FORECASTING ABILITY OF VALUATION RATIOS

(NAIROBI STOCK EXCHANGE)

BY

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DECLARATION:

This research proposal is my original work and has not been presented for the award of a degree in any other university.

Signed. ..... Date 25-X-2002

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

Signed. ..... Date 26.10.2002.

OTIENO ODHIAMBO LUTHER

DEDICATION

To the great love of my life-my family .

ACKNOWLEDGEMENTS

To my parents, Perpetua and Simeon. I owe you my life and more. Thank you for all that you have done for me. You have always been there for me, you have instilled in me that desire to reach for the stars. I am eternally indebted to you. I love you.

To my siblings-Maina,Wanjiku, Kamunya, Kingori and Nyambura thank you for your support and words of encouragement. I am blessed to have you.

To all my friends,for always being there for me.

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Abstract

This research paper provides a test of the extent of predictive ability of three-valuation ratios-Price Earnings, Dividend Yield and Price Sales Ratios at the Nairobi Stock Exchange. The research question was-how useful are these valuation ratios in predicting future returns?

The predictive regression models were subject to a small sample bias of fourteen organisations with a financial accounting year-end of 31st December, over a period of five years (1996 to 2000). The valuation ratios were then lagged for one quarter in order to see what impact this has on the predictive ability of the valuation model.

The three ratios are found to have predictive ability only in some cases. This implies that they can be only be used selectively. It could also be true that the forecasting period is different from the lagged period that was used of one quarter.

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1.0 CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND

To maximise shareholder value, a firm must choose the best combination of decisions on investment, financing, and dividend payout .In order to make sound investment decisions it is imperative that one forecasts the payoffs of potential investment instruments. Valuation is concerned about forecasting payoffs and is undertaken by or on behalf of the investors.

Every asset whether it is financial or real should have value, Mankiw (1986). Successful investing and managing of assets lies in understanding not only what the value of the asset is, but also understanding the sources of value. Any asset can be valued, but some assets are easier to value than others. The details of valuation will vary from case to case. A valuation model that specifies what is to be forecasted guides forecasting. Much of the work of security analysts and investment bankers involves forecasting future asset earnings as a prelude to determination of asset value.

Valuation is the art/science of determining what a security or asset is worth. Where market value for a security is a variable our interest shifts and we are interested in assessing whether it is over or under valued i.e. if it is a cheap buy or a profitable sale. At times there is no market value and we have to

construct one for bargaining or transaction purposes (e.g., a corporation is interested in selling a division.).

The value of a security or asset is going to depend crucially on the asset's earning power. Whether it is an investment in real estate, shares or even a car, investors are buying future earnings .It therefore becomes an issue of modelling the future to determine a present value. In which case a model that enables investors forecast future earnings (returns) from an investment is invaluable.

Valuation is useful in a wide range of tasks. The role that is actually plays differs depending on the arena, Damodaran (1996). Valuation is of relevance in portfolio management, acquisition analysis and in corporate finance.

The role played by valuation in portfolio management is determined to a great extent by the investment philosophy of the investor, Summers (1986). For the fundamental analysts valuation is the central focus. The underlying theme in fundamental analysis is that true value of an asset such as a firm can be related to its financial characteristics-its growth prospects, risk profile and cash flows. Any deviation from this true value is a sign that a share is under or over valued. Not everyone believes in valuation. The chartists are such a group. They believe that prices are driven as much by investor psychology

as by any underlying financial variables. For those who believe in the efficient market hypothesis, valuation is useful in determining why a share sells for the price it does. It is based on the underlying assumption that the market price is the best estimate of the true value of the firm. The objective then becomes determining what assumptions about growth and risk are implied in this market price, rather than finding under or over valued firms. We need to identify variables that highlight such factors.

In acquisition and merger analysis valuation plays a central role. The bidding firm or individual has to decide on a fair value for the target firm before making a bid, and the target firm has to determine a reasonable value for itself before deciding to accept or reject the offer.

In corporate finance the objective is to maximise a firm's value. As a result of this the relationship between financial decisions, corporate strategy and firm value has to be delineated. The value of the firm is therefore related to the decisions that it makes-what projects to undertake, how to finance these projects, what dividend policy to have. Understanding this relationship is the key to making value-increasing decisions and to sensible financial restructuring, Samuelson (1965).

In capital markets, the most common kind of valuation problem is equity valuation. Financial statement analysis has traditionally been seen as part of the fundamental analysis required for equity valuation, Lucas (1978).

There are currently a number of valuation models. These include the discounted cashflow valuation (Capital Asset Pricing Model), relative valuation and contingent claim valuation. The discounted cashflow method relates the value of an asset to the present value of expected future cashflows from that asset. Relative valuation estimates the value of an asset by looking at the pricing of comparable assets relative to a common variable like earnings, cashflows, book value or sales. Valuation ratios fall under the relative valuation model. This is because it involves estimating the value of future returns using the pricing of assets relative to common variables. Contingent claim valuation uses option-pricing models to measure the value of assets that share option characteristics, Kothari (1997).

Valuation models centre on manipulating known variables that depict risk, return and time value of money. There is no doubt that the starting point to any valuation model is the input variable. Drawing on recent researches Campbell and Shiller (2001), Lewellen (2002), Fama and French (1988), Goetzmann and Jorion (1993), Stambaugh (1986) and Kothari (1997) this research seeks to empirically find out which of these three valuation ratios-

Price Earnings Ratio, Dividend Yield and Price Sales Ratio, has higher value in predicting future returns. The main innovation is to see which of these three ratios contains more information, which will be useful in forecasting the returns of a share. From the results it hopes to provide insight to investors on how to forecast future prices of shares with a view to maximising their returns. The lessons are particularly relevant for developing countries, where the stock markets are relatively inactive and many investors do not make use of useful economic tools to improve in the way that they invest.

The three valuation ratios have been selected due to the fact that they share several common features. Each of these ratios measures price relative to 'fundamentals'. These valuation ratios are said to be positively related to expected returns. The rational pricing theory also states that these ratios track time variation in discount rates: the ratios are low when discount rates are low and high when discount rates are high and they therefore predict returns because they capture information about risk premium. These three ratios also share similar time series properties Lewellen (2001). These three valuation ratios are widely looked at and used by investors and investment advisers.

1.2 STATEMENT OF THE PROBLEM

Investors have at their disposal a number of valuation ratios to choose from. However it is their wish to choose a model that enables them to select assets whose returns are commensurate with the inherent risk. The usefulness of valuation ratios is primarily their ability to enable the investor(s) to accurately forecast share price and returns. They are used to determine whether share prices are over, under or correctly valued. From this information the potential investor would be in a position to make a wise and sound investment decision on which shares to buy and which to sell. Although valuation ratios are widely used in our environment, not all investors are aware of the exact information content of the ratios and specifically the empirical evidence of the predictive power of the valuation ratios is scarce. This issue is pronounced in an environment like ours where shares performance is dismal.

The situation gets more complicated in the case when more than one valuation model exists or when a number of variables compete as inputs to the valuation model. This is because it then becomes necessary to identify the single model that has the highest information content. One also has to decide whether using a combination of valuation ratios would yield more accurate results.

In the investment process, the investor risks money now in anticipation of a future reward. It follows that investors are faced with an uncertain future. This requires that investors make forecasts on investment variables such as return on shares, that is of interest to them. It requires that investors attach value to

assets such as shares. Investors therefore have to deal with uncertain future. They make forecasts about that uncertain future in an attempt to reduce the uncertainties that surround their investments.

At the stock markets an array of decision variables have been suggested as useful in choosing shares. Investment decision variables such as Price Earnings, Dividend Yield and Price Sales Ratio are well researched on and are assumed to be useful inputs in an investor decision model. They are assumed to possess information content that enable an investor to make an informed decision. The problem facing an investor (forecaster) is how effectively to develop projections that effectively shape his/her future investments.

The assumption in this study is that the variable that is most critical to an investor is the future returns from an investment. This is important because potential for future earnings signify potential growth of an investment.

The core concepts in this study are therefore valuation returns from assets and forecasting of returns. The idea is to find out the extent to which widely used variables (Price Earnings, Dividend Yield and Price Sales Ratio) are useful in predicting future returns. The argument is that the investors will only use such ratios if they can be used successfully in forecasting the future returns.

Forecasting future returns is central to an investment decision given that investors enjoy a number of investment opportunities to choose from.

One of the ways of overcoming this problem is by carrying out an empirical study that will give sufficient evidence, which will enable one to choose the most appropriate valuation model.

This research seeks to determine the appropriateness of the three valuation ratios-Price Earnings, Dividend Yield and Price Sales Ratio, in predicting future returns from shares.

1.3 OBJECTIVE OF THE STUDY

The purpose of the study is to explore the predictability of common ordinary share returns quoted on the Nairobi Stock Exchange using the following variables:

1. Price Earnings Ratio
2. Dividend Yield Ratio
3. Price Sales Ratio

The main objective of this research is to:

1. Establish the extent to which changes in Price Earnings Ratio explains future stock returns.
2. Establish the extent to which changes in Dividend Yield Ratio explains future stock returns.
3. Establish the extent to which changes in Price Sales Ratio explains future stock returns.

1.4 HYPOTHESES

This research paper is concerned with three valuation ratios-Price Earnings (PE), Dividend Yield and Price Sales Ratio. First of all we are interested in whether the three valuation ratios selected have predictive value. That is whether each one of them is able to forecast future earnings with reasonable accuracy. It follows that our hypotheses will be based on results of previous studies, which showed that:

- Price Earnings Ratio has no forecasting ability for future stock returns. (Campbell and Shiller (2001))
- Dividend Yield Ratio has no forecasting ability for future stock returns (Goetzmann and Jorion (1993)
- Price Sales Ratio has no forecasting ability for future stock returns (Martin and Senchack (1987))

The null and alternative hypothesis for each of the three valuation ratios will therefore be:

$$\text{Null hypothesis: } \beta = 0$$

$$\text{Alternative hypothesis: } \beta \neq 0$$

The justification for using a zero value as a benchmark is that the variable would not be included in an equation if its expected coefficient were zero according to Pepper (1993).

