A STUDY OF THE FACTORS INFLUENCING STOCKS RETURNS AT THE NSE

BY

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DECLARATION

This research project is my original work and has not been presented to any college or University for examination purposes.

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This research project has been submitted for examination with my approval as University Supervisor.

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DEDICATION

To Mr. and Mrs. Muchemi, Ann, Jackline and Dennis for their reliability and dependability.

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ABSTRACT

The purpose of this study was to investigate the performance of the Arbitrage Pricing Theory (APT) in the Nairobi Securities Exchange (NSE) on a monthly basis, for the period January 2001 to December 2010.The study examined six pre-specified variables which are: Inflation Rate, Treasury Bill Rate, Exchange Rate, Price Earnings Ratio, NSE 20- Share Index and Dividend Yield. Some of the variables used were the same as those used by Chen, Roll and Roll for their study on the US stock market. In the study however, the researcher developed two more variables namely Price Earnings Ratio and Dividend Yield, which have a relation with the stock return.

Using regression analysis and the analysis of variance, the researcher observed that including market based financial measures in the model add explanatory power to the APT model. The serial correlation problem was discussed using Durbin-Watson statistics. The test results confirmed that the portfolio constructed had no serial correlation. Our results show that the market portfolio reacts differently when the market based financial measures are introduced or dropped in the model. This can be seen through the variations in R – Squared, R –Predicted as well as the Durbin Watson statistic.

The analysis appears to be the first empirical test of APT that includes market based financial measures in the model in a study of the NSE. The finding therefore indicates the importance of conducting more studies on APT by including the performance indicators of companies listed at the NSE.

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LIST OF ABBREVIATION

AIMS	Alternative Investment Market Segment
APT	Arbitrage Pricing Theory
CAPM	Capital Asset Pricing Model
CMA	Capital Market authority
CPI	Consumer Price Index
ER	Exchange Rate
HPR	Holding Period Return
INF.	Inflation Rate
KNBS	Kenya National Bureau of Statistics
MIMS	Main Investment Market Segment
NSE	Nairobi Securities Exchange
NSEI	NSE 20 – Share Index
TBR	91 – Day Treasury Bill Rate
UON	University of Nairobi

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Risk and investing being two sides of the same coin, investors cannot avoid risk if they want the potential rewards of investing. Balancing the tradeoffs between low risk investments with low returns and higher risk investments with potentially higher returns is a constant challenge for investors (Michael & Eugene, 2009). According to Erol et al (2010), a rational investor is the one who wants to earn much enough at a given risk level undertaken. In other words, a higher level of risk incurred must be awarded with a higher rate of return. On the other hand, it cannot be expected for every investor to have an identical risk attitude so that while some investors are risk avoiders who are willing to get enough return for a reasonably low risk level, some others like bearing high levels of risk with the expectation of receiving much more return as possible. Whatever risk profile an investor has, it should be noted that the main point is to receive satisfactorily high returns at rationally reduced risk levels. Reducing risks associated with a financial investment is the basic concern of portfolio construction and management.

Low levels uncertainty (low risk) is associated with potential low returns. High levels of uncertainty (high risk) are associated with potential high returns. The risk return tradeoff is the balance the desire for the lowest possible risk and the highest possible returns. A common misconception is that higher risk equals greater return. The risk/return tradeoff tells us that the higher risk gives us the possibility of higher returns. There is no guarantee. Just as risk means higher potential returns, it also means higher potential losses. According to Akwambi (2003), risk and return are positively correlated. The implication for financial managers in evaluating a prospective investment project is that an effective decision about the project's value to the firm cannot be made simply by focusing simply on the expected level of return; the projects' level of risk must also be simultaneously be considered. This risk return tradeoff is central to investment decision making for managers to achieve the objective of shareholder wealth maximization. Determining the risk level that is most appropriate for an investor is a question that must be answered. Risk tolerance differs from a person to another. The decision depends on ones' goals, income and personal intuition among other factors.

1.1.1 The Concept of Return

Since risk is something an investor has to face when investing it is impossible to talk about risk without talking about the return as well. According to standard portfolio theory, these two are connected in any decision that one make, a higher risk must mean a potential higher return. If this does not hold no one would purchase a risky security if it would not offer a higher reward. What most market participants try to do is to minimize the risk in a portfolio while increasing the expected return (Biglova et al., 2004 and Bodie et al., 2004). To understand the concept of risk the expected return must be understood.

According to Michael and Eugene, (2009) it is usually more convenient to summarize information about returns in percentage terms, rather than dollar terms, because that way your return does not depend on how much you actually invest. Percentages tell how much we get for each dollar invested. According to Reilly and Brown, (2002) the return from holding an investment over some period say, a year is simply any cash payments received due to ownership, plus the change in market price, divided by the beginning price. The return depends on the increase/decrease in the price of the share over the investment horizon as well as dividend income the share has provided. This is called the Holding Period Return (HPR).

Average Return given by the sum of each of the values being considered divided by the total number of the values. It can also be seen as the sum of the various one – period rates of return divided by the number of periods (Pandey, 2005). The result is the historical average of the individual values. Expected return on the other hand refers to the return expected on a stock given its current price and expected future cash flows. According to Michael and Eugene, (2009), expected returns refer to the return on a risky asset expected in the future. If the stock is in equilibrium, the required rate of return will equal to the expected rate of return. The expected return of a portfolio Portfolio's expected return is the weighted average of its component stocks' expected return. The geometric average of returns refers to the n^{th} root of the product resulting from multiplying a series of returns together, less one. It gives the true rate of return for multiple periods.

1.1.2 The Concept of Risk

Knowledge on measurement and determination of return enables us to value risky assets. According to the Webster's dictionary, risk is define as "a hazard; a peril; exposure to loss or injury. According to Michael and Eugene (2009), no investment should be undertaken unless the expected rate of return is high enough to compensate for the perceived risk. A risk premium, which refers to the additional compensation investors require for assuming the additional risk, is therefore demanded by investors who venture in risky investments.

Risk can for most investors be perceived in three ways; to generate negative returns; underperforming a benchmark such as an index or a competing portfolio; and failing to meet one's goals (Harvey, 1995). Even though the average investor describes risk as the probability that something bad will happen there are almost no variables taking this fact into consideration. Markowitz risk measure and beta for example does not necessarily have to be negative as long as the market is in a positive trend (Sharpe et al, 1999).

According to Fabozzi (1980), risk in the financial field means an uncertainty that can be measured in terms of variance or standard deviation, which can also be interpreted as asset volatility. This means the uncertainty in the probability distribution of returns. Forces that contribute to the variation in return can be external to the firm, uncontrolled and affect large numbers of securities. Other influences are internal to the firm and are controllable to a large degree. In investments, those forces that are uncontrollable, external, and are broad in their effects are called sources of systematic risk. Conversely, controllable, internal factors somewhat peculiar to industries and/or firms are referred to as sources of unsystematic risk.

The portfolio risk is lower than either individual asset's because of diversification. It is important to note that the Total Risk (Standard Deviation) includes both Systematic Risk as well as Unsystematic Risk. Unsystematic risk is diversifiable whereas Systematic risk is not diversifiable. Estimation of systematic risk (Beta) is done through CAPM which gives us a mathematical relationship between an individual stock's expected return, and systematic risk. Beta is the amount of systematic risk of a stock relative to the market

risk. It is the slope of the fitted line that describes the relationship between individual stock return and the market return. The beta of a portfolio is simply the weighted average of its component stock betas. Portfolio risk therefore depends on the risk of the component assets (Konuralp, 2001). Markowitz (1952) suggests that a well diversified portfolio is exposed only to systematic risk since unsystematic or idiosyncratic risks are theoretically eliminated through constructing sufficiently diversified portfolios (Fig 1). Therefore, the focus is only on both dealing with the management of systematic risk of any investment and deciding the right time for trading. The addition of financial assets from different countries helps increase portfolio return without increasing the total risk. (Ceylan & Korkmaz, 2008). Unsystematic risk refers to risk that is unique to a particular company. It is independent of economic, political and other factors that affect securities in a systematic manner e.g. wildcat strike may not only affect one company; a new competitor may begin to produce essentially the same product. By diversification, the risk can be reduced or even eliminate.

1.2 Statement of the Problem

The NSE is currently one of the most attractive and promising markets in Africa. Many investors want to benefit from the high growth and promising economic outlook and therefore invest in the NSE (World Bank, 2006). However, there has been an erosion of investor confidence due to volatility of returns of quoted companies, as has been witnessed in the recent past, (Mwaura, 2006). According to Ferson and Harvey (1993), expected returns of holding common stocks and bonds are to some extent predictable. They found out that a rational asset pricing model, which focuses on risk, could explain most of the predictability. It is on the basis of these findings that this study seeks to formulate a model that will provide useful information to investors on the factors that drive stock returns at the NSE.

The Kenyan economy is currently characterized by high inflation rate and unstable exchange rate since the country is a net importer of most commodities. This has further posed a challenge for investors wishing to earn returns from the stock market. The Central Bank of Kenya has attempted to use various instruments at its disposal to address

such challenges. These include use of money supply, interest rates controls among other corrective measures.

Investors therefore are left to wonder, what factors are responsible for the volatility of returns at the stock market? The government analysts are constantly searching for information that can help bridge the knowledge gap on drivers of stock returns which is crucial for investors especially in reducing information asymmetry. The current research will therefore attempt to address these questions by establishing the factors that drive stock returns at the NSE. Market based financial measures; price/earnings ratio and Dividend Yield will be included in the current research. The researcher did not come across a study on factors driving stock returns at the NSE which included a market based financial measure in the multi – index APT model.

1.3 Objectives of the Study

The study will work towards meeting the following objectives.

(i) To test the effect of six pre-specified variables which are: Inflation Rate, Treasury Bill Rate, Exchange Rate, Price Earnings Ratio, NSE 20- Share Index and Dividend Yield on stock returns traded at the NSE.

(ii) To establish whether the predicting power of the APT can be improved by including a market based financial measures.

1.4 Research Questions

The researcher will be guided by the following research questions:

(i) What is the effect of six pre-specified variables which are: Inflation Rate, Treasury Bill Rate, Exchange Rate, Price Earnings Ratio, NSE 20- Share Index and Dividend Yield on returns of stocks traded at the NSE?

