ESTIMATING FIRM BOOK TO MARKET RATIO USING ALTMAN'S Z – SCORE RATIOS: A STUDY OF FIRMS AT THE NAIROBI STOCK EXCHANGE

BY

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DECLARATION

This research project is my original work and has not been presented for a degree in any other university.

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

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DEDICATION

To my loving wife Mildred, daughter Pamela and son, Franklin. May God bless you abundantly.

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ABSTRACT

This study looks at the relationship between market to book ratio and risk of firms at the Nairobi Stock Exchange from January 1996 to December 2003. The proxy for risk is Altman's Z Score ratio formulation. The assumption is that if Altman Z score discriminates between firms of different risk, i.e. bankrupt and non bankrupt firms, the same set of ratios are useful in classifying firms into high and low book to market ratios. This study therefore aims at determining the discriminating ability of Altman's Z score ratios in separating firms with low book to market value ratio from those having high book to market value ratio.

I begin by examining the average market returns of each of the stocks at the NSE. I generate coefficients for Altman's variables using group statistics and ultimately Altman's Z score ratio. Using this ratio, I rank the stocks on the basis of book to market value (BMV) ratio by categorizing them into two groups: high book to market ratio firms and low book to market ratio firms.

Empirical evidence I obtained suggests that in roughly eight (8) out of ten (10) times, the Z score ratio generated is roughly correct and can be useful in grouping firms into low and high book to market value ratio.

This result of this study suggest that Altman's Z score can be useful in making investment decisions in choosing between low and high risk assets. However investors should be warned that Altman's Z score alone cannot be used to make investment decisions. Other factors also play a role, the reason it was not possible to achieve 100% accuracy using Z score to discriminate between firms.

LIST OF ABBREVIATIONS

No.	FULL NAME	SHORT NAME
1	Nairobi Stock Exchange	NSE
2	Brook Bond Ltd.	BBOND
3	George Williamson Kenya Ltd.	GWK
4	Kakuzi	KAKUZI
5	Kapchorua Tea Co. Ltd.	KAPCHORUA
6	Limuru Tea Co. Ltd.	LIMURU
7	Rea Vipingo Plantations Ltd.	REA
8	Sasini Tea & Coffee Ltd.	SASINI
9	Eaagads Ltd.	EAGADS
10	A. Baumann & Co. Ltd.	ABOUM
11	Uchumi Supermarkets Ltd.	UCHUMI
12	Car & Genaral (K) Ltd.	CAR & GEN
13	CMC Holdings Ltd.	CMC
14	Express Ltd.	EXPRESS
15	Kenya Airways Ltd.	KENAIR
16	Marshalls (E.A.) Ltd.	MARSHAL
17	Tourism Promotion Services Ltd. (Serena)	TPS
18	Standard Newspaper Group	SMGROUP
19	Barclays Bank Ltd.	BBK
20	C.F.C Bank Ltd.	CFC
21	City Trust Ltd.	CITYTRUST
22	Diamond Trust Bank Kenya Ltd.	DTB
23	Housing Finance Co. Ltd.	HFCK
24	I.C.D.C Investments Co. Ltd.	ICDC
25	Jubilee Insurance Co. Ltd.	JUBILEE
26	Kenya Commercial Bank Ltd.	KCB
27	National Bank of Kenya Ltd.	NBK
28	National Industrial Credit Ltd.	NIC
29	Lonhro East Africa Ltd	LONRHO
30	Standard Chartered Bank Ltd.	SCHB
31	NIC Bank Ltd.	NICB
32	Athi River Mining	ARM
33	Bamburi Cement Ltd.	BAMBURI
34	British American Tobacco Kenya Ltd.	BAT
35	B.O.C Kenya Ltd.	BOC
36	Carbacid Investments Ltd.	CARB
37	Crown Berger Ltd.	CBERG
38	Dunlop Kenya	DUNLOP
39	East African Breweries Ltd.	EABL
40	E. A. Cables Ltd.	EACAB
41	E.A. Packaging Ltd.	EAPACK

42	E.A. Portland Cement Ltd.	EAPORT
43	Firestone East Africa Ltd.	FIRES
44	Kenya Oil Co. Ltd	KENOL
45	Kenya National Mills Ltd.	KNMILL
46	Kenya Power & Lighting Co. Ltd	KPLC
47	Total Kenya Ltd.	TOTAL
48	Unga Group Ltd.	UNGA

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Background of the study

The rationale of this study is to examine the relationship between book to market value ratio and risk of firms listed at the Nairobi Stock Exchange. The proxy for risk is Altman's Z Score ratio formulation. One explanation of differences in firms book to market value ratio is that high book to market equity firms have a less greater risk for distress.

The investment selection process requires the investor to estimate and evaluate both risk and return for alternative investments available. This is because different assessment of risk can lead to very different valuations for investment opportunities.

Valuation models such as price to earnings ratio, capital asset pricing model, book to market value (BMV) etc are used by investors in valuing assets during asset selection process. The book to market value (BMV) ratio is a valuation technique is extensively discussed in finance and investment literature. Investors use this ratio, along with other ratios, e.g. price to earnings ratio, price to cash flows ratio, and price to sales ratio, dividend yield to estimate asset values. Investor reliance on such ratio is only justified if the selected ratios contain vital information that enjoys a discriminating power when there is a need to rank assets. Given a variety of valuation of ratios at the disposal of investors to choose from, it is necessary to identify a model with higher information content. From a purely investment perspective, an adequate model is one that captures both the returns and risk intrinsic in the asset that is being valued.

It has been suggested that the book to market value (BMV) is useful to investors in choosing shares for investment. The book to market value (BMV) ratio is computed by comparing the book value to the value in stock market

of the shareholders' investment in the firm. In an efficient market, this ratio (BMV) compares the market price per share with a historical value. Thus helping investors determine whether the value of their investment in the firm have grown or diminished. Hopefully, the book to market value (BMV) ratio summarize the stock market investors' view or perception of the effectiveness of a firm's management's policy and the impact or expected impact of that policy on a firm's profitability, liquidity, profits and risk. The power of book to market ratio is that it can be used in valuation of non-dividend paying firms.

Fama and French (1992), Campbell and Shiller (2001), Kothari (1997), Lewellen (2000), Fama and French (1995), Gotzmann and Jorion (1993), Fama and French (1988), Stambaugh (1986) studied the relationship between portfolio performance and share past returns, company size and price to earnings ratio, and risk factor in book to market ratio. Their objective is to identify a valuation ratio with potential in predicting future returns.

Rosenberg, Reid and Lanstein (1985) study find a positive relationship between a firm's book to market ratio and future stock returns, and deem this finding to be evidence against efficient market hypothesis. Fama and French (1995) and Cohen Polk and Vuolteenaho (2000) show that, as a result of book of price level effect, market ratio is useful in forecasting the returns on the firm's stock.