This concludes defining our problem, and setting the research hypotheses.

1.5 IMPORTANCE OF THE STUDY

This study is of importance to the following:

Academic researchers-by adding on the existing body of knowledge.

Investors, investment advisers, StockBrokers and managers -who are involved in making investment decisions.

2.0 CHAPTER TWO - LITERATURE REVIEW

2.1 THEORETICAL JUSTIFICATION OF THE VALUATION RATIOS

2.1.1 *PRICE-EARNINGS RATIO - P/E*

It is a valuation ratio of a firm's current share price to its per-share earnings. This ratio is widely used and is published worldwide in both financial and non-financial press.

It is calculated by:

P/E Ratio = Market Value per Share /Earnings per Share (EPS)

It is sometimes referred to as the "multiple" because it shows how much investors are willing to pay per shilling of earnings. The P/E Ratio has traditionally been the best yardstick for measuring valuation for shares, because it includes both retained and distributed profits, Campbell (1988). While this ratio is now supplemented by a variety of other sophisticated valuation tools, it retains the dominant valuation role on account of its simplicity, widespread use and long historic data runs. We use it to compare the valuation of shares against alternative liquid investments, specifically government bonds and cash held in short term deposits, as our version for the equity risk premium.

Goyal (1999) states, that in general, a high P/E means high projected earnings in the future. But the P/E Ratio actually doesn't tell us a whole lot by itself. It's usually only useful to compare the P/E Ratios of companies in the same industry, or to the market in general, or against the firm's own historical P/E. The P/E is easy to calculate and understand. If you want to know what the market is paying for a firm's earnings at any given moment, check its P/E. The P/E is a firm's price-per-share divided by its earnings-per-share. If an organisation's share is trading at sh40 a share, for instance, and earnings came in at sh 4 a share, its P/E would be 10 (40/4). That means investors are paying sh10 for every shilling of the firm's earnings. If the P/E slips to 8 they're only willing to pay sh 8 for that same sh1 profit. (This number is also known as a stock's "multiple," as in the organisation is trading at a multiple of 10 times earnings.)

The traditional P/E is what's known as a "trailing" P/E. It's the share's price divided by earnings-per-share for the previous 12 months. Also popular among many investors is the "forward" P/E -- the price divided by an estimated earnings-per-share for the coming year, Campbell (1988).

Which is better? The trailing P/E has the advantage that it deals in facts -- its denominator is the audited earnings number the firm reported to the Stock Exchange. Its disadvantage is that those earnings will almost certainly

change -for better or worse- in the future. By using an estimate of future earnings, a forward P/E takes expected growth into account. And though the estimate may turn out to be wrong, it at least helps investors anticipate the future the same way the market does when it prices a share, Brealey (2001).

The biggest weakness with either type of P/E is that companies sometimes "manage" their earnings with accounting wizardry to make them look better than they really are. A crafty chief financial officer can fool with a firm's tax assumptions during a given quarter and add several percentage points of earnings growth.

It's also true that quality of earnings estimates can vary widely depending on the firm and the investment analysts that follow it. The bottom line is that despite its popularity, the P/E Ratio should be viewed as a guide.

The simplicity of the Price Earnings Ratio makes it an attractive choice in applications however its relationship to a firm's financial fundamentals (expected growth, risk, payout ratios, difference in fundamentals across time and across firms) is often ignored, leading to significant errors in its applications, Damodaran, (1996)

Price Earnings Ratios are also not meaningful when the earnings per share are negative. This can be partly overcome by using a normalised or average earnings per share, but the problem cannot be totally eliminated. Secondly the volatility of earnings can cause the PE Ratio to change dramatically from period to period, Muth (1961).

The PE Ratio has to therefore be controlled for differences in fundamentals, absence of which would lead to erroneous conclusions based purely upon a direct comparison of multiples.

2.1.2 *DIVIDEND YIELD RATIO*

A dividend is a payment many companies make to shareholders out of their excess earnings. It's usually expressed as a per-share amount. When you compare companies' dividends, however, you talk about the "Dividend Yield," or simply the "yield."

It is calculated by:

Dividend Yield Ratio = Dividend per share /Market Price per share

It tells you what percentage of your purchase price the firm will return to you in dividends. Example: If a share pays an annual dividend of sh2 and is trading at sh50 a share, it would have a yield of 4%.

Not all shares pay dividends, nor should they. If a firm is growing quickly and can best benefit shareholders by reinvesting its earnings in the business, that's what it should do. Microsoft, for instance, doesn't pay a dividend. So a share with no dividend or yield isn't necessarily a loser.

Still, many investors like a dividend, both for the income and the security it provides. If your firm's share price falters, you always have a dividend. And it is definitely a nice sweetener for a mature share with steady, but unspectacular growth.

But don't make the mistake of merely searching for shares with the highest yield -- it can quickly get you in trouble. Consider the share mentioned above with the sh2 dividend and the 4% yield. As it happens, 4% is well above the market average, which is usually below 2%. But that doesn't mean all is well with the share. Consider what happens if the firm misses an earnings projection and the price falls overnight from sh50 a share to sh40. That's a 20% drop in value, but it actually raises the yield to 5% (sh2/sh40). Would you want to invest in a share that just missed earnings estimates because its yield is now higher? Probably not. Even when searching for shares with strong dividends, it's always crucial to make sure the firm clears all your other financial hurdles.

Dividend Yield indicates the relationship between the dividends per common share and the market price per common share. If the firm successfully invests the money that is not distributed as dividends, the price should rise. If the

dividends are held at low amounts to allow for reinvestment of profits the Dividend Yield if the firm has a record of above average return on equity, Hodrick (1992).

2.1.3 *PRICE-TO-SALES RATIO*

As the name implies, the Price/Sales Ratio is the firm's price divided by its sales (or revenue). But because the sales number is rarely expressed as a per-share figure, in which case it's easier to divide a firm's total market value by its total sales for the last 12 months. (Market value = share Price x shares outstanding.)

Price Sales Ratio = Market Price per share/Revenues per share.

The Price/Sales Ratio has become an increasingly popular method of valuation for a few reasons. First, quantitative investor James O'Shaughnessy (1998) that shares with low Price/Sales Ratios (PSRs) outperformed shares with low Price/Earnings (P/E) multiples. Second many investors don't trust net earnings, since they are often manipulated through write-offs and other accounting gimmicks. Sales are much harder to "manage"or manipulate. Finally, the explosion in Internet shares forced investors to look for ways to value companies with lots of potential, but no earnings yet.

Generally speaking, a firm trading at a PSR of less than 1 should attract your attention. If a firm has sales of sh1 billion but a market value of sh900 million, it has a PSR of 0.9. That means you can buy sh1 of its sales for only 90 cents. There may be plenty else wrong with the firm to justify such a low price (like maybe it's losing money), but that's not always the case. It might just be an overlooked bargain.

O'Shaughnessy (1998) found that PSRs work best for large-cap companies, perhaps because their market values tend to be much closer to their massive sales to begin with. The ratio is less appropriate for service companies like banks or insurers that don't really have traditional sales. Most value investors set their PSR hurdle at 2 and below when looking for undervalued situations. But, as always, we'd counsel that you compare a firm's PSR value to its competitors and its own history. To use this ratio look at its trend while making tentative forecast or compare it across organisations of identical risk class.

Valuing companies with erratic earnings--or no earnings at all--can be tricky. That's where the Price/Sales Ratio comes in. Unlike the more common Price/Earnings Ratio (P/E), Price/Sales can be used to value any public company, and it sometimes provides a more stable valuation measure than P/E does, Martin and Senchack (1987).

Price/Sales also can be used to value companies with no earnings at all. For example, MCI WorldCom WCOM had negative reported earnings in 1994, 1996, and 1998 because of merger-related write-offs, making P/E virtually worthless in charting the firm's progress. But its Price/Sales Ratio grew steadily over this period, from 1.4 in 1994 to 5.1 in 1998. These figures give a much better picture of the value the market places on the firm.

What does a high Price/Sales Ratio tell us? Well, that depends on the industry. For example, pharmaceutical companies generally have high Price/Sales Ratios because they tend to have high profits relative to their sales. On the other hand, retailers generally have low Price/Sales Ratios because they need to generate a lot of sales to make up for their thin profit margins. So when assessing any firm's Price/Sales Ratio, it helps to compare it with those of its competitors or with an industry average, Lucas (1978).

Price/Sales Ratios vary based on a firm's capital structure. A firm that takes on a lot of debt to increase its assets, as General Motors GM did in the 1990s, will generate more sales than a firm that shuns debt. But the high-debt firm won't be rewarded with a higher Price/Sales Ratio. Interest expenses will eat into profits from those extra sales.

Besides comparisons with industry norms, another way to use Price/Sales Ratios is to look for companies trading for less than their historical average, in a search for bargains and turnaround plays. For example, an organisation with a trailing P/E of 100, after years of P/Es around 20. Possibly this surge is not necessarily as a result off sudden market recognition, but could be because a combination of poor results and write-offs has shrunk the firm's recent earnings, thereby inflating its P/E. A more accurate story comes from looking at the organisation's Price/Sales Ratio, which steadily has shrivelled to its current level of 1.1, less than half its five-year average.