(ii) Can the predicting power of the APT can be improved by including market based financial measure?

1.5 Hypothesis of the Study

Null Hypothesis

The predicting power of the APT cannot be improved by including a market based financial measures.

Alternative Hypothesis

The predicting power of the APT can be improved by including a market based financial measures.

1.6 Significance of the Study

The findings of this study will be of significance to the stock investors at the NSE since they can use this information as a basis of building their investment philosophy. Market regulators (NSE and CMA) will also use the findings of the research in establishing the NSE performance against investors' perception of risks and returns and hence develop ways of building investors confidence. Moreover, policy makers will use the findings to develop various strategies geared towards increasing the product range, market players and protection of investors as well as provision of professional guidance to investors. Additionally, other researchers will find a point of reference from the study to add to the body of knowledge on stock returns.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

The information about the expected return and standard deviation helps an investor to make decision about investments. This depends on investor risk preference. Generally, investors would prefer investments with higher rates of return and lower standard deviations, (Pandey, 2005). Risk and investing being two sides of the same coin, investors cannot therefore avoid risk if they want the potential rewards of investing. Balancing the tradeoffs between low risk investments with low returns and higher risk investments with potentially higher returns is a constant challenge for investors. Risk being a natural part of investing , investors therefore need to find their comfort level and build their portfolios and expectations accordingly and one can control the amount of risk to take and that begins with knowing their tolerance for risk through risk estimation measures. The standard approach to estimating equity risk premiums remains the use of historical returns, with the difference in annual returns on stocks and bonds over a long time period comprising the expected risk premium, looking forward (www.investopedia.com)

Low levels uncertainty (low risk) is associated with potential low returns. High levels of uncertainty (high risk) are associated with potential high returns. The risk return tradeoff is the balance or the desire for the lowest possible risk and the highest possible returns. A higher standard deviation means a higher risk and a higher possible return. Two theories, i.e. APT and CAPM have provided a rigorous foundation for computing the trade - off between risk and return.

2.1 The Capital Asset Pricing Model (CAPM)

The foundations for the development of CAPM were laid by Markowitz (1952) and Tobin (1958). Early theories suggested that the risk of an individual security is the standard deviation of its returns – a measure of return volatility. Thus, the larger the standard deviation of security returns the greater the risk. An investor's main concern, however, is the risk of his/her total wealth made up of a collection of securities, the

portfolio. Markowitz (1952) observed that when two risky assets are combined, their standard deviations are not additive, provided the returns from the two assets are not perfectly positively correlated and when a portfolio of risky assets is formed, the standard deviation risk of the portfolio is less than the sum of the standard deviations of its constituents. Markowitz was the first to develop a specific measure of portfolio risk and to derive the expected return and risk of a portfolio. The Markowitz model generates the efficient frontier of portfolios and the investors are expected to select a portfolio, which is most appropriate for them, from the efficient set of portfolios available to them. Tobin (1958) suggested a course of action to identify the appropriate portfolios among the efficient set.

The computation of risk reduction as proposed by Markowitz is tedious. Sharpe (1964) developed a computationally efficient method, the single index model, where the return on an individual security is related to the return on a common index. The common index may be any variable thought to be the dominant influence on stock returns and need not be a stock index (Jones, 1991). The single index model can be extended to portfolios as well. This is possible because the expected return on a portfolio is a weighted average of the expected returns on individual securities. When analyzing the risk of an individual security, however, the individual security risk must be considered in relation to other securities in the portfolio. In particular, the risk of an individual security must be measured in terms of the extent to which it adds risk to the investor's portfolio. Thus, a security's contribution to the portfolio risk is different from the risk of the individual security.

Investors face two kinds of risks, namely, diversifiable (unsystematic) and non diversifiable (systematic). Unsystematic risk is the component of the portfolio risk that can be eliminated by increasing the portfolio size, the reason being that risks that are specific to an individual security such as business or financial risk can be eliminated by constructing a well-diversified portfolio. Systematic risk is associated with overall movements in the general market or economy and therefore is often referred to as the market risk. The market risk is the component of the total risk that cannot be eliminated through portfolio diversification.

The CAPM developed by Sharpe (1964) and Lintner (1965) relates the expected rate of return of an individual security to a measure of its systematic risk. The model has become an important tool in finance for assessment of cost of capital, portfolio performance, and portfolio diversification, valuing investments and choosing portfolio strategy among others.

CAPM is aimed at predicting the relationship between the expected return and risk for traded securities. In order for the model to work it needs a few assumptions. The most important one is that it assumes that all investors are alike when it comes to risk aversion and initial wealth, leading to that all investors are looking for the highest return facing the lowest amount of risk. Hence investors are mean variance efficient in their attitudes towards risk and return. (Bodie et al. 2004).

Further, CAPM's assumes that the capital market is efficient i.e. share prices reflect all available information thus securities are analyzed in the exact same way by all analysts and they share the same view of the economic outlooks. All investors holding periods are taken to be the same and investors are assumed to have the same expectations about the expected return and risk as a security. Under CAPM, Portfolios are created from the same publicly traded assets. Taxes or transaction costs are not regarded, so gains from stocks and bonds and dividends and capital gains are not considered different for investors. Additionally, all investors are assumed to be mean variance optimizers.

Under CAPM, risk is the variance of expected return. Risk can be broken into two components: diversifiable (unsystematic) risk and non diversifiable (systematic) risk. Through proper diversification unsystematic risk can be reduced. Therefore, beta is the relevant measure of risk for investors with diversifiable portfolios. It is also argued that under CAPM, risk and return are linearly related. An investor is taken to hold two portfolios; a risk free asset and the market portfolio. The return that an investor actually receives is derived from only two sources: risk proportional market return plus nonsystematic random return.

The last half-century has witnessed the proliferation of empirical studies testing on the validity of the CAPM. A growing number of studies found that the cross-asset variation in expected returns could not be explained by the systematic risk alone. Therefore, a

variety of models have been developed to predict asset returns. The CAPM conveys the notion that securities are priced so that the expected returns will compensate investors for the expected risks. There are two fundamental relationships: the capital market line (CML) and the security market line (SML). These two models are the building blocks for deriving the CAPM.

The CML specifies the return an individual investor expects to receive on a portfolio. This is a linear relationship between risk and return on efficient portfolios. The CML shows that the expected return on a portfolio can be thought of as a sum of the return for delaying consumption and a premium for bearing the risk inherent in the portfolio. The CML is valid only for efficient portfolios and expresses investors' behavior regarding the market portfolio and their own investment portfolios. On the other hand, the SML expresses the return an individual investor can expect in terms of a risk-free rate and the relative risk of a security or portfolio. The SML is applicable to portfolios as well. Therefore, SML can be used in portfolio analysis to test whether securities are fairly priced, or not.

2.1.1 Empirical issues on Single-factor CAPM

In order to test the validity of the CAPM researchers, always test the SML. The CAPM is a single-period ex ante model. However, since the ex ante returns are unobservable, researchers rely on realized returns. So the empirical question arises: Do the past security returns conform to the CAPM? The beta in such an investigation is usually obtained by estimating the security characteristic line (SCL) that relates the excess return on security i to the excess return on some efficient market index at time t. The ex post SCL can be written as:

$$R_{it} - R_{ft} = \acute{\eta}_i + b_{im}(R_{mt} - R_{ft}) + \varepsilon_{it} \qquad \text{Equation (1)}$$

Where $\acute{\eta}_i$ is the constant return earned in each period and b_{im} is an estimate of $ß_{im}$ in the SML (Jensen, 1968). The estimated $ß_{im}$ is then used as the explanatory variable in the following cross-sectional equation:

$R_{it} = \gamma_0 + \gamma_1 b_{im} + \mu_{it}$ Equation (2)

to test for a positive risk return trade-off. The coefficient γ_0 is the expected return of a zero beta portfolio, expected to be the same as the risk-free rate, and γ_1 is the market price of risk (market risk premium), which is significantly different from zero and positive in order to support the validity of the CAPM. When testing the CAPM using (1) and (2), we are actually testing the following issues: (i) b_{im}'s are true estimates of historical $ß_{im}$'s, (ii) the market portfolio used in empirical studies is the appropriate proxy for the efficient market portfolio for measuring historical risk premium and (iii) the CAPM specification is correct (Radcliffe, 1987).

Early studies (Lintner, 1965; Douglas, 1969) on CAPM were primarily based on individual security returns. Their empirical results were discouraging. Miller and Scholes (1972) highlighted some statistical problems encountered when using individual securities in testing the validity of the CAPM. Most studies subsequently overcame this problem by using portfolio returns. Black et al. (1972), in their study of all the stocks of the New York Stock Exchange over the period 1931-1965, formed portfolios and reported a linear relationship between the average excess portfolio return and the beta, and for beta >1 (<1) the intercept tends to be negative (positive). Therefore, they developed zero-beta version of the CAPM model where the intercept term is allowed to change in each period. Extending the Black et al. (1972) , Fama and MacBeth (1973) provided evidence; of a larger intercept term than the risk-free rate; that the linear relationship between the average return and the beta holds ; that the linear relationship holds well when the data covers a long time period.

Subsequent studies, however, provide weak empirical evidence on these relationships (see, for example, Fama and French, 1992; He and Ng, 1994; Davis, 1994; Miles and Timmermann, 1996).The mixed empirical findings on the return–beta relationship prompted a number of responses: The single-factor CAPM is rejected when the portfolio used as a market proxy is inefficient, for example, Roll, 1977; Ross, 1977). Even very small deviations from efficiency can produce an insignificant relationship between risk and expected returns (Roll and Ross, 1994; Kandel and Stambaugh, 1995). Kothari et al.

(1995) highlighted the survivorship bias in the data used to test the validity of the asset pricing model specifications.

Beta is unstable over time (see, for example, Bos and Newbold, 1984); Faff et al., 1992; Brooks et al., 1994; Faff and Brooks, 1998). There are several model specification issues: For example, Kim (1995) and Amihud et al. (1993) argued that errors-in-the-variables problem impact on the empirical research. Kan and Zhang (1999) focused on a time-varying risk premium. Jagannathan and Wang (1996) showed that specifying a broader market portfolio can affect the results. Additionally, Clare et al. (1998) argued that failing to take into account possible correlations between idiosyncratic returns may have an impact on the results.

