THE VALIDITY OF THE DIVIDEND DISCOUNT MODEL IN DETERMINATION OF GROWTH STOCK PERFORMANCE IN THE NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

This research project is my original work and has not been presented for examination in any other University.

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LIST OF ABBREVIATIONS

AR – Abnormal Returns
ATT – Average effect of the Treatment on the Treated
CAPM – Capital Asset Pricing Model
CIM – Conditioned Independence Assumption
CMA – Capital Markets Authority
DCF – Discounted Cash Flow
DDM – Dividend Discount Model
GDP – Gross Domestic Product
NASI – NSE All Share Index
NSE – Nairobi Securities Exchange
PSM – Propensity Score Matching
ROE – Return on Equity
ROI – Return on Investment
SEO – Seasoned Equity Openings
WACC – Weighted Average Cost of Capital
ABSTRACT

The widespread lack of investor education on stock market investment and persistent information asymmetry in the securities market in Kenya and in the greater financial world has cost investors a pretty penny, and they have incurred great financial loss while making their investment decisions. This study contributes by finding out what one of the methods of investment analysis; the dividend discount model can contribute to solving this investment problem. The purpose of this project was to determine the validity of the dividend discount model in determination of growth stock performance in the Nairobi Securities Exchange. The DDM assumption of multiple growth periods was tested to evaluate its validity. Stratified sampling was used in the sample selection for the study. The research involved a historical longitudinal study of the financial data released by the listed growth stock firms in the NSE. The population of the study comprised 17 growth stocks listed in the Nairobi Securities Exchange as at 31st December 2013. The research relied upon secondary data obtained from the Nairobi Securities Exchange, and financial reports of the growth stock firms obtained from the Capital Markets Authority. High frequency data (monthly) was obtained for the bid prices of the stock. The period of study was the four year period between January 2008 and December 2013. The data collected was for 15 growth stock firms out of a possible 17, thus an overall success rate of 88.2%. The data was analyzed using descriptive analysis, propensity score matching and multiple regression analysis using SPSS. The results revealed that the DDM obtained from historical financial data of a growth stock had a weak positive significant correlation with actual stock returns (0.949). The study also found that market beta had a weak negative insignificant relationship with the DDM (-0.58). There is also a weak negative insignificant relationship between market beta and the actual stock return value of -0.001. The study recommends that in order for investors to make the best investment decisions regarding growth stocks in the NSE, the DDM model may be used in order to obtain a descriptive forecast of investment returns in such instruments, use of the CAPM model which heavily relies on market beta is however not advised. The study also recommends that there is also need to identify the growth stocks as prime investment ventures while taking caution to perform fundamental analysis of the company financials for the particular growth stocks.
CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

This section introduces the concept of dividend discount models and their application in stock performance analysis in the Nairobi Securities Exchange. Due to the lack of investor education on stock market investment and persistent information asymmetry in the securities market in Kenya and in the greater financial world, investors have incurred great financial loss while making their investment decisions. This study contributes by finding out what one of the methods of investment analysis; the dividend discount model can contribute to solving this investment problem.

The cleanest and most straightforward measure of cash flow is dividends because these are clearly cash flows that go directly to the investor, which implies that an investor should use the cost of equity as the discount rate. However, this dividend technique is difficult to apply to firms that do not pay dividends during periods of high growth, or that currently pay very limited dividends because they have high rate of return investment alternatives available. On the other hand, an advantage is that the reduced form of the dividend discount model (DDM) is very useful when discussing valuation for a stable mature entity where the assumption of relatively constant growth for the long term is appropriate (a good example is the aggregate stock market). A benefit, but also a potential problem with the discounted cash flow valuation models, one of which is the DDM, is that it is possible to derive intrinsic values that are substantially above or below prevailing prices depending on how the estimated inputs are adjusted to the prevailing environment (Brown, 2009).

According to the Investopedia, there has been an increasing trend of individual investors taking charge of their own investment decisions. This is where individual investors choose to build and manage their portfolios with the use of discount brokerages as opposed to full-service brokerages or money managers. It is common to find a sharp rise in the level of this type of investing following market downturns or economic uncertainty. The advent of discount brokerages and a multiple of online investment tools
have led to a large increase in do-it-yourself investing in recent years. Individual investors will often choose to manage their own investments and leave their brokerages, portfolio managers and mutual funds due to the management fees associated with those investments, or the poor performance of their investments relative to the broader market. Although discount brokerages do not charge management fees, they still charge trading and maintenance fees which can eat away at an individual investor’s portfolio. Some of the challenges that come with individual investing include investing in something one does not understand, falling in love with a company, lack of patience, too much investment turnover, market timing, waiting to get even, failing to diversify and letting one’s emotions rule the process. These investment mistakes can be avoided in order to reduce the financial loss and keep the investor’s portfolio on track. Do-it-yourself investing is quite difficult especially due to the lack of financial knowledge in investments in finance. It requires the implementation of consistent long-term investment strategies over time in order to build wealth. Investment mistakes are part of the investing process. Knowing what they are, when they are committed and how to avoid them will help investors achieve their investment goals. To avoid committing them, they have to develop a thoughtful, systematic plan and stick with it (Investopedia, 2014).

This study pays special attention to growth stocks. A growth stock is a stock of a company that generates substantial and sustainable positive cash flow and whose revenues and earnings are expected to increase at a faster rate than the average company within the same industry (O’Neil, 2002). A growth company typically has some sort of competitive advantage like a new product, a breakthrough patent or overseas expansion that allows it to fend off competitors (Lowe, 2001). Growth stocks usually pay smaller dividends, as the company typically reinvests retained earnings in capital projects. Growth investing is about finding stocks that are showing high and accelerating earnings growth. Growth investing is a style of investment strategy where investors invest in companies that exhibit signs of above-average growth, even if the share price appears expensive in terms of metrics such as price to earnings or price to book ratios. Growth investors look for companies that traditionally have high growing earnings. Therefore, growth stocks are equity securities with high price earnings per share and price to book ratio. In theory, high growth equals high stock prices in turn, high profits. People
involved in growth investing take their risks wagering that young, upcoming companies will break through and become leaders in their industry (Brown, 2009).

1.1.1 The Dividend Discount Model

There are several methods that can be used in the analysis of the performance of a particular stock. These methods fall into one of two broad categories: fundamental analysis and, technical analysis. Fundamental analysis involves the analysis of security values grounded in basic factors such as earnings, balance sheet variables, and management quality. It attempts to determine the true value of a security, and, if the market price of the stock deviates from this value, to take advantage of the difference by acquiring or selling the stock. Fundamental analysis may involve investigating a firm's financial statements, visiting its managers, or examining how a particular industry is affected by changes in the economy. Technical analysis on the other hand, is the study of relationships among security market variables, such as price levels, trading volume, and price movements, so as to gain insights into the supply and demand for securities.

Rather than concentrating on earnings, the economic outlook, and other business-related factors that influence a security's value, technical analysis attempts to determine the market forces at work on a certain security or on the securities market as a whole. The dividend discount model is one method of discounted cash flow analysis which is used in fundamental analysis and it depends on information found within the financial statements of a firm. According to the Farlex Financial Dictionary, discounted cash flows are future expected cash flows from a project or venture that have been adjusted to arrive at their present value. One uses the calculation of discounted cash flows to determine whether a particular investment is likely to be profitable. The dividend discount model is used to determine the price at which a security should sell based on the discounted value of estimated future dividend payments. Dividend discount models are used to determine if a security is a good buy, such as one that sells at a lower current price than the model would indicate, or a bad buy, such as one that sells at a higher current price than the model would indicate (Scott, 2003).
The DDM assumes that the value of a share of common stock is the present value of all future dividends as follows:

$$P_0 = \frac{D_1}{(1 + k)} + \frac{D_2}{(1 + k)^2} + \cdots + \frac{D_n}{(1 + k)^n} + \frac{P_N}{(1 + k)^N}$$

$$P_0 = \sum_{t=1}^{n} \frac{D_t}{(1 + k)^t}$$

(Equation 1.1)

$P_0 = \text{Price of Stock at Sale}$

$D_t = \text{Dividend during Period } t$

$g = \text{Growth Rate}$

$k = \text{Required rate of Return}$

$$\frac{P_N}{(1 + k)^N} = \text{Terminal Value}$$

Whenever the stock is sold, its value (that is, the sale price at that time) will be the present value of all future dividends. When this ending value is discounted back to the present, you are back to the original dividend discount model. The infinite period model assumes that investors estimate future dividend payments for an infinite number of periods. Some of the assumptions of the infinite period DDM are: dividends grow at a constant rate; the constant growth rate will continue for an infinite period, and; the required rate of return($K_e$) and the expected growth rate of dividends($g$). If it is not, the model gives meaningless results because the denominator becomes negative. In determining the value of a growth stock, the DDM is one of the most reliable models. Growth companies as explained earlier are firms that have the opportunities and abilities to earn rates of return on investments that are consistently above their required rates of return. The required rate of return is its weighted average cost of capital (WACC). To exploit these outstanding investment opportunities, these growth firms generally retain a
high percentage of earnings for reinvestment, and their earnings will grow faster than those of a typical firm (Brown, 2009).

Notably, the earnings growth pattern for these growth companies is inconsistent with the assumptions of the infinite period DDM. First, the infinite period DDM assumes dividends will grow at a constant rate for an infinite period. This assumption seldom holds for companies currently growing at above-average rates. As an example, both Apple and Google have grown at rates in excess of 20 percent a year for several years. It is unlikely that they can maintain such extreme rates of growth because of the inability to continue earning the ROEs implied by this growth for an infinite period in an economy where other firms will compete with them for these high rates of return.

Second, during periods when these firms experience abnormally high rates of growth, their rates of growth probably exceed their required rates of return. There is no automatic relationship between growth and risk; a high-growth company is not necessarily a high-risk company. In fact, a firm growing at a high constant rate would have lower risk (less uncertainty) than a low-growth firm with an unstable earnings pattern. In summary, some firms experience periods of abnormally high rates of growth for some finite periods of time. The infinite period DDM cannot be used to value these true growth firms because these high-growth conditions are temporary and therefore inconsistent with the assumptions of the DDM (Brown, 2009).