Rozeff (1984), Shiller (1984), and Fama and French (1988) suggest that the aggregate dividend yield is a proxy for risk premium, i.e. there a positive relationship between dividend yield and stock market returns. The policy implication is that investors can use dividend yield in constructing portfolios.

Fama and French (1995) on examining whether the behaviour of stock price to size and book to market value reflected earnings changes, concluded that high book value to market value ratio (value stock) securities experience low return on equity and that low book value to market value ratio (value stock) securities experience high return on equity. That variability in return on equity is linked to book value to market value ratio implying a relationship between book value to market value ratio and risk in a security.

This paper is a furtherance of research carried out locally by Obell (2004) in which he investigated the relationship between price to book value ratio and risk of firms at the Nairobi Stock Exchange at single asset level. In evaluating the relationship, Obell (2004) used standard deviation as a measure of risk and reported a significant relationship between risk of firms and their price to book ratio. He concluded that investors in firms with high variability (high risk firms) ask for additional return thus the high book to market ratio. However Obell (2004) cautioned that investors interested in analyzing risk need not entirely rely on book to market ratio for that purpose because the differences in book to market ratio may be explained by other factors, and not necessary risk alone.

This study is an endeavour to give more insight into the relationship between book to market ratio and risk. The assumption is that if Altman Z score discriminates between firms of different risk, i.e. bankrupt and non bankrupt firms, the same set of ratios are useful in classifying firms into high and low book to price ratios. Whereas Obell (2004) used Standard deviation as a measure of risk, in this study I attempt to use to a multiple discriminant analysis (MDA), specifically the Z score technique, to see whether the same results can be achieved. Professor Edward Altman of the NYU introduced the Z score technique in the late 1960s. Rather than search for a single best ratio, Altman built a model that distils five key performance ratios into a single score, which he used in predicting corporate financial

health or corporate bankruptcy. The five key ratios were: **Working capital / Total assets; Retained Earnings / Total assets; Earnings before interest and taxes / Total assets; Market value equity / Book value of total debt and Sales / Total assets**

The multiple discriminant analysis (MDA) can be a useful statistical measure. Although not as popular as regression analysis, MDA has been used before in a number of ways since its inception in the 1930s (Fisher, 1936). In those earlier years, MDA was used in the biological and behavioural sciences. The method was later applied successfully to financial problems such as consumer credit evaluation (Durand, 1941) and investment classification (Walter, 1959). In the latter, Walter used the MDA to classify high and low price earnings ratio firms. Smith (1965) used the MDA technique to classify firms into standard investment categories.

The MDA technique is used to classify an observation into one of several groupings dependant upon the observation's individual characteristics. It is used primarily to classify and/or make predictions in problems where the dependent variable appears in qualitative form. The first step is to establish explicit group classifications. After the groups are established, data are collected for the objects in the groups; MDA then attempts to derive a linear combination of these Characteristics which best discriminates between the groups. If a particular object, for instance a corporation, has characteristics (financial ratios), which can be quantified for all the companies in the analysis, the MDA determines a set of discriminant coefficients. When these coefficients are applied to the actual ratio, a basis for classification into one of the mutually exclusive groupings exists.

One advantage of the MDA technique is that it considers an entire profile of characteristics common to relevant firms, as well as the interaction of those properties. A Univariate study, on the other hand, can only consider the

measurements used for group assignments one at a time. The MDA computes the discriminant coefficients, while the independent variables are the actual value.

In my proposed study, Z is the score on discrimination function either have high or low book to market ratio and therefore low risk or high risk.

When utilizing a comprehensive list of financial ratios in assessing a firm's risk potential there is reason to believe that some of the measurements will have a high degree of correlation or co linearity with each other. While this aspect necessitates careful selection of the predictive variables (ratios), it is also has the advantage of yielding a model with a relatively small number of selected measurements which has the potential of conveying a great deal of information. This information might very well indicate differences between groups but whether or not these differences are significant and meaningful is a more important aspect of the analysis.

The primary advantage of MDA in dealing with classification problems is the potential of analysing the entire variable profile of the object simultaneously rather than sequentially examining its individual characteristics. Researchers have identified five critical variables in the measure of risk. These are **liquidity, profitability, leverage, solvency and activity ratios.** I propose to use the same variables together in predicting corporate risk.

1.2 Research Problem

Valuation is much more complex in emerging markets because buyers and sellers face greater risks while information useful in investment is scarce and of a lower quality (Mimi and Koller, 2000). At a lower level it is more difficult valuing private companies not listed at the stock exchange than the listed ones. Investors are in search of techniques useful in valuing firms not

listed. The practice is to develop market driven indicators and test their applicability in non-listed companies.

Book to market ratio capture both return and risk inherent in investments (Fama and French, 1992). High book to market equity firms show higher risks because of greater risk of distress. Such a relationship is an important input investment decision.

Lewellen (2002), Campbell and Shiller (2001). Kothari (1997), Fama and French (1995), Gotzmann and Jorion (1993), Fama and French (1992), Fama and French (1988), Stambaugh (1986) mention that firms with high book to market equity ratio continually report low earnings, higher financial leverage, and high earnings variability. Fama and French (1992) point out that low BMV ratios may operate as a measure of risk because such firms with are more likely to face financial distress and could be on their way out of business.

Lewellen (1999) concludes that book to market ratio is a proxy for a risk factor in returns. Lewellen (1999), Fama and French (1993) provide evidence that confirm the relationship between risk and book to market ratio. It follows that BMV ratio should capture changes in both expected returns and risk. The study attempts to determine whether the use of Altman's Z score ratios can be useful in categorizing high Book to Market ratio firms from low book to market ratio firms at the Nairobi Stock Exchange.

If book to market value ratio is still valid for distinguishing value stocks from growth stocks, we should see return and risk differences for firms at opposite ends of the book to market value ratio ranking. Similarly, if Altman's Z score ratios are useful in identifying very risky firms from less risky firms from the bankruptcy perspective, it is probable that Altman's Z scores may be useful in estimating the level of book to market ratios across

firms. The research question is: Are there visible differences in two groups of firms namely, low book to market ratio and high book to market ratio, if Altman's MDA's Z score set of ratios are used as the discriminating index? This research seeks an answer to the question: Do shares with high book to market ratio show significant differences from shares with low book to market ratio using Altman's Z score ratios?

1.3 Research objectives

To establish the extent to which Altman's Z score ratios are useful in grouping firms listed at the Nairobi Stock Exchange (NSE) into high and low book to market ratios.

HYPOTHESIS

H_0: Altman's Z score ratios are not useful in classifying ratios into two classes, namely low and high book to market ratio.