2.2 Empirical Issues on Multifactor Models

A growing number of studies found that the cross-sectional variation in average security returns cannot be explained by the market beta alone, and showed that fundamental variables such as size (Banz, 1981), ratio of book-to-market value (Rosenberg et al., 1985; Chan et al., 1991), macroeconomic variables and the price to earnings ratio (Basu, 1983) account for a sizeable portion of the cross-sectional variation in expected returns.

Fama and French (1995) observed that the two non-market risk factors SMB (the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks) and HML (the difference between the return on a portfolio of high-book-to-market stocks and the return on a portfolio of low-book-to-market stocks) are useful factors when explaining a cross-section of equity returns. Chung et al. (2001) observed that, as higher order systematic co-moments are included in the cross-sectional regressions for portfolio returns; the SMB and HML generally become insignificant.

Therefore, they argued that SMB and HML are good proxies for higher order co-moments. Ferson and Harvey (1999) claimed that many multifactor model specifications are rejected because they ignore conditioning information.

Another possibility is to construct Multifactor Arbitrage Pricing Theory (APT) models introduced by Ross (1976). The idea here is to allow more than one measure of

systematic risk. APT models allow for priced factors that are orthogonal to the market return and do not require that all investors are mean–variance optimisers, as in the CAPM. Groenewold and Fraser (1997) examined the validity of these models for Australian data and compared the performance of the empirical version of the APT and the CAPM. They concluded that APT outperforms the CAPM in terms of within sample explanatory power.

2.3 The Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory (APT) was propounded by Ross (1976) as a means of relating changes in returns on investments to unanticipated changes in a range of key value drivers for these investments (Kettell, 2001). Therefore, under the APT framework, all investment have "expected returns" and affected by macroeconomic forces/factors (the range of these factors are not specified in the initial theory).

APT starts with the assumption that security returns are related to an unknown number of unknown factors (Alexander et al., 2001). However, Roll and Ross (1980) stated four major factors; these are the unanticipated change in the inflation, risk premiums, the terms structure of interest rates and industrial production. Chen, Roll and Roll (1986) (CR&R) examined the validity of the APT in the US securities market. CR&R (1986) analysis used the US macroeconomic variables as proxies for the underlying risk factors that determine the stock returns. They found several of these macroeconomic variables to be significant in explaining expected stock.

APT was developed as a result the weaknesses of CAPM. It is an alternative model to the CAPM and was developed by Ross in (1976) in his paper "Arbitrage Theory in Capital Pricing" and is based purely on arbitrage arguments. The APT assumes that arbitrage has taken place in the market. Arbitrage is the practice of taking advantage of a state of imbalance in the markets and thereby a risk free profit. It is the process by which market players take advantage of price differentials of similar assets selling overpriced and buying under priced assets until equilibrium is attained. The APT implies that there are multiple risk factors that need to be taken into account when calculating risk adjusted performance or alpha. Ross (1976) developed an equilibrium asset pricing theory, which

requires fewer assumptions than the CAPM. It assumes that the expected security returns are generated by multiple k factors instead of one pervasive market risk premium factor identified in the CAPM

In contradiction to CAPM, which has beta as solely risk variable, the APT relates the various types of risk associated with a security such as changes in interest rates, inflation and productivity with the expected return of that same security. The APT is less restrictive compared to CAPM, and has three major assumptions. First is the assumption that the capital markets are perfectly competitive. Secondly, investors are taken to always prefer more wealth to less wealth with certainty. Additionally, it is assumed that the stochastic process generating asset returns can be expressed as a linear function of a set of K risk factors (or indexes).

Equally important, assumptions which were used in the development of the CAPM such as investors possess quadratic utility functions, normally distributed security returns, as well as a market portfolio that contains all risky assets and is mean-variance efficient, are not required.

The model is both simpler and can explain differential security prices, and it is considered a superior theory to the CAPM. As noted, the theory assumes that the stochastic process generating asset returns can be represented as a K factor model of the form:

$Ri = E(Ri) + bi1\delta1 + bi2\delta2 + \ldots + bik\delta k + \varepsilon i$ for i = 1 to n
Equation (3)

Where:

Ri = the actual return on asset i during a specified time period, i = 1, 2, 3, . . . n

E(Ri) = the expected return for asset i if all the risk factors have zero changes

bij = the reaction in asset i's returns to movements in a common risk factor j

δk = a set of common factors or indexes with a zero mean that influences the returns on all assets

εi = a unique effect on asset i's return (i.e., a random error term that, by assumption, is completely diversifiable in large portfolios and has a mean of zero)

n = number of assets

Similar to the CAPM model, the APT assumes that the unique effects (εi) are independent and will be diversified away in a large portfolio. Specifically, the APT requires that in equilibrium the return on a zero-investment, zero-systematic-risk portfolio is zero when the unique effects are diversified away. This assumption (and some theoretical manipulation using linear algebra) implies that the expected return on any asset i (i.e., E(Ri)), can be expressed as:

$$\mathbf{E(Ri) = \lambda 0 + \lambda 1 bi1 + \lambda 2 bi2 + \ldots + \lambda k bik} \qquad \text{Equation (4)}$$

where:

λ0 = the expected return on an asset with zero systematic risk

λ j = the risk premium related to the jth common risk factor

bij = the pricing relationship between the risk premium and the asset; that is, how responsive asset i is to the jth common factor. These are called factor betas or factor loadings.

In contrast to the CAPM, the primary practical problem associated with implementing the APT is that neither the identity nor the exact number of the underlying risk factors are developed by theory and therefore must be specified in an ad hoc manner (Shanken, 1982).

2.3.1 Empirical Literature on the Arbitrage Pricing Theory

Tests of APT conducted about ten years later than those of CAPM are less controversial because the APT itself requires no assumptions about returns distribution, investor preferences and market portfolio while being able to predict relative pricing of any subset of securities. Roll and Ross (1980) embarked on empirical investigation of APT by looking at the daily returns on NYSE and AMEX stocks between 1962 and 1972. After studying the relationship between mean and standard deviation; and the lognomality causes they found that the total variance of returns do not add explanatory power to the model. They also find the same result for the intercept term which proves that APT is robust and should not be rejected.

Chen (1983) grouped stocks into high market value and low market value groups and found that grouping based on market value is not significant. Wei (1988) used Nash equilibrium APT by adding market portfolio as another factor which effectively combines CAPM and APT. Robun and Shukla (1991) examined the monthly returns from 1976 to 1985 using Chicago's Research on security prices (CRSP) data and found that pricing errors and variance are high and statistically significant. Pari and Chenn, (1989) conducted a test on APT model for 2090 firms for the period 1975 to 1980. Using this model, they found that factors such as general market index, price volatility of energy and interest rates risk, influence stock price. Bruce N. Lehmann et al in their tests on 'Empirical Foundations of the Arbitrage Pricing Theory' issued in 1989 provided a detailed and extensive examination of the validity of the APT based on maximum likelihood factor analysis of large cross sections of securities.

The empirical implementation of the theory proved incapable of explaining expected returns on portfolios composed of securities with different market capitalizations although it provided an adequate account of the expected returns of portfolios formed on the basis of dividend yield and mean variance where risk adjustment with the CAPM employing the usual market failed. Chen (1991) examined cross sectional differences in Japanese stock returns and found a significant relationship between expected returns in the Japanese stock market and four variables including earnings yield, size, book to

market value ratio and cash flow yield of which the last two variables have the most significant positive effect on expected stock return

Shanken challenged whether the APT can be empirically verified. He argued that the nature of many tests are such that it is impossible to reject the theory This is the Shanken challenge to testability of APT. Dhrymnes and Shanken both questioned the usefulness of the APT model because it was not able to identify the factors that determine the expected rates of return. They questioned whether the theory is testable under these conditions. Akwambi (2003) conducted a research on the application of APT in predicting stock returns at the NSE. His study covered a period of seven years. Regression results pointed out that the multi-index APT provides additional power in explaining the variability of NSE stock returns over the single index model that uses the market index only.

2.4 The Superiority of APT over CAPM

The Capital Asset Pricing Model (CAPM) asserts that the return for any asset is a positive function of only one variable, its market beta, or the systematic risk, which can be defined as the covariance of an asset's return and the market return (Black, 1972; Lintner, 1965; Sharpe, 1964). The main implication of the CAPM is the mean-variance efficiency of the market portfolio. The efficiency of the market portfolio implies that a positive linear relationship between ex ante expected returns and market beta exists, and that there are no other variables except the market beta that can have power in the examination of the time series and the cross-sectional test of asset returns (Alexander et al., 2001).

Though initial empirical studies supported the CAPM (Fama & MacBeth, 1973; Black et al., 1972), there are empirical variables e.g. the market value of equity ratio (MVE), the earnings to stock price ratio (E/P), and the book-to-market equity ratio that had explanatory power greater than the beta of the market (Banz, 1981; Basu, 1983; Lakonishok and Shapiro, 1984; 1986; Rosenberg et al., 1985). Ross's (1976) Arbitrage Pricing Theory (APT) commenced a new family of models which have tried to verify that beta is not the only component that could measure the systematic risk or undiversified of stock returns and other securities, e.g. the macroeconomic APT showed that there are

many different variables that have an effect on stock returns (Chen et al., 1986; Chen & Jordan, 1993).

According to Pandey (2005), CAPM is based on a number of assumptions that are far from the reality. For example, it is very difficult to find a risk free security. A short – term, highly liquid government security is considered as a risk – free security. It is highly unlikely that the government will default, but inflation causes uncertainty about the real rate of return. The assumption of the equality of the lending and borrowing rates is also incorrect. In practice, these rates often differ. Further, investors may not hold highly diversified portfolios, or the market indices may not be well diversified. Under these circumstances, CAPM may not accurately explain the investment behavior of investors and beta may fail to capture the risk of investment.