When assessing any firm's Price/Sales Ratio, it helps to compare it with those of its competitors or with an industry average and we avoid relying on a share's P/E in isolation. It pays to validate your conclusions by looking at the firm's Price/Sales Ratio, too. You may get a very different picture of the share's valuation, Martin and Senchack (1987).

One of the advantages of using revenue instead of earnings and book value is stability. This stability can also become a disadvantage when the firm's problems lie in cost control. In such cases, the revenues may not decline even though the earnings and value drop precipitously. Thus while it is tempting to use value troubled firms with negative earnings and book value, the failure to

control for differences across firms in costs and profit margins can lead to very misleading valuations.

Screening stocks on the basis of Price/Sales (PS) multiples has been incorporated by some investors into their investment strategies. Senchak and Martin (1987) compared the performance of low PS Ratio portfolios with low PE Ratio portfolios and concluded that the low PS portfolios outperformed the market but not the low PE portfolio.

Jacob and Levy (1988) concluded that PS Ratio remains a significant factor in explaining excess returns (together with PE Ratio and size). The significance of this is the ability to identify undervalued securities.

The Price Sales Ratio is widely used to value private firms and to compare value across publicly traded firms. Comparisons of Price Sales multiples across firms have to take into account differences in profit margins.

2.2 FORECASTING ABILITY OF VALUATION RATIOS

A vast amount of literature devoted to valuation ratios from the point of view of their predictive power. The motivation behind such attempts is apparent, since these ratios incorporate both fundamental information and the markets reaction to it, as well as to the economic conditions.

There is much evidence that share returns are predictable. At the aggregate level, variables such as interest rates, financial ratios, and the default premium appear to forecast share returns (e.g., Fama and French (1989) and Lewellen (2001)). Further, LeRoy and Porter (1981) and Shiller (1981) argue that price volatility cannot be explained solely by changes in dividends, providing indirect evidence that share returns are predictable.

At the firm level, Fama and French (1992, 1996) and Jegadeesh and Titman (1993) show that size, book-to-market, and past returns together explain much of the cross-sectional variation in average returns. There seems little doubt that expected returns vary both cross sectionally and over time. The interpretation of predictability is more contentious. The empirical results are potentially consistent with either market efficiency or mispricing. In general terms, market efficiency implies that prices fully reflect available information. To formalize this idea for empirical testing, Fama (1976) distinguishes between the probability distribution of returns perceived by 'the market,' based on whatever information investors view as relevant, and the true distribution of returns conditional on all information. The market is said to be (informationally) efficient if these distributions are the same. It follows that, in an efficient market, investors should be aware of any cross-sectional or time-variation in expected returns– predictability simply reflects changes in the risk premium. Thus, researchers must judge whether predictability is consistent with

credible models of rational behaviour or whether it is better explained by irrational mispricing.

It has been argued that there is a third potential source of predictability: parameter uncertainty. Research on parameter uncertainty typically focuses on the subjective distribution perceived by Campbell and Shiller (2001) who studied the use of Price Earnings Ratios and Dividend-Price Ratios as forecasting variables for the stock market. This was examined using aggregate annual US data 1871 to 2000 and aggregate quarterly data for twelve countries since 1970. Various simple efficient-markets models of financial markets imply that these ratios should be useful in forecasting future dividend growth, future earnings growth, or future productivity growth. They concluded that, overall, the ratios do poorly in forecasting any of these. Rather, the ratios appear to be useful primarily in forecasting future share price changes, contrary to the simple efficient-markets models.

Goetzmann and Jorion (1993) re-examined the ability of Dividend Yields to predict long-horizon share returns. They used the bootstrap methodology, as well as simulations, to examine the distribution of test statistics under the null hypothesis of no forecasting ability. These experiments were constructed as to maintain the dynamics of regression models with lagged dependent variables over long horizons. Their findings were that the empirically observed

statistics were well within the 95% bounds of their simulated distributions and overall, there was no strong statistical evidence indicating that Dividend Yields can be used to forecast share returns.

Lewellen (2001) provided a new test of the predictive ability of Price earnings, Dividend yield and Book to market ratios for a small sample. The focus was short horizon tests regressed on lagged valuation ratios. It was established that Price Earnings and Book to market predict stock returns for shorter periods (1963-2000) and Dividend yield predicts returns for longer time horizons (1946-2000).

Campbell and Shiller (1988) found that a linearization of a rational expectations present value model for corporate stock prices produced a simple relation between the log dividend-price ratio and mathematical expectations of future log real dividend changes and future real discount rates. This relation was tested using vector autoregressive methods. Three versions of the linearized model, differing in the measure of discount rates, were tested for United States time series 1981-1986: versions using real interest rate data. The results yielded a metric to judge the relative importance of real dividend growth, measured real discount rates and unexplained factors in determining the Dividend-Price Ratio.

Campbell (1999) reviewed the behaviour of financial asset prices in relation to consumption. The paper lists some important stylized facts that characterize US data, and relates them to recent developments in equilibrium asset pricing theory. Data from other countries are examined to see which features of the US experience apply more generally. The paper argues that to make sense of asset market behaviour one needs a model in which the market price of risk is high, time varying, and correlated with the state of the economy. Models that have this feature, including models with habit-formation in utility, heterogeneous investors, and irrational expectations, are discussed. The main focus is on share returns and short-term real interest rates, but bond returns are also considered.

In terms of analysis models, Chris Kirby (1997) showed that when a regression model is used to forecast share and bond returns, the sample R2 increases dramatically with the length of the return horizon. These studies argue, therefore, that long-horizon returns are highly predictable. This article presents evidence that suggests otherwise. Long-horizon regression models can easily yield large values of the sample R2, even if the population R2 is small or zero. Moreover, long-horizon regression models with a small or zero. Moreover, long-horizon regression models with a small or zero population R2 can produce t-ratios that might be interpreted as evidence of strong predictability. In general, the analysis provides little support for the view that long-horizon returns are highly predictable.

According to Nissim and Penman (2001) valuation ratios are useful in providing historical benchmarks for forecasting, however they state that the analysis being carried out has been typically ad hoc. They therefore propose a more structured approach in the use of valuation ratios.

2.3 SUMMARY

From the information given we can see that there are some researches that state that valuation ratios have predictive power and others that state that they do not have predictive power. This research which is based on previous researches carried out in the US stock market (Campbell and Shiller (2001)) is now being replicated in the Kenyan Stock Market with a view to establishing whether these valuation ratios have predictive power.

3.0 CHAPTER THREE-RESEARCH METHODOLOGY

3.1 INTRODUCTION

The research will adopt the approach used by Campbell and Shiller (2001) and Lewellen (2002) that relied on the linear regression model approach. To determine or measure the value of future returns on shares, Price Earnings, Dividend Yield and the Price Sales Ratio will be used.

3.2 RESEARCH METHODOLOGY

3.2.1 POPULATION

The population of the study will include all the fifty-three (53) publicly quoted companies of the Nairobi Stock Exchange-NSE (Appendix A). The population includes only those organisations that are listed at the NSE as at the end of the year 2001, Martin and Senchak (1987). This means that those organisations that are delisted from the NSE as at the end of the year 2001 will not be included.

3.2.2 SAMPLE DESIGN

All public companies in the Industrial, Agriculture and Commercial Sector of the Nairobi Stock Exchange will be selected. The Financial Sector will not be included because this sector does not generate sales. Of the public companies

selected we will use only those organisations that have a year-end of 31st December. The sample therefore consists of fourteen organisations listed below:

COMMERCIAL	INDUSTRIAL	AGRICULTURAL
1. Express Kenya	4. Athi River Mining	12. Brooke Bond
2. Nation Media Group	5. B.A.T. Kenya	13. Kakuzi (Tea & Coffee)
3. Tourism P.S. (Serena)	6. Bamburi Cement	14. Limuru Tea
	7. Crown Berger	
	8. Dunlop Kenya	
	9. E.A. Cables	
	10. Firestone E.A.	
	11. Total Kenya	

3.2.3 *INDEPENDENT (EXPLANATORY) VARIABLES*

The study analyses the effects of the three valuation ratios-Price Earnings, Dividend Yield and Price Sales Ratio on the changes in stock prices.

The independent variables are therefore:

1. Price Earnings Ratio

P/E Ratio = Market Value per Share /Earnings per Share (EPS)

2. Dividend Yield Ratio

Dividend Yield Ratio = Dividend per share /Market Price per share

3. Price Sales Ratio

Price Sales Ratio = Market Price per share/Revenues per share.

3.2.4 *DEPENDENT VARIABLES*

Replicating the Campbell and Shiller (2001) methodology, the study will use expected returns as the dependent variable.

Returns (*end year1*)=[(Market Price per share (*end year1*)- Market Price per share (beg *year1*))+Dividend per share (*beg year1*)]/Market price per share (*beg year1*)

3.3 DATA COLLECTION

Secondary data will be collected for this study from 1996 to 2000.A five-year period was selected based on studies carried out by Campbell and Shiller (1988) who similarly selected a five-year period. Data from the performance

reports that the quoted companies send to the Nairobi Stock Exchange (NSE) will be used. Given that the data is collected over a period of five years 1996-2000 there are various adjustments that were made to ensure that the data is comparable. The specific data obtained is as follows:

- Quarterly Market returns-daily market prices were obtained from the Nairobi Stock Exchange. This data was then adjusted; the SPSS software was then used to obtain quarterly market returns from the daily market prices.
- Quarterly Earnings per share –annual earnings were obtained for all the organisations in my samples. Quarterly earnings attributable to shareholders were obtained by interpolation using SAS statistical software.
- Quarterly Dividend per share- annual dividends was obtained for all the organisations in my sample. Quarterly dividends were then obtained by interpolation using SAS statistical software.
- Revenue/turnover per share- annual turnover were obtained for all the organisations in my sample. Quarterly turnover were obtained by interpolation using SAS statistical software.