H_1: Altman's Z score ratios are useful in classifying firms into two classes, namely low and high book to market ratio.

1.4 Importance of this study

1. Investors, investment advisors, and corporate managers of listed companies will learn the reliability of book to market value ratio as a valuation or investment ratio and specifically its relationship with risk. This study offers an exact recipe for incorporating risk information into valuation analysis.
2. Give insight for further research on book to market ratio and risk.

1.5 The principal assumption of this study

The principal assumption of the book to market-based model is that the ratio of book and market equity values is stationary i.e. is stable. This rules out explosive bubble type behaviour where prices move away from the intrinsic or fundamental value.

CHAPTER 2

LITERATURE REVIEW

In the literature review, I attempt to explore the usefulness of Altman's MDA Z score, the relationship to risk and the importance of ratio analysis in this study.

2.1 Ratio Analysis

Ratio analysis is known to be a powerful tool of financial analysis. A financial ratio is the relationship between two accounting figures, expressed mathematically. A ratio helps to indicate a quantitative relationship, which can in turn be used to make a qualitative judgement. In financial analysis, ratios are used as a yardstick to measure financial position and performance of a firm. The use of ratios is based on the realization that failing firms are significantly different from non-failing firms (Keige, 1991). Discriminant analysis has been used before in Kenya. Keigi (1991) used the model to predict business failure. He noted that ratios that best discriminate between failing firms and non-failing firms appear to differ from one place to another. He found that, current ratio, fixed charge coverage ratios, retained earnings to equity, return on total assets, return on net worth, average collection period and sales to total assets, in Kenya, appeared to be useful in failure prediction for a period up to 2 years.

Hamer (1983) tested to see if classification success was sensitive to a variable selection. She examined four variables sets; those selected by Altman (1968), Deakin (1972), Blum (1974) and Ohlson (1980). She found there was little direct consistency in the variables selected for inclusion in the set, however, each contained variables that measure profitability, liquidity and leverage.

2.2 Edward Altman (1968) Z- Score

Edward Altman developed the Z Score model. Through this model Altman showed that for a small sample of observations, financially distressed firms could be separated from the non-financially distressed firms in the year before the declaration of bankruptcy. He used financial ratios and the technique of discriminant analysis to develop the model. Discriminant analysis is a way of classifying an observation into one of several a priori groupings, or make predictions where the dependent variable appears in a qualitative form.

Altman's z score took the following form:

$$Z= 0.012X1 + 0.014X2 + 0.033X3 + 0.006X4 + 0.010X5$$

Where:

X1 - Working capital / Total assets

X2 - Retained Earnings / Total assets

X3 - Earnings before interest and taxes / Total assets

X4 - Market value equity / Book value of total Debt

X5 - Sales / Total assets

In application, Altman found that Z-scores of less than 1.81 indicated a high probability of bankruptcy, while Z scores higher than 3.00 indicated a low probability of bankruptcy.

X_1 – Working Capital / Total Assets

The working capital/ total assets ratio is a measure of the net liquid assets of the firm relative to the total capitalization. Working Capital has been defined as the difference between current assets and current liabilities. Liquidity and size characteristics are explicitly considered. Ordinarily a firm experiencing consistent operating losses will have shrinking current assets in relation to total assets.

X_2 – Retained Earnings / Total Assets

A relatively young firm will probably show a low RE/TA ratio because it has had no time to build up its cumulative profits. Thus the incidence of failure is much higher in a young firm than in an older firm.

X_3 - Earnings before Interest and Taxes / Total Assets

This ratio is calculated by dividing the total assets of a firm into its earnings before interest and tax deductions. It is a measure of the true productivity of the firm's assets, abstracting from any tax or leverage factors. Since a firm's ultimate existence is based on the earnings power of its assets, this ratio appears to be appropriate for studies dealing with corporate failure. Furthermore insolvency in a bankruptcy sense occurs when the total liabilities exceed a fair valuation of the firm's assets with value determined by the earnings power of the assets.

X_4 - Market Value of Equity / Book Value of Total Debt

Equity is measured by the combined market value of all the stocks, preferred and common, while debt includes both current and long term. The measure shows how much the firm's assets can decline in value (measured by market value of equity plus debt) before the liabilities exceed the assets and the firm becomes insolvent.

X_5 - Sales / Total Assets

The capital-turnover ratio is a standard financial ratio illustrating the sales generating ability of the firm's assets. It is one measure of management's capability in dealing with competitive conditions. Though this is the least

significant ratio on an individual basis, its unique relationship to the other variables in the model ranks second in its contribution to the overall discriminating ability of the model.

Scholars such as Garner (2000) criticized the use of discriminant analysis model in risk evaluation on the basis that:

(i) It usually discriminates only between two extreme cases of behaviour, default and non-default

(ii) There is no obvious economic reason to expect the weights in a discriminant function to be constant of any but very short periods

(iii) The model ignores qualitative factors that may play a crucial role in the default and non-default decisions.

Dambolena and Khoury (1980), sought to improve Altman's model by introducing ratio stability in the discriminant model. They held that it was the stability of every ratio that was relevant and not just the earnings.

Taffer and Tisshaw (1977) developed Z scores for quoted manufacturing companies as well as for non manufacturing companies with a turnover of over half a million pounds. The model for quoted companies was:

$$Z= C_0+C_1R_1+C_2R_2+C_3R_3+C_4R_4$$

Where C_0 to C_4 were coefficients
and R_1 to R_4 were:

R_1 = Profit before Taxation / Current Liabilities
R_2 = Current Assets / Total Liabilities
R_3 = Current Assets / Total assets
R_4 = No Credit Interval = Immediate Assets – Current Liabilities / Operating Costs excluding Depreciation

The four ratios combine together various aspects of profitability and solvency to produce the Z score. The above model developed from Altman's 1968 model was applied to UK based data.

The leverage ratio with which a firm enters financial distress might also affect its survival probability. In Particular, the higher a firm's leverage ratio the more severe its financial difficulties. Zingales (1998) finds that the likelihood of a firm's survival is affected by its leverage, with higher leverage reducing the survival probability.

The size of a firm may also affect its survival. It is for this reason that larger firms are less likely to be acquired (Hasbrouck, 1985).

2.3 Risk

Different investors have different preferences for risk depending on the risk-return tradeoff. Investors often are at conflict in the risk-return trade off they desire. It is generally true investors will only take additional risk if the market is willing to compensate them for the extra risk taken. Where return is apparent most investors would rather put their funds in low earning securities. There are also diversable and non-diversable risks.

