

investor takes into account the risk that the exchange rate between the domestic currency and the foreign currency in which the investment is made might change.

Fama et al (1990) find strong relations between current stock returns and future real activity. As noted by Fama, there are at least three explanations for such relations. First, information about future real activity may be reflected in stock prices well before it occurs-this is essentially the notion that stock prices are a leading indicator for the well-being of the economy. Second, changes in discount rates may affect stock prices and real investment similarly, but the output from real investment doesn't appear for some time after it is made. Third, changes in stock prices are changes in wealth, and this can affect the demand for consumption and investment goods. The results reported by Fama (1990) indicated a strong positive relation between real stock returns and future production growth rates, even when variables that proxy for time-varying expected returns and shocks to expected returns are included in the regressions.

Geske et al (1983) report that contrary to economic theory and common sense, stock returns are negatively related to both expected and unexpected inflation. They argue that this puzzling empirical phenomenon does not indicate causality. Instead, stock returns are negatively related to contemporaneous changes in expected inflation because they signal a chain of events which results in a higher rate of monetary expansion. Exogenous shocks in real output, signaled by the stock market, induce changes in tax revenue, in the deficit, in treasury borrowing and in Federal Reserve "monetization" of the increased debt. Although expected inflation seems to have a negative effect on subsequent stock returns, this could be an empirical illusion, since a spurious causality is induced by a combination of a reversed adaptive inflation expectations model and a reversed money growth/stock returns model. If the real interest rate is not a constant, using nominal interest proxies for expected inflation is dangerous, since small changes in real rates can cause large and opposite percentage changes in stock prices. They also suggest that stock returns may be negatively correlated with changes in the Treasury bill rate. A change in the real rate of interest should be a true cause of ex-post stock returns, because an increase in the real interest rate induces a reduction in all asset values and vice versa. Thus, to the extent that changes in the Treasury bill rate are due to changes in its real interest component, we

would anticipate a contemporaneous stock return of the opposite sign. This view is also supported by Sweeney et al (1986). Geske et al (1983) however concluded that there would be a positive relation between the beginning-of-period T-bill rate's real interest component and the subsequent stock return. Thus, real interest variability cannot explain the negative relation found between ex-ante T-bill rates and subsequent equity returns.

Patro et al (2002) found a significant time-variation in the exposure (beta) of country equity index returns to the world market index and the risk-adjusted excess returns (alpha). They find that several variables including imports, exports, inflation, market capitalization, dividend yields and price-to-book ratios significantly affect a country's exposure to world market risk. While investigating the specific financial and economic determinants of world market betas and alphas, they found that a large fraction of the variation in beta can be explained by changes in macroeconomic and financial variables. They find that higher exports are associated with more positive exposure to the world market, while higher imports are associated with more negative exposure. They further demonstrate that countries with higher government surplus have a lower beta; that higher taxes imply a higher beta; a larger market capitalization to world capitalization ratio implies a more positive beta. There is mixed evidence of the impact of inflation, money - to-price ratio on beta. They conclude that all these results either suggest mis-pricing that has not been fully exploited or model misspecification.

Twerefou et al (2005) while investigating whether the pricing of assets on the Ghana Stock Exchange (GSE) has significant macroeconomic risk factors during the period January 1997 to December 2002 used six macroeconomic factors in the study. Using the APT model, the study revealed that investors in Ghana considered three main macroeconomic risk factors in the determination of asset prices during the period under consideration. These are the short-term interest rate risk, inflation risk and the term structure of the country's interest rate. Short-term interest rate reported mixed signs at different lags and this could be due to the inefficient nature of the stock market even at the weak form. Inflation risk was found to be vital in the determination of asset prices in Ghana. Asset prices in all the industries are strongly influenced by inflation risk; however, the signs are different at different lags. The outcomes on term structure were

mixed. On the negative side, assets in the financial and manufacturing industries were more sensitive to the time horizon risk compared with the rest of the industries which showed impacts of less than 5 percent. From the results it was found essential for the government to stay within its borrowing limit in order to reduce risks associated with the short-term interest rate. This is because in an attempt to over borrow through open market operations, the interest equivalent on the 91-day Treasury bill escalates. Investors feed on this action only to the downtrend of asset prices on the GSE. The term structure of interest rate in the country only favors short term investment, which is not healthy for a developing country like Ghana.