Using this data I was then able to compute the quarterly Price Earnings, Dividend Yield and Price Sales ratio for each organisation in my sample and also for the market.

3.4 RESEARCH DATA AND METHOD

The research method is similar to that used by Martin and Senchak (1987). I selected the Nairobi Stock Exchange for the 1996-2000 period. I then choose all the sectors other than the financial sector. Each firm selected had half yearly data available. From this data I will derive quarterly data using the SAS statistical software-by interpolation. I choose all the firms that had a year ending 31st December. I excluded the financial sector because it does not generate sales in the usual accounting sense. I also deleted firms that had restated sales in prior periods because of an acquisition or accounting change, because it is impossible to reconstruct their ex ante sales from existing data.

I then will compute each firm's Price Earnings, Dividend Yield and Price Sales Ratio at the end of each calendar quarter. To allow for the timely disclosure of this accounting information I will use the closing price per share at the end of the quarter following the reporting period. Annual valuation ratios using the three ratios will be computed for a period of five years (1996-2000) to establish the valuation model using regression model analysis. . The variables will then be lagged by one quarter and then regressed.

3.5 EVALUATION MODEL

The research data processing will be based on the simple and the multiple regression model approach. This approach has been used in similar researches

by Campbell and Shiller (2001), Goetzmann and Jorion (1993), Stambaugh (1986,1999) and Mankiw and Shapiro (1986).

To analyse the data, the SPSS statistical software (Version 11 for Windows) will be used.

The simple linear regression model postulates that:

$$Yt = \alpha + \beta Xt\text{-}1 + \varepsilon t$$

Where:

Xt	-	the independent variable in quarter t
Yt	-	the dependent variable in quarter t
εt	-	the "residual" e is a random variable with mean zero
α	-	is also referred to as the y intercept
β	-	is the slope or the regression model coefficient or (β) coefficient

The coefficient (α) and (β) are determined by the condition that the sum of the square residuals is as small as possible.

The classic statistical problem is to try to determine the relationship between two random variables X and Y.

In the case of my research hypotheses I will compute three regression models:

Model 1

Variable Y is Predicted Share market Price and Variable X is the Price Earnings Ratio.

Model 2

Variable Y is Predicted Share market Price and Variable X is the Dividend Yield Ratio.

Model 3

Variable Y is the Predicted Share market Price and Variable X is the Price Sales Ratio.

MODEL 1-3:

$Yt = \alpha + \beta Xt\text{-}1 + \varepsilon t$

The following will be the process used:

1. The best-fitting straight line (linear model) will be estimated.
2. The linear model will be tested for goodness of fit.
3. Tests will be carried out to test whether the mathematical assumptions of the linear model are satisfied.
4. If the estimated line passes the goodness of fit tests and the

mathematical assumptions are satisfied the model will be used to generate forecasts.

5. An evaluation of the estimated model will be carried out in terms of its forecasting reliability. This is because there may be situations in which the model performs admirably when viewed from a historical perspective yet fails as a forecasting tool

I will compute each of these models for a five-year period (1996-2000). I will then lag the independent variable by one quarter, and then recompute the regression model equation for the five-year period 1996-2000.

Predicted and Residual Scores. The regression model line expresses the best prediction of the dependent variable (Y), given the independent variables (X). However, nature is rarely (if ever) perfectly predictable, and usually there is substantial variation of the observed points around the fitted regression model line (as in the scatter plot shown earlier). The deviation of a particular point from the regression model line (its predicted value) is called the residual value, McLeay (1984).

Residual Variance and R-square. The smaller the variability of the residual values around the regression model line relative to the overall variability, the better is our prediction, Beecher (1984). For example, if there is no

relationship between the X and Y variables, then the ratio of the residual variability of the Y variable to the original variance is equal to 1.0. If X and Y are perfectly related then there is no residual variance and the ratio of variance would be 0.0. In most cases, the ratio would fall somewhere between these extremes, that is, between 0.0 and 1.0. 1.0 minus this ratio is referred to as R-square or the coefficient of determination. This value is immediately interpretable in the following manner. If we have an R-square of 0.4 then we know that the variability of the Y values around the regression model line is 1-0.4 times the original variance; in other words we have explained 40% of the original variability, and are left with 60% residual variability. Ideally, we would like to explain most if not all of the original variability. The R-square value is an indicator of how well the model fits the data (e.g., an R-square close to 1.0 indicates that we have accounted for almost all of the variability with the variables specified in the model).

Interpreting the Correlation Coefficient R. Customarily, the degree to which two or more predictors (independent or X variables) are related to the dependent (Y) variable is expressed in the correlation coefficient R, which is the square root of R-square. In multiple regression models, R can assume values between 0 and 1. To interpret the direction of the relationship between variables, one looks at the signs (plus or minus) of the regression model or B coefficients. If a B coefficient is positive, then the relationship of this

variable with the dependent variable is positive; if the B coefficient is negative then the relationship is negative. Of course, if the B coefficient is equal to 0 then there is no relationship between the variables.

Assumptions, Limitations, Practical Considerations

1. Assumption of Linearity. It is assumed that the relationship between variables is linear. In practice this assumption can virtually never be confirmed; fortunately, regression model procedures are not greatly affected by minor deviations from this assumption. However, as a rule it is prudent to always look at bivariate scatter plot of the variables of interest. If curvature in the relationships is evident, one may consider either transforming the variables, or explicitly allowing for non-linear components.
2. Normality Assumption. It is assumed in regression model that the residuals (predicted minus observed values) are distributed normally (i.e., follow the normal distribution). Again, even though most tests (specifically the F-test) are quite robust with regard to violations of this assumption, it is always a good idea, before drawing final conclusions, to review the distributions of the major variables of interest. You can produce histograms for the residuals as well as normal probability plots, in order to inspect the distribution of the residual values.

3. Limitations. The major conceptual limitation of all regression model techniques is that one can only ascertain relationships, but never be sure about underlying causal mechanism. .

4. Multicollinearity and Matrix Ill-Conditioning. This is a common problem in many correlation analyses. When there are very many variables involved, it is often not immediately apparent that this problem exists, and it may only manifest itself after several variables have already been entered into the regression model equation. Nevertheless, when this problem occurs it means that at least one of the predictor variables is (practically) completely redundant with other predictors. There are many statistical indicators of this type of redundancy (tolerances, semi-partial R, etc., as well as some remedies (e.g., Ridge regression model).

5. Fitting Centered Polynomial Models. The fitting of higher-order polynomials of an independent variable with a mean not equal to zero can create difficult multicollinearity problems. Specifically, the polynomials will be highly correlated due to the mean of the primary independent variable. With large numbers (e.g., Julian dates), this problem is very serious, and if proper protections are not put in place, can cause wrong results! The solution is to "center" the independent variable (sometimes, this procedures is referred to as "centered polynomials"), i.e., to subtract the mean, and then to compute the polynomials.

6. Choice of the Number of Variables. Regression model is a seductive technique: "plug in" as many predictor variables as you can think of and usually at least a few of them will come out significant. This is because

one is capitalising on chance when simply including as many variables as one can think of as predictors of some other variable of interest, Bird (1977). This problem is compounded when, in addition, the number of observations is relatively low. Most authors recommend that one should have at least 10 to 20 times as many observations (cases, respondents) as one has variables, otherwise the estimates of the regression model line are probably very unstable and unlikely to replicate if one were to do the study over.

7. The Importance of Residual Analysis, Horrigan (1983) Even though most assumptions of regression model cannot be tested explicitly, gross violations can be detected and should be dealt with appropriately. In particular outliers (i.e., extreme cases) can seriously bias the results by "pulling" or "pushing" the regression model line in a particular direction, thereby leading to biased regression model coefficients. Often, excluding just a single extreme case can yield a completely different set of results.

3.6 LAGGED VARIABLES

When all variables in a regression model are measured at time t (where t is a specific time period), the implicit assumption is that the effects of the independent variables on the dependent variables are completely felt during this time period. The validity of this assumption depends on the particular system being studied and modeled, Atkinson (1993) Theoretical

considerations suggest either that the impact of a given economic factor may not manifest itself for several time periods or the impact may be distributed over several time periods.

For the purpose of my study the distributed lags have been used. It attempts to explain delayed responses when the effects of the independent variable are spread over a number of periods.

4.0 CHAPTER 4 -RESEARCH FINDINGS & INTERPRETATION

4.1 INTRODUCTION

In order to analyze my data the following statistical tests were applied for each of the three valuation models.

A scatter plot graph was first drawn to obtain the line of best fit. Where there evidence that the relationship was not linear, a curve estimate was drawn and there was an analysis of variance to check the strength of the relationship.

The coefficients of the regression model line were then obtained. The ANOVA table was obtained in order to test the acceptability of the model from a statistical perspective.

The regression model row shows the information about the variation accounted for by the regression model. The residual row displays information about the information that is not accounted for by the regression model.

The regression model and residual sums of square indicate the extent of explanation of the dependent variable by the independent variable.

While the ANOVA table is a useful test of the model's ability to explain any variation in the dependent variable, it does not directly address the strength of that relationship. To resolve this the model summary table reports the strength of the relationship between the model and the dependent variable.

The coefficient of determination was then computed to show the extent to which the independent variable shows the changes in the dependent variable. Any coefficient of determination greater or equal to 0.2 is acceptable.

As a further measure of the strength of the model fit, the standard error of estimate was compared to the standard deviation of the dependent variable.