Diversifiable risks can potentially be eliminated through diversification because they are unique to a company or to firms in the same industry. Non-diversifiable risks on the other hand, cannot be avoided, because they affect all firms in the economy. Models such as CAPM (Capital asset-pricing model) have been used to price risk and return. (Sharpe, Alexander and Bailey, 1999). In CAPM, only non-diversifiable risks are relevant to an investor because the investor can potentially engage in investing activities to minimise the impact of such risks. In an efficient market, diversifiable or avoidable risks do not affect the expected rate of return.

The study of efficient market portfolio indicates that there is a linear relationship between expected returns on a security and the market risk when measured by beta. Also that market betas explain the cross-sectional differences in expected returns (Sharpe, 1999). Large investors should use more than one portfolio manager in order to benefit from diversification of judgment. Diversification of judgment refers to allocating investment funds to more than one investment manager to guard against the risk of poor judgment of one investment manager or the risk of exposure due from a particular investment manager's investment style.

In this study the Z score has been employed as the relevant measure of risk. A discriminant function can measure the probability of financial distress or the risk of bankruptcy which in turn can predict business risk among firms. The assumption made is that the higher the probability of financial distress the more risky a firm is and vice versa. I assume this should be depicted by a high book to market value ratio and vice versa respectively.

2.4 Return

Studies have been conducted by a number of scholars on the relationship between book to market ratio and stock returns. Lewellen (1999) used dividend yield, book to market value and price to earnings ratio to predict aggregate market returns. He finds a relationship between these ratios and future returns. Chan, Hamao and Lakonishok (1996) find that a firm's expected earnings is influenced by its size, earnings yield, cash flow yield, and that a firm's book to market ratio have a reliably positive impact on expected returns.

Other studies have suggested that firms with a high price to earnings ratio and a high return on equity show better relationship with future returns than those with a low price to earnings ratio and a low return on equity -

Shroff (1995). Studies by Kothari, Shanken and Sloan (1997) however, suggest that the relationship between book to market ratio and returns is periodic and largely insignificant. The relationship between stock returns and book to market ratio was found to be stronger in Japan that in the USA - Kent, Titman, Wei (2001).

Griffin and Lemmon (2002) examines the relationship book to market equity, distress risk and stock returns. They find that firms with high book to market ratio are assigned a higher risk premium because of the greater risk of distress. Consistent with this view, Fama and French (1995) and Chen and Zhang (1998) show that firms with high book to market ratio have persistently low earnings, higher financial leverage, more earnings uncertainty, and are more likely to pay less dividends compared to firms with high market to book ratio. Other studies outside the U.S. consistent with the findings of Fama and French include studies by Chan, Hamao, and Lakonishok (1991), Capaul, Rowley, and Sharpe (1993), Hawawini and Keim (1997), Fama and French (1998) and Griffin (2002)

On the other hand, Dichev(1998) uses measures of bankruptcy proposed by Ohlson (1980) and Altman (1968) to identify firms with a high likelihood of financial distress and finds that such firms tend to have low average stock returns. The results observed by Dichev appear to contradict the view that firms with high book to market ratio earn high returns as a premium for distress risk. Using a different measure or risk, Shumway (1996) finds some evidence that firms with high distress risk do earn higher returns.

Another alternative explanation for the return patterns identified by Griffin and Lemmon (2002) is that low book to market ratio stocks are overpriced and high book to market ratio stocks are underpriced (also, Lakonishak, Shleifer, and Vishny, 1994). Lakonishak et al (1994) further suggests that mispricing arises from investors extrapolating past operating performance

too far into the future. However Griffin and Lemmon (2002) contrasts this view citing strong evidence of mispricing in firms with weak current operating performance.

2.5 Explaining diversity in book to market value ratios

The basic differences in book to market value ratios between firms is largely due to different expected growth rates, different dividend payout ratios, different risk levels and different returns, observes Damodaran (1996). His assertion is that the book to market value ratio increases as risk in a firm increases.

It has been observed that stable economies i.e. economies with low risk, exhibit low book to market value (BMV) ratio. Studies have also suggested that a number of firm characteristics such as size, book to market ratio and price earnings ratio are related to excess return. It can be argued that book to market ratio contains information about the infinite future of conditional expected returns and profitability i.e. information on risk and returns.

Chan and Chen (1991) suggest that there is a possibility that the risk captured in the book to market ratio is a relative distress factor, implying in a sense that the earning prospects of firms are related to the risk factor in returns. This means that poor-prospect stocks have low prices and high book to market value while good prospect stocks have high prices but low book to market values.

Lewellen (1999) identifies firm size (market capitalization) and the ratio of book to market value as factors that explain stock returns. Small firms are associated with high book to market ratio.

2.6 Book or Market Value

Book to Market Value ratio (BMV) is the ratio of a firm's book value of equity to its market value of equity. Book Value is often calculated by using the historical information contained in the financial statements of firms. However market value of equity is determined from current information (prices) in the stock market arising from the transactions of buying and selling. Edward and Bell (1961), Feltham and Ohlsom (1995) suggest that market value of equity can be adding the book value of equity to discounted sum of abnormal earnings.

Book value of equity may be considered as a downward-biased estimate of net asset value. Some view book value ratios as obsolete. Davis (2001) suggests that ranking firms on the basis of book value as a waste of time. This assertion is contentious and has not been tested empirically.

The principle assumption of the book to market value ratio is that it stationary and that a point of time value can be relied on over a long period of time. In effect this among other things rules out explosive bouncy type behavior where prices diverge indefinitely from the intrinsic or fundamental values. Barring the existence of such infinitely live bubbles in asset prices, if price is high today, expected cash flow fundamentals must be high and or expected returns low. Assumptions are made in order to derive the accounting approximate present-value model. The first assumption is that the variables are positive, the book equity, dividend and market value of equity are assumed to be strictly positive to allow for log transformations.

By examining a sample of one thousand four hundred companies (1400) over the period 1980 to 1984, Rosenberg, Reid and Lanstein(1985) established that excess returns could be earned by investing in companies, which had a high book to market value ratio. Factors that could link the high book to market value ratio to excess returns from small firms include, market

liquidity, information and transaction costs. Investors demand a premium on the stocks of small firms because they are difficult to dispose compared to stocks of large companies i.e. low capitalization. Small firms often do not present/ prepare financial information as frequently or as of high quality as large firms. If this argument holds then we expect the shares of small firms to be more risky than those of large firms.

We expect that the cost of monitoring large portfolios small firms will be by far greater that those of monitoring large firms since small firms do not release regular and quality information. The end results is that transaction costs of buying and selling the shares of small firms (firms that tend to have high book to market ratio) will be higher than those of buying and selling the shares of large firms. Thus, reducing the apparent excess returns from investing in small firms. Again this is a testable proposition.