2.3 Overview of Literature

The studies reviewed indicate that even in the presence of an efficient market where the stock prices fully reflect all available information the returns of a stock are still serially correlated. Studies that support this include Gallagher et al (2002). The studies examine specific channels through which the macro economy influence the stock returns. Apart from the macroeconomic variables, studies such as He et al (1994) and Moolman (2004) identify that in the determination of returns, it is also important to look at the factors that determine the discount rate by which these variables are discounted which include the risk premium. In the determination of the impact of macroeconomic variables on stock returns, the studies use the APT by allowing many factors to affect the stock returns. Following the same APT model, the study specifies the macroeconomic variables from theoretical and empirical literature in order to investigate their impact on the stock returns.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter gives the analytical framework, the specification of the empirical model, construction of variables and the data types and sources. We further discuss the estimated model.

3.1 Analytical Framework

3.1.1 Specification of the Empirical Model

The model to be used in this study is based on the dividend discount model which is theoretically a worthwhile tool for equity valuation. Financial theory states that the value of a stock is worth all of the future cash flows expected to be generated by the firm discounted by an appropriate risk-adjusted rate hence the basic idea behind the dividend discount model is that any stock is ultimately worth no more than what it will provide investors in current and future dividends. According to the DDM, dividends are the cash flows that are returned to the shareholder. The model requires a forecast of future dividends and a rate at which these benefits are to be discounted to their present value.

The value of a stock will therefore be influenced by all the factors that influence the cash flows and the discount factor. Linking the factors to the stock returns the APT model will be applied as it allows for a large number of factors to affect the securities or stocks hence more applicable than the CAPM that assumes only one measure of risk (beta).

Dividend Discount Model (DDM)

Stock prices can be expressed as expected discounted dividends/ cash flows:

$$p = \frac{E(c)}{k} \dots\dots\dots (1)$$

This indicates that actual returns are given by:

$$\frac{dp}{p} + \frac{c}{p} = \frac{d[E(c)]}{c} - \frac{dk}{k} + \frac{c}{p} \dots\dots\dots (2)$$

The returns on a share will therefore be influenced by all the factors that influence the cash flows and the discount factor.

Relating the returns on a share with returns on a stock market index, will involve getting continuously compounded returns defined as the first difference of the log of monthly stock prices, calculated as:

$$R_t = \log(p_t / p_{t-1}) \dots\dots\dots (3)$$

The returns will therefore be computed as capital gains log differences:

$$R_t = \ln p_t - \ln p_{t-1} \dots\dots\dots (4)$$

Where p_t represents the value of the price of a share at the time t or the current market price and p_{t-1} represents the previous month market price.

From equation 1, it follows that those macroeconomic forces that influence returns are those that change discount factors, k , and expected cash flows, $E(c)$.

The discount factor k is a summation of Risk-free rate + (Market risk premium) * Beta.

$$k = RP + RF$$

Where RP is the risk premium and RF is the risk free rate as measured by the end of period return on the 91 days Treasury bill (TB).

On the upper side of the DDM are the expected cash flows which change because of both real and nominal forces. Nominal expected cash flows are influenced by the inflation rate as well as the nominal interest rate.

$$E(C) = F(INT, INF) \dots\dots\dots (5)$$

Where INT is the interest rate and INF is the inflation rate.

Hence the inflation and interest rate explain the changes in cash flows thus the changes in stock returns. Njuguna et al (1999) hypothesize that inflation originates from both the demand and the supply sides. The demand side is represented by the demand for money (MD) while the supply side is made up of the foreign sector. They showed that inflation emanating from the foreign sector can be split into transmission effects coming from imported input prices in foreign currency terms and inflation following the depreciation of the exchange rate. This relationship is specified as:

$$P_t = \beta_1 NER_t + \beta_2 WP_t \dots\dots\dots (6)$$

Where P_t is the component of inflation (price changes) emanating from the foreign sector, NER_t is the nominal exchange rate index, WP_t is the log of foreign price index that reflects the import prices and the β 's are the changes in inflation due to change in the nominal exchange rate and the import prices.