1.1.2 Stock Performance

For a long time, financial performance has been perceived only through its ability to obtain profits. This changed over time, today the concept of performance having different meanings depending on the user perspective of financial information. A company can be categorized as global performance if it can satisfy the interests of all stakeholders: managers are interested in the welfare and to obtain profit because their work is appreciated accordingly; owners want to maximize their wealth by increasing the company’s market value (this objective can only be based on profit); current and potential shareholders perceive performance as the company’s ability to distribute dividends for capital investment, given the risks they take; commercial partners look for the solvency and stability of the company; credit institutions want to be sure that the
company has the necessary capacity to repay loans on time (solvency); employees want a stable job and to obtain high material benefits; the state seeks a company to be efficient, to pay its taxes, to help creating new jobs, (Valentin, 2013). Companies’ management use financial indicators to measure, report and improve its performance. It has been proved that in order to obtain a global situation of an economic entity at a specific moment it’s necessary that the evaluation to be based on a balanced multidimensional system which includes both financial ratios and non-financial indicators.

Analysis of determinants of corporate financial performance is essential for all the stakeholders, but especially for investors. The Anglo-Saxon corporate governance focuses on maximizing shareholder value. This principle provides a conceptual and operational framework for evaluating business performance. The value of shareholders, defined as market value of a company is dependent on several factors; the current profitability of the company, its risks and its economic growth essential for future company earnings (Branch & Gale, 1983). All of these are major factors influencing the market value of a company.

Other studies (Brief & Lawson, 1992) argue the opposite, that financial indicators based on accounting information are sufficient in order to determine the value for shareholders. A company’s financial performance is directly influenced by its market position. Profitability can be decomposed into its main components: net turnover and net profit margin. Ross et al. (1996) argues that both can influence the profitability of a company one time. If a high turnover means better use of assets owned by the company and therefore better efficiency, a higher profit margin means that the entity has substantial market power.

Risk and growth are two other important factors influencing a firm’s financial performance. Since market value is conditioned by the company’s results, the level of risk exposure can cause changes in its market value (Fruhan, 1979). Economic growth is another component that helps to achieve a better position on the financial markets because market value also takes into consideration expected future profits (Varaiya, Kerin & Weeks, 1987).
1.1.3 The Effect of Dividends on Stock Performance

Valuation of common stock is very important yet a very complex process. The stock requires a deeper analysis compared to preferred stock or debts. The major techniques of valuation of common stock are: relative valuation models which is based on the earnings power of the firm, the book value and sales, and; the discounted cash flow techniques, where the value of stock is estimated based upon the present value of some measure of cash flow including dividends, operating cash flow among others. Miller and Modigliani (1961) argue that dividends are irrelevant and that it does not matter whether a firm capitalizes dividends or earnings, because price changes in shares will be reflected on both earnings and dividends and those investors would select whether to receive income as dividends or by sale of shares. In the real world it is generally accepted that dividends policy matters because of presence of transactions cost, taxation effects, monopolistic effects in the markets for borrowing and investment and indivisible investment opportunities (Wilkes, 1977). The dividends discount model therefore has a strong foundation for share valuation. The dividend discount model is perceived as an appropriate model in this study because: first there is no sound methodology for evaluating price earnings ratio which in essence is the reciprocal of the required rate of return.

Secondly, dividends are the flow of returns received by the investors. Thirdly others have intensively used the dividend discount model in valuation of securities. There is evidence that complex dividend discount models improve the accuracy of the forecast and therefore are useful in selecting shares (Fuller and Chi Cheng 1984; Sorensen and Williamson 1985).Fourthly, the dividend discount model is based on a simple, widely understood concept. The fair value of any security should be equal to the discounted value of cash flows expected to be produced by that security. Fifth, the basic inputs for the model are standard outputs for many large investment management firms, that is these firms employ security analysts who are responsible for projecting corporate earnings (Sharpe et al 1999). Finally it is argued that the dividend discount model provides a consistent and plausible framework for imbedding analysts judgments of share value (Michaud and Davis,1982). As a qualification of security value, the dividend discount model is often a first and critical step in a quantitative investment management program.
The dividends and earnings valuation methods have not gained widespread or wholehearted acceptance by investors because of the choice of required rate of return (Olweny, 2011).

1.1.4 Nairobi Securities Exchange

The Nairobi Securities Exchange is the principal stock exchange of Kenya. It began in 1954 as an overseas stock exchange while Kenya was still a British Colony with the permission of the London Stock Exchange. The NSE is a member of the African Securities Exchanges Association. It is Africa’s fourth largest stock exchange in terms of trading volumes, and fifth in terms of market capitalization as a percentage of GDP. The Exchange works in cooperation with the Uganda Securities Exchange and the Dar es Salaam Stock Exchange, including the cross listing of various equities. NSE is reorganized into ten independent market sectors including: Agricultural, Commercial and Service, Telecommunication and Technology, Manufacturing and Allied, Banking, Automobiles and Accessories, Insurance, Energy and Petroleum, Construction and Allied Investment. Two indices are popularly used to measure performance. The NSE 20-Share Index has been in use since 1964 and measures the performance of 20 blue-chip companies with strong fundamentals and which have consistently returned positive financial results. The other index is the NSE All Share Index (NASI) which was introduced as an alternative index. Its measure is an overall indicator of market performance. The index incorporates all the traded shares of the day (NSE, 2014).

1.2 Research Problem

Individual investors today no longer depend of money managers or full-service brokerages to conduct their investment activities or manage their portfolios. Due to their hands-on approach the challenge of constantly ensuring a positive return on their investment has arisen and investors have taken a great blow to their investments over the years mostly because of lack of investment know-how and information asymmetry in the financial market. Over the years, behavioral biases such as prospect theory, regret and cognitive dissonance, anchoring, mental accounting, overconfidence, over and under reaction, representativeness, disposition effect, the disjunction effect, gambler’s fallacy and speculation, perceived irrelevance of history, magical thinking, quasi-magical
thinking, attention anomalies etc. have been found to have significant influence on investors’ behavior, determining their trading decisions, influencing prices and ultimately determining the amount of gains/returns realized. This is because investors are emotional beings and are not always rational in their decisions as much as they try to be (Shiller, 1998).

In the Nairobi Securities Exchange, when an investor commits certain funds, he expects a stream of returns over the period of ownership. The investor could be an individual, the government, a pension fund or a corporation. The investor therefore trades a known shilling amount today for some expected future stream of payments that will be greater than the current outlay. Since an investment involves sacrifice of a current shilling for a future shilling, time and risk must be taken into consideration. The sacrifice made today is certain while the returns expected in future are uncertain. Thus active efforts to find the value of common stock will continually be made for the benefit of investors (Olweny, 2011).

In a research done by Tobias Olweny (2011), on the reliability of the dividend discount model in the valuation of common stock, it was determined that a firm’s share price is not influenced by its dividend and the use of multiple models may result to more robust analysis than a single model like the dividend discount model. The researcher however, assumed that the joint distribution of security prices is multivariate normal, while it is actually serially independent (random), and which led to the non-reliability conclusion made.

Previous studies have been done on this topic, and have covered the validity and reliability of the model in estimating the true value of common stock and the contribution of the model towards investment decisions. In 1979, Fruhan identified the DDM as a significant method in financial strategy in the creation, transfer and destruction of shareholder value. These efforts were mirrored in Riley & Brown’s (2009) Investment Analysis & Portfolio Management and Van Horne’s (2001) Financial Management and Policy. In research projects as well, Mikaely, Thaler and Womak (1995) tested the short-run and long-run effects of dividend initiation on stock returns; Patel et al., (2009) examined which combination of dividend yield and payout ratio worked best to indicate
future stock performance; while Olweny (2011), discussed the reliability of the DDM in stock performance determination of common stock.

However, there are few known studies on the validity of the dividend discount model on growth stocks as applied to the Nairobi Securities Exchange. There is also a knowledge gap in the market on the intrinsic value of stocks which is vital information to individual investors and can assist in making decisions on whether to buy, hold or sell a financial asset. The study sought to answer the following question; is the dividend discount model valid in the determination of stock performance of growth stocks traded in the Nairobi Securities Exchange?

1.3 Research Objectives
The main objective of this research is to study the applicability of the dividend discount model to the performance of the growth stocks traded in the Nairobi Securities Exchange.

1.3.1 Specific Objectives
i. To establish the stock performance of growth stocks using the dividend discount model.

ii. To establish the validity of the dividend discount model in the determination of the performance of the stocks traded in the NSE.

1.4 Value of the Study
The study generated information that can be used by various stakeholders interested in individual investing and the performance of the stocks in the telecommunications industry in Kenya. It enables the managers of discount investment firms to advise their clients accordingly on when to invest or divest in a particular security in the NSE.

The study provides stakeholders in the capital markets with more information to aid them in decision making. Firms with securities that are traded in the NSE benefit from this study in that it provides them with knowledge regarding the performance of their stocks and they could use this information to make decisions regarding how their operations are conducted to suit and counter these performance forecasts generated from the use of the DDM. Information from this study also helps individual investors who may be planning or have already invested in growth stocks to be aware of the dangers of investing without
a proper analysis of stock performance. This helps them make better decisions that result in better or higher returns or that costs them less.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
This chapter presents a review of the related literature on the subject under study presented by various researchers, authors and analysts. It includes theories on the Dividend Discount Model and its weakness is briefly discussed. It is then concluded by a summary of the chapter.