Most of the assumptions of CAPM may not be very critical for its practical validity. The empirical results have given mixed results. Most of the past results showed that there were positive relations between beta and returns but the relationship was not as strong as predicated by beta. Further, these results revealed that returns were also related to other measures of risk including the firm specific risk, macroeconomic variables among other risk factors. All empirical studies testing CAPM have a conceptual problem. CAPM is an ex ante model; that is, we need data on expected prices to test CAPM. Unfortunately, in practice, the researchers have to work with the actual past (ex - post) data. Thus, this will introduce bias in the empirical result.

Beta is a measure of security future risk. But investors do not have future data to estimate Beta. What they have is past data about the share prices and the market portfolio. Thus they can only estimate beta based on historical data. Investors can use historical beta as a measure of future risk only if it is stable over time. Most research has shown that beta of individual securities are unstable over time. This implies that historical betas are poor indicator s of future security risk.

2.5 Summary on the Empirical Evidence

From the empirical literature reviewed, the Capital Asset Pricing Model (CAPM) asserts that the return for any asset is a positive function of only one variable, its market beta, or the systematic risk, which can be defined as the covariance of an asset's return and the market return (Black, 1972; Lintner, 1965; Sharpe, 1964).

A growing number of studies however found that the cross-sectional variation in average security returns cannot be explained by the market beta alone, and showed that fundamental variables such as size (Banz, 1981), ratio of book-to-market value (Rosenberg et al., 1985; Chan et al., 1991), macroeconomic variables and the price to earnings ratio (Basu, 1983) account for a sizeable portion of the cross-sectional variation in expected returns. Further, these results revealed that returns were also related to other measures of risk including the firm specific risk, macroeconomic variables among other risk factors.

Most of the assumptions of CAPM may not be very critical for its practical validity. According to Pandey (2005), CAPM is based on a number of assumptions that are far from the reality. For example, it is very difficult to find a risk free security. A short – term, highly liquid government security is considered as a risk – free security. It is highly unlikely that the government will default, but inflation causes uncertainty about the real rate of return. The assumption of the equality of the lending and borrowing rates is also incorrect. In practice, these rates often differ. Further, investors may not hold highly diversified portfolios, or the market indices may not be well diversified. Under these circumstances, CAPM may not accurately explain the investment behavior of investors and beta may fail to capture the risk of investment.

The empirical literature reviewed therefore provides the rationale to apply the Multifactor Arbitrage Pricing Theory (APT) models introduced by Ross (1976). The idea here is to allow more than one measure of systematic risk. APT models allow for priced factors that are orthogonal to the market return and do not require that all investors are mean–variance optimizers, as in the CAPM. Groenewold and Fraser (1997) examined the validity of these models for Australian data and compared the performance of the

empirical version of the APT and the CAPM. They concluded that APT outperforms the CAPM in terms of within sample explanatory power.

2.6 Macroeconomic Variables Affecting Stock Return

Inflation can be described as a decline in the real value of money or a loss of purchasing power. When the general price level rises, each unit of currency buys fewer goods and services. A chief measure of price inflation is the inflation rate, which is the percentage change in a price index over time. Inflation affects sales revenue and borrowing of a firm through changes in nominal cash flows or the discount rate. Anticipated inflation is already priced in the discount rate and sales price.

The NSE 20-share index is a weighted mean with 1966 as the base year at 100. It is based on 20 companies calculated on a daily basis. The index is useful in determining the performance of the NSE by measuring the general price movement in the listed shares of the stock exchange.

P/E ratios are ratios of share prices to earnings. The P/E ratio of a stock is equal to the price of a share of the stock dividend by per share earnings of the stock. For a stock index, the P/E ratio is calculated the same way—the average share price of the firms in the index is divided by the average earnings per share of these firms

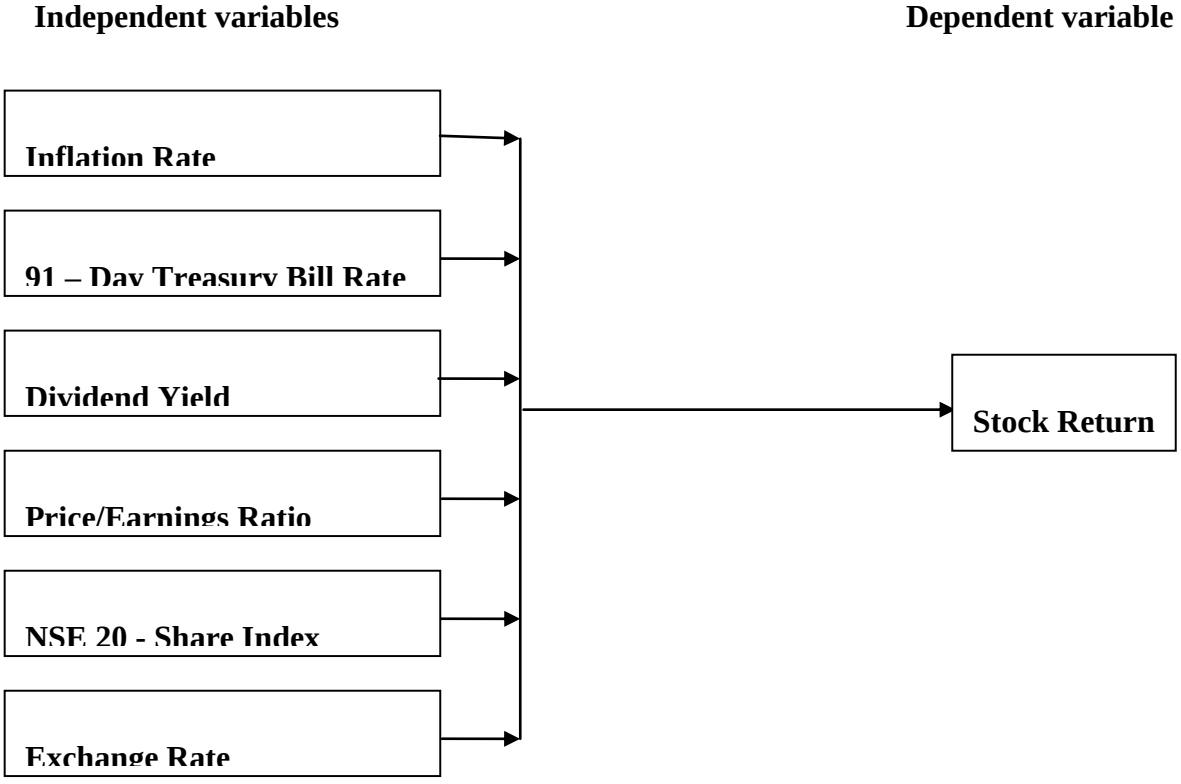
Since there has been a considerable increase in economic globalization, most of the businesses are directly or indirectly affected by international activities. Globalization and liberalization have increased in the last 30 years as a result of the increase; the exchange rates play an important role in capital mobility. Consequently, sales of cash flow may change “in the value”. It is considerable as an important risk factor from some investors’ point of view.

Dividend refers to the distribution of a portion of a company's earnings, decided by the board of directors, to a class of its shareholders. The dividend is most often quoted in terms of the dollar amount each share receives (dividends per share). It can also be quoted in terms of a percent of the current market price, referred to as dividend yield. The issue of whether dividend yields predict stock returns has been hotly debated over the last

years. The initial successes reported in Fama and French (1988) and Fama and French (1989) were increasingly questioned on grounds of econometric methodology, data mining issues and weak out-of-sample predictive power.

2.7 The Conceptual Framework

Figure 2.7.1 – Conceptual Framework



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter described the procedure used to conduct the empirical research. This includes how the data will be collected, assumptions made, determination of the sample used and how the information will be interpreted i.e. research design, the target population, sampling size and strategy, data collection instruments and procedures, and methods of data analysis.

3.2. Research Design

According to Cooper and Emory (1995), a research design is a framework of specifying the relationship among the study's variables and it starts with a plan for selecting the sources and types of information used to answer the research question. Nyandemo (2007) stated that correlation method describes in quantitative terms the degree to which variables are related and explores the relationships between variables as well as predicting a subject's score on one variable given the score on another variable.

The study adopted a historical correlation method with a view to estimating the relative influence of the Inflation Rate, Treasury Bill Rate, Exchange Rate, Price Earnings Ratio, NSE 20 - Share Index and Dividend Yield on returns of stocks trading in the NSE within the MIMS. The study covered a period of 120 months from January 2001 – December 2010. Quantitative historical research design was therefore considered suitable for the study since the researcher used historical quantitative data retrieved from independent sources.

Secondary data was used to measure the unanticipated changes in expectations. Treating changes as unexpected is consistent with a rational expectations view of economic decision making and is consistent with a large body of empirical evidence (Akwambi, 2003). Information or data was collected using a representative sample of the companies trading at the NSE.

3.3 Model Specification

The Arbitrage Pricing theory assumes that stock returns are generated according to factor models e.g. we can describe stock returns as;

Total return = Expected return + Unexpected return

$R = E(R) + U$ Equation (5)

In this study, six predictor variables were examined from the period between January 2001 to period of December 2010. The model in equation 6 was designed to test the effect of those predictor variables on the stock return. The factors tested include the Inflation Rate (INF.), Treasury Bill Rate (TBR), Exchange Rate (ER), Price Earnings Ratio (P/E), NSE 20 - Share Index (NSEI) and Dividend Yield (DY). The Exchange Rate (ER) and NSE 20 - Share Index (NSEI) were converted from absolute values to relative values using geometric average. The variables were formulated into a linear model as suggested by CR&R (1986) as follows:

$R_i = b_{i0} + b_{i1}F_1 + b_{i2}F_2 + b_{i3}F_3 + b_{i4}F_4 + b_{i5}F_5 + b_{i6}F_6 + e_i$ Equation (6)

where, R_i is the actual return on the portfolio I; b_i, is the reaction coefficient measuring the change in portfolio return for change in risk factors, F_i, is the predictor variables. In this study, the factors tested are: F_1, Inflation Rate; F_2, Treasury Bill Rate; F_3, Exchange Rate; F_4, Price Earnings Ratio; F_5, NSE 20 - Share Index ; F_6 , Dividend Yield (DY) and e_i is a residual error for portfolio I.