The book to market value ratio has a strong role in explaining the cross section of average returns on Japanese stocks, explains Chan and Lakonishok (1991). Capaul, Rowley and Sharpe (1993) find that stocks with high book to market value ratio earned excess returns in every international market they analyzed between 1981 and 1992. Investors often look at the relationship between the price they pay for a stock and the book value of equity (or net worth) as a measure of how overvalued or undervalued a stock is. Stocks priced at less than book value are acquired on the assumption that in time their market share price will reflect at least their stated book value .

It is important to note that there could be a cross-sectional variation in the results obtained in measuring the book to market value ratio. The differences may emerge from differences in industries arising from different growth potentials and the quality of investments of firms in each of those sectors. The book to market value ratio is based on the book value of the

firm as a whole and market value of all assets and not just equity alone. The alternative ratio to the book value ratio is the replacement cost of the asset, especially for those who believe that book value is not a good measure of the true value of the asset.

2.7 Book to Market Value Ratio and Returns

Ibbotson (1986) studied the relationship between stock prices as a percentage of book value and investments returns by ranking all stocks listed on the New York Stock Exchange (NYSE) at the end of each year on 31 December during an 18-year period from 1966 to 1984. The stocks were ranked as a percentage of book value and sorted into deciles (A deciles is 10 percent of the stock listed on the NYSE). He found that stocks with a high book to market value ratios had significantly better investment returns and risk over the 18-year period than stocks priced high as a percentage of book value.

Fama and French (1992) examined the effects of market capitalization and price as a percentage of book value on investments by American firms in the NYSE, ASE (American Stock Exchange) and NASDAQ from July 1963 to December 1990. They found that smaller market capitalization companies, at the lowest prices in relation to book values provided the best returns. Furthermore, within every market capitalization category, the best returns were produced with low prices in relation to book value. Through regression analysis they examined the power of the book to market ratio and concluded that the ratio was strongly consistent in explaining the cross section average stock returns.

Lakonishok, Vishny, and Sheifer (1993), tested the relationship between investment returns and book to market value ratios. They ranked all companies listed on NYSE and ASE according to stock price as a percentage

of book value and sorted the companies into deciles. Portfolios were initially formed on April 30 1968 and new portfolios were formed on each subsequent April 30 until April 1990. The deciles portfolios were held for five years returns and the average cumulative totals five years returns were calculated. The investments returns were equally weighed. They also examined the consistency of investment returns for high book to market values of companies as compared to the low book to market value over 1 year, 3 year and 5 year holding periods from 1968 through 1990. The investment returns, for the companies in the low book to market value category, i.e. returns for the companies in the highest two deciles of the companies which had been ranked on the book to market value, were subtracted from the investments returns of the high book to market value companies which comprised the bottom two deciles as book to market value ranking. They conclude that firms with highest book to market values provided the best returns.

Lakonishok, Vishny, and Sheifer (1993), conclude that the high book to market value stocks outperformed the low book to market value stocks in 16 of the 22 years or 73 percent of the time, for the three year holding periods and that the high book to market value companies outperformed low book to market value companies in 18 out of the 20 year periods. For the five year holding periods, the high book to market value companies were better choice than the low book to market value companies every time.

2.8 Book to Market Value Ratio and Risk.

The relationship between book to market value ratio and risk has been studied by a number of researchers. Fama (1992) point out that book to market value could be a measure of financial distress and that higher returns and high book to market value firms incorporate financial risk premium. Peevy, Senchack and Woodruff (1993), on the other hand provided

evidence that book to market ratio is not a proxy for financial distress. Chan and Chen (1991) and Fama and French (1995) point out that small firms and high book to market value ratio firms are particularly sensitive to adverse economic conditions and have sustained periods of low profitability. Therefore the higher risk premiums on such companies can be viewed as a rational consequence of investor's risk aversion.

Jenson, Johnson and Mercer (1997) suggest that as monetary and economic conditions change, the risk concerns of investors shift thereby affecting the influence of risk factors such as size and book to market ratios on stock returns.

Lakonishok, Vishny and Shleifer (1993) conclude that the value strategy (high book to market value) appear to do somewhat better than glamour strategy (low book to market value). The superior performance of value strategy is tilted toward negative return months rather than positive return month. This shows that the value strategy does not expose investors to greater downside risk. What rise must fall and what falls must rise.

Sharpe, Capaul, and Rowley, (1993) examined the comparative investment returns of high book to market value stocks ("value" stocks) and low book to market value stocks ("growth" stocks) in France, Germany, Switzerland, the United Kingdom and the United States. They found that the cumulative difference between the investment returns of the value stock and growth stocks in each country over 11 ½ years period from January 1981 through June 1992 outperformed growth stocks on average in each country during the period studied both absolutely and after adjustments for risk.

DeBondt and Thaler (1985) examined investment performance of stocks with the worst and best prior investment results from 1932 to 1977. They compared investment results of the worst performing and best performing

stocks to a market index designed from all stocks listed in NYSE. They report that the worst performing stocks, over the preceding five year period, produced average cumulative returns of 18 percent in excess of the market index 17 months after the portfolio formation. However, the best performing stocks based on investments returns over the prior three years performed below market.

Vuolteenaho (2000) developed a simple model of the book to market ratio. The model is to enable him to allocate the variation in the book to market ratio to subsequent profitability, interest rates and excess returns. He reports that the time series variation in the aggregate book to market ratio is mainly driven by changes in equity premium expectations, not by changes in the expected cash flow fundamentals.

The relationship between equity and risk has been highlighted in studies of developed economies (Wilcox 1984). Capaul, Rowley and (1993) conclude that value stocks, that is stock with high BMV ratio earned excess return in every market that they analyzed.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Design

This research took the form of an empirical study based on data recorded at the Nairobi Stock Exchange database.

3.2 Population and sample

The study sample comprised the whole population of the securities listed in the NSE from 1996 to 2003. The study was restricted to quoted firms because of the difficulties that would have been experienced in getting data from private firms. The sample was the set of all firms for which data was available from the Nairobi Stock Exchange database.

By design, the sample exhibited a survivor bias, in that, for any given calendar year, the sample included only those firms that have remained publicly traded since 1996. The panel data set for this study was constructed as follows; "all firms that have been de-listed during the study period will be eliminated" from the sample. The study was limited to eight years 1996 to 2003 to avoid problems of unavailability of data.

3.3 Data collection Design

The data for this study was obtained from the Nairobi Stock Exchange secretariat. Secondary data sources and annual reports of listed companies were used. Annual share prices were used in calculating Book to Market ratio. Security returns adjusted for dividends, seasonal equity offerings and stock splits, if any, of stock that was traded on the NSE were computed and used in estimating risks. In addition accountants' measure of return was used.

3.4 The Variables and Variable Measurements of the Study

The main strategy in this study was to see the extent to which Altman's ratios can be used to classify ratios into either high or low book to market ratio.