To check the assumption of the normality of the error term a histogram or P-P plot of the residuals was drawn. The P-P plotted residuals were then plotted. If it follows the 45-degree line it can be assumed that the normality assumption of the error term is upheld.

To check for influential points Cook's distance is plotted against the Centered Leverage value.

The t test will be used to accept or reject the null hypothesis. The benchmark is 0.2.Any t statistics above 2 will be accepted.

The independent variable-the respective valuation ratio, was then lagged by one quarter and a new regression model was calculated. The above statistical tests were recomputed for each of the three-regression valuation models using three valuation models-Price Earnings, Dividend Yield and Price Sales Ratio.

4.2 PREDICTING WITH PRICE EARNINGS RATIO

From the Price Earnings Ratios per quarter (Table 1) we observe a gradual decline in PE during the period from 1996 to 2000 for ninety-three percent (93%) of the sample. This is mainly attributable to the difficulties in economic fundamentals that most organizations in Kenya experienced during this period.

Where the organizations have reflected negative price earnings as in the case of Brooke Bond and Express Kenya, this is as a result of that organization making a loss during that particular quarter. We have to keep in mind that this negative price earnings is not informative-it does not tell us much. It has therefore been necessary to compute the average earnings per share per quarter for that organization, and use these average earnings per share to compute the Price Earnings Ratio for that particular quarter.

The regression results for the model that uses Price Earnings Ratio as the independent variable and future stock returns as the dependent variable is summarized in Table 2.

Where there is no lagging of the independent variable, the coefficient of determination is strong (more than 0.2) for seven percent (7%) of the sample. This means only in the case of one organization does the Price Earnings ratio explain significantly the changes in future stock returns.

The low coefficient of determination means that the independent variable only explains to a limited extent the change in the dependent variable. It could

also mean that the relationship between the two variables is due to chance. In turn this implies that either the wrong model is being utilized or alternatively that there are other independent variables other than Price Earnings ratio that determine the future share returns.

To test the null hypothesis -that the Price Earnings does not have predictive ability the t statistics were calculated. Where the t statistics were greater or equal to two the null hypothesis of no predictive ability of the Valuation ratio was accepted .In the case where there is no lagging of the independent variable the null hypothesis is accepted in twenty-eight percent (28%) of the cases. This is in the case of four organizations (Limuru Tea, TPS-Serena, Crown Berger and Total Kenya.). Therefore for these four organizations the Price Earnings ratio should not be used to predict future stock returns.

With the lagging of the PE ratio by one quarter we observe an increase in both the coefficient of determination (for fifty seven percent (57%) of the sample) and the t statistics (for fifty percent (50%) of the sample). Where there is lagging of the independent variable by one quarter, twenty eight percent (28%) of the sample show strong coefficient of determination. This implies that with lagging the strength of the relationship between the independent and the dependent variable increases.

From the point of view of the coefficient of determination, we can see due to lagging, fifty-seven percent (57%) of the sample showed an increase in their coefficient of determination. However only in one case was the increase high enough to warrant classifying the independent variable as being significant in terms of explaining changes in the dependent variable. With lagging we see an increase in fifty percent (50%) in the t statistics of the sample. However of this (50%), in only one of these cases was the increase large enough to make us conclude that the Price Earnings model has significant predictive value.

The Price Earnings Ratio is a determinant of the future stock prices. It can be observed that the relationship exists between the future returns and the Price Earnings ratio. This finding is in agreement with Lewellen (2001) who established that Price Earnings ratios predict stock returns for shorter periods. There similarity between this research and Lewellen (2001) is that in both cases the sample was small and the focus was on short horizon tests regressed on lagged valuation ratios.

This conclusion however is contrary with that of Campbell and Shiller (2001) who stated that price earnings ratio do poorly in forecasting. They stated that there is a relationship between the Price Earnings ratio and the future stock returns, but they emphasize the fact that other variables need to be considered.

They improved on their study by decomposing stock returns-which is the dependent variable into future dividend, earnings and productivity growth.

Tables 1 to 2 provide a summary statistics for the data on the Price Earnings Ratios

TABLE 1-PRICE EARNINGS RATIOS PER QUARTER

	Brooke Bond	Kakuzi	Limuru Tea	Express	NMG	TPS	ARM	Bamburi	BAT	Cberger	Dunlop	E.A.Cables	Firestone	Total
1996Q3	267.73	21.99	29.64	5.53	6.33	NO	NO	18.99	15.66	5.48	140.79	30.52	7.58	0.39
1996Q4	259.28	27.31	36.86	5.87	6.52	NO	NO	16.01	13.11	3.86	139.90	30.90	7.33	0.30
1997Q1	94.22	27.49	40.47	5.93	6.70	13.08	NO	22.46	13.55	3.86	153.54	26.97	8.32	0.34
1997Q2	44.03	23.70	38.68	6.22	9.41	13.27	NO	19.85	10.90	3.86	152.86	22.91	7.47	0.31
1997Q3	32.35	23.10	28.54	6.72	10.74	13.27	NO	20.36	9.52	3.55	252.44	19.21	7.51	0.32
1997Q4	30.90	18.61	20.52	7.48	11.31	13.27	31.81	16.41	8.09	2.94	178.07	16.32	6.22	0.30
1998Q1	51.15	14.63	16.59	9.21	11.28	12.65	22.11	18.44	7.88	3.34	69.32	15.82	7.57	0.36
1998Q2	51.40	14.11	13.63	8.10	16.58	11.91	16.05	15.38	7.36	2.89	86.88	11.62	7.26	0.26
1998Q3	51.40	14.81	11.33	7.10	17.02	11.35	13.36	13.78	7.95	2.98	35.82	9.03	7.04	0.24
1998Q4	51.40	13.46	9.71	7.94	15.86	10.52	12.74	12.75	9.47	2.62	19.67	9.45	6.42	0.21
1999Q1	51.40	13.81	8.44	10.02	16.69	11.19	15.25	15.93	11.39	2.93	29.78	11.53	7.69	0.27
1999Q2	51.40	12.41	7.39	7.96	14.90	9.91	15.96	13.70	11.76	3.26	22.94	8.91	7.07	0.27
1999Q3	200.08	13.45	6.21	6.61	12.88	9.64	20.16	16.53	8.54	3.70	22.45	7.06	6.72	0.29
1999Q4	29.03	12.79	6.15	5.93	11.25	9.76	28.58	16.22	7.20	3.84	17.63	5.70	6.46	0.27
2000Q1	17.71	13.80	6.54	8.69	10.27	9.16	34.87	16.96	6.33	3.63	14.91	6.53	6.81	0.25
2000Q2	12.86	13.67	7.48	21.25	8.70	8.59	49.00	17.71	4.76	4.12	12.60	7.74	6.41	0.21
2000Q3	13.55	16.97	9.20	5.27	9.05	8.41	32.65	19.08	4.94	5.12	11.03	9.01	6.91	0.20
2000Q4	19.12	22.80	12.04	5.27	9.47	8.14	20.42	19.37	5.42	5.94	9.42	12.99	7.96	0.18

Price Earnings ratio(PE ratio)=Market price per share(MPS)/Earnings per share (EPS)

key:
NO-this organisation(s) was not publicly quoted in this year.
Brooke Bond-1998Q2,Q3,Q4 & 1999Q1,Q2 the earnings were negative therefore the average EPS of sh51.40 has been used.
Express K-2000Q3 & Q4 the earnings were negative therefore the average EPS of sh5.27 have been used.

TABLE 1-PRICE EARNINGS RATIO PER QUARTER

TABLE 2-RELATIONSHIP BETWEEN RETURNS AND PRICE EARNINGS RATIO.REGRESSION RESULTS (1996-2000)

Company	beta	alpha	R squared	Residual Std deviation	SE of beta	SE of alpha	t statistics	Null Hypothesi
Brooke Bond	3.44	-0.04	0.07	0.24	3.18	0.10	-1.49	N
Brooke Bond (L=1)	3.91	-0.07	0.09	0.24	3.18	0.10	-0.65	N
Kakuzi	0.00	0.04	0.00	0.24	0.01	0.21	0.19	N
Kakuzi (L=1)	0.00	0.13	0.01	0.24	0.01	0.21	0.62	N
Limuru Tea	-0.01	0.20	0.10	0.22	0.01	0.10	2.07	S
Limuru Tea (L=1)	-0.01	0.19	0.07	0.23	0.01	0.10	1.87	N
Express	0.01	-0.04	0.01	0.29	0.02	0.17	-0.22	N
Express (L=1)	-0.07	-0.50	0.65	0.18	0.01	0.11	-4.59	N
Nation Media Group	0.01	0.07	0.01	0.27	0.02	0.22	0.33	N
Nation Media Group (L=1)	0.00	0.12	0.00	0.27	0.02	0.25	0.49	N
Tourism P.S. (Serena)	-0.06	0.77	0.17	0.23	0.03	0.37	2.04	S
Tourism P.S. (Serena) (L=1)	-0.05	0.58	0.65	0.06	0.01	0.11	5.52	S
Athi River Mining	0.01	-0.26	0.17	0.26	0.01	0.19	-1.35	N
Athi River Mining (L=1)	-0.02	-0.52	0.68	0.17	0.01	0.13	-4.14	N
Bamburi Cement	0.04	-0.64	0.15	0.26	0.03	0.44	-1.45	N
Bamburi Cement (L=1)	0.02	-0.18	0.02	0.29	0.03	0.50	-0.36	N
B.A.T. Kenya	-0.04	0.41	0.11	0.36	0.03	0.25	1.62	N
B.A.T. Kenya (L=1)	-0.02	0.19	0.04	0.31	0.02	0.23	0.83	N
Crown Berger	-0.13	0.59	0.16	0.32	0.07	0.29	2.03	S
Crown Berger (L=1)	-0.03	0.13	0.01	0.30	0.07	0.27	0.48	N
Dunlop Kenya	0.00	-0.13	0.00	0.46	0.00	0.16	-0.79	N
Dunlop Kenya (L=1)	0.00	-0.10	0.04	0.40	0.00	0.14	-0.73	N
E.A. Cables	0.01	0.18	0.08	0.35	0.01	0.17	1.05	N
E.A. Cables (L=1)	0.00	0.01	0.02	0.27	0.01	0.14	0.09	N
Firestone E.A.	0.16	-1.10	0.06	0.36	0.15	1.10	-1.00	N
Firestone E.A. (L=1)	0.18	-1.31	0.11	0.29	0.12	0.88	-1.48	N
Total Kenya	-2.46	0.73	0.27	0.32	0.95	0.29	2.51	S
Total Kenya (L=1)	-1.71	0.45	0.23	0.25	0.75	0.23	1.97	N

key:
S-Significant (Accept the null hypothesis)
N-Not significant (Reject the null hypothesis)
L=1-Independent variable lagged by one qtr
All values are rounded off to two decimal places