3.3.1 The Exchange Rate

Since there has been a considerable increase in economic globalization, most of the businesses are directly or indirectly affected by international activities. Globalization and liberalization have increased in the last 30 years. Consequently, the exchange rates play an important role in capital mobility. It is considerable as an important risk factor from some investors' point of view. In the current study, calculation of exchange rate was done using the mean of commercial banks buying and selling exchange rates prevailing at the end of the month. The US Dollar was used as a proxy for exchange rate in the current study.

3.3.2 Inflation

Inflation can be described as a decline in the real value of money or a loss of purchasing power. When the general price level rises, each unit of currency buys fewer goods and services. A chief measure of price inflation is the inflation rate, which is the percentage change in a price index over time. Inflation affects sales revenue and borrowing of a firm through changes in nominal cash flows or the discount rate. In the current study, 'Month on Month' inflation rate is used. It is calculated as a percentage change of the CPI between the current month and the same month a year ago.

3.3.3 NSE – 20 Share Index

The NSE 20-share index is a weighted mean with 1966 as the base year at 100. It is based on 20 companies calculated on a daily basis. The index is useful in determining the performance of the NSE by measuring the general price movement in the listed shares of the stock exchange.

3.3.4 Price-to-Earnings Ratio

Price-to-Earnings Ratio (P/E) ratio of a stock is equal to the price of a share of the stock divided by per share earnings of the stock. For a stock index, the P/E ratio is calculated the same way as the average share price of the firms in the index is divided by the average earnings per share of these firms. The calculation in the current study for P/E was as illustrated in equation 7:

$$\text{Price-to-Earnings Ratio} = \frac{\text{Market Price per Share}}{\text{Earnings per Share}} \qquad \text{Equation (7)}$$

Additionally, geometric average of Price-to-Earnings Ratio (P/E) was computed to come up with values that were comparable for the current study.

3.3.5 Dividend Yield

Dividend refers to the distribution of a portion of a company's earnings, decided by the board of directors, to a class of its shareholders. The dividend is most often quoted in

terms of the dollar amount each share receives (dividends per share). It can also be quoted in terms of a percent of the current market price, referred to as dividend yield. The issue of whether dividend yields predict stock returns has been of interest to many researchers. The calculation in the current study for dividend yield was as illustrated in equation 8:

$$\text{Dividend Yield} = \frac{\text{Dividend per Share}}{\text{Market Price per Share}} \times 100 \qquad \text{Equation (8)}$$

3.3.6 91 - Days Treasury Bills Rates

Treasury bills are short – term government securities. In Kenya, 91 - Days Treasury Bills mature after 91 – Days. The current study considered the Average annual Yield Rates of the 91 - Days Treasury Bills.

3.3.7 Portfolio Return

The study used portfolio returns from the period between January 2001 to period of December 2010. Using these data, the sensitivity of the portfolios return to the variables (factors) was calculated. Early studies (Lintner, 1965; Douglas, 1969) on CAPM were primarily based on individual security returns. Their empirical results were discouraging. Miller and Scholes (1972) highlighted some statistical problems encountered when using individual securities in testing the validity of the CAPM. Most studies subsequently overcame this problem by using portfolio returns.

Portfolio's expected return is the weighted average of its component stocks' expected return. In the current study, geometric average of returns was used from the period between January 2001 to period of December 2010. It refers to the n^{th} root of the product resulting from multiplying a series of returns together, less one. It gives the true rate of return for multiple periods. Stock price changes were used to compute returns.

The simplest of theory of pricing a financial asset is through discounting future cash flow. The variables that affect future cash flows or risk adjusted discount rate of a

company must be considered. The aim of explaining the variables is to measure the predictor variables that influence the stock returns.

3.4 Target Population

The target population consisted of all the NSE stocks trading at the NSE. Stocks of Twenty Nine (29) companies from the Main Market Investment Segment (MIMS) were randomly selected for the study using simple random sampling method. This is because the MIMS is the main quotation market supported by stringent listing requirements as opposed to the Alternative market investment Segment (AIMS), which holds stocks of small, medium sized and young companies that find it difficult to meet the more stringent listing requirements of the MIMS with an alternative method of raising capital.

3.5 Data Collection Procedure

Data collection was based on secondary data. Secondary data on the Inflation Rate, 91 - Day Treasury Bill rate and Exchange rate was obtained from the Kenya National Bureau of Statistics. Data on monthly stock prices, Price Earnings Ratio (P/E), NSE 20 - Share Index (NSEI) and Dividend Yield (DY) was obtained from the NSE. The raw data was tabulated by means of a secondary data schedule using MS Excel.

3.6 Data Analysis

Regression analysis was used to come up with the model expressing the relationship between the dependent variable and the independent variables. Correlation analysis was used to check on the overall strength of the established regression model and also the individual significance of the independent variables. Statistical Packages for Social Scientists (SPSS) software was used to generate the statistics necessary to make the analysis. For the purpose of communicating effectively to ultimate users, findings were presented using tabular presentation

Various statistical tests on the variables were conducted. To ascertain the strength of the various explanatory variables, variations of the number of explanatory variables was done to see the effect on R^2 . Autocorrelation problem was discussed using Durbin-Watson statistics. To test whether to reject or accept the null hypothesis, the T – test was used.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

The collected data was analyzed and interpreted in line with the objectives of the study mainly aimed at establishing the factors that drive stock returns at the NSE. Six pre-specified independent variables, which are: Inflation Rate, Treasury Bill Rate, Exchange Rate, Price Earnings Ratio, NSE 20 - Share Index and Dividend Yield were used.

The study sample was Twenty Nine (29) companies listed at the NSE. A diversified portfolio of Four (4) Companies was constructed from the MIMS market categories which included companies from Agricultural sector, Commercial and Services, Industrial and Allied as well as Finance and Investment. The Four Companies selected to form a diversified portfolio included CFC Stanbic Holdings, Nation Media Group, Total Kenya Limited and Rea Vipingo Sisal Estate.

Following the study, a multiple regression model was fitted to the data and the output was as follows;

4.2 Regression Analysis

Regression analysis was done in two phases; using six predictor variables that include the market based financial measures and secondly, by omitting the market based financial measures from the model to establish their effect on the power of the model.

4.2.1 Regression Analysis with Market Based Financial Measures

Regression analysis was done using six predictor variables. Market based financial measures; Dividend Yield and Price to earnings Ratio were included. Table 4.1 below shows the results of the analysis.

Table 4.1: Regression Analysis with Market Based Financial Measures

Predictor	**Coef**	**SE Coef**	**P**
Constant	-24.44	17.57	0.299
Exchange Rate	-4.4541	0.4042	0.008
Treasury Bill Rate	-8.1296	0.9573	0.014
Inflation Rate	1.9641	0.3870	0.037
Dividend Yield	17.240	3.515	0.039
Price Earning Ratio	0.2720	0.3868	0.555
NSE 20 - Share Index	0.29064	0.05426	0.033

R-Sq = 99.5% R-Sq(adj) = 98.1%

R-Sq(pred) = 78.21%

Where ;

Coef refers to the Coeficient ;

SE Coef stands for Standard error of the Coeficient;

P represents the level of significance and is used in the t – test (see **4.3.1**);

R-Sq is the R – Squared

R-Sq(adj) is the adjusted R – Squared

R-Sq(pred) indicates the extent to which the predictor variables explain changes in the dependent variable.

The regression equation that was fitted on the data is as shown below in Equation (8);

S R = - 24.4 - 4.45 ER - 8.13 T B R+ 1.96 INF.+ 17.2 DY + 0.272 P/E + 0.291 NSEI

Equation (8)

The interpretations of the regression analysis are discussed later in 4.3.

4.2.2 Analysis of Variance with Market Based Financial Measures

Analysis of Variance was done using six predictor variables. Market based financial measures; Dividend Yield and Price to earnings Ratio were included. Table 4.2 below shows the results of the analysis.

Table 4.2: Analysis of Variance with Market Based Financial Measures

Source	**DF**	**SS**	**MS**	**P**
Regression	6	8461.5	1410.3	0.014
Residual Error	2	40.4	20.2	
Total	8	8502.0		

Durbin-Watson statistic = 2.46636

Where ;

DF (Degrees of Freedom) refers to the Number of Predictor variables;
SS stands for Sum of Squares;
MS Mean squared errors;
P represents the level of significance and is used in the t – test (see **4.3.1**);
Durbin-Watson statistic represents the level of Autocorrelation between Predictor Variables;

The interpretations of the Analysis of Variance and the Durbin-Watson statistic are discussed later in 4.3.

4.3 Interpretation of the Regression Analysis

Following regression analysis with the market based financial measures; the interpretations on the output in Table 4.1 and Table 4.2 are as follows;

4.3.1 Significance of Regression Coefficients (t -test)

The t- test is used to check the significance of individual regression coefficients in the multiple linear regression models. Adding a significant variable to a regression model makes the model more effective, while adding an unimportant variable may make the

model worse. The hypothesis statements to test the significance of a particular regression coefficient β_j are:

$H_0: \beta_j = 0$ versus $H_1: \beta_j \neq 0$, where j=1, 2, 3, 4, 5, 6.

We reject the null hypothesis if the p-value <0.05.

From the output in Table 4.1 and 4.2, we find that five of the regression coefficients are highly significant at a confidence level of 95 %(see p- values in Table 4.1). These are Inflation Rate, Treasury Bill Rate, Exchange Rate, NSE 20 - Share Index and Dividend Yield. However, the influence of Price Earnings Ratio on stock returns is insignificant as indicated by the p –value in Table 4.1.

The regression coefficient of the **'Inflation rate = 1.9641'**, implies that this predictor variable has a positive effect on the response variable. The regression coefficient of the **'Treasury Bill rate = -8.1296'**. This means that the predictor variable has a negative effect on the response variable. i.e. It will inversely affect the response variable.

The regression coefficient of the **'Exchange rate= -4.4541'**. It implies that this predictor variable has a negative effect on the response variable. (Inverse effect on the response variable). The regression coefficient of the **'Price earnings ratio =0.2720'**. This variable has a positive effect on the response variable.

The regression coefficient of the **'NSE 20 - Share Index = 0.29064'**, implies that this predictor variable has a positive effect on the response variable. The regression coefficient of the **'Dividend Yield = 17.240'**, implying that this predictor variable has a positive effect on the response variable. The findings indicate that Dividend Yield has a greater influence on stock returns than NSE 20 - Share Index as indicated by the regression coefficient.