Inflation is therefore a function of money demand and exchange rate.

$$INF = f(MD, NER_t) \dots\dots\dots (7)$$

From equation 5 and 7 we infer that:

$$E(c) = f(INT, MD, NER) \dots\dots\dots (8)$$

Combining the factors that affect the cash flows and the discount rate in order to have an effect on the stock returns:

$$R_t = f(INF, MD, NER, TB, PR) \dots\dots\dots (9)$$

Using the variables above we obtain the model to be estimated:

$$R_t = \alpha + \beta_1 INF + \beta_2 MD + \beta_3 NER + \beta_4 TB + \beta_5 PR + \varepsilon \dots\dots\dots (10)$$

Where the variables in the model are defined as:

- R_t capital gain log difference as computed in equation 4
- β 's factor weights that have a clear interpretation as risk factor sensitivities for stocks.
- INF inflation rate per period.
- MD money demand
- NER nominal exchange rate (Kshs/USD)
- TB interest rate (treasury bill rate)
- PR price of risk (risk premium)

3.2 Construction of variables

Risk Premium

Risk premium is the price of risk that must be estimated separately as it affects the returns on a stock through the discount rate. The two-stage model is used to measure the risk premium. It uses the CAPM and the single index model. An index such as the NSE 20 share index is used as a proxy for the unobservable market portfolio. In developing a single factor model, we write the Security market line which relates the capital market

line to an individual asset. It is an indicator of the efficiency of an asset held in the securities market whereby an efficient asset is said to lie on the capital market line and its correlation coefficient with the market is positive one. Its risk premium is determined by how its returns co-vary with market returns. The security market line is given by:

$$E(R_j) - R_f = \beta_j [E(R_m) - R_f] \dots\dots\dots (11)$$

Where R_j and R_m are the returns on a security j and the market returns respectively.

β_j is a measure of the systematic risk of the security in form of the securities responsiveness to market changes.

R_f is the risk free rate.

The left hand side of equation 11 is the excess return on security j while the right hand side is beta times the market excess return. This is a single index model in the sense that the excess return on a security is determined by a single factor, that is, the market excess return.

Estimating the single index model involves gathering data on the excess return on the market index and a specific stock and regressing the security market line which is a plot of the security expected excess return over the risk free rate as a function of the excess return on the market. The regression form is as follows:

$$R_j - R_f = \alpha_j + \beta_j [R_m - R_f] + \varepsilon_j \dots\dots\dots (12)$$

Where $R_j - R_f$ and $R_m - R_f$ are the excess return on a security j and the market's excess returns respectively.

α_j is the security j 's return if the market factor is neutral which CAPM predicts to be zero. That is $R_j / R_m = 0$

$\beta_j [R_m - R_f]$ is the component of return due to movement in the overall market.

ε_j is the component attributable to unexpected events that are relevant only to security j . That is, the firm specific risk.

After estimation of the risk component β_j , we move to the second stage in order to estimate the price of risk. This involves expressing the market return as a function of risk thus estimating the following function:

$$R_m = \lambda_0 + \lambda_1\beta + \varepsilon \dots\dots\dots (13)$$

Where λ_1 is the price of risk.

If the market is neutral thus α_j is equal to zero or is insignificant, from equation 11 beta can be computed as:

$$\beta_j = \frac{E(R_j) - R_f}{E(R_m) - R_f} \dots\dots\dots (14)$$

A stock's risk premium depends only on its market risk, not its total risk, Brigham (2004). Thus moving to the second stage in order to calculate the risk premium:

$$RP_j = (R_m - R_f)\beta_j \dots\dots\dots (15)$$

Where RP_j is security j 's risk premium.

$R_m - R_f$ is the excess return on the market.

β_j is the risk of holding security j .

The market return is computed using the NSE share index. The NSE share index is a proxy for market returns. It comprises 20 listed companies from all the sectors of the market. It is an equi-weighted geometric mean of twenty large ordinary stocks traded at the Nairobi Stock Exchange which represents the general market performance.

It is computed as:

$$R_m = \ln I_t - \ln I_{t-1}$$

Where R_m is the return on the market

I_t is the share index at time t .

I_{t-1} is the share index at time $t-1$.

Inflation

INF is the domestic inflation rate computed as the change of the consumer price index.

$$INF = \left[\frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \right]$$

Where CPI_t is the consumer price index at time t (the current period) and CPI_{t-1} is the consumer price index at time $t-1$ (the previous period).