2.2 Theoretical Review
Since determining of the present value of all future dividends is difficult, analysts typically apply simplifying assumptions when employing the DDMs. The typical assumption is that the stock’s dividends will grow at a constant rate over time. Although unrealistic for fast growing or cyclical firms, this assumption may be appropriate for many mature firms. More complex DDMs exist for more complicated growth forecasts including two-stage growth models (a period of fast growth by a period of constant growth) and three-stage growth models (a period of fast growth followed by a period of diminishing growth followed by a period of constant growth). The constant growth DDM implies that when dividends grow at a constant rate, a stock’s price should equal next year’s dividend, \( D_1 \), dividend by investors’ required rate of return on the stock \( K_e \) minus the dividend growth rate \( g \):

\[
\text{Intrinsic Value} = \frac{D_1}{k - g}
\]  

(Equation 2.1)

Assuming constant dividend growth, the following year’s dividend \( D_1 \) should equal the current dividend, \( D_0 \), increased by the constant dividend growth rate: \( D_1 = D_0(1 + g) \). Since the current dividend is known, to estimate intrinsic value we need only estimate the dividend growth rate and the investor’s required rate of return (Brown, 2009).

The study includes the theoretical derivation of the DDMs. The different types of tractable DDMs reflect different sets of assumptions about dividend growth rates. These are; the zero-growth model, the constant-growth model, the multiple growth model and
valuation based on a finite holding period. But first, let us take a look at the underlying theories that DDMs are based on.

2.2.1 The Theory of Investment Value

A valuation model converts a set of forecasts of a series of company and economic variables into a forecast of market value for the company’s stock. Inputs to a valuation model include future earnings, dividends and variability of earnings. Valuation model therefore is a formal relationship that is expected to exist between a set of corporate and economic factors and the market’s valuation of these factors. The dividend discount model explains the relationship between the share price and dividends paid in a particular period. In a world of no taxes, Miller and Modigliani (1961) proved that payout has no effect on shareholders wealth (share prices). Dividend policy is therefore irrelevant. They argue that the value of the firm depends on the firm’s earnings which results from its investment policy. When corporate and personal taxes are introduced into the model, shareholders wealth decreases when dividends are paid out. Empirical research on the relationship between dividend yields and common stock prices has, in most cases not looked at the effect of departures from an optimal dividend payout (Weston and Copeland, 1992).

Although managers behave as though dividend policy is a critical variable, their behavior does not imply that market actually values that attention. Given the conflicting impacts of market imperfections, the relevance of dividend policy becomes an empirical question. A critical question may be asked – what does real world stock price suggest about how dividend policy affects equity valuation? In a real world there are market imperfections which include taxation effects, transactions costs, monopolist effects in the markets for borrowings, asymmetric information and agency costs. Therefore a firm’s dividend policy might impact on the value of its shares. Brennan (1970) added a dividend yield variable to the capital asset pricing model, and reasoned that firms with higher dividend yields should have higher pre tax returns than equity in firms with lower payouts. This higher yield would compensate investors for higher taxes and, therefore equates after tax returns holding constant for systematic risk. Empirical tests of Brennan’s model however, have not yielded definitive results with respect to dividend yield coefficient as noted by
Long (1978) conducted a unique study on the relationship between dividend yield and market returns. He examined prices of two classes of common stock in a firm (Citizens Utilities Company of Atlanta, Georgia) with two classes of common stock. One pays cash dividend while the other class provides an equivalent dollar value in extra shares via stock split. Tax models of dividend policy predict the stock split shares will sell at a premium relation to the cash dividend shares. Surprisingly, Long found the opposite. The cash dividend shares sold at a significant premium to the other class of shares. Although this result represents only one firm, it suggests the market value cash dividend over capital gains. If taxes play a large role in the composition of investor’s portfolios, high yield stocks to escape taxes, while low tax bracket investors should be more indifferent to the dividend policies of firms. In other words tax induced dividend clienteles should exist. Lewellen et al. (1978) examined the dividend yields on portfolios held by individual investors in a cross section of tax brackets and found weak support, suggesting that high tax bracket investors chose stocks that paid lower dividend yields.

2.2.2 Dividend Irrelevance Theory
Miller and Modigliani state that the tax differential in favor of capital gains is undoubtedly the major systematic imperfection in the market. Implying that existence of differential taxes on income and capital gains should make the shares of corporations that pay low more desirable, and thus a corporation can increase the value of its shares by reducing its payout ratio. Nevertheless, Miller and Modigliani still conclude that dividend policy has no effect on the share values. Finally, a popular avenue of research of tax effect and tax-induced clientele effect has been the stock price behavior across the dividend day. Elton and Grubber (1970) authored an influential study of stock price behavior around the ex-dividend day, they found less than full dividend price drop on the dividend day during periods of differential taxation. Their study concludes that ex dividend price behavior of stocks is evidence of investor’s preference for capital gains over cash dividends. Empirical studies that clearly model how dividend policy impacts firms value due to corporate flotation costs and investors translates are, unfortunately not available. The Agency theory models that suggest dividend policy can help reduce agency conflicts between bond shares and stockholders have, to date, not been tested.
With respect to whether managers use dividend policy to convey news about changes in firms value based on their inside or asymmetric information, empirical studies are more definitive. Studies have shown that stock prices significantly rise when dividends are increased by more than the expected amount, and vice versa. The stocks splits study by Fama et al (1969) as cited in Fama (1976), found that when splits were accompanied by dividend announcements there was an increase in adjusted share prices for the group that announced dividend increase and a decline in share prices for the dividend decrease group. Other studies of the effect of unexpected dividend changes on share prices were made by Pettit (1972), Watts (1973) Kwan (1981) and Aharony and Swary (1980).

Healy and Palepu (1988) found that investors interpret announcements of dividend initiations and omissions as managers forecast of future earnings changes. Further, Brickley (1983) has shown that “specially designated dividends” which bear such labels as “special” or “extra” when announced by the board, convey less favorable information than do increases in regular dividend. These findings suggest that market regards specially designated dividends as more temporary versus the permanent increase implied by an increase in regular dividend. Empirical evidence also shows that stock’s prices do respond positively when firms announce repurchase programs. However, the economic factors that lead managers to choose cash dividends versus stock repurchases are not well understood.

To develop a theory that explains choice between payout mechanisms, the differential costs and benefits between the alternatives must be specified. Based on asymmetric information arguments, Barclay and Smith (1988), say that if managers time their repurchases in periods when they think, based on outside information, that their stock is undervalued, selling shareholders lose while remaining shareholders, including non selling managers, win. Such gaining activity cannot be conducted to the disadvantage of selling shareholders since the market is aware of managers’ ability to exploit inside information. A higher market price will be attached to firms with a regular cash dividend policy versus a more sporadic share repurchase policy. This observation might explain the reason why cash dividends are much more commonly used as a method of cash disbursement than stock repurchase.
In conclusion, it is difficult to summarize the dividend puzzle. As Black (1976) noted, “The harder we look at the dividend picture, the more it seems like a puzzle with pieces that just do not fit together”. In a perfect capital market world with both certainty and uncertainty cases; dividend policy is irrelevant, a trivial detail that managers could as well ignore. In a world of imperfections dividends policy is favored. However, certain market imperfections seem to favor a managed dividend policy, others favor residual dividend policy, yet other imperfections are ambiguous as to their impact. The empirical evidence on whether dividend policy affects stock value or required returns is mixed and generally inconclusive. What is unknown dominates what is known about dividends policy. Little evidence suggests an appropriate dividends payout level. However, compelling evidence suggests that stock price changes accompany changes in cash dividends and stock repurchase announcements (Black, 1976).

### 2.2.3 The Zero-Growth Model

The no-growth firm is a mythical company that is established with a specified portfolio of investments that generate a constant stream of earnings \((E)\) equal to \(r\) (equal to the rate of return on assets) times the value of assets. Earnings are calculated after allowing for depreciation expense used to maintain the assets at their original value. Therefore,

\[
E = r \times Assets
\]  \hspace{1cm} (Equation 2.2)

It is also assumed that all earnings of the firm are paid out in dividends; if \(b\) is the rate of retention, \(b = 0\). Hence,

\[
E = r \times Assets = Dividends
\]  \hspace{1cm} (Equation 2.3)

Under those assumptions, the value of the firm is the discounted value of the perpetual stream of earnings\((E)\). The discount rate (the investor’s required rate of return) is specified as \(k\). In this case, it is assumed that \(r = k\). The firm’s rate of return on assets equals its required rate of return. Therefore, the value of the firm is
In the no-growth case, the earnings stream never changes because the asset base never changes, and the rate of return \( r \) on the assets never changes. Therefore, the value of the firm never changes, and investors continue to receive \( k \) on their investment (Brown, 2009).

2.2.4 The Constant-Growth Model

\[
V = \frac{E}{k} = \frac{(1-b)E}{k}
\]  

(Equation 2.4)

Equation 2.5 as it stands is not very useful in valuing a stock because it requires dividend forecasts for every year into the indefinite future. To make the DDM practical, we need to introduce some simplifying assumptions. A useful and common first pass at the problem is to assume that dividends are trending upward at a stable growth rate \( g \). Then if \( g = 0.05 \), and the most recently paid dividend was \( D_0 = 3.81 \), expected future dividends are

\[
D_1 = D_0(1 + g) = 3.81 \times 1.05 = 4.00
\]

\[
D_2 = D_0(1 + g)^2 = 3.81 \times (1.05)^2 = 4.20
\]

\[
D_3 = D_0(1 + g)^3 = 3.81 \times (1.05)^3 = 4.41
\]

etc.

Using those dividend forecasts in Equation 2.5, we solve for intrinsic value as

\[
V_0 = \frac{D_0(1 + g)}{1 + k} + \frac{D_0(1 + g)^2}{(1 + k)^2} + \frac{D_0(1 + g)^3}{(1 + k)^3} + \ldots
\]

This equation can be simplified to

\[
V_0 = \frac{D_0}{1} + \frac{D_0}{(1 + k)} + \frac{D_0}{(1 + k)^2} + \frac{D_0}{(1 + k)^3} + \ldots
\]

(Equation 2.6)
\[ V_0 = \frac{D_0(1 + g)}{k - g} = \frac{D_1}{k - g} \]

Note in Equation 2.6 that we divide \( D_1 \) (not \( D_0 \)) by \( k - g \) to calculate intrinsic value. Equation 2.6 is called the constant growth DDM or the Gordon Model, after Myron J. Gordon, who popularized the model. It is a generalization of the perpetuity formula to cover the case of a growing perpetuity. As \( g \) increases, the stock price also rises.