4.3 PREDICTING WITH DIVIDEND YIELD RATIO

The Dividend yield ratios were fairly constant over the period 1996 to 2000. The range was in most cases not greater than 0.1 (Appendix D). In the events where the organization did not pay dividend for any particular year (as in the case of Dunlop for the year 1996 and 1997) we did not consider that year when computing our regression results.

The summary of regression results is stated in Table 2. From the regression model we can see that the strength of the relationship between the independent variable and the dependent variable is weak. In only twenty eight percent (28%) of the sample is the relationship strong. The rest reflected a weak relationship.

From the results of the t statistics, we accept the null hypotheses in two cases-Firestone and Total Kenya ltd. (which accounts for twenty eight percent (28%) of the total sample). This means that the Dividend yield ratio was not a significant predictor of future share returns for twenty eight percent (28%) of the cases.

When the independent variable is lagged we accept the null hypothesis in one of the cases-which accounts for seven percent (7%).

In fifty-four percent (54%) of the cases there is an improvement in the extent to which the independent variables explains changes in the dependent variable-

measured by the coefficient of determination. However in none of these cases is this improvement large enough for us to accept the null hypothesis.

The t statistics increased in thirty-one percent (31%) of the total sample when the independent variable was lagged by one quarter. It must be mentioned that in none of these cases was the increase large enough to for us to change our conclusion. In all the cases we still maintain the same position of rejecting the null hypothesis that states that the Dividend Ratio has no forecasting ability.

In this study we see that in majority of the cases there is an inverse relationship between the change in the coefficient of determination and t statistics on lagging the independent variable. However it is beyond the scope of this research paper to determine why. However this information is important because it means that with an increase in the coefficient of determination and a decrease in the t statistics there is an increase in the predictive power of the model. This is where the null hypothesis is that the valuation ratio has no predictive power.

In conclusion we reject the null hypothesis that the Dividend yield ratio has no predictive power and accept the alternate hypothesis. The Dividend yield ratio has predictive power. This conclusion concurs with that of Lewellen (2001) who also used a similar approach of regressed lags over short time horizons for small sample biases.

Our conclusion does not agree with that of Goetzmann and Jorion (1993) who found out that there is no strong statistical evidence indicating that dividend yield ratios can be used to forecast share returns. For both my study and Goetzmann lagged variables were used. The difference between the two studies is the time horizon that is used. Goetzmann and Jorion (1993) used long horizons whereas in this research a five-year period was used. Our justification for the five-year period was based on an earlier study carried out by Campbell and Shiller (1988). Campbell and Shiller (2001) also used a long time horizon (1871-2000) for their study on the predictive ability of the dividend yield ratio. Their conclusion was that this ratio shows poor forecasting ability. Tables 3 to 4 provide a summary statistics for the data on the Dividend Yield Ratios.

TABLE 3-DIVIDEND YIELD PER QUARTER

Qtr	Brooke Bond	Kakuzi	Limuru Tea	Express	NMG	TPS	Bamburi	BAT	Cberger	Dunlop	E.A.Cables	Firestone	Total Kenya
1996Q2	0.02	0.02	0.02	0.09	0.03	0.03	0.03	0.06	0.05	ND	0.03	0.11	0.02
1996Q3	0.02	0.02	0.02	0.07	0.02	0.04	0.03	0.06	0.06	ND	0.03	0.10	0.03
1996Q4	0.01	0.02	0.03	0.05	0.02	0.04	0.04	0.07	0.09	ND	0.03	0.10	0.04
1997Q1	0.01	0.02	0.03	0.05	0.03	0.04	0.03	0.06	0.10	ND	0.03	0.08	0.03
1997Q2	0.01	0.02	0.04	0.04	0.02	0.05	0.03	0.07	0.12	ND	0.03	0.09	0.04
1997Q3	0.01	0.02	0.06	0.04	0.02	0.06	0.03	0.08	0.12	ND	0.03	0.09	0.04
1997Q4	0.01	0.02	0.08	0.04	0.02	0.08	0.03	0.09	0.14	ND	0.04	0.11	0.05
1998Q1	0.01	0.02	0.09	0.04	0.02	0.08	0.03	0.09	0.11	ND	0.03	0.09	0.05
1998Q2	0.01	0.02	0.10	0.05	0.01	0.10	0.03	0.11	0.12	ND	0.04	0.09	0.06
1998Q3	0.02	0.02	0.11	0.06	0.01	0.11	0.03	0.11	0.11	0.01	0.06	0.09	0.07
1998Q4	0.03	0.02	0.11	0.06	0.01	0.12	0.03	0.09	0.12	0.02	0.06	0.10	0.08
1999Q1	0.03	0.02	0.11	0.04	0.01	0.11	0.02	0.08	0.12	0.02	0.06	0.08	0.07
1999Q2	0.03	0.02	0.09	0.04	0.01	0.12	0.03	0.07	0.13	0.03	0.10	0.08	0.07
1999Q3	0.04	0.02	0.08	0.03	0.01	0.11	0.03	0.09	0.14	0.03	0.16	0.08	0.07
1999Q4	0.04	0.02	0.06	0.01	0.02	0.10	0.04	0.10	0.16	0.04	0.23	0.07	0.07
2000Q1	0.04	0.02	0.04	0.01	0.02	0.10	0.04	0.11	0.19	0.04	0.24	0.07	0.06
2000Q2	0.05	0.02	0.03	0.02	0.02	0.10	0.04	0.14	0.19	0.05	0.23	0.07	0.06
2000Q3	0.06	0.02	0.04	0.03	0.02	0.10	0.03	0.13	0.16	0.05	0.22	0.07	0.04
2000Q4	0.06	0.01	0.06	0.01	0.03	0.10	0.03	0.12	0.11	0.06	0.12	0.08	0.01

Dividend Yield=Dividend per share (DPS)/Market Price per share (MPS)

ND-Dunlop did not pay dividends in the year 1996 and 1997 therefore there is no dividend yield.

TABLE 3-DIVIDEND YIELD RATIO PER QUARTER

TABLE 4-THE RELATIONSHIP BETWEEN RETURNS AND DIVIDEND YIELD RATIO.REGRESSION RESULTS

Company	beta	alpha	R squared	Residual Std deviation	SE of beta	SE of alpha	t statistics	Null Hypothesis
Brooke Bond	4.31	-0.05	0.11	0.23	3.04	0.09	-0.52	N
Brooke Bond (L=1)	4.97	-0.08	0.15	0.23	3.01	0.10	-0.84	N
Kakuzi	20.46	-0.37	0.06	0.23	20.79	0.44	-0.83	N
Kakuzi (L=1)	7.77	-0.11	0.01	0.24	20.80	0.44	-0.25	N
Limuru Tea	-0.70	0.14	0.01	0.23	1.78	0.13	1.07	N
Limuru Tea (L=1)	-1.80	0.22	0.06	0.23	1.90	0.14	1.55	N
Express	-4.26	0.10	0.01	0.30	4.81	0.19	0.53	N
Express (L=1)	-2.01	0.19	0.06	0.28	4.18	0.18	1.07	N
Nation Media Group	-6.17	0.26	0.01	0.26	13.68	0.27	0.96	N
Nation Media Group (L=1)	1.79	0.12	0.00	0.27	14.36	0.28	0.41	N
Tourism P.S. (Serena)	2.22	-0.06	0.07	0.23	2.07	0.19	-0.34	N
Tourism P.S. (Serena) (L=1)	2.24	-0.07	0.06	0.24	2.41	0.23	-0.32	N
Bamburi Cement	10.83	-0.23	0.03	0.28	15.44	0.48	-0.48	N
Bamburi Cement (L=1)	23.40	-0.61	0.14	0.27	15.03	0.46	-1.31	N
B.A.T. Kenya	4.21	-0.32	0.06	0.36	3.82	0.35	-0.90	N
B.A.T. Kenya (L=1)	7.79	-0.65	0.21	0.34	3.63	0.34	-1.93	N
Crown Berger	6.84	-0.78	0.50	0.25	1.63	0.21	-3.75	N
Crown Berger (L=1)	8.47	-0.99	0.74	0.19	1.24	0.16	-6.20	N
Dunlop Kenya	5.92	-0.24	0.07	0.44	5.30	0.14	-1.74	N
Dunlop Kenya (L=1)	6.32	-0.26	0.07	0.45	5.53	0.15	-1.74	N
E.A. Cables	2.36	-0.22	0.26	0.31	0.94	0.11	-1.96	N
E.A. Cables (L=1)	2.12	-0.22	0.21	0.33	1.00	0.12	-1.77	N
Firestone E.A.	-19.38	1.48	0.36	0.30	5.16	0.46	3.23	S
Firestone E.A. (L=1)	-14.17	1.27	0.23	0.34	6.31	0.55	2.29	S
Total Kenya	-15.86	1.45	0.37	0.28	4.85	0.43	3.37	S
Total Kenya (L=1)	-5.37	0.57	0.05	0.27	5.70	0.49	1.17	N

key:
S-Significant (Accept the null hypothesis)
N-Not significant (Reject the null hypothesis)
L=1-Independent variable lagged by one qtr

Table 6 contains the summary of regression results. From the data we observe that in seven percent (7%) of the cases there was a significant coefficient of determination. A significant coefficient of determination being measured as being over 0.2, measures the strength of the linear relationship. In thirty five percent (35%) of the cases there was no relationship at all. In the remaining fifty-eight percent (58%) there was a weak relationship between Price Sales ratio and the future stock returns.