Ngugi (2005) hypothesized that the relationship between stock prices and inflation could be positive, negative or insignificant, depending on the supply and demand factors influencing inflation.

Interest rates

I_t is the interest rate at the present period. Treasury bill rate is used to measure the rate of interest or the end of period return on the 91 day Treasury bill. The annual interest rates are converted to harmonize the rate to monthly rates. The formula for changing from an annual percentage rate to a monthly one is given as:

$$\text{Effective rate for period} = (1 + \text{annual rate})^{(1/\text{number of periods})} - 1$$

The monthly rate is therefore:

$$MR = (1 + AR)^{(1/12)} - 1$$

Where MR is the monthly rate and AR is the annual rate.

The Treasury bill rate is a better proxy for nominal interest rate because it captures the opportunity cost of holding shares instead of other short term monetary instruments that are relatively liquid. The investor is assumed to compare the return on a stock and on a bond hence a negative relationship is expected.

Money demand

Chen (2007) uses money demand as a measure of monetary policy. In Kenya M1, M2 and M3 are used as the measures of demand for money.

M1: Physical currency and demand deposits. This is used as a measurement for economists trying to quantify the amount of money in circulation. The M1 is a very liquid measure of the money supply, as it contains cash and assets that can quickly be converted to currency.

M2: M1 + small time deposits, savings deposits, and non-institutional money-market funds. M2 is a broader classification of money than M1. Economists use M2 when looking to quantify the amount of money in circulation and trying to explain different economic monetary conditions.

M3: M2 + all large time deposits, institutional money-market funds, short-term repurchase agreements, foreign deposits along with other larger liquid assets. The broadest measure of money; it is used by economists to estimate the entire supply of money within an economy

To get the impact of money demand on stock prices, M2 is used since it gives a broader view of money balances held by investors than M1. M3 would assume that investors are holders of foreign reserves which is not the case in the country.

Expansion in monetary policy which increases demand for shares should increase stock returns. However, this affects the level of inflationary expectations as well as the nominal interest rates thus an indirect relationship between stock returns and expansion in monetary policy.

Exchange Rate

This is the nominal exchange rate index.

$$EXR = ksh/USD$$

Measure of exchange rate to be considered is the average monthly exchange rate expressed in terms of shillings per US dollar. Upon liberalization, exchange rate risk has been of concern for both local and foreign investors hence the need for the investigation of the extent to which this variable is associated with risk factor in the stock returns in Kenya. The return on investment on a foreign currency has to be converted to the domestic currency to calculate the return to the investor thus the investor takes into account the risk that the exchange rate between the domestic currency and the foreign currency in which the investment is made might change.

Ngugi (2005) concluded that there is a negative relationship between the exchange rate and the stock prices implying that a real appreciation of the exchange rate is bad for

domestic firms because it reduces their competitiveness, while real exchange rate depreciation stimulates the economy in the short run. Large fluctuations in the nominal exchange rate also affects the investor's uncertainty about the return to investment increasing the level of speculation in the country as investors use the share market as a temporary stopping place until the foreign exchange market settles. A lower exchange rate boost supply of foreign currency to the country which in turn increases the demand for shares and pushes up prices. However, some studies indicate that this relationship is inconclusive as some emerging stock markets depict a positive relationship. Given that the exchange rate affects the competitiveness of the firms, it implies that it affects the firms that are in the business of importing and exporting.

The hypothesized (expected) signs for the variables and their definition are shown as in the table below.

Table 2: Expected signs for the independent variables

Variable	Expected Sign
Inflation	+ or -
Money demand	+ or -
Nominal Exchange rate	+ or -
Interest rate	-
Risk premium	+

3.3 Data types and Sources

The study used secondary monthly time series data from the NSE, Central Bank of Kenya annual reports and economic surveys for the period January 2000 to December 2005. Sample selection was based on the availability of information on stock prices for companies. The data available only made it possible for seven companies to be used in the study due to missing stock prices for other NSE listed companies for some months in the period of study.

Panel data would have provided a better understanding of the impact of macroeconomic risk on stock prices since it includes both the time series and cross sectional dimensions. This was however not used since there was a too wide information base on time series,

twelve months for six years, compared to the cross section variation, seven companies. The cross section variation was thus too narrow thus regressions were done for specific companies.