The constant growth DDM is valid only when \( g \) is less than \( k \). If dividends were expected to grow forever at a rate faster than \( k \), the value of the stock would be infinite. If an analyst derives an estimate of \( g \) that is greater than \( k \), that growth rate must be unsustainable in the long run. The appropriate valuation model to use in this case is a multistage DDM that is discussed below. The constant growth DDM is so widely used by stock market analysts that it is worth exploring some of its implications and limitations.

The constant growth rate DDM implies that a stock’s value will be greater: the larger its expected dividend per share; the lower the market capitalization rate, \( k \); the higher the expected growth rate of dividends. Another implication of the constant growth model is that the stock price is expected to grow at the same rate as dividends. To generalize

\[ P_1 = \frac{D_2}{k - g} = \frac{D_1(1 + g)}{k - g} = \frac{D_1}{k - g}(1 + g) \]

\[ = P_0(1 + g) \]

(Equation 2.7)

Therefore, the DDM implies that, in the case of constant expected growth of dividends, the expected rate of price appreciation in any year will equal that constant growth rate, \( g \). For a stock whose market price equals its intrinsic value (\( V_0 = P_0 \)) the expected holding period return will be:

\[ E(r) = Dividend \ yield + Capital \ Gains \ yield \]
\[
\frac{D_1}{P_0} + \frac{P_1 - P_0}{P_0} = \frac{D_1}{P_0} + g
\]

(Equation 2.8)

This formula offers a means to infer the market capitalization rate of a stock, for if the stock is selling at its intrinsic value, then \( E(r) = k \), implying that \( k = \frac{D_1}{P_0} + g \). By observing the dividend yield, \( D_1/P_0 \), and estimating the growth rate of dividends, we can compute \( k \). This equation is known as the discounted cash flow (DCF) formula.

This is an approach often used in rate hearings for regulated public entities. The regulatory agency responsible for approving utility pricing decisions is mandated to allow the firm to charge just enough to cover costs plus a fair profit that allows the firms to charge just enough to cover costs plus a fair profit, one that allows a competitive return on investment (ROI) the firm has made in its productive capacity. In turn, that return is taken to be the expected return investors require on the stock of the firm. The \( \frac{D_1}{P_0} + g \) formula provides a means to infer that required return (Bodie, 2004).

**2.2.5 The Multiple-Growth Model**

Multistage growth models allow dividends per share to grow at several different rates as the firm matures. Many analysts use three-stage growth models. They may assume an initial period of high dividend growth (or instead make year-by-year forecasts of dividends for the short term), a final period of sustainable growth, an a transition period in between, during which dividend growth rates taper off from the initial rapid rate to the ultimate sustainable rate. These models are conceptually no harder to work with that a two-stage model, but they require many more calculations and can be tedious to do by hand. It is easy however, to build an Excel spreadsheet for such a model (Bodie, 2004).

Valuing common stocks with a DDM technically requires an estimate of future dividends over an infinite time horizon. Accurately forecasting dividends three years from today, let alone 20 years in the future is difficult and there are thus several ways that investment firms can go about implementing DDMs. One approach is to constant or two-stage dividend growth models. However, although such models are relatively easy to apply, institutional investors typically view the assumed dividend growth as overly simplistic.
Instead, these investors generally prefer three-stage models believing that they provide the best combination of realism and ease of application. Whereas many variations of the three-stage DDM exist, in general, the model is based on the assumption that companies evolve through three stages during their lifetimes. (Figure 2.1 portrays these stages)

**Figure 2.1 The Three Stages of the Multiple-Growth Model**

<table>
<thead>
<tr>
<th>Time</th>
<th>KES</th>
<th>Earnings per Share</th>
<th>Dividends per Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maturity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Sharpe, Alexander & Bailey (1999) Investments

The growth stage is characterized by rapidly expanding sales, high profit margins, and abnormally high growth in earnings per share. Because of highly profitable expected investment opportunities, the payout ratio is low. Competitors are attracted by the unusually high earnings, leading to a decline in the growth rate.

The transition stage usually occurs in later years as increased competition reduces profit margins, and earnings growth slows down. With fewer new investment opportunities, the company begins to pay out a larger percentage of earnings. The maturity stage or the steady state stage occurs eventually when the company reaches a position at which its new investment opportunities offer, on average, only slightly attractive returns on equity. At that time its earnings growth rate, payout ratio, and return on equity stabilize for the
remainder of its life. The forecasting process of the three-stage DDM involves specifying earnings and dividend growth rates in each stage. Although one cannot expect a security analyst to be omniscient in his or her growth forecast for a particular company, one can hope that the forecast pattern on growth – in terms of magnitude and duration – resembles that actually realized by the company, particularly in the long run. Investment firms attempt to structure their DDMs to make maximum use of their analysts’ forecasting capabilities. Thus the models emphasize specific forecasts in the near term, when it is realistic to expect security analysts to project earnings and dividends accurately. Conversely, the models emphasize more general forecasts over the longer term, when distinctions between companies’ growth rates become less discernible.

More three-stage DDMs assume that during the transition stage, earnings growth declines and payout ratios rise linearly to the maturity-stage steady-state levels. (For example, if the transition stage is ten years long, earnings growth at the maturity stage is 5% per year, and earnings growth at the end of the growth stage is 25%, then earnings growth will decline 2% in each year of the transition stage.) Finally, most three-stage DDMs make standard assumptions that all companies in the same growth rates, payout ratios, and return on equity (Sharpe, 1999).

2.2.6 Valuation Based on a Finite Holding Period

For an investor who plans to sell the stock in a year, cash flows that the investor expects to receive from purchasing a share of the stock are equal to the dividend expected to be paid one year from now (for ease of exposition, it is assumed that common stocks pay dividends annually) and the expected selling price of the stock. Thus it would seem appropriate to determine the intrinsic value of the stock to the investor by discounting these two cash flows at the required rate of return as follows:

\[ V = \frac{D_1 + P_1}{(1 + k)} \]

\[ = \frac{D_1}{(1+k)} + \frac{P_1}{(1+k)} \]

(Equation 2.9)
where \(D_1\) and \(P_1\) are the expected dividend and selling price at \(t = 1\), respectively. In order to use Equation 2.20, one must estimate the expected price of the stock at \(t = 1\). The simplest approach assumes that the selling price will be based on the dividends that are expected to be paid after the selling date. Thus the expected selling price at \(t = 1\) is:

\[
P_1 = \frac{D_2}{(1 + k)^1} + \frac{D_3}{(1 + k)^2} + \frac{D_4}{(1 + k)^3} + \cdots
\]

\[
= \sum_{t=2}^{\infty} \frac{D_t}{(1 + k)^{t-1}}
\]

(Equation 2.10)

Substituting Equation 2.21 for \(P_1\) in the right-hand side of Equation 2.20 results in:

\[
V = \frac{D_1}{(1 + k)^1} + \left[ \frac{D_2}{(1 + k)^1} + \frac{D_3}{(1 + k)^2} + \frac{D_4}{(1 + k)^3} + \cdots \right] \left( \frac{1}{1 + k} \right)
\]

\[
= \frac{D_1}{(1 + k)^1} + \frac{D_2}{(1 + k)^2} + \frac{D_3}{(1 + k)^3} + \frac{D_4}{(1 + k)^4} + \cdots
\]

\[
= \sum_{t=1}^{\infty} \frac{D_t}{(1 + k)^t}
\]

(Equation 2.11)

which is exactly the same as Equation 1.1. Thus valuing a share of common stock by discounting its dividends up to some point in the future and its expected selling price at that time is equivalent to valuing stock by discounting all future dividends. The two are equivalent because the expected selling price is itself based on dividends to be paid after the selling date. Thus Equation 1.1, as well as the zero-growth, constant-growth, and the multiple-growth models that are based on it, is appropriate for determining the intrinsic value of a share of common stock regardless of the length of the investor’s planned holding period (Sharpe1999).
2.3 Determinants of Stock Performance

The CAPM asserts that security betas are sufficient to explain the cross-section of expected security returns. However, since the late 1970s, it has been shown that additional factors have explanatory power in determining expected returns. Fama and French (1992a) propose the following factors: firm size, leverage, earning-price ratio and book-to-market ratio. Fama and French also explore the joint roles of market beta, size, leverage, book-to-market value of equity and earning-price ratio in explaining the cross-section of average stock returns. They find that used alone or in combination with other variables, beta provides little information about average returns. While size, earning-to-price ratio, leverage, and book-to-market ratio all have strong explanatory power when used alone. Fama and French (1993) identify three common risk factors as determinants of stock returns: an overall market factor, firm size, and book-to-market ratio. The overall market factor (market beta) appears to capture the time-varying aspect of stock returns, while firm size and book-to-market ratio explain the cross-sectional variations of stock returns.

The three factor model expands on the capital asset pricing model (CAPM) by adding size and value factors in addition to the market risk factor in CAPM. This model considers the fact that value and small cap stocks outperform markets on a regular basis. By including these two additional factors, the model adjusts for the outperformance tendency, which is thought to make it a better tool for evaluating manager performance. Fama and French attempted to better measure market returns and, through research, found that value stocks outperform growth stocks; similarly, small cap stocks tend to outperform large cap stocks. As an evaluation tool, the performance of portfolios with a large number of small cap or value stocks would be lower than the CAPM result, as the three factor model adjusts downward for small cap and value outperformance (Investopedia, 2014).