In testing the hypothesis using the t statistics, from the sample there was no organization that had significant t statistics. We therefore rejected the null hypothesis in a hundred percent (100%) of the cases. This means that the Price Sales Ratios has predictive ability to determine future stock returns.

When the independent variable was lagged there was a thirty-five percent (35%) increase in the coefficient of determination. However the increase did not increase the coefficient of determination to the level where it can be considered large enough to be reliable in explaining the variation of the independent variable.

As a result of the lagging of the independent variable there was an eighty-six percent (86%) increase in the t statistics, however the increase still did not make the regression model statistically significant. On lagging the independent

variable we note that the t statistics and the coefficient of determination become inversely related.

We can conclude that for our sample irrespective of whether the independent variable was lagged or not, we reject the null hypothesis and accept the alternate hypothesis that states that the Price Sales ratio has predictive ability.

Price Sales Ratios are a useful measure of share returns especially in the case where the organization has incurred losses. However it cannot be used in isolation, this is because the relationship between Price Sales ratio and future share returns is not strong enough. This is in line with Jacob and Levy (1988) and Martin and Senchack (1987) who concluded that the Price Sales ratio has predictive value but should be used together with the Price Earnings ratio.

Tables 4 to 5 provide a summary statistics for the data on the Price Sales Ratios.

TABLE 5-PRICE SALES RATIO PER QUARTER

Qtr	Brooke Bond	Kakuzi	Limuru Te:	Express	NMG	TPS	ARM	Bamburi	BAT	Cberger	Dunlop	E.A.Cables	Firestone	Total
1996Q2	1.68	2.50	5.25	0.75	0.50	NO	2.83	1.80	1.87	0.33	25.17	3.10	9.31	0.52
1996Q3	1.66	2.27	4.95	0.84	0.58	NO	2.83	1.80	1.66	0.27	26.55	3.41	9.87	0.39
1996Q4	1.59	2.12	4.67	0.80	0.59	NO	2.83	1.68	1.35	0.19	28.13	3.45	9.60	0.30
1997Q1	1.38	1.97	4.45	0.63	0.59	0.63	2.58	2.52	1.03	0.20	31.70	3.16	10.89	0.34
1997Q2	1.18	1.83	4.26	0.47	0.81	0.58	2.24	2.35	0.72	0.20	31.20	2.88	9.81	0.31
1997Q3	1.23	2.05	3.48	0.34	0.91	0.54	1.92	2.56	0.56	0.21	49.40	2.58	9.90	0.32
1997Q4	1.26	1.93	2.90	0.24	0.96	0.48	1.47	2.19	0.47	0.18	32.68	2.29	8.21	0.30
1998Q1	1.39	1.74	2.70	0.19	0.99	0.56	1.35	2.66	0.42	0.21	11.76	2.21	9.96	0.36
1998Q2	1.36	1.89	2.51	0.11	1.56	0.50	1.09	2.39	0.37	0.18	13.41	1.56	9.43	0.26
1998Q3	1.62	2.18	2.36	0.07	1.73	0.48	0.90	2.24	0.40	0.17	4.93	1.16	9.05	0.24
1998Q4	1.53	2.12	2.30	0.06	1.76	0.47	0.79	2.06	0.49	0.15	2.35	1.19	8.26	0.21
1999Q1	1.70	2.24	2.31	0.07	NA	0.54	0.82	2.37	0.68	0.16	3.04	1.50	10.16	0.27
1999Q2	1.89	1.98	2.37	0.05	NA	0.51	0.69	1.74	0.84	0.18	2.00	1.28	9.87	0.27
1999Q3	1.75	2.01	2.29	0.04	NA	0.52	0.66	1.75	0.73	0.21	1.74	1.13	10.06	0.29
1999Q4	1.58	1.70	2.47	0.03	NA	0.54	0.65	1.45	0.71	0.21	1.28	0.98	10.23	0.27
2000Q1	1.49	1.53	2.57	0.03	NA	0.52	0.55	1.37	0.70	0.20	1.11	1.08	10.88	0.25
2000Q2	1.14	1.19	2.55	0.03	NA	0.49	0.60	1.40	0.55	0.20	1.03	1.08	9.57	0.21
2000Q3	1.03	1.06	2.46	0.03	NA	0.48	0.42	1.53	0.59	0.21	1.03	0.94	9.03	0.20
2000Q4	1.14	0.92	2.35	0.03	NA	0.46	0.38	1.58	0.63	0.19	1.00	0.90	8.73	0.18

Price Sales Ratio=Market Price per share (MPS)/Turnover per share

key:
NO-this organisation was not publicly quoted in this year.
NA--the data for this period was not adjusted therefore it has not been included.

TABLE 6-THE RELATIONSHIP BETWEEN RETURNS AND PRICE SALES RATIOS-REGRESSION RESULTS(1996-2000)

Company	beta	alpha	R squared	Residual Std deviatio	SE of alpha	SE of beta	t statistics	Null Hypothesis
Brooke Bond	0.09	-0.08	0.01	0.25	0.26	0.37	-0.21	N
Brooke Bond (L=1)	-0.12	0.21	0.02	0.25	0.26	0.38	0.55	N
Kakuzi	0.06	-0.05	0.01	0.24	0.15	0.27	-0.18	N
Kakuzi (L=1)	0.07	0.19	0.01	0.24	0.16	0.29	0.67	N
Limuru Tea	0.05	0.25	0.04	0.23	0.06	0.19	1.28	N
Limuru Tea (L=1)	-0.05	0.25	0.03	0.24	0.08	0.23	1.11	N
Express	0.09	0.00	0.01	0.29	0.27	0.09	0.05	N
Express (L=1)	0.14	0.00	0.01	0.30	0.33	0.10	0.01	N
Nation Media Group	0.06	0.13	0.09	0.18	0.15	0.17	0.42	N
Nation Media Group (L=1)	0.12	0.07	0.02	0.19	0.14	0.16	0.83	N
Tourism P.S. (Serena)	0.10	0.09	0.00	0.28	1.49	0.77	0.11	N
Tourism P.S. (Serena) (L=1	-1.49	0.90	0.04	0.26	2.04	1.04	0.87	N
Athi River Mining	-0.16	0.14	0.06	0.27	0.18	0.17	0.82	N
Athi River Mining (L=1)	-0.22	0.18	0.06	0.28	0.25	0.22	0.85	N
Bamburi Cement	0.10	0.30	0.02	0.28	0.16	0.32	0.92	N
Bamburi Cement (L=1)	-0.21	0.53	0.11	0.28	0.16	0.32	1.62	N
B.A.T. Kenya	0.03	0.04	0.00	0.38	0.20	0.17	0.24	N
B.A.T. Kenya (L=1)	0.09	-0.05	0.02	0.31	0.18	0.15	-0.36	N
Crown Berger	1.53	-0.23	0.07	0.34	1.32	0.27	-0.88	N
Crown Berger (L=1)	0.92	-0.16	0.04	0.29	1.14	0.23	-0.70	N
Dunlop Kenya	0.01	-0.24	0.06	0.44	0.01	0.14	-1.72	N
Dunlop Kenya (L=1)	0.00	-0.17	0.00	0.40	0.01	0.13	-1.38	N
E.A. Cables	0.02	-0.05	0.00	0.36	0.09	0.17	-0.26	N
E.A. Cables (L=1)	-0.02	-0.02	0.01	0.27	0.07	0.14	-0.15	N
Firestone E.A.	0.13	-1.16	0.64	0.23	0.02	0.22	-5.29	N
Firestone E.A. (L=1)	0.05	-0.47	0.15	0.28	0.03	0.28	-1.70	N
Total Kenya	0.23	-0.15	0.02	0.37	0.89	0.26	-0.58	N
Total Kenya (L=1)	-0.06	-0.04	0.00	0.29	0.69	0.20	-0.19	N

key:
S-Significant (Accept the null hypothesis)
N-Not significant (Reject the null hypothesis)
L=1-Independent variable lagged by one qtr

5.0 CONCLUSION

5.1 SUMMARY OF FINDINGS AND CONCLUSION

The research objectives of this study was to establish the extent to which changes in:

1. Price Earnings Ratio explains future stock returns.

2. Dividend Yield Ratio explains future stock returns.

3. Price Sales Ratio explains future stock returns.

Price Earnings Ratio explains future stock returns:

From this analysis we conclude that the Price Sales ratios have predictive ability in majority of the sample observations. In some of the cases where there is a high t statistics we observe low coefficient of determination. This observation implies that the regression model can be improved on through incorporation of other independent variables. However when the independent variable is lagged in majority of the cases it has resulted in an increase of the predictive ability of the regression model.