With the available data, the analysis aimed at explaining the impact of macroeconomic risk on stock returns in the different trading sectors and to a lesser extent explaining whether the companies in the same sector are affected by the same macroeconomic risk.

CHAPTER FOUR

RESULTS AND FINDINGS

4.0 Introduction

This chapter gives an account of research findings starting with the descriptive statistics of the variables used in the study followed by the regression results of the macroeconomic variables on the stock returns.

4.1 Summary statistics

This section gives a summary of the variables used in the model estimation as well as the correlation results. The summary specifically gives the mean, standard deviation, minimum, maximum, skewness and kurtosis values of the variables.

Table 3: Descriptive statistics of the variables

Variable	Mean	Std Dev	min	Max	Skewness	Kurtosis
Inflation	0.007	0.013	-0.030	0.045	0.231	4.398
Money demand	362677.7	52771.15	304342.7	474849.6	0.548	1.898
Interest rate	0.187	0.059	0.052	0.262	-0.984	2.627
Exchange Rate	77.449	2.039	71.607	81.204	-0.598	3.001
DEPENDENT VARIABLES						
NIC	0.0041	0.0553	-0.1013	0.1602	0.6845	3.7230
Stanchart	0.0055	0.0490	-0.1512	0.1419	-0.4008	2.9494
BBK	0.0060	0.0432	-0.1243	0.1635	0.4007	3.5362
KenAir	0.0146	0.0483	-0.0905	0.1756	0.8670	4.7764
NMG	0.0044	0.0524	-0.1833	0.1693	0.0066	1.4982
BAT	0.0063	0.0475	-0.1652	0.1542	-0.0617	3.3028
Total	-0.0025	0.1390	-0.4386	0.4353	-0.0711	3.0197

NOTE: The dependent variables are the returns from different companies from the different sectors. NIC, stanchart (Standard Chartered) and BBK (Barclays Bank of Kenya) are all companies from the finance and investment sector. Kenair (Kenya Airways) and NMG (Nation Media Group) from the commercial and services sector whereas BAT (British American Tobacco) and Total are from the industrial and allied sectors.

The results show that returns for all the companies range from positive to negative values given the maximum and the minimum values respectively.

The table also gives tests for normality of the variables using skewness and kurtosis. Skewness characterizes the degree of asymmetry of a distribution around its mean with

positive skewness indicating a distribution with an asymmetric tail extending towards more positive values and negative skewness indicating a distribution with an asymmetric tail extending towards negative values. For data that is normally distributed, the value of skewness should be within the range of -2 or +2. From the table, the value of skewness for all the variables ranges between -2 and +2 meaning that all these variables are normally distributed.

Kurtosis, on the other hand indicates the relative peakedness or flatness of a distribution compared with the normal distribution. Positive kurtosis indicates a relatively peaked distribution and negative kurtosis indicates a relatively flat distribution. For data that is normally distributed, the value of kurtosis is supposed to range within the range of +3 or -3. In this regard, the above results show that all the variables have a peaked distribution.

Table 4: Summary of the correlation Results

Variables	Inflation	Money demand	Interest rate	Exchange rate
NIC	-0.108	0.080	-0.177	
Stanchart	-0.013	-0.011	-0.130	
BBK	-0.015	0.062	-0.151	
Kenair	0.025	0.388	-0.151	
NMG	-0.139	0.069	-0.199	
BAT	-0.089	0.032	-0.244	
Total	0.070	0.109	-0.129	-0.109
Inflation	1.000	0.077	-0.043	-0.137
Money demand		1.000	-0.455	-0.218
Interest rate			1.000	0.003
Exchange rate				1.000

NOTE: The names of the companies represent the dependent variables which are the returns from different companies from the different sectors. NIC, stanchart (Standard Chartered) and BBK (Barclays Bank of Kenya) are all companies from the finance and investment sector. Kenair (Kenya Airways) and NMG (Nation Media Group) from the commercial and services sector whereas BAT (British American Tobacco) and Total are from the industrial and allied sectors.