The market model is a single factor model, which shows the relationship between the security return and the market return. It is probably the most frequently used approach, and is expressed as follows:
\[ R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \]

(Equation 2.12)

\( \alpha_i = \text{a constant term for the } i\text{th stock} \)

\( \beta_i = \text{the market beta of the } i\text{th stock} \)

\( R_{mt} = \text{the market return} \)

\( \varepsilon = \text{an error term} \)

The parameters of the models are estimated by time-series data from the estimation period that precedes each individual announcement. The estimated parameters are then matched with actual returns over the event period. Thus, the abnormal returns (AR) in the equation can be calculated from actual returns during the event period and the estimated coefficients from the estimation period:

\[ AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta} R_{mt} \]

(Equation 2.13)

which is the estimated impact of the treatment.

The market model assumes joint distribution of security prices is multivariate normal. However, as a model, it has limitations: factors such as size, earning-to-price ratio, and market-to-book ratio have been discovered to have an effect on the average asset return, indicating important deviations from the CAPM and related single factor models. Accordingly, firm-size-adjusted models and multifactor models have emerged to extend the theory to account for multiple sources of risk.

One of the solutions developed is the Propensity Score Matching that matches multiple characteristics variables simultaneously. Rosenbaum and Rubin (1983) suggested this propensity-score matching (PSM) method in which treatment units and control units are matched by a propensity score \( p(X) \) which satisfies:
\[ X \perp D|p(X) \]  

(Equation 2.14)

This propensity score is actually a function of the observed covariates X such that the conditional distribution of X given \( p(X) \) is the same for treated \((D = 1)\) and control \((D = 0)\) units. Specifically, it is the probability of assignment of the treatment to the units with some specific characteristics X,

\[ p(X) = pr(D = 1|X) \]  

(Equation 2.15)

Based on the two identification conditions in the traditional matching method, Rosenbaum and Rubin (1983) prove that if treatment status is random conditional on X and if treatment and control units have a common support, that is,

\[(R_0,R_1) \perp D|X, \text{and } 0 < \Pr(D = 1|X) < 1 \text{ for all } X,\]

(Equation 2.16)

then the randomization also holds conditionally on the propensity score \( p(X) \); and for a specific \( p(X) \), both treatment and control units can be found, that is,

\[(R_0,R_1) \perp D|p(X), \text{and } 0 < \Pr(D = 1|p(X)) < 1 \text{ for all } X\]

(Equation 2.17)

Based on these results, the average effect of the treatment on the treated (ATT) can be rewritten as

\[ \Delta = E_{p(X)}[E(R_1|D = 1, p(X)) - E(R_0|D = 1, p(X))] \]

\[ = E_{p(X)}[E(R_1|D = 1, p(X)) - E(R_0|D = 0, p(X))] \]

(Equation 2.18)
Thus, PSM reduces multiple dimensions to one dimension.

Rosenbaum and Rubin (1983) develop this method to deal with the selection bias problem in observational studies. In the evaluation problem, data often come from non-randomized observational studies, not from randomized experimental studies. The method can reduce the bias in the estimation of treatment effects with observational data sets by controlling for the existence of the confounding factors.

2.4 Empirical Literature

Numerous studies have examined the validity of the Dividend Discount Model in the determination of stock prices and most have found that for blue-chip stocks this is subject to considerable ambiguity. There are positive stock price reactions to dividend initiations that are widely accepted in the empirical literature in finance. Asquith and Mullins (1983) investigated 168 firms that initiated dividends during the period 1963 to 1980 and reported a 3.7 percent cumulative excess return over a 2-day announcement period. The results also show that the positive excess returns are positively related to the size of the initial payment. Healy and Palepu (1988) confirm the significantly positive impact of dividend initiations on stock returns and also find that firms that initiate dividends have significant increases in their earnings for at least the year prior to, the year of, and the year following dividend initiation.

Kiweu (1991) did a study to determine the behavior of share prices in the Nairobi Stock Exchange. He did examine the behavior of ordinary share price of ten selected “blue chip” companies in the Nairobi Stock Exchange. He investigated the behavior of bid change over five years from January 1986 to December 1990. He concluded that weekly returns of shares traded in the Nairobi Stock Exchange are serially independent (random). The evidence presented suggested that no important dependencies could be identified in the stock market. He did not however model the DDM or suggest whether stock performance was affected by the intrinsic value of the stocks. Asiemwa (1992) did an empirical study to identify the relationship between investments ratios and share performance of companies quoted on the NSE. She did multiple regression analysis of establish the relationship between investment ratios and share price and concluded that earnings per share, dividend per share, price earnings and dividend yield have a
significant effect on share prices. She concluded that a significant association between share prices and investment ratios exist. She however assumed that empirical data is normally distributed which empirically is incorrect.

Mickaely, Thaler and Womack (1995) test both short-run and long-run effects of dividend initiations on stock returns and report a 3.4 percent excess return over a three-day horizon and a much larger excess return in post-dividend initiation years. Mwangi (1997) did a study to analyze the price movement for selected stocks in Nairobi Stock Exchange. He developed a model using a PC (version) software package and using this model; he computed and compared the prices from the month of Jan, 1992 to April, 1997 with the actual ones. He did t-test to determine whether the two prices were significantly different from one another. He concluded that it is not always possible to develop models that are only as good as being proxy for the investor’s decision process and are limited by the inaccuracies in estimating future earnings of the company. At best they are only a framework for analyses which is useful for structuring the way an investor can conceptualize share valuation. He however used the pooled variance approach which assumed that sampled data comes from population with equal variance which is not necessarily correct. The Welch approach is a better alternative.

Gathoni (2002) did a study on forecasting ability of valuation ratios (Nairobi Stock Exchange). She did predictive regression model on a small sample of fourteen organizations with a financial year end of 31st Dec, over a period of five years (1996 to 2000). The ratios were then lagged for one quarter in order to see what impact this had on the predictive ability of the valuation model. She concluded that price earnings ratio explains future stock returns. She concluded that price earnings ratio have predictive ability in majority of samples observed and are again determinant of future stock returns. She also concluded that price earnings in majority of samples observed and are again determinants of future stock returns. However, she did not address the intrinsic value of the stock which affects the returns of any asset.

Froidevaux (2004) did a fundamental equity valuation study on stock selection based on discounted cash flow methods. He developed a sophisticated fundamental equity valuation model which on testing proved that low risk financial assets produce high
returns and are negatively correlated to the market indices returns. He concluded that the model can be used to generate abnormal returns over extended periods of time in the US Stock Market. However, he did not address the inaccuracies that arise in the use of the CAPM to deduce the cost of equity.

In a study done by Patel et al. (2009), which examined 12 countries, calculating which combination of dividend yield and payout ratio worked best to indicate future stock performance. In a majority of markets examined, the maximum stock performance was delivered by companies with high dividend yields and low payout ratios. The study had the best performance in a U.S. empirical test between 1990 and 2009. In some countries such as Germany, high yield, high payout, was the top strategy. Stocks with high yields generally outperformed those with low yields as the empirical studies done in all the 12 countries examined revealed. While high dividend paying stocks dipped along with the rest of the market, they maintained their status as top performers.

2.5 Summary of Literature Review
The literature review was guided by the use of the capitalization of income method to determine the intrinsic value of common stocks since the cash flows associated with an investment in any particular common stock are the dividends that are expected to be paid throughout the future on the shares purchased. The empirical literature reveals that the use of the DDMs in valuation of common stock has not been widely applied in the NSE and the true value of the financial assets of the firms that are traded in the market are not readily available.

Kiweu (1991) did a study to determine the behavior of share prices in the Nairobi Securities Exchange, however, he did not model the DDM or suggest whether stock performance was affected by the intrinsic value of the stocks. A study by Asiemwa (1992) done to identify the relationship between investments ratios and share performance of companies quoted on the NSE established that a relationship between investment ratios and share price existed and that earnings per share, dividend per share, price earnings and dividend yield have a significant effect on share prices. However, the effect of these ratios on the value of the shares was not identified. She also assumed that empirical data is normally distributed which empirically is incorrect.
Mwangi (1997) did a study to analyze the price movement for selected stocks in Nairobi Stock Exchange; he however used the pooled variance approach which assumed that sampled data comes from population with equal variance which is not necessarily correct. The Welch approach is a better alternative. The findings of research done by Gathoni (2002) concluded that price earnings ratio have predictive ability in majority of samples observed and are again determinant of future stock returns. However, the researcher recommends that other factors such as intrinsic values of stocks among others may be explored to determine future stock returns.

From the literature reviewed there existed a research gap on the validity of these valuation models and how they may affect the investment decisions of investors in the NSE. This research will address this knowledge gap.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction
In this chapter the research design used is presented and justified. The population of study, sampling methods, data collection techniques and data analysis methods used are presented.

3.2 Research Design
The rapid globalization and increased trading volumes with the associated potential risk in the NSE have complicated the market dynamics for the valuation of stocks traded in the market and in particular the assumption of multiple growth periods. The goal is to describe relevant aspects of DDMs in NSE in testing its validity, hence a descriptive design was be used. The research involved a historical longitudinal study of the financial data released by the listed growth stock firms in the NSE covering the four year period between January 2008 and December 2013. This time period was considered because it coincides with the time the Nairobi All Share Index (NASI) has been operational at the NSE. NASI is a price index that shows the daily performance of all the equity securities quoted at the NSE.

In this study, the DDM assumption of multiple growth periods was tested to evaluate its validity. Stratified sampling was used in the sample selection for the study. The study dealt with the estimation of systematic risk for the NSE. The market portfolio beta was assumed to be approximately 1 as all investable assets thrive under this condition. The quoted companies were divided into two groups; growth stocks and non-growth stocks (income stocks or value stocks, blue-chip stocks, speculative stocks, cyclical stocks and defensive stocks). Stratifying was done by observing listed companies that typically had some sort of advantage, like a new product, a breakthrough patent or expansion that gives it an edge above the rest; and/or stocks that pay relatively smaller dividends with the company re-investing retained earnings in capital projects; and/or companies with above average growth in earnings. The sample was made up of 17 companies classified as growth stocks that have been actively traded in the NSE for three years or more.
3.3 Population
The target population of the study was all the 17 growth stocks listed in the Nairobi Securities Exchange as at 31st December 2013. The study adopted a survey of all annual financial reports on declaration of dividends of the listed growth companies. The market returns for these companies was used in the model irrespective of the sector the company was in.