Dividend Yield Ratio explains future stock returns:

The Dividend Yield ratio has predictive ability for a short time horizon for a small sample. However the relationship between the Dividend Yield ratio

and future stock returns is weak. This is a clear sign that the regression model can be improved on.

On lagging the independent variable we note an increase in predictive ability for half of the sample.

Price Sales Ratio explains future stock returns:

Compared with the other valuation ratios used in this study, the Price Sales ratio has great predictive ability. This is because we rejected the null hypothesis for the entire sample of observations. The extent to which changes in future returns are explained or caused by the Price Sales ratio in this case was low. This limitation should be improved on, by possible incorporation of other independent variables.

When the independent variable is lagged this increases the predictive power of the regression model. Mainly due to the effects of delayed responses when the effects of the Price Sales ratio are spread over a number of periods.

This study was carried out in a relatively thin market, for a small sample bias, for a short time horizon (five years) using lagged variables. It should be noted that it is difficult to generalize the results from this analysis to be representative of the predictive ability of the valuation model in Kenya. Therefore there

should be selective use of these results.

5.2 LIMITATIONS OF THE STUDY

Availability of raw data that takes time to be adjusted-the basic premise of regression models is that the changes in the future returns are closely associated linearly with changes in the valuation ratios. Therefore in the event that there are any errors in the market data-earnings per share, dividend per share and turnover per share this will hamper the reliability of the regression model. In the Nairobi Stock Exchange the data provided has to be adjusted over a period of time to make it comparable. These adjustments involve aggregating data, which could result in averaging out variations in observations. To clean up the data was time consuming and prone to error if care was not taken.

5.3 RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The time horizon for the study was five years. For future researches one could consider taking longer time periods as has been done in similar researches carried out in other stockmarkets-US Stock Market (Campbell and Shiller (2001)).

The sample was limited to fourteen organizations that had similar financial

year-ends of 31st December. Future consideration could be taken to using organizations with different year-ends, thus expanding the sample size.

This research did not test the relationship between the different valuation models. Future researches could consider finding out whether using a combination of valuation models would enhance their predictive ability.

Further lagging of the independent variable can be carried out to check whether there is an improvement of the relationship between the valuation ratios and the future share returns.

One can focus on the organizations where a relationship between the valuation ratios and the future share prices exists and establish the clientele effect.

For this study ex posts were carried out. According to Peppers (1993) the best test of reliability of the regression model is its ex-ante forecasting performance. The ex ante test will involve providing estimating values of the future stock returns beyond the time period for which the data is provided.

A linear regression was used for this study. Its limitations are that bias may be introduced in the model and there could be an increase in forecasting and unexplained errors. A multiple regression model should be used in order to reduce the unexplained error and therefore strengthen the statistical tests. It will also eliminate the bias that could result as a result of ignoring variables that could have a significant impact on the future stock returns. It will also

reduce the forecasting error by more fully using all the information available.

Although there is a relationship between statistical reliability and forecast accuracy, they are not synonymous. Therefore in this study we have not evaluated the usefulness of regression as a predictive device. Future research could evaluate the usefulness of regression as a predictive device.

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APPENDICES

APPENDIX A –TOTAL POPULATION

TOTAL POPULATION

The Nairobi Stock Exchange (NSE), founded in 1954, was among the very first stock exchanges to be established in Africa. In 1991 the NSE changed status from a society to a corporate entity limited by guarantee. Trade is conducted on ordinary shares, preference shares, debentures, corporate bonds and Government bonds. There are fifty-three organizations listed on the Nairobi Stock Exchange as at 31st December 2001.These organizations are classified according to sectors. There are four sectors:

1. Agricultural
2. Industrial
3. Commercial
4. Financial

AGRICULTURAL

1. Brooke Bond
2. Eaagads
3. George Williamson
4. Kakuzi (Tea & Coffee)
5. Kapchorua Tea
6. Limuru Tea
7. Ol Pejeta
8. REA Vipingo
9. Sasini Tea & Coffee
10. Theta Group

COMMERCIAL

11. Baumann
12. Car & General
13. CMC Holdings
14. Express Kenya
15. Hutchings Biemer
16. Kenya Airways

17. Lonrho Motors
18. Marshalls
19. Nation Media Group
20. Pearl Drycleaners
21. Tourism P.S. (Serena)
22. Standard Newspapers
23. Uchumi Supermarkets

INDUSTRIAL

24. Athi River Mining
25. B.A.T. Kenya
26. Bamburi Cement
27. BOC Kenya
28. Carbacid Investments
29. Crown Berger
30. Dunlop Kenya
31. E.A. Cables
32. E.A. Packaging
33. E.A. Portland
34. Firestone E.A.
35. E.A. Breweries
36. Kenya National Mills
37. Kenya Oil
38. Kenya Orchards
39. Kenya Power & Light.
40. Total Kenya
41. Unga Group

FINANCIAL

42. Barclays Bank
43. City Trust
44. CFC Bank
45. Diamond Trust Bank
46. I.C.D.C. Investment
47. Housing Finance Co.
48. Jubilee Insurance
49. Kenya Comm. Bank
50. National Bank
51. NIC Bank
52. Pan Africa Insurance
53. Standard Chartered Bank

APPENDIX B –SAMPLE

SAMPLE

	COMMERCIAL	INDUSTRIAL	AGRICULTURAL
4.	Express Kenya	12. Athi River Mining	15. Brooke Bond
5.	Nation Media Group	13. B.A.T. Kenya	16. Kakuzi (Tea & Coffee)
6.	Tourism P.S. (Serena)	14. Bamburi Cement	17. Limuru Tea
		15. Crown Berger	
		16. Dunlop Kenya	
		17. E.A. Cables	
		18. Firestone E.A.	
		19. Total Kenya	

SAMPLE

COMMERCIAL	INDUSTRIAL	AGRICULTURAL
4. Express Kenya	12. Athi River Mining	15. Brooke Bond
5. Nation Media Group	13. B.A.T. Kenya	16. Kakuzi (Tea & Coffee)
6. Tourism P.S. (Serena)	14. Bamburi Cement	17. Limuru Tea
	15. Crown Berger	
	16. Dunlop Kenya	
	17. E.A. Cables	
	18. Firestone E.A.	
	19. Total Kenya	

APPENDIX C-MARKET RETURNS PER QUARTER

APPENDIX F-MARKET RETURNS PER SHARE PER QUARTER
(in ksh)

	Brooke Bon	Kakuzi	Limuru Te	Express	NMG	TPS	ARM	Bamburi	BAT	Cberger	Dunlop	E.A.Cables	Firestone	Total
1996Q3	0.04	0.01	0.02	0.24	0.24	0.03	0.00	0.07	0.07	-0.14	0.02	0.18	0.22	-0.09
1996Q4	0.00	0.07	0.02	0.12	0.07	0.04	0.00	-0.01	-0.04	-0.23	0.02	0.08	0.11	-0.12
1997Q1	-0.13	0.06	0.03	-0.01	0.05	0.04	0.00	0.55	0.20	0.16	0.10	-0.04	0.26	0.18
1997Q2	-0.16	0.04	0.03	-0.04	0.43	-0.02	0.00	-0.05	-0.06	0.10	-0.03	-0.05	-0.01	-0.10
1997Q3	-0.01	0.24	-0.10	-0.06	0.17	-0.02	-0.05	0.08	0.01	0.18	0.58	-0.07	0.10	-0.03
1997Q4	-0.03	0.02	-0.06	-0.08	0.10	-0.07	-0.18	-0.15	-0.04	-0.01	-0.34	-0.08	-0.08	-0.10
1998Q1	0.06	-0.04	0.08	0.01	0.07	0.18	-0.03	0.18	0.06	0.30	-0.65	0.01	0.32	0.15
1998Q2	-0.03	0.12	0.10	-0.25	0.61	-0.07	-0.16	-0.12	0.00	-0.04	0.11	-0.26	0.04	-0.22
1998Q3	0.20	0.17	0.10	-0.21	0.13	0.02	-0.14	-0.06	0.16	0.11	-0.64	-0.22	0.06	0.02
1998Q4	-0.06	-0.03	0.12	0.07	0.03	0.07	-0.10	-0.06	0.33	-0.06	-0.52	0.06	0.00	-0.03
1999Q1	0.09	0.04	0.11	0.27	0.15	0.27	0.06	0.22	0.44	0.21	0.32	0.27	0.29	0.35
1999Q2	0.06	-0.13	0.08	-0.17	-0.04	0.09	-0.13	-0.18	0.29	0.25	-0.31	-0.15	-0.01	0.06
1999Q3	-0.13	0.00	-0.01	-0.15	-0.09	0.19	-0.02	0.13	-0.07	0.30	-0.09	-0.09	0.01	0.15
1999Q4	-0.13	-0.16	0.08	-0.18	-0.10	0.22	0.04	-0.07	0.06	0.18	-0.23	-0.05	0.00	0.02
2000Q1	0.93	0.89	1.00	1.05	0.90	1.01	0.89	1.01	0.97	0.90	0.85	1.05	0.99	1.06
2000Q2	-0.16	-0.19	0.04	-0.01	-0.17	0.09	0.17	0.10	-0.10	0.19	-0.07	0.24	-0.07	0.04
2000Q3	0.04	-0.06	0.03	-0.13	-0.01	0.12	-0.24	0.16	0.19	0.19	-0.01	0.13	0.03	0.18
2000Q4	0.27	-0.08	0.04	-0.02	-0.02	0.10	-0.05	0.09	0.21	0.01	-0.03	0.22	0.08	0.05

Mkt Returns (end quarter 1)=[(Mkt Price per share (end quarter1)- Mkt Price per share (beg qtr1))+Dividend per share (beg qtr1)]/Mkt price per share (beg qtr1)