3.4.1 Book to Market Value Ratio

Book to Market Value ratio a function of the company's asset value. The higher the book to market ratio, the more appealing the stock is to the investor. For an investor who is oriented towards undervalued stocks, then a good combination may be low Price/Earnings ratio and high book/market ratio.

In order to calculate the book to market value (BMV) ratio, one needs market price per share (MPS), number of shares in issue (NSI) and shareholder funds (or equity), (SHF). First, calculate book value per share (BVpS) i.e. shareholder funds (or equity), (SHF) divided by number of shares in issue (NSI). Then BMV is calculated as follows:

$$BMV = \frac{BVpS}{MPS}$$

3.4.2 Risk

Stock returns are either riskier or more volatile or less risky/ less volatile. The aim in my study is to determine a set of ratios that maximize the difference between very risky stocks and less risky stocks, the proxy for risk being book to price ratio. This is to be done using a Z score from multi discriminant analysis model.

3.4.3 Ratios

The ratios to be used are those suggested by Altman (1968). See Section 2.2 page 10 above.

3.5 Data Analysis

I make a very critical assumption that the higher the probability of financial distress or bankruptcy to a firm the more risky the firm is and that such a firm's book to price ratio should be different from a firm with a lower probability of financial distress. High Z scores should indicate lower probability of financial distress and low risk and that low Z scores should indicate higher probability of financial distress and therefore highly risky stocks or firms. The model to be used was developed by Altman (1968):

$Z = V_1X_1 + V_2X_2 + \ldots\ldots V_nX_n$

Where:

Z is the score on discrimination function, in this study either very risky stocks or less risky stocks

V_1 to V_n = the discriminant weights or coefficients

X_1 to X_n = the independent Predictor Variables.

A classification matrix shall be used to test the validity of the MDA model. This shall take the following form:

Actual Group Membership	**Predicted Group Membership**	
	Group 1	**Group 2**
Group 1	C_1	I_1
Group 2	I_2	C_2

Where:

C refers to the number of correct classifications

I refers to the number of Incorrect Classifications

In this study, group 1 will be the number of very risky stocks at the NSE whereas group 2 will consist of the less risky stocks. If the model is a good predictor, then $\mathbf{I_1 = I_2}$.

Data Analysis Steps

1. Rank stocks on the basis of book to market value (BMV) ratio and categorise into two groups: top ten and bottom ten.

2. Classify the results in 1 above by assigning values, 1 to firms with low book to price value and 0 to firms with high book to price value depending on whether it is top ten or bottom ten.

3. Calculate Altman's ratios. Rank stocks on the basis of the Z score and categorise into two groups, as above or below the market average risk.

4. Generate the coefficients and predicted groups.

Do the statistical test of significance.

3.6 Significance Tests

3.6.1 Box's *M* tests the assumption of equality of covariance's across groups, low and high price to book ratio. Log determinants are a measure of the variability of the groups. Larger log determinants correspond to more variable groups. Large differences in log determinants indicate groups that have different covariance matrices. Since Box's *M* is significant, you should request separate matrices to see if it gives radically different classification results.

3.6.2 The tests of equality of group means measure each independent variable's potential before the model is created. Each test displays the results of a one-way ANOVA for the independent variable using the grouping variable as the factor. If the significance value is greater than 0.10, the variable probably does not contribute to the model.

3.6.3 Wilks' lambda is another measure of a variable's potential. Smaller values indicate the variable is better at discriminating between groups. The standardized coefficients allow you to compare variables measured on different scales. Coefficients with large absolute values correspond to variables with greater discriminating ability.

3.6.4 The structure matrix shows the correlation of each predictor variable with the discriminant function. The ordering in the structure matrix is the same as that suggested by the tests of equality of group means and is different from that in the standardized coefficients table. This disagreement is likely due to the co linearity.

CHAPTER 4

4.0 RESULTS OF DATA ANALYSIS AND INTEPRETATION

4.1 Introduction

The aim of this project is to examine whether there is a significant difference between two groups centroids i.e. between the means: high book to market ratio (1) and those with low book to market ratio (0) of firms listed at the NSE. The model used in discriminating the groups is explained in 2.2 page 9.

The technique used to is discriminant analysis given that this study's dependant variable is categorical. In addition, I perform separate significance tests of the difference of means of each of the five independent variables i.e. univarate tests.

4.2 Summary Statistics

Table 1: Number of Firms in this study

	1996		1997		1998		1999		2000		2001	
Unweighted Cases	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Valid	32	65.3	33	67.3	34	69.4	35	71.4	36	73.5	34	69.4
Excluded	17	34.7	16	32.7	15	30.6	14	28.6	13	26.5	15	30.6
Total	49	100	49	100	49	100	49	100	49	100	49	100

Table 1 shows the number of firms that were included or excluded from the study on the basis of discriminating variables or group codes

Table 1 above shows the number and percentage of the firms that were included or excluded from the analysis out of the original 49 firms selected for processing. Firms were excluded from the study either because their group codes were out-of-range or were missing. Firms with at least one discriminating variable missing were also excluded.

The valid cases across the years from 1996 to 2001 were classified as having low book to market ratio (0) because their book to market ratio was below the average of the same ratio for the market. Other firms were classified as having high book to market ratio (1) if their book to market ratio was above the average of the same ratio for the market.

4.2. Group Statistics

4.2.1 Out of the 49 firms at NSE during 1996 there were only 32 valid cases. Firms with missing or out of range group or with at least one discriminating variable missing were

excluded i.e. a total of 17 firms were excluded from the analysis in that year. Of the 32 firms remaining, 22 of them were classified as having low book to market ratio (0) because their book to market ratio was below the average of the same ratio for the market. The group statistics are summarised (in **table 2a)** below.

The group statistics highlight the difference between the two groups 0's and 1's. For all the five predictors, larger groups means are associated with firms that were categorised as having high book to market price ratio.

Table 2a: Group Statistics - Altman's Ratios (1996)

cBtM1996	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA96	.11991	.089884	22
	REtTA96	.18792	.115420	22
	EBtTA96	.10909	.065120	22
	EQtTD96	2.52696	3.393569	22
	SAtTA96	.98158	.723707	22
1	WCtTA96	.21162	.234595	10
	REtTA96	.26411	.187812	10
	EBtTA96	.22363	.150642	10
	EQtTD96	8.43478	14.595491	10
	SAtTA96	1.43446	1.040089	10
Total	WCtTA96	.14857	.152696	32
	REtTA96	.21173	.143361	32
	EBtTA96	.14488	.111224	32
	EQtTD96	4.37315	8.797089	32
	SAtTA96	1.12311	.845193	32

4.2.2 In 1997, out of the 49 firms there were 33 valid cases for analysis and 16 cases were excluded for analysis. Of the 33 cases, 23 were classified as having low book to market ratio while 10 were classified as having high book to market ratio. The group statistics (in **table 2b)** below show the differences between the two groups 0's and 1's. Similarly for all the five predictors, the group statistics suggest that the larger groups means are associated with firms with high book to market ratio.