According to the model, it can be seen from the adjusted R-Squared that it's able to explain 99.5% of the variability in the model. In addition, Predicted R-Squared is suggesting that the model has a relatively high prediction ability of 78.21%.

From the analysis of variance, the model is highly significant at a p-value of 0.014 (1.4%). This implies that the model has a good fit to the data.

4.3.2 Test for Autocorrelation amongst residual values (Durbin-Watson test)

To test for possibility of autocorrelation amongst the six predictor variables, we consider the Durbin-Watson test that allows for the determination of whether there is evidence of first-order autocorrelation; a condition in which a relationship exists between consecutive residuals values in the model. The Durbin-Watson statistic tests the following hypothesis;

H_0: There is no first order autocorrelation among the residual values.

H_1: There is a negative first order auto correlation among the residual values.

According to Durbin-Watson test, the statistic estimate, d, lies within the interval [0, 4]. The interpretation of this estimate is that; d approaching zero, indicates that there is a strong positive first order autocorrelation amongst the residual values, (i.e. $d<2$); d approaching four, indicates that there is a strong negative first order autocorrelation amongst the residual values, (i.e. $d>2$); $d = 2$, indicates that there is no first order autocorrelation among the residual values; d approaching two, indicates that there is a weak negative or positive first order autocorrelation amongst the residual values.

The study indicates that the Durbin-Watson statistic estimate is 2.46636 (see Table 4.2), when market based financial measures are included in the analysis; implying that there is a weak negative first order autocorrelation amongst the residual values.

4.4 Regression Analysis without Market Based Financial Measures

To test the effect of the market based financial measures, (P/E and DY) on the regression model, we remove the two predictor variables from the model so that we remain with only macroeconomic predictor variables. The output is as follows;

4.4.1 Regression Analysis

Regression analysis was done omitting market based financial measures; Dividend Yield

and Price to earnings Ratio from the model. Table 4.3 below shows the results of the analysis.

Table 4.3: Four Factor Regression Analysis (without market based financial measures)

Predictor	**Coef**	**SE Coef**	**T**	**P**
Constant	50.79	22.79	2.23	0.090
Exchange Rate	-3.465	1.149	-3.01	0.039
Treasury Bill Rate	-7.591	2.942	-2.58	0.041
Inflation Rate	0.2491	0.8440	0.30	0.783
NSE Index	0.2021	0.1739	1.16	0.310

R-Sq = 88.3% R-Sq (adj) = 76.7%

R-Sq (pred) = 3.96%

Where;
Coef refers to the Coefficient;

SE Coef stands for Standard error of the Coefficient;

P represents the level of significance and is used in the t – test;

R-Sq is the R – Squared;

R-Sq (adj) is the adjusted R – Squared;

R-Sq (pred) indicates the extent to which the predictor variables explain changes in the dependent variable.

The regression equation is;

SR = 50.8 - 3.47 ER - 7.59 TBR + 0.249 INF. + 0.202 NSEI Equation (9)

4.4.2 Analysis of Variance

Table 4.4: Four Factor APT Model (with market based financial measures) ANOVA

Source	DF	SS	MS	F	P
Regression	4	7511.2	1877.8	7.58	0.038
Residual Error	4	990.7	247.7		
Total	8	8502.0			

Durbin-Watson statistic = 0.872889

4.5 Interpretation of the Regression Analysis (Table 4.3 and 4.4)

Following regression analysis with the market based financial measures, the interpretations on the output in Table 4.3 and Table 4.4 are as follows;

4.5.1 Significance of Regression Coefficients (t -test)

From the output in Table 4.3 and 4.4, we find that two of the regression coefficients are highly significant at a confidence level of 95 %(see p- values in Table 4.3). These are Treasury Bill Rate and Exchange Rate. Although NSE 20 - Share Index and inflation Rate have little influence on stock returns as shown by the p – values in Table 4.3, NSE 20 - Share Index is seen to have considerable influence on stock returns compared to the inflation rate.

The regression coefficient of the **'Inflation rate = 0.2491'**, implies that this predictor variable has a positive effect on the response variable. The regression coefficient of the **'Treasury bill rate = -7.591'**. This means that the predictor variable has a negative effect on the response variable. i.e. It will inversely affect the response variable.

The regression coefficient of the **'Exchange rate= -3.465'**. It implies that this predictor variable has a negative effect on the response variable. (Inverse effect on the response variable). The regression coefficient of the **'NSE 20 - Share Index = 0.2021'**, implies that this predictor variable has a positive effect on the response variable.

From the analysis of variance, the model is highly significant at a p-value of 0.038 (3.8%) (See Table 4.4). This implies that the model has a good fit to the data.

By dropping the price earnings ratio and Dividend Yield from the regression model, it is clear that the adjusted R-Squared has dropped from 99.5 % to 88.3 %. The Adjusted R-Squared has reduced from 98.1 % to 76.7 %. In addition, Predicted R-Squared has dropped from 78.21 % to 3.96 %. This suggests that the market based financial measures have a significant effect on the 'Stock returns' since omitting the variables from the model reduces the predicting power of the model (see R-Sq (pred) Table 4.1 vs R-Sq (pred) Table 4.3).

4.5.2 Autocorrelation amongst residual values (Durbin-Watson test)

To test for possibility of autocorrelation amongst the predictor variables, we consider the Durbin-Watson test that allows for the determination of whether there is evidence of first-order autocorrelation; a condition in which a relationship exists between consecutive residuals values in the model. The Durbin-Watson statistic tests the following hypothesis;

H_0: There is no first order autocorrelation among the residual values.

H_1: There is a negative first order auto correlation among the residual values.

According to Durbin-Watson test, the statistic estimate, d, lies within the interval [0, 4]. The interpretation of this estimate is that; d approaching zero, indicates that there is a strong positive first order autocorrelation amongst the residual values, (i.e. $d<2$); d approaching four, indicates that there is a strong negative first order autocorrelation amongst the residual values, (i.e. $d>2$); $d = 2$, indicates that there is no first order autocorrelation among the residual values; d approaching two, indicates that there is a weak negative or positive first order autocorrelation amongst the residual values.

By dropping price earnings ratio and Dividend Yield from the regression model, the study indicates that the Durbin-Watson statistic estimate is 0.872889 (see Table 4.4), implying that there is a strong positive first order autocorrelation amongst the residual values. This suggests that the market based financial measures have a significant effect

on the model. This is because omitting the variables from the model shifts the Durbin-Watson statistic estimate further from the ideal position of a value d = 2 and consequently makes Equation (8) worse of as compared to Equation (9).

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The objectives of this study were to determine the factors that drive stock returns at the NSE and to establish whether the predicting power of the APT can be improved by including a market based financial measures. To address the objectives, this chapter summarizes the findings based on the analysis in chapter four and gives the conclusions as well as the recommendations about the study.

5.2 Summary

Before analyzing the coefficients, we look at the diagnostics of regression. In this case, Durbin Watson shows the serial correlation of residuals. Our test results confirmed that in the portfolio used there is weak serial correlation. Including market based financial measures in the model indicates that the Durbin-Watson statistic estimate is 2.46636; implying that there is a weak negative first order autocorrelation amongst the residual values.

Additionally, by including market based financial measures in the model, it can be seen from the Adjusted R-Squared that it is possible to explain 98.1% of the variability in the model (see Table 4.1). In addition, Predicted R-Squared is suggesting that the model has a relatively high prediction ability of 78.21%. The analysis of variance indicates that the model is highly significant at a p-value of 0.014 (1.4%). This implies that the model has a good fit to the data.

In overall test results, Inflation rate, Price Earnings Ratio and NSE 20 - Share Index have a positive effect on the stock returns. On the other hand, Treasury Bill Rate as well as Exchange rate have negative effect on stock returns i.e. both will inversely affect the response variable (stock returns). However, the effect of Price Earnings Ratio on stock returns is insignificant.

By dropping the price earnings ratio and Dividend Yield from the regression model (Table 4.3), the effect of Treasury Bill Rate as well as that of Exchange rate on stock returns remains negative. However, it is clear that the R-Squared has dropped from 99.5 % to 88.3 %. The Adjusted R-Squared has reduced from 98.1 % to 76.7 %. In addition, Predicted R-Squared has dropped from 78.21 % to 3.96

5.3 Conclusions

This study has tried to observe the relationship between the pre-specified predictor variables and stock market returns in the NSE for the period between January 2001 to December 2010 on monthly basis. In summary, the results indicate that there is a significant pricing relationship between the stock return and the tested predictor variables; namely, Inflation Rate, Treasury Bill Rate, Exchange Rate, NSE 20 - Share Index and Dividend Yield.

The Inflation rate has a positive effect on stock returns. This means that the market's estimate of the inflation rate is very close to the actual rate when announced. Inflation Rate is also seen to be statistically significant in explaining the dependant variable in when we add the market based financial measures to the regression model.

Treasury bill rate had negative effect on stock returns as shown in Table 4.1 and 4.3. It is therefore a very important factor in determining portfolio returns at the NSE as indicated by p – value of 0.014 and 0.041 in Table 4.1 and 4.3 respectively. Investors at the NSE can also invest in Treasury bills when the returns are attractive and this could explain the movements in stock returns depicted by the current study.

The Exchange rate had negative effect on stock returns as shown in Table 4.1 and 4.3. It implies that this predictor variable has a negative effect on the response variable. Exchange rate is therefore an important factor in determining international competitiveness. According to the exchange rate movements, the stock market may gain or lose its competitive position. It is therefore a very important factor in determining

portfolio returns at the NSE as indicated by p – value of 0.008 and 0.039 in Table 4.1 and 4.3 respectively.

The Price earnings ratio has a positive effect on stock returns. However, the influence of Price Earnings Ratio on stock returns is insignificant as indicated by the p –value of 0.555 in Table 4.1. This means that there are other more significant factors affecting stock market returns at the NSE other than Price earnings ratio.