3.4 Data Collection
The research relied upon secondary data obtained from the Nairobi Securities Exchange, and financial reports of the growth stock firms obtained from the Capital Markets Authority. High frequency data (monthly) was obtained for the bid prices of the stock. Correspondingly, returns and annual dividends per share were used, including financial ratios and market betas.

3.5 Data Analysis
The data was analyzed as a three-stage dividend discount model. Rather than forecasting year-by-year dividends in the first stage, the researcher forecasted an initial high dividend growth rate. In the last stage, dividends are forecast to grow indefinitely at a constant rate. In the transition years, the researcher forecasted a dividend growth rate in between the initial high rate and the more moderate sustainable rate.

3.5.1 Analytical Model
As indicated in the previous chapters, the price of a share is denoted by:

\[ P_0 = \sum_{t=1}^{n} \frac{D_t}{(1 + k)^t} \]

(Equation 3.1)

\[ P_0 = \text{Price of Stock at Sale} \]

\[ D_t = \text{Dividend during Period } t \]

\[ g = \text{Growth Rate} \]
The dividend discount model represents a formal notation for the statement that share prices depend on expected returns, but this is not sufficient to make the statement testable. To provide a level between expected values and real values a model of equilibrium was required.

As the study sought to avoid a single-factor method to avoid bias, the propensity-score matching approach was used. The set of characteristic covariates \( X \) consisted of the following five variables: market beta, firm size, leverage ratio, market-to-book ratio, and earnings-to-price ratio and industry dummies. This was the first time that PSM was applied into this area and so many risk factors were combined into the return models. All of these variables appear to influence both dividend policy decisions and stock returns. The nearest neighborhood matching method was adopted to estimate the effect on stock returns (the average effect of treatment on the treated, i.e., ATT) over three different event windows 0, (-1, 0) and (-1, 1). Finally, although PSM also has its own weakness, it is superior to the market and three-factor models since it can reduce the bias generated by the existence of confounding factors.

The outcome of interest was stock returns at the dividend declaration date. Specifically, the final variable of interest was ATT denoted by \( \Delta \):

\[
\Delta = E(R_1|D = 1) - E(R_0|D = 1) = E_{p(X)}[E(R_1|D = 1, p(X)) - E(R_0|D = 0, p(X))]
\]

(Equation 3.2)

To derive this, one first has to select the reasonable covariates \( X \) that determine both treatment decisions and stock returns, and specify the logistic function to satisfy the balance property. With the common support constraint, a matching with the control group can be made in terms of the estimated propensity score. Finally, one chooses an appropriate matching method to estimate the counterfactual and calculate ATT.
The CIA, i.e., \((R_0, R_1) \perp D|X\), can be satisfied only if \(X\) includes all variables that affect both the estimated value as per the DDM and the outcomes, stock returns. Variables that affect outcome of the DDM but not stock returns would not lessen the selection bias but would worsen the support problem. In a non-experimental evaluation problem there is no systematic mechanism to select variables. However, the selection is not arbitrary. Based on finance theories and previous empirical evidence, there are a number of variables commonly accepted as playing roles in estimating value of stocks using DDMs. Since the present paper was only concerned with dividends, only short-run earnings were considered.

After selecting the characteristic variables, we proceed to estimate the propensity scores. Rosenbaum and Rubin (1983) define a propensity score as a function of the observed covariates \(X\) such that the conditional distribution of \(X\) given \(p(X) = \Pr(D = 1|X)\) is the same for treated \((D = 1)\) and control \((D = 0)\) units, that is \(X \perp D|p(X)\) or \(E[D|X, p(X)] = E[D|p(X)]\). The intuition behind this balancing property is the following: after conditioning on \(\Pr(D = 1|X)\), additional conditioning on \(X\) should not provide new information about dividend initiation. Otherwise, if \(D\) is still dependent on \(X\), a misspecification of the covariates \(X\) in the model used to estimate \(P(X)\) is implied. The most frequently used model is logit or probit. In this study, the logit model was employed to estimate the propensity of dividend initiation, which is expressed as:

\[
p(X_i) = \Pr(D_i = 1|X_i) = \frac{\exp[\beta g(X_i)]}{1 + \exp[\beta g(X_i)]}
\]

(Equation 3.2)

where \(g(X)\) is not necessarily linear with the covariates \(X\).

Since the balancing condition was crucial for the conditional independence assumption (CIA) in propensity score matching, a balance test was necessary for the model specification. The idea was to test whether or not there were differences in \(X\) between the \(D = 1\) and \(D = 0\) groups after conditioning on \(P(X)\).
An alternative approach (Dehejia and Wahba (2002)) divides the observations into strata based on the estimated propensity scores. These strata are chosen so that there is no statistically significant difference in the means of the estimated propensity scores between the treatment and comparison group observations within each stratum. Then, within each stratum, t-tests are used to test for mean differences in each X variable between the treatment and comparison group observations. When significant differences are found for particular variables, higher order and interaction terms in those variables are added to the logistic model and the testing procedure is repeated until such differences no longer emerge.

Based on Dehejia and Wahba (2002), a variant of the algorithm for estimating the propensity score is implemented in this paper as follows:

1. Start estimating the logit model with a parsimonious specification, which means that only linear terms are included.
2. Split the sample into k equal intervals of the estimated propensity score; I start with k=5.
3. Within each interval, test that the average propensity scores of treated and control units do not differ.
4. If the test fails in one interval, split the interval into halves and test again. Continue until, in all intervals, the average propensity score of treated and control units do not differ.
5. Within each interval, test that the means of each characteristic do not differ between treated and control units. This is the necessary condition for the balance property.
6. If the means of one or more characteristics differ, that is, the balancing properties are not satisfied, higher-order terms and first-order interaction terms should be added.

This is a recursive procedure and should not stop until the balancing property is satisfied. It is worth mentioning that steps 2 to 5 are restricted to the common support, where the supports of the estimated propensity scores in the G and NG groups overlap. Imposing the common support condition in the estimation of the propensity scores may improve the quality of the matches used to estimate the ATT.

After the propensity scores were estimated and the two identification conditions were satisfied, the researcher constructed the control group and estimated the ATT. Smith and
Todd (2003) provide a comprehensive discussion of different ATT estimators and matching methods.

3.5.2 Test of Significance

Research Hypothesis: The Dividend Discount Model is valid in the determination of stock performance of growth stocks in the Nairobi Securities Exchange.

Null Hypothesis: The Dividend Discount Model is not valid in the determination of stock performance in the Nairobi Securities Exchange

Level of Significance is $\alpha = 0.05$

Null Hypothesis $H_0: \beta_1 = \beta_2 = 0$

Alternative Hypothesis $H_1$: Not all $\beta_j$ are equal to zero, for all $j = 1,2$.

Test Statistic:

$F \text{-Test} = \frac{\text{MSR}}{\text{MSE}}$ where MSR=SSR/$k$ and MSE=SSE/$n-k-1$

SSR = Regression Sum of Squares (Explained Variability)

SSE = Error Sum of Squares (Unexplained Variability)

MSR = Mean Sum of Regression

MSE = Mean Sum of Error

$n$ is the number of observations

$k$ is the number of independent variables = 2

Decision Rules:

$\text{If } F - \text{Test} \geq F_{0.05}; k; n - k - 1, \text{The Null Hypothesis is rejected}$

$\text{If } F - \text{Test} < F_{0.05}; k; n - k - 1, \text{The Null Hypothesis is accepted}$
CHAPTER FOUR
DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction
This chapter covers data presentation and analysis. The study objective was to establish the validity of the dividend discount model in the determination of the performance of the stocks traded in the NSE. The analysis is based on data collected from 2008 to 2013. The results are presented in the form of summary tables. The data for this study was obtained from annual financial statements of the growth firms traded in the Nairobi Securities Exchange. The validity and reliability of the data collected for the study was ascertained through source of information, which included the annual financial statements of companies, the Capital Markets Authority, the Central Bank of Kenya, and high volume data from a discount brokerage firm in Kenya. The companies which were included in the study were 15 out of a population of 17 thus the overall response rate was 88.2%. The data was analyzed using descriptive analysis, and multiple linear regressions to answer the research objective using SPSS.

4.2 Descriptive Statistics
A population of seventeen growth firms was targeted, to this end, a total of seventeen growth stocks were expected to form part of the study. A sample of fifteen growth firms was achieved, which translates to 88.2%, owing to two of the firms having joined the NSE after the commencement of the study period.

4.3 Propensity Score Matching Results
In Propensity score matching, each growth firm had to be matched to a non-growth firm, for purposes of the matching element in the PSM method of analysis. Thus, a total of 30 firms were analyzed according to five different variables for the year 2012, the most recent annual period that could be analyzed against the 2013 stock returns.

The average stock return observations are drawn from the CMA monthly stock files which covers all firms listed in the NSE during the period January-December 2013. The corresponding ex-ante characteristic data are extracted from the company financial statements of the CMA annual industrial files. To avoid a serious selection bias, several screening criteria are imposed on the sample selection. For each month t,
1. All the shares selected (in the treatment and comparison groups) are ordinary common shares.

2. Owing to complications due to regulations, firms in the financial service sector and in the utility sector are included, but considered as outliers.

3. The distribution must be ordinary dividends, which are paid regularly in cash. Extra or special, year-end or final, interim and non-recurring dividends are excluded.

4. There are no other distribution announcements in a one-month window; otherwise the confounding effects would contaminate the results.

5. All the screened firms (growth and non-growth) must be listed in the NSE. For each screened firm, the NSE must have the following characteristics data at the end of year t-1: market beta (data 1), firm size (data 2), leverage ratio (data 3), market-to-book ratio (data 4), earnings-to-price ratio (data 5), the stock return estimate according to the DDM as estimated from characteristic variables in year t-1 (data 6), and the actual stock return in year t (data 7).