Table 2b: Group Statistics - Altman's Ratios (1997)

cBtM1997	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA97	.08302	.096191	23
	REtTA97	.16759	.121300	23
	EBtTA97	.12028	.060042	23
	EQtTD97	2.79176	4.358003	23

	SAtTA97	1.00398	.727800	23
1	WCtTA97	.22031	.195706	10
	REtTA97	.27243	.148358	10
	EBtTA97	.21155	.154536	10
	EQtTD97	6.40233	6.633562	10
	SAtTA97	1.26146	.869867	10
Total	WCtTA97	.12462	.145735	33
	REtTA97	.19936	.136748	33
	EBtTA97	.14794	.104926	33
	EQtTD97	3.88587	5.317201	33
	SAtTA97	1.08201	.769036	33

4.2.3 In 1998, out of the 49 firms there were 34 valid cases for analysis and 15 cases were excluded for analysis. Of the 34 cases, 25 were classified as having low book to market ratio while 9 were classified as having high book to market ratio. The group statistics (see **table 2c below)** show the differences between the two groups 0's and 1's. Similarly for all the five predictors, the group statistics suggest that the larger groups means are associated with firms with high book to market ratio.

Table 2c: Group Statistics - Altman's Ratios (1998)

CBtM1998	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA98	.10620	.163244	25
	REtTA98	.18513	.154553	25
	EBtTA98	.10981	.095441	25
	EQtTD98	3.73207	5.262316	25
	SAtTA98	.82208	.464742	25
1	WCtTA98	.13432	.165877	9
	REtTA98	.22932	.151256	9
	EBtTA98	.20815	.181979	9
	EQtTD98	4.26776	3.298851	9
	SAtTA98	1.47172	1.041836	9
Total	WCtTA98	.11364	.161895	34
	REtTA98	.19682	.152676	34
	EBtTA98	.13584	.128809	34
	EQtTD98	3.87387	4.778632	34
	SAtTA98	.99405	.710524	34

4.2.4 In1999, out of the 49 firms there were 35 valid cases for analysis and 14 cases were excluded for analysis. Of the 35 cases, 24 were classified as having low book to market ratio while 11 were classified as having high book to market ratio. The group statistics (see **table 2d**) show the differences between the two groups 0's and1's. Similarly for all the five predictors, the group statistics suggest that the larger groups means are associated with firms with high book to market ratio.

Table 2d: Group Statistics - Altman's Ratios (1999)

cBtM1999	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA99	.07361	.183782	24
	REtTA99	.14294	.144803	24
	EBtTA99	.03900	.092827	24
	EQtTD99	2.35134	4.070969	24
	SAtTA99	.91176	.788420	24
1	WCtTA99	.12950	.125618	11
	REtTA99	.24134	.176424	11
	EBtTA99	.11964	.139916	11
	EQtTD99	2.99281	2.974180	11
	SAtTA99	1.08727	.930288	11
Total	WCtTA99	.09118	.167876	35
	REtTA99	.17387	.159647	35
	EBtTA99	.06434	.114147	35
	EQtTD99	2.55295	3.728804	35
	SAtTA99	.96692	.825755	35

4.2.5 In 2000, out of the 49 firms there were 36 valid cases for analysis and 13 cases were excluded from the analysis. Of the 36 cases, 24 were classified as having low book to market ratio while 12 were classified as having high book to market ratio. The group statistics (see **table 2e**) show the differences between the two groups 0's and 1's. Similarly for all the five predictors, the group statistics suggest that the larger groups means are associated with firms with high book to market ratio.

Table 2e: Group Statistics - Altman's Ratios (2000)

cBtM2000	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA00	.09017	.183488	24
	REtTA00	.15555	.169241	24
	EBtTA00	.02822	.091852	24
	EQtTD00	1.38953	1.978855	24
	SAtTA00	.96217	.839099	24
1	WCtTA00	.10629	.142490	12
	REtTA00	.21534	.159953	12
	EBtTA00	.08745	.098761	12
	EQtTD00	2.63416	2.091545	12
	SAtTA00	1.14367	.966812	12
Total	WCtTA00	.09555	.169012	36
	REtTA00	.17548	.166374	36
	EBtTA00	.04796	.097013	36
	EQtTD00	1.80441	2.074180	36
	SAtTA00	1.02267	.874063	36

4.2.6 In 2001, out of the 49 firms there were 34 valid cases for analysis and 15 cases were excluded for analysis. Of the 34 cases, 28 were classified as having low book to market ratio while 6 were classified as having high book to market ratio. The group statistics (in **table 2f** below) show the differences between the two groups 0's and 1's. Here the results were different. Only for EQtTD and SAtTA did the group statistics suggest that the larger groups means are associated with firms with high book to market ratio. The group statistics for WCtTA, REtTA and EBtTA suggest that lower group means are associated with firms with low book to market ratio.

Table 2f: Group Statistics - Altman's Ratios (2001)

cBtM2001	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA01	.09691	.199376	28
	REtTA01	.18967	.174181	28
	EBtTA01	.05080	.067098	28
	EQtTD01	1.31661	1.471862	28
	SAtTA01	1.03885	.837730	28
1	WCtTA01	.06966	.253033	6
	REtTA01	.16237	.127997	6
	EBtTA01	.00069	.097699	6
	EQtTD01	4.90561	8.639875	6
	SAtTA01	1.22067	1.044530	6
Total	WCtTA01	.09210	.205756	34
	REtTA01	.18486	.165580	34
	EBtTA01	.04196	.074201	34
	EQtTD01	1.94996	3.874455	34
	SAtTA01	1.07093	.862817	34

4.2.7 In 2002, out of the 49 firms there were 32 valid cases for analysis and 8 cases were excluded from the analysis. Of the 32 cases, 24 were classified as having low book to market ratio while 8 were classified as having high book to market ratio. The group statistics (in **table 2g** below) show the differences between the two groups 0's and 1's. Similarly for all the five predictors, the group statistics suggest that the larger groups means are associated with firms with high book to market ratio.