The NSE 20 - Share Index has a positive effect on stock returns. It is an important factor in determining portfolio returns at the NSE as indicated by p – value of 0.033 in Table 4.1. However, since the p – value lenders the NSE 20 - Share Index insignificant when the market based financial measures are omitted from the model, investors need to also consider the financial measures such as dividend yield when forming their investment portfolio.

Dividend Yield has a positive effect on stock returns. It is an important factor in determining portfolio returns at the NSE as indicated by p – value of 0.039 in Table 4.1. Some investors at the stock market prefer companies that pay high dividends. This may explain why companies paying high dividends have high trading activity throughout the year.

Market based financial measures are therefore seen to have a significant effect on the Stock returns. By dropping the price earnings ratio and Dividend Yield from the regression model, it is clear that the adjusted R-Squared has dropped from 99.5 % to 88.3 %. The Adjusted R-Squared has reduced from 98.1 % to 76.7 %. In addition, Predicted R-Squared has dropped from 78.21 % to 3.96 % .This suggests that the market based financial measures have a significant effect on the ‘Stock returns’ since omitting the variables from the model reduces the predicting power of the model (see R-Sq (pred) Table 4.1 vs R-Sq (pred) Table 4.3).

5.4 Recommendations

Based on the findings of the study, the following are the recommendations as well as suggestions for further research.

5.4.1 Recommendations and Policy Implications

The inflation rate has a positive effect on the returns of the constructed portfolio. This means that the market's estimate of the inflation rate is very close to the actual rate when announced. However, as shown in 5.3, the investors forming an investment philosophy need to also examine the performance of companies in which they wish to invest in their stocks.

The study indicates that Exchange rate is very important factor in determining international competitiveness. According to the exchange rate movements, the market may gain or lose its competitive position. Based on the findings, the government should ensure that monetary and fiscal policies ensure that the domestic currency is stable and strong enough to enhance investor earnings. Additional measures to improve the exchange rates include export promotion, encouraging foreign direct investment among other measures.

Additionally, domestic borrowing through 91 – day Treasury Bills should be regulated in such a way that it doesn't erode earnings of stock market investors. Crowding effect may result from the sale of government securities through the scarcity of funds for domestic private investors

5.4.2 Suggestions for Further Research

This study focused on stock returns of stocks trading in the NSE within the MIMS. Only Two market based financial measures were used in the research. It is therefore recommended that a similar study be carried out on stocks trading in the NSE within the Alternative Market Segment. In addition, research can be carried out on other market based financial measures not used in this study.

5.5 Limitations of the Study

Time for data collection was limited. There was thin trading in some companies and hence this could have an effect on the findings of the study.

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APPENDIX I: VARIABLES AFFECTING ALL LISTED COMPANIES

S.NO	YEAR	INF.	ER	NSEI	TBR
1	**2001 JANUARY**	12.00	78.606	1,897.50	14.76
2	FEBRUARY	10.20	78.250	1,932.90	15.30
3	MARCH	9.50	77.753	1,830.50	14.97
4	APRIL	9.00	77.499	1,767.90	12.90
5	MAY	6.90	78.540	1,636.50	10.52
6	JUNE	4.60	78.620	1,657.10	12.07
7	JULY	4.20	79.018	1,620.70	12.87
8	AUGUST	4.00	78.914	1,505.50	12.84
9	SEPTEMBER	3.10	78.946	1,400.90	12.39
10	OCTOBER	3.20	78.967	1,472.90	11.63
11	NOVEMBER	2.10	78.959	1,420.50	11.50
12	DECEMBER	1.80	78.686	1,355.10	11.01
13	**2002 JANUARY**	0.40	78.597	1,343.40	10.85
14	FEBRUARY	1.10	78.250	1,313.60	10.61
15	MARCH	1.90	78.057	1,183.10	10.14
16	APRIL	0.90	78.274	1,129.30	10.01
17	MAY	1.70	78.315	1,071.10	9.04
18	JUNE	2.80	78.663	1,086.60	7.34
19	JULY	2.10	78.797	1,097.70	8.63
20	AUGUST	1.80	78.574	1,043.38	8.34
21	SEPTEMBER	1.80	78.807	1,043.38	7.60
22	OCTOBER	1.90	79.324	1,116.36	8.07
23	NOVEMBER	2.70	79.565	1,161.60	8.30
24	DECEMBER	4.10	79.534	1,362.90	8.38

S.NO	YEAR	INF.	ER	NSEI	TBR
25	**2003 JANUARY**	6.40	77.718	1,510.60	8.38
26	FEBRUARY	7.40	76.841	1,557.70	7.77
27	MARCH	10.10	76.583	1,608.30	6.24
28	APRIL	11.60	75.656	1,846.60	6.25
29	MAY	14.90	71.607	2,074.70	5.84
30	JUNE	13.70	73.722	2,005.10	3.00
31	JULY	10.90	74.747	1,935.00	1.54
32	AUGUST	8.30	75.960	2,107.40	1.18
33	SEPTEMBER	7.90	77.904	2,379.90	0.83
34	OCTOBER	9.10	77.765	2,457.10	1.00
35	NOVEMBER	9.00	76.738	2,737.00	1.28
36	DECEMBER	8.30	76.019	2,738.00	1.46
37	**2004 JANUARY**	9.10	76.295	3,157.90	1.58
38	FEBRUARY	9.90	76.390	3,175.40	1.57
39	MARCH	8.30	77.262	2,770.60	1.59
40	APRIL	7.60	77.910	2,707.60	2.11
41	MAY	4.70	79.243	2,689.10	2.87
42	JUNE	5.90	79.270	2,639.80	2.01
43	JULY	8.50	79.991	2,708.00	1.71
44	AUGUST	15.80	80.826	2,708.90	2.27
45	SEPTEMBER	19.00	80.721	2,670.70	2.75
46	OCTOBER	18.30	81.202	2,829.70	3.95
47	NOVEMBER	16.60	81.204	2,918.30	5.06
48	DECEMBER	16.30	79.774	2,945.60	8.04
49	**2005 JANUARY**	14.90	77.930	3,094.00	8.26

S.NO	YEAR	INF.	ER	NSEI	TBR
50	FEBRUARY	13.90	76.938	3,212.80	8.59
51	MARCH	14.10	74.803	3,208.70	8.63
52	APRIL	6.00	76.146	3,227.60	8.68
53	MAY	5.70	76.397	3,330.00	8.66
54	JUNE	7.20	76.681	3,440.00	8.50
55	JULY	5.50	76.234	3,402.00	8.59
56	AUGUST	4.70	75.809	3,370.00	8.66
57	SEPTEMBER	4.00	74.103	36,040.00	8.58
58	OCTOBER	3.70	73.709	3,939.50	8.19
59	NOVEMBER	6.00	74.738	3,974.10	7.84
60	DECEMBER	7.6	73.107	3,973.00	8.07
61	**2006 JANUARY**	15.4	72.214	4,171.80	8.23
62	FEBRUARY	18.9	71.804	4,056.60	8.02
63	MARCH	19.1	72.281	4,101.60	7.60
64	APRIL	14.9	71.304	4,925.20	7.02
65	MAY	13.1	71.764	4,349.80	7.01
66	JUNE	10.9	73.405	4,260.50	6.60
67	JULY	10.1	73.657	4,258.50	5.89
68	AUGUST	11.5	72.870	4,486.10	5.96
69	SEPTEMBER	13.8	72.866	4,879.90	6.45
70	OCTOBER	15.7	72.289	5,314.40	6.83
71	NOVEMBER	14.6	71.127	5,615.20	6.41
72	DECEMBER	15.6	69.627	5,645.70	5.73
73	**2007 JANUARY**	9.7	69.885	5,774.30	6.00
74	FEBRUARY	6.8	69.616	5,387.30	6.22

S.NO	YEAR	INF.	ER	NSEI	TBR
75	MARCH	5.9	69.293	5,133.70	6.32
76	APRIL	5.7	68.577	5,148.10	6.65
77	MAY	6.3	67.191	5,001.80	6.77
78	JUNE	11.1	66.575	5,146.70	6.53
79	JULY	13.6	67.068	5,340.10	6.52
80	AUGUST	12.4	66.946	5,372.00	7.30
81	SEPTEMBER	11.7	67.024	5,146.50	7.35
82	OCTOBER	10.6	66.845	4,971.00	7.55
83	NOVEMBER	11.8	65.490	5,234.50	7.52
84	DECEMBER	12	63.303	5,444.80	6.87
85	**2008 JANUARY**	18.2	68.081	4,712.70	6.95
86	FEBRUARY	19.1	70.624	5,072.40	7.28
87	MARCH	21.8	64.924	4,843.20	6.90
88	APRIL	26.6	62.256	5,336.00	7.35
89	MAY	31.5	61.899	5,175.80	7.76
90	JUNE	29.3	63.783	5,185.60	7.73
91	JULY	26.5	66.704	4,868.30	8.03
92	AUGUST	27.6	67.679	4,648.80	8.02
93	SEPTEMBER	28.2	71.409	4,180.40	7.69
94	OCTOBER	28.4	76.657	3,386.70	7.75
95	NOVEMBER	29.4	78.176	3,341.50	8.39
96	DECEMBER	27.7	78.040	3,521.20	8.59
97	**2009 JANUARY**	13.3	78.950	3,412.00	8.46
98	FEBRUARY	14.6	79.533	3,004.00	7.55
99	MARCH	14.6	80.261	2,805.00	7.31

S.NO	YEAR	INF.	ER	NSEI	TBR
100	APRIL	12.4	79.626	2,800.10	7.34
101	MAY	9.6	77.861	2,852.60	7.45
102	JUNE	8.6	77.851	3,294.60	7.33
103	JULY	8.4	76.751	3,273.10	7.24
104	AUGUST	7.3	76.372	3,102.70	7.25
105	SEPTEMBER	6.7	75.605	3,005.50	7.29
106	OCTOBER	6.6	75.244	3,083.60	7.26
107	NOVEMBER	5	74.739	3,189.60	7.22
108	DECEMBER	5.3	75.431	3,247.40	6.82
109	**2010 JANUARY**	10.06	75.786	3,565.30	6.56
110	FEBRUARY	9.28	76.730	3,629.40	6.21
111	MARCH	8.41	76.947	4,072.90	5.98
112	APRIL	7.7	77.254	4,233.20	5.17
113	MAY	7.2	78.541	4,241.80	4.21
114	JUNE	6.66	81.018	4,339.30	2.98
115	JULY	6.11	81.426	4,438.60	1.60
116	AUGUST	5.57	80.440	4,454.60	1.83
117	SEPTEMBER	5.08	80.912	4,629.80	2.04
118	OCTOBER	4.63	80.714	4,659.60	2.12
119	NOVEMBER	4.36	80.460	4,395.20	2.21
120	DECEMBER	4.08	80.568	4,432.60	2.28