The table above shows correlation between the dependent variables and the independent variables as well as between the independent variables. Stock returns on the first six companies do not depend on the exchange rate and similarly there are no correlation results between the stock returns and the exchange rate. Total Oil Company is the only company where the exchange rate has been used as a variable. As compared to all the other companies in the sample, it is the one whose returns are most likely to be affected

by the exchange rate changes since it deals with oil which is an imported product. Fluctuations of the exchange rate reduce the competitiveness of the product thus the negative relationship between stock returns and the exchange rate.

There is a positive correlation between inflation and money demand. According to the Keynesians, excess spending means increase in demand that cannot be matched by the level of supply thus pushing up prices. Hence with increase in money demand, inflation is expected to increase.

There is a negative correlation between inflation and the interest rate. According to Friend et al (1976), with increase in demand of risk free assets due to increase in inflation that expose risky assets to higher returns, the price or return of the risk free assets will fall.

There is a negative correlation between inflation and the exchange rate. According to Kara et al (2006), a weak relationship between consumer price inflation and the exchange rate is observed and this can be rationalized by a weaker response of import price-setters to exchange rate movements.

There is a negative correlation between money demand and interest rate. This can be explained under the Keynesian, speculative demand for money theory. Keynes argued that individuals have a conception of what the normal interest rates should be. If the interest rates were to rise above this expected value, the individual would expect that the next movement of interest rates would be downwards (and vice versa). Since a fall in the interest rates represents a capital gain for bondholders, Keynes predicts that a high interest rate will lead to a large demand for bonds, and consequently a low demand for speculative money balances. In this way Keynes derived an inverse relationship between interest rates and speculative demand for money.

There is a negative correlation between money demand and exchange rate. Mladenovic et al (2000) concluded that domestic money supply and demand determine the price level and purchasing power parity (PPP) subsequently sets the exchange rate. This is however mostly the case under hyperinflation where the exchange rate is determined directly in

the money market, without any reference to prices. In the absence of hyperinflation the relationship between the two variables could take any direction depending on the influence of prices.

4.2 Unit Root Test

The pre-requisite for use of cointegration to study the relationship between the stock market and the macroeconomic fundamentals is that the individual data series be non-stationary across time.

The unit root test for the variables gave the following results:

Table 5: Unit root results

Independent Variables	ADF	Order of integration
Inflation	-5.2277	I(0)
Money demand	-8.0961	I(1)
Interest rate	-5.3589	I(1)
Exchange rate	-7.0889	I(1)
Risk Premium	-6.3191	I(0)
Dependent Variables (Stock Returns)		
NIC	-9.8879	I(0)
Stanchart	-9.5643	I(0)
BBK	-8.6022	I(0)
Kenair	-7.3272	I(0)
NMG	-7.5711	I(0)
BAT	-7.5674	I(0)
Total	-8.0547	I(0)
Critical Values: 5%	-2.9029	
1%	-3.5253	

NOTE: The names of the companies represent the dependent variables which are the returns from different companies from the different sectors. NIC, stanchart (Standard Chartered) and BBK (Barclays Bank of Kenya) are all companies from the finance and investment sector. Kenair (Kenya Airways) and NMG (Nation Media Group) from the commercial and services sector whereas BAT (British American Tobacco) and Total are from the industrial and allied sectors.

The ADF statistic is significant at levels for some variables since it is less than the critical value thus trend stationarity. That is, the series is not integrated and we therefore run an OLS.

4.3 Market Neutrality Test

In estimation of the risk premium, we test the market neutrality where excess market returns ($R_m - R_f$) are regressed on excess security returns ($R_i - R_f$) as in equation 12. If the market is neutral, CAPM predicts the resulting constant to be insignificant hence assumed to be zero. The following results are consistent with the CAPM's assumptions as the constants are insignificant at 1% and 5% significance levels.

Table 6: Summary of the neutrality test results

Company	R^2	$R_m - R_f$	Constant
NIC	0.7600	1.0865 (0.0000)	0.0167 (0.2533)
Stanchart	0.7400	0.9955 (0.0000)	0.0014 (0.9234)
BBK	0.8238	1.0093 (0.0000)	0.0042 (0.7029)
Kenair	0.7180	0.9840 (0.0000)	0.0083 (0.5699)
NMG	0.6950	1.0232 (0.0000)	0.0053 (0.7426)
BAT	0.7717	1.0522 (0.0000)	0.0126 (0.3571)
Total	0.3947	1.4071 (0.0000)	0.0691 (0.0989)

NOTE: The dependent variables are the excess returns from different companies from the different sectors. NIC, stanchart (Standard Chartered) and BBK (Barclays Bank of Kenya) are all companies from the finance and investment sector. Kenair (Kenya Airways) and NMG (Nation Media Group) from the commercial and services sector whereas BAT (British American Tobacco) and Total are from the industrial and allied sectors.