6. For each screened firm, the data on market beta must be calculated from the data available in the CMA database by the end of year t-1.

Finally, these 6 criteria result in 15 treatment cases and 15 non-treatment cases for firms listed before year t-5. The DDM results for firms newly listed are not reported. The detailed sample information is listed in Table 4.1.

As discussed before, several variables have been shown empirically to play a role in dividend decisions. In this paper, they are defined as follows:

BETA: the slope of the regression of individual stock returns on market returns;

SIZE: the natural log of the product of share prices and shares outstanding;

LR: leverage ratio, defined as the ratio of total liabilities to total assets;

MB: market-to-book ratio, which is the ratio of the market value of total assets to the book value of total assets;
EPR: the earning to price ratio.

These six determinants of dividend payments were used to specify the logit model.

Table 4.1 Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Score</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Beta</td>
<td>.250</td>
<td>1</td>
<td>.617</td>
</tr>
<tr>
<td>Leverage Ratio</td>
<td>.921</td>
<td>1</td>
<td>.337</td>
</tr>
<tr>
<td>Market to book ratio</td>
<td>.337</td>
<td>1</td>
<td>.562</td>
</tr>
<tr>
<td>Earnings to price ratio</td>
<td>.843</td>
<td>1</td>
<td>.359</td>
</tr>
<tr>
<td>DDM</td>
<td>6.639</td>
<td>1</td>
<td>.010</td>
</tr>
<tr>
<td>Overall Statistics</td>
<td>10.226</td>
<td>5</td>
<td>.069</td>
</tr>
</tbody>
</table>

Source: Researcher’s Findings

The Table 4.1 above lists the covariates and their significance in the formulation of DDM values for the study.
Table 4.2 Propensity Score

Variables in the Equation PSM

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>.000</td>
<td>1.534</td>
<td>.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>PRE_1</td>
<td>.000</td>
<td>5.034</td>
<td>.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.639</td>
<td>2.511</td>
<td>1.105</td>
<td>.293</td>
<td>.071</td>
</tr>
</tbody>
</table>

a. Variable(s) entered on step 1: Treatment, PRE_1.

Source: Research Findings

Table 4.2 above shows the results of the initial binary logistic regression carried out in order to determine the propensity scores of the treatment groups and the control groups.

Table 4.3 Logit Model

Variables not in the Equation Logit

<table>
<thead>
<tr>
<th>Variables</th>
<th>Score</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>.000</td>
<td>1</td>
<td>1.000</td>
</tr>
<tr>
<td>Logit</td>
<td>.010</td>
<td>1</td>
<td>.920</td>
</tr>
<tr>
<td>Overall Statistics</td>
<td>.011</td>
<td>2</td>
<td>.995</td>
</tr>
</tbody>
</table>

Source: Research Findings
Table 4.3 above shows the results of the second binary logistic regression carried out in order to determine the effect of the propensity scores of all the covariates represented by logit on the outcome variable.

The propensity scores of both the treatment and control groups were obtained in SPSS as shown in appendix II and paired using a method known as greedy matching where the highest non-treatment firm in terms of propensity score was paired with the highest treatment variable in terms of propensity score. Only one treatment value is matched with a single non-treatment value in this type of propensity score matching.

### 4.4 Dividend Discount Model Results
The characteristic variables of year t-1 were used to obtain the DDM estimates of stock returns. This was then subjected to a correlation analysis where it was identified that the DDM stock value estimated were somewhat similar to the actual stock values achieved in 2013 to the extent of the correlation co-efficient.
Table 4.4 DDM Forecasts for each stock

<table>
<thead>
<tr>
<th>Stock</th>
<th>DDM</th>
<th>Actual Value 2013</th>
<th>Month</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barclays Bank of Kenya</td>
<td>32.89</td>
<td>18.65</td>
<td>October</td>
<td>89.93</td>
</tr>
<tr>
<td>Pan Africa Life Assurance Ltd</td>
<td>100.03</td>
<td>90</td>
<td>December</td>
<td>92.91</td>
</tr>
<tr>
<td>Diamond Trust Bank Ltd</td>
<td>173.95</td>
<td>174</td>
<td>October</td>
<td>99.96</td>
</tr>
<tr>
<td>Carbacid Ltd</td>
<td>283.11</td>
<td>212</td>
<td>August</td>
<td>49.72</td>
</tr>
<tr>
<td>Standard Chartered Bank Kenya</td>
<td>594.09</td>
<td>310</td>
<td>September</td>
<td>-100.88</td>
</tr>
<tr>
<td>Housing Finance Company of Kenya</td>
<td>31.03</td>
<td>31.5</td>
<td>December</td>
<td>99.67</td>
</tr>
<tr>
<td>KenolKobil Ltd</td>
<td>39.39</td>
<td>13.65</td>
<td>January</td>
<td>81.80</td>
</tr>
<tr>
<td>British American Tobacco Ltd</td>
<td>1000.72</td>
<td>600</td>
<td>January</td>
<td>-183.35</td>
</tr>
<tr>
<td>Kenya Commercial Bank Ltd</td>
<td>76.9</td>
<td>49</td>
<td>November</td>
<td>80.27</td>
</tr>
<tr>
<td>East African Brewarries Ltd</td>
<td>332.2</td>
<td>329</td>
<td>October</td>
<td>97.74</td>
</tr>
<tr>
<td>Jubilee Insurance</td>
<td>37.59</td>
<td>187</td>
<td>January</td>
<td>-5.65</td>
</tr>
<tr>
<td>Rea Vipingo Group</td>
<td>57.91</td>
<td>28</td>
<td>December</td>
<td>78.85</td>
</tr>
<tr>
<td>Limuru Tea Co Ltd</td>
<td>589.67</td>
<td>500</td>
<td>September</td>
<td>36.59</td>
</tr>
<tr>
<td>Nation Media Group Ltd</td>
<td>248.08</td>
<td>259</td>
<td>November</td>
<td>92.28</td>
</tr>
<tr>
<td>Total Kenya Ltd</td>
<td>29.74</td>
<td>25</td>
<td>December</td>
<td>96.65</td>
</tr>
</tbody>
</table>

**Average Accuracy** 47.10

Source: Research Findings
4.5 Inferential Statistics

In order to establish the statistical significance of the independent variables on the dependent variable (stock return) regression analysis was employed. The regression equation took the following form

\[ Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon \]

Where;

Y = Stock returns

X_1 = Market beta

X_2 = Firm Size

X_3 = Leverage

X_4 = Market-to-price ratio

X_5 = Price-to-earnings ratio

X_6 = DDM

\( \varepsilon \) = Error term

In the model \( \alpha \) is the constant term while the coefficient \( \beta_1 \) to \( \beta_7 \) are used to measure the sensitivity of the dependent variable (Y) to unit change in the explanatory variable (X_1, X_2, X_3, X_4, X_5, X_6, X_7). \( \varepsilon \) is the error term which captures the unexplained variations in the model.
### Table 4.5 Regression Analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Constant)</em></td>
<td>13.039</td>
<td>14.802</td>
<td>.881</td>
<td>.387</td>
</tr>
<tr>
<td>Market Beta</td>
<td>13.253</td>
<td>5.100</td>
<td>.151</td>
<td>2.599</td>
</tr>
<tr>
<td>Leverage Ratio</td>
<td>-12.790</td>
<td>4.178</td>
<td>-.206</td>
<td>3.061</td>
</tr>
<tr>
<td>Market-to-book ratio</td>
<td>-.026</td>
<td>.029</td>
<td>-.050</td>
<td>-.909</td>
</tr>
<tr>
<td>Earnings-to-price ratio</td>
<td>-.558</td>
<td>.681</td>
<td>-.044</td>
<td>-.819</td>
</tr>
<tr>
<td>DDM</td>
<td>.469</td>
<td>.057</td>
<td>.696</td>
<td>8.171</td>
</tr>
<tr>
<td>Predicted probability</td>
<td>139.406</td>
<td>38.400</td>
<td>.328</td>
<td>3.630</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: Actual Value 2013*

**Source: Research Findings**

#### 4.5.1 Correlation Analysis

The researcher used correlation analysis to determine the extent to which Dividend Discount Model estimates are associated with stock returns of growth stocks traded in the Nairobi Securities Exchange. Table 4.3 shows the correlation results for dependent and independent variables. The result indicates that there is a weak negative insignificant relationship between market beta and the DDM Pearson correlation coefficient of -0.58 which is very low with the significance of two tailed test figure being 0.762 which is greater than 0.01. There is also a weak negative insignificant relationship between market beta and the actual stock return value of -0.001 which is very low with the significance of two tailed test figure being 0.995 which is greater than 0.01. The study further (Table 4.3) revealed that there is strong positive significant relationship between the DDM and the actual stock returns (0.949).
Table 4.6 Correlation Analysis