APPEDIX II: ANNUAL PRICE – EARNING RATIO

S.NO	YEAR	Kakuzi Ord.5.00	Rea Vipingo Plantations Ltd Ord 5.00	Sasini Ltd Ord 1.00	CMC Holdings Ltd Ord 0.50	Car & General (K) Ltd Ord 5.00	Kenya Airways Ltd Ord 5.00	Marshalls (E.A.) Ltd Ord 5.00	Nation Media Group Ord. 2.50	TPS Eastern Africa (Serena) Ltd Ord 1.00	Barclays Bank Ltd Ord 2.00	CFC Stanbic Holdings Ltd ord.5.00
1	**2001**	37.82	43.54	48.90	2.52	-37.96	2.57	-0.85	6.01	6.80	0.88	7.64
2	**2002**	-15.60	6.17	-72.29	2.74	29.90	4.17	9.00	11.12	6.94	0.93	6.36
3	**2003**	-24.34	95.81	-9.78		24.97	6.64	3.9	16.95	42.03	16.9	9.54
4	**2004**	9.36	4.43	1.01	10.16	9.14	3.4	11.32	14.17	14	11.03	12.55
5	**2005**	-12.82	9.88	-3.2	6.75	3.33	3.67	5.08	18.92	274.23	109.25	21.18
6	**2006**	6.22	13.59	8.83	13.31	7.43	10.04	4.83	28.5	23.37	23.28	14.77
7	**2007**	3.71	10.17	-99.07	12.05	7.27	10.7	8.16	21.6	14.49	21.85	21.76
8	**2008**	1.59	6.07	2	11.58	4.67	6.2	-1.6	7.92	24.95	12.41	19.4
9	**2009**	1.38	4.47	2.59	10.8	4.73	-2.23	-2.94	15.04	12.51	10.03	342.79
10	**2010**	4.15	15.95	3.05	18.56	4.4	13.61	-0.079	17.06	20.82	8.01	11.56

S.NO	YEAR	Diamond Trust Bank Kenya Ltd Ord 4.00	Housing Finance Co Ltd Ord 5.00	Jubilee Holdings Ltd Ord 5.00	Kenya Commercial Bank Ltd Ord 1.00	National Bank of Kenya Ltd Ord 5.00	NIC Bank Ltd 0rd 5.00	Pan Africa Insurance Holdings Ltd 0rd 5.00	Standard Chartered Bank Ltd Ord 5.00	Athi River Mining Ord 5.00	British American Tobacco Kenya Ltd Ord 10.00	Bamburi Cement Ltd Ord 5.00
1	**2001**	17.48	-3.70	4.61	12.50	4.81	13.25	3.84	5.20	10.12	8.11	8.29
2	**2002**	10.53	10.71	3.39	-0.85	7.09	14.12	-21.52	6.90	7.62	6.56	12.93
3	**2003**	19.98	26.73	8.46	16.64	6.61	15.46	-48.12	16.93	20.35	24.3	42.86
4	**2004**	16.97	16.3	7.55	16.23	9.88	15.77	10.75	18.1	11.95	16.53	20.07
5	**2005**	13.6	27.28	5.47	17.01	9.61	14.95	10.87	15.42	18.41	14.76	23.58
6	**2006**	20.77	54.63	20.78	19.78	18.57	18.35	46.59	21.16	29.18	16.4	29.85
7	**2007**	20.82	71.57	14.46	19.12	8.35	8.29	23.75	16.15	21.85	10.03	19.78
8	**2008**	9.91	32.71	7.76	12.44	6.93	12.44	-31	13.39	17.81	7.7	17.55
9	**2009**	8.43	17.68	5.66	11.13	5.33	9.39	15.55	9.25	17.03	12.04	8.12
10	**2010**	8.87	16.06	4.95	8.94	5.37	8.86	5.34	13.78	22.89	15.28	12.81

S.NO	YEAR	B.O.C Kenya Ltd Ord 5.00	Crown Berger Ltd 0rd 5.00	E.A.Cables Ltd Ord 0.50	E.A.Portland Cement Ltd Ord 5.00	East African Breweries Ltd Ord 2.00	Total Kenya Ltd Ord 5.00	Unga Group Ltd Ord 5.00
1	**2001**	7.80	4.65	11.69	1.33	5.34	-8.54	-3.52
2	**2002**	4.95	2.72	-31.33	9.13	3.88	9.45	-3.82
3	**2003**	12	12.94	29.52	18.41	16.43	12.82	-28.11
4	**2004**	16.71	13.05	8.35	-15.88	12.7	28.34	-8.97
5	**2005**	13.65	24.13	13.03	14.36	20.58	13.34	16.87
6	**2006**	13.83	22	34.15	28.85	16.99	12.37	30.74
7	**2007**	11.68	15.63	20.39	12.96	16.55	11.27	11.21
8	**2008**	15.59	19.08	11.49	13.33	17.13	7.96	2.3
9	**2009**	19.03	6.6	13.85	3.44	13.32	10.67	4.09
10	**2010**	32.49	9.34	17.9	-35.4	16.2	5.48	3.93

S.NO	YEAR	Kakuzi Ord.5.00	Rea Vipingo Plantations Ltd Ord 5.00	Sasini Ltd Ord 1.00	CMC Holdings Ltd Ord 0.50	Car & General (K) Ltd Ord 5.00	Kenya Airways Ltd Ord 5.00	Marshalls (E.A.) Ltd Ord 5.00	Nation Media Group Ord. 2.50	TPS Eastern Africa (Serena) Ltd Ord 1.00	Barclays Bank Ltd Ord 2.00	CFC Stanbic Holdings Ltd ord.5.00
1	**2001**	0.00	0.00	5.05	8.33	0.00	16.56	0.00	3.70	6.47	15.52	7.44
2	**2002**	0.00	9.80	3.79	5.80	0.00	7.64	0.00	2.08	5.79	5.95	7.28
3	**2003**	0	7.77	0	1.47	0.99	8.7	0	2.62	4.04	5	2.55
4	**2004**	2.5	8.42	12.2	1.82	4.47	7.81	0	3.53	2.33	7	1.45
5	**2005**	0	3.9	0	3.17	2.31	5.21	0	3.16	0.49	5.32	1.12
6	**2006**	0	3.14	1.82	1.93	1.48	1.67	6.67	3.83	1.45	2.14	1.97
7	**2007**	0	4.09	0	2.28	1.18	1.84	4.17	3.22	2.19	2.09	1.47
8	**2008**	4.35	1.18	0	2.39	1.49	3.37	0	3.82	2.38	3.96	0.83
9	**2009**	7.87	4.5	6.61	3.5	1.6	5.06	0	4.66	2.78	5.5	0
10	**2010**	3.07	4.47	3.76	1.54	1.7	1.67	0	4.79	1.82	8.72	1.06

S.NO	YEAR	Diamond Trust Bank Kenya Ltd Ord 4.00	Housing Finance Co Ltd Ord 5.00	Jubilee Holdings Ltd Ord 5.00	Kenya Commercial Bank Ltd Ord 1.00	National Bank of Kenya Ltd Ord 5.00	NIC Bank Ltd 0rd 5.00	Pan Africa Insurance Holdings Ltd 0rd 5.00	Standard Chartered Bank Ltd Ord 5.00	Athi River Mining Ord 5.00	British American Tobacco Kenya Ltd Ord 10.00	Bamburi Cement Ltd Ord 5.00
1	**2001**	4.44	0.00	11.29	0.00	0.00	10.67	4.13	9.04	0.00	16.12	6.71
2	**2002**	6.00	0.00	11.29	0.00	0.00	10.15	0.00	6.21	2.13	16.67	8.00
3	**2003**	2.5	0	4.5	1.85	0	4.95	0	4.45	2.35	4.53	2.22
4	**2004**	2.5	0	4.31	3.13	0	4.8	4.76	5.33	0	8.25	6.44
5	**2005**	2.17	0	4.82	3.54	0	5	3	5.4	1.9	6.13	3.79
6	**2006**	1.38	0	1.32	2.49	0	2.65	1.57	4.15	1.2	6.09	2.56
7	**2007**	1.48	0.55	2	2.46	0	1.28	1.61	4.85	1.34	12.23	3.06
8	**2008**	2.04	1.55	3.46	4.26	0	1.15	0	6.25	1.38	12.98	3.64
9	**2009**	2.12	2.78	3.91	4.88	0	1.6	3.78	7.45	1.35	8.29	7.05
10	**2010**	1.19	2.64	2.99	5.75	1.55	1.09	4.58	5.23	0.96	4.91	4.55

S.NO	YEAR	B.O.C Kenya Ltd Ord 5.00	Crown Berger Ltd 0rd 5.00	E.A.Cables Ltd Ord 0.50	E.A.Portland Cement Ltd Ord 5.00	East African Breweries Ltd Ord 2.00	Total Kenya Ltd Ord 5.00	Unga Group Ltd Ord 5.00
1	**2001**	11.83	0.50	11.96	9.09	8.96	0.00	0.00
2	**2002**	16.86	1.50	5.43	12.00	10.91	8.74	0.00
3	**2003**	4.37	4.23	7.33	3.78	5.31	6.63	0
4	**2004**	3.28	0	6.86	3.68	3.84	2.68	0
5	**2005**	3.79	2.86	3.65	2.58	2.01	0	0
6	**2006**	7.06	3.43	1.46	1.97	2.99	0	0
7	**2007**	5.78	0	2.14	2.36	4.32	0	0
8	**2008**	4.25	0	3.81	0	2.84	0	0
9	**2009**	4.53	0	4.94	1.86	3.83	0	0
10	**2010**	7.12	0	6.15	0	3.45	0	4.08