The table above shows the coefficients for the independent variable ($R_m - R_f$) and the constant. The figures in the parenthesis are the probabilities for the same. With the constant being insignificant it is consistent with the CAPM's assumption thus we estimate the risk premium using equation 15.

4.4 Regression results

This section gives a summary of the estimation results for the seven companies used in the analysis.

Table 7: Summary of the regression results

Variable	NIC	Stanchart	BBK	Kenair	NMG	BAT	Total
Constant	0.102 (0.000)	0.093 (0.000)	0.084 (0.000)	0.096 (0.000)	0.098 (0.000)	0.092 (0.000)	0.166 (0.000)
Inflation	-0.434 (0.219)	-0.203 (0.532)	-0.233 (0.437)	-0.152 (0.645)	-0.486 (0.152)	-0.339 (0.262)	-0.314 (0.529)
Money demand	-2.31 (0.040)	-3.45 (0.001)	-2.87 (0.003)	-2.45 (0.020)	-2.100 (0.042)	-2.770 (0.004)	-3.860 (0.015)
Interest rate	0.191 (0.541)	0.012 (0.966)	0.297 (266)	0.331 (0.259)	0.164 (0.583)	-0.044 (0.869)	0.002 (0.996)
Exchange rate							-0.827 (0.046)
Risk premium	0.488 (0.000)	0.429 (0.000)	0.383 (0.000)	0.430 (0.000)	0.465 (0.000)	0.427 (0.000)	0.828 (0.000)
R-squared	0.596	0.562	0.520	0.537	0.587	0.598	0.878
Adjusted R-Squared	0.571	0.536	0.491	0.509	0.561	0.573	0.869
F- statistic	24.297	21.215	17.906	19.132	23.405	24.518	93.500
Prob > f	0.000	0.000	0.000	0.000	0.000	0.000	0.000

NOTE: The names of the companies represent the dependent variables which are the returns from different companies from the different sectors. NIC, stanchart (Standard Chartered) and BBK (Barclays Bank of Kenya) are all companies from the finance and investment sector. Kenair (Kenya Airways) and NMG (Nation Media Group) from the commercial and services sector whereas BAT (British American Tobacco) and Total are from the industrial and allied sectors.

Above are results of the regression of the macroeconomic variables on the stock returns for each company in the sample. The coefficients are independent variables factor weights that have a clear interpretation as risk factor sensitivities for stocks. The figures in the parenthesis are the probabilities that show the significance of the independent variables as risk factors that have an impact on stock returns.

Total Oil Company is the only company where the exchange rate has been used as a variable thus the missing results for the coefficients of regression of the exchange rate on the stock returns of the other companies. Total Oil Company is the one that is most likely to be affected by the exchange rate changes since it deals with oil which is an imported product. Fluctuations of the exchange rate reduce the competitiveness of the product thus the negative relationship between stock returns and the exchange rate.

All companies from the finance and investment sector as well as the commercial and services sector have only the money demand and the risk premium as significant macroeconomic risk factors with an impact on stock returns, at 5% level of significance. Increase in money demand decreases stock returns. This implies that expansion in monetary policy increases the level of inflationary expectations as well as the nominal interest rates thus an indirect relationship between stock returns and expansion in monetary policy.

In the industrial and allied sector, the same is observed. The money demand and the risk premium are the significant factors apart from the company prone to exchange rate changes. As observed in Total, the exchange rate in addition to the money demand and the risk premium is a significant indicator of macroeconomic risk in the stock market, at 5% level of significance.

In conclusion, the study revealed that investors in Kenya considered three main macroeconomic risk factors in the determination of asset prices during the period under consideration. That is, money demand, exchange rate and the risk premium.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.0 Summary and conclusions

We can conclude that first we do not reject that there is a relationship between the macroeconomic indicators and the stock returns. The relationship established is however in the short run thus in the short run the stock market can be used as a barometer of the level of economic performance or activity. A long run relationship may not be explained because of the competence-difficulty¹ gap which is high in LDC's.