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Market Beta</th>
<th>Leverage Ratio</th>
<th>Market-to-book ratio</th>
<th>Earnings-to-price ratio</th>
<th>DDM</th>
<th>Actual Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Beta</td>
<td>1</td>
<td>.255</td>
<td>.211</td>
<td>.139</td>
<td>-.058</td>
<td>-.001</td>
</tr>
<tr>
<td></td>
<td>.174</td>
<td>.264</td>
<td>.462</td>
<td>.762</td>
<td>.995</td>
<td></td>
</tr>
<tr>
<td>Leverage Ratio</td>
<td>.255</td>
<td>1</td>
<td>.232</td>
<td>.094</td>
<td>-.224</td>
<td>-.257</td>
</tr>
<tr>
<td></td>
<td>.174</td>
<td>.217</td>
<td>.622</td>
<td>.235</td>
<td>.171</td>
<td></td>
</tr>
<tr>
<td>Market-to-book ratio</td>
<td>.211</td>
<td>.232</td>
<td>1</td>
<td>-.035</td>
<td>-.057</td>
<td>-.054</td>
</tr>
<tr>
<td></td>
<td>.264</td>
<td>.217</td>
<td>.856</td>
<td>.764</td>
<td>.775</td>
<td></td>
</tr>
<tr>
<td>Earnings-to-price ratio</td>
<td>.139</td>
<td>.094</td>
<td>-.035</td>
<td>1</td>
<td>.140</td>
<td>.135</td>
</tr>
<tr>
<td></td>
<td>.462</td>
<td>.622</td>
<td>.856</td>
<td>.459</td>
<td>.475</td>
<td></td>
</tr>
<tr>
<td>DDM</td>
<td>-.058</td>
<td>-.224</td>
<td>-.057</td>
<td>.140</td>
<td>1</td>
<td>.949**</td>
</tr>
<tr>
<td></td>
<td>.762</td>
<td>.235</td>
<td>.764</td>
<td>.459</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Actual Value 2013</td>
<td>-.001</td>
<td>-.257</td>
<td>-.054</td>
<td>.135</td>
<td>.949**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>.995</td>
<td>.171</td>
<td>.775</td>
<td>.475</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Researcher’s Findings

4.5.2 ANOVA Model Analysis
To test the robustness of the model, the study adopts analysis of variance (ANOVA), R² and t-test to test the significance of regression equation coefficients. Analysis of Variance
(ANOVA) consists of calculations that provide information about levels of variability within a regression model and form a basis of tests of significance. ANOVA on Table 4.5 shows that the combined effect of market beta, firm size, leverage, market-to-book ratio and price-to-earnings ratio and the DDM on the stock returns of growth stocks.

Appendix III shows that the F-statistics is 7.957 and is significant at 0.309. Thus the independent variable in the model influence stock returns at 30.9% level of significance (5%) and 95% level of confidence. The model was thus considered robust or fitted well to the actual data of the variables.

Table 4.7 ANOVA

<table>
<thead>
<tr>
<th>DDM</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>326542.467</td>
<td>1</td>
<td>326542.467</td>
<td>7.957</td>
<td>.309</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1149100.246</td>
<td>28</td>
<td>41039.295</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1475642.713</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Research Findings

4.6 Interpretation of the Findings

This section summarizes the results of the study. From the descriptive statistics above, it is evident that the covariates X have an effect on both the DDM and the Value of Stocks in year t. The Pearson correlation analysis shows the relationship between the variable that is both the explanatory and the dependent variables. The correlation analysis shows a positive relationship between earnings to price ratio and the dividend discount model values as well as the stock returns, while for the other three variables there is a negative relationship with the DDM values and actual stock return values. Hence the model is expected to show a negative coefficient for the above variables.

The regression analysis in Table 4.5 shows the coefficients of all the variables in relation to stock returns, while the standard errors show how the data is fit for the model while the
t-test shows the variables are not significant at 5% in explaining the relationship between market beta, leverage, market-to-price ratio and price-to-earnings ratio to stock returns.

When compared to other studies, there is a significant contradiction whereby others have found the dividend discount model not reliable in valuation of common stock in the Nairobi Securities Exchange (Olweny 2011), whereas this study finds a weak but significant reliability in the model. This study however sought to eliminate biases caused by the use of the CAPM model which relies heavily on the market beta, which as seen earlier in the study has little impact on stock performance. Thus, the dependence on the propensity score model eliminates said dependence on one factor: market beta; and includes significant covariates to refine the results.
CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction
This chapter presents the summary of the study, conclusion, recommendations, limitations of the study and suggestions for further research

5.2 Summary
The study sought to establish the relationship between the dividend discount model and stock returns for growth stocks traded in the NSE. The study used a historical longitudinal study of the financial data released by the listed growth stock firms in the NSE covering the four year period between January 2008 and December 2013. Propensity Score Matching of characteristic variables was done to identify the stock returns was performed. The population of the study included all 17 growth stocks and the control group of 15 non-growth stocks.

The companies that took part in the survey were 30 out of a possible 34 which translates to 88.2%. The independent covariates in the study analyzed included market beta, firm size, leverage ratio, market-to-book ratio and earnings-to-price ration while the dependent variables included the dividend discount model estimates and the actual stock returns. The study covered a period of six years from 2008 to 2013.

The studies revealed that the DDM obtained from historical financial data of a growth stock had a weak positive significant correlation with actual stock returns (0.949). The study also found that market beta had a weak negative insignificant relationship with the DDM (-0.58). There is also a weak negative insignificant relationship between market beta and the actual stock return value of -0.001.

5.3 Conclusion
The main objective of this study was to determine the validity of the dividend discount model on the stock return of growth stocks in the NSE. From the summary of the finding above, the study concludes that DDM estimates are valid in the determination of stock returns at 40% level of significance.
A review of the related literature revealed a general consensus from the theoretical and empirical studies that there is indeed a relationship between the DDM and the stock returns of growth stocks in the NSE. Empirical studies reviewed included Asquith and Mullins (1983), Healy and Palepu (1988), Kiweu (1991) and Asiemwa (1992).

5.4 Recommendations for Policy
The study recommends that in order for investors to make the best investment decisions regarding growth stocks in the NSE, the DDM model should be used in order to obtain a descriptive forecast of investment returns in such instruments, use of the CAPM model which heavily relies on market beta is however not advised.

The study also recommends that there is also need to identify the growth stocks as prime investment ventures while taking caution to perform fundamental analysis of the company financials for the particular growth stocks.

The study further recommends that emphasis on market beta should not be made in all investment decisions, as has been the case due to its insignificant effect on the DDM and stock returns.

5.5 Limitations of the Study
A number of limitations could be pointed out for this study. Firstly, the study only focused on growth stocks traded in the NSE which form approximately one third of the companies traded in the NSE. Secondly, the DDM cannot be used to value a stock that pays low or no dividends. If the dividend payout ratio is adjusted to reflect changes in the expected growth rate, a reasonable value can be obtained even for non-dividend paying firms. The DDM also provides too conservative an estimate of value since the value is determined by more than the present value of expected dividends. The dividend discount model also requires an enormous amount of speculation in trying to forecast future dividends, thus the model should be applied with great care.

Lastly, the descriptive and correlation study relied on secondary data which had already been compiled by the CMA, discount brokerage firms in Kenya, and published financial statements of the sample selected companies. Data were used as they were obtained and the researcher had no means of verifying the validity of the data which were assumed to
be accurate for the purpose of this study. The study results are therefore subject to the validity of the data.

5.6 Suggestions for Further Research

The objective of this study was to establish the validity of the dividend discount model in the determination of growth stock performance in the Nairobi Securities Exchange. This research could be replicated by increasing the sample of analysis and adjusting for dividend initiation decisions to establish whether the results would be different from the current study.

Secondly, another study could be done but with more variables like asset base, customer base and return on asset among others, other than the five covariates deliberately chosen for the purpose of this study.

Lastly, this study can be replicated for other kinds of stocks traded in the NSE in order to find out if the same analysis can be successfully applied for these different stocks. Thus it can be replicated for financial institutions, value stocks, or even stocks in one sector e.g. manufacturing to identify whether the DDM can assist investors in making the best investment decisions.
REFERENCES


Valentin Z. (2013). *Scale Efficiency and Homoethnicity: Equivalent of Primal and Dual Measure*. School of Economics, University of Queensland.


APPENDIX

APPENDIX I: GROWTH STOCKS LISTED IN THE NSE AS AT 31ST DECEMBER 2013

Based on Dividend Yield and Earnings-to-Price Ratio, the growth companies whose stocks were listed in the NSE as at 31st December 2013 include:

1. Barclays Bank Kenya
2. British American Tobacco
3. Carbacid Ltd
4. CFC Heritage Insurance Co. Ltd*
5. Diamond Trust Bank Ltd
6. East African Breweries Ltd
7. Home Afrika Ltd*
8. Housing Finance Company of Kenya
9. Jubilee Insurance
10. KenolKobil Ltd
11. Kenya Commercial Bank Ltd
12. Limuru Tea Co. Ltd.
13. Nation Media Group Ltd
14. Pan Africa Life Assurance Ltd
15. Rea Vipingo Group
16. Standard Chartered Bank Kenya
17. Total Kenya Ltd

*Growth Firms joined the NSE in 2011 and 2013 respectively; which occurs during the study period. Thus these growth stocks were eliminated from the study population.
APPENDIX II: PROPENSITY SCORES; GREEDY MATCHING

<table>
<thead>
<tr>
<th>Stock</th>
<th>PRE_1</th>
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<tbody>
<tr>
<td>Umeme Ltd</td>
<td>0.72598</td>
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<tr>
<td>Barclays Bank of Kenya</td>
<td>0.96857</td>
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<td>NIC</td>
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<td>Pan Africa Life Assurance Ltd</td>
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<td>Co-op Bank</td>
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<td>Diamond Trust Bank Ltd</td>
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<tr>
<td>Carbacid Ltd</td>
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<tr>
<td>Cfc Stanbic Bank</td>
<td>0.49046</td>
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<tr>
<td>Standard Chartered Bank Kenya</td>
<td>0.58938</td>
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<tr>
<td>BOC Kenya</td>
<td>0.48313</td>
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<tr>
<td>Housing Finance Company of Kenya</td>
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<tr>
<td>Equity Bank</td>
<td>0.47305</td>
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<tr>
<td>KenolKobil Ltd</td>
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<tr>
<td>Kapchorua Tea &amp; Coffee Ltd</td>
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<td>British American Tobacco Ltd</td>
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<tr>
<td>Kakuzi</td>
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<tr>
<td>Kenya Commercial Bank Ltd</td>
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<td>Unga Ltd</td>
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<td>East African Breweries Ltd</td>
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<td>Rea Vipingo Group</td>
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<td>Company</td>
<td>Score</td>
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<td>------------------</td>
<td>--------</td>
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<tr>
<td>Standard Group</td>
<td>0.31553</td>
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<tr>
<td>Total Kenya Ltd</td>
<td>0.31055</td>
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