Money demand is an important risk factor in the determination of stock prices in the short run thus the decisions and policies of the CBK on behalf of the government regarding monetary policy with an aim of stabilizing the economy significantly affect the stock returns.

In the short-run the foreign exchange may affect stock returns implying that there exists a link between the stock and the foreign exchange markets, both which are inherently unstable. An economic shock which affects the foreign exchange market may filter into the stock market causing instability. The two markets can interact with each other to produce greater instability in the market and the whole financial system

The risk premium which is a component of the discount factor by which the cash flows are discounted to get stock returns. It is also seen to be an important risk factor in the determination of stock prices in the short-run.

5.1 Policy Implications and recommendations

The government through the CMA should enhance a fair play in the stock market. The government may not be directly involved in regulating the stock market but it should enhance its supervision role. Given the bidirectional relationship between the macro

¹ The competence difficult gap gives a measure of spread between the economic agents' competence to make an optimal decision and the complexity or the difficulty of the decision problem. The faster the processing speed of a new set of information, the lower the C-D gap (Kibicho 1998). The concept of the gap implies that different economic agents have different processing speeds.

economy and the financial sector, fluctuations in the macro economic indicators as well as the performance of the stock market may adversely affect the allocation of resources in the economy. These fluctuations result to lots of speculation in the stock market causing instability and creating a disincentive for companies to source funds at the stock market.

There is a short run relationship between the stock returns and the exchange rate. With liberalization, forces of demand and supply determine the exchange rate. The CBK however intervenes in order to correct the short term fluctuations with destabilizing effects on the economy. It means that we have a managed floating exchange rate system. The CBK should properly manage the exchange rate to avoid unnecessary fluctuations in the foreign exchange market. This requires timely interventions.

The monetary policy is seen to have an effect on the stock returns for all companies in the sample as money demand is a significant risk factor. This calls for proper measures by the government in order to ensure that money supply and demand do not feed inflation in the economy leading to capital losses for the investors as this would affect the performance of the stock market which is an avenue for raising capital for companies. Citizens are increasingly investing in shares and in addition the government should encourage investment in other assets such as unit trusts and government securities especially for the risk averse investors who may shy away from the stock market. This will go a long way towards reducing money in the economy thus reducing inflationary pressure.

Improvements in efficiency in the NSE will also go a long way to enhance the work of the exchange. For the market to move towards the frontiers of efficiency, investors and fund managers must be information-sensitive. This could be achieved if stock brokerage firms could carry out a more detailed and fundamental analysis of government policy initiatives and their impact on the market. In connection with this, the government must also cultivate the habit of announcing key macroeconomic indicators as early as possible to avoid delays which may fuel speculation. Such tendencies/speculations are not healthy for the development of the NSE.

In conclusion, the stock market should be closely supervised in order to ensure fair play for all market participants as well as ensuring that speculative activities are minimized. The macro economic sector and the financial sector depend on each other hence increased need for policy harmonization.

5.2 Limitations of the study

The main limitation in this study is the lack of consistent data especially data on stock returns for companies listed on the NSE. This reduced the sample size and at the same time, it was not possible to get complete information on any company from the agricultural sector as well as the alternative investment sector. It may therefore be that the low sample size has affected the findings especially if they are to be compared with previous studies.

5.3 Areas for Further Research

This study uses time series data to find out the impact of macroeconomic risk on stock prices. More studies should come up to focus on the cross sectional and panel analysis for a better understanding of the relationship between the macro economy and the stock market.

The same kind of research should be done on current information since there have been observed changes especially since the automation of the NSE from September 2006. With automation, there is probably greater speed in processing information and this could have an implication on the impact of macroeconomic risk on stock returns.

Following the previously experienced inflation in the country from the beginning of this year, this destabilized the real sector as well as the financial sector, research on the effect of the inflation on the stock returns as well as the performance of stock market in general should also be encouraged.

Lastly, further research should also be done to establish the speed of adjustment or the speed of processing the information in the stock market so as to determine for instance at what time the CBK should intervene to regulate the exchange rate in order to reduce

speculations that destabilize the stock market. This will encourage fair play for all market participants.

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