Table 2g: Group Statistics - Altman's Ratios (2002)

cBtM2002	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA02	0.111265	0.162259	24
	REtTA02	0.201662	0.138947	24
	EBtTA02	0.049348	0.06558	24
	EQtTD02	1.49938	2.854036	24
	SAtTA02	0.944239	0.864274	24
1	WCtTA02	0.116345	0.260954	8
	REtTA02	0.28086	0.165292	8

	EBtTA02	0.085582	0.085346	8
	EQtTD02	4.029623	3.930338	8
	SAtTA02	1.304519	0.908977	8
Total	WCtTA02	0.112535	0.186856	32
	REtTA02	0.221461	0.147334	32
	EBtTA02	0.058407	0.071343	32
	EQtTD02	2.131941	3.281879	32
	SAtTA01	1.034309	0.875155	32

During 2003, out of the 49 firms there were 36 valid cases for analysis and 13 cases were excluded from the analysis. Of the 36 cases, 24 were classified as having low book to market ratio while 12 were classified as having high book to market ratio. The group statistics (in **table 2h** below) show the differences between the two groups 0's and 1's. However except for WCtTA, REtTA and EBtTA predictors, the group statistics suggest that the larger groups means are associated with firms with high book to market ratio.

Table 2h: Group Statistics - Altman's Ratios (2003)

cBtM2003	Variables	Mean	Std. Deviation	Valid Cases
0	WCtTA03	0.133738	0.145285	21
	REtTA03	0.261089	0.149349	21
	EBtTA03	0.069474	0.077798	21
	EQtTD03	2.586634	3.986829	21
	SAtTA03	0.94643	0.685378	21
1	WCtTA03	0.057807	0.243342	11
	REtTA03	0.168957	0.225222	11
	EBtTA03	0.058246	0.14083	11
	EQtTD03	4.248221	3.348247	11
	SAtTA03	1.449816	1.331752	11
Total	WCtTA03	0.107637	0.184559	32
	REtTA03	0.229419	0.180914	32
	EBtTA03	0.065615	0.101646	32
	EQtTD03	3.157805	3.809724	32
	SAtTA03	1.119469	0.966532	32

4.3 Tests Of Equality Of Means

Tests of equality of means measure the potential of each of Altman's (1968) ratios. This is necessary before the model is created. If the significance or p-value is greater than 0.10 for a variable, then it is possible that the variable might not contribute to the model. The results of the tests of equality of means are displayed (see **table 3)** below:

Table 3: Tests of Equality of Group Means 1996 – 2003

	Wilks' Lambda	F	df1	df2	Sig.
WCtTA96	.920	2.609	1	30	.117
REtTA96	.937	2.005	1	30	.167
EBtTA96	.765	9.227	1	30	.005
EQtTD96	.900	3.334	1	30	.078
SAtTA96	.936	2.040	1	30	.164
WCtTA97	.807	7.428	1	31	.010
REtTA97	.872	4.551	1	31	.041
EBtTA97	.835	6.117	1	31	.019
EQtTD97	.900	3.461	1	31	.072
SAtTA97	.976	.776	1	31	.385
WCtTA98	.994	.195	1	32	.662
REtTA98	.983	.547	1	32	.465
EBtTA98	.883	4.234	1	32	.048
EQtTD98	.997	.081	1	32	.778
SAtTA98	.832	6.445	1	32	.016
WCtTA99	.975	.832	1	33	.368
REtTA99	.916	3.038	1	33	.091
EBtTA99	.889	4.109	1	33	.051
EQtTD99	.993	.218	1	33	.644
SAtTA99	.990	.334	1	33	.567
WCtTA00	.998	.071	1	34	.792
REtTA00	.970	1.034	1	34	.316
EBtTA00	.915	3.167	1	34	.084
EQtTD00	.918	3.049	1	34	.090
SAtTA00	.990	.338	1	34	.565
WCtTA01	.997	.084	1	32	.773
REtTA01	.996	.131	1	32	.720
EBtTA01	.932	2.346	1	32	.135
EQtTD01	.872	4.718	1	32	.037
SAtTA01	.993	.214	1	32	.647
WCtTA02	1.000	.004	1	30	.948
REtTA02	.944	1.777	1	30	.193
EBtTA02	.950	1.577	1	30	.219
EQtTD02	.885	3.900	1	30	.058
SAtTA02	.967	1.017	1	30	.321
WCtTA03	0.961	1.231	1	30	.276
REtTA03	0.940	1.928	1	30	.175
EBtTA03	0.997	.085	1	30	.772
EQtTD03	0.956	1.390	1	30	.248
SAtTA03	0.937	2.023	1	30	.165

In 1996, the results of the tests of equality of group means suggest that earnings before interest and tax to total assets (p = 0.004903), followed by market value of equity to book value of total debt (p = 0.077827) are the best in discriminating between firms of high and low book to price ratio. The other variables such as working capital with p-value of 0.116745 have p-values greater than 0.10. In 1997, the results suggest that all the variables except for SAtTA can be used to discriminate between low and book to market value firms since all the P-values are less that 0.10. However WCtTA would be the best discriminating variable followed by EBtTA, REtTA and EQtTD. In 1998, the results show that SAtTA is the best discriminating variable between firms of high and low book to market ratio. This is followed by EBtTA. However EQtTD, REtTA and WCtTA are not suitable for discriminating firms as the p-value is more than 0.1. In 1999, the results on indicate that apart from WCtTA, EQtTD and SAtTA, the other variables i.e. REtTA and EBtTA are suitable as discriminating index. The results of year 2000 as suggest that EQtTD and EBtTa are the only variables suitable as discriminating index between low and high book to market ratio firms. In 2001, the results suggest that EQtTD is the only variable suitable for discriminating between low and high book to market ratio firms, as the p- value is less than 0.1. In 2002, the results suggest that EQtTD is the only variable suitable for discriminating between low and high book to market ratio firms, as the p- value is less than 0.1. In 2003, the results suggest that none of the variables is suitable for discriminating between low and high book to market ratio firms, as all the variables have a p- value of less than 0.1.

Wilks' Lambda is another measure of a variably potential as the tests of equality of means. In year 1996, the values of Lambda for EBtTA (0.765) and EQtTD (0.900) indicate that the variables are better at discriminating between two groups. According to Wilks' Lambda test the variables REtTA (0.937) and SAtTA (0.936) posses the lowest potential as discriminating variables. In 1997, the results above **(table 3)** indicate that WCtTA (0.807) is the best discriminating index followed by EBtTA (0.835), then REtTA (0.041), EQtTA (0.900) and lastly SAtTA (0.976). The results achieved for year 1998 to 2003 to test the discriminating power of the variables using Wilk's Lambda are the same as those achieved when using the significance test described in the paragraph above.

4.4 Box's M results.

The application of discriminant analysis is in fact not encouraged if the within –groups covariance matrices are significantly different. The Box's M tests are used to test null

hypothesis of equal covariance matrices. This is because the difference between the matrices should not be significant. In 1996 the Box's M is significant and ideally we should request for separate matrices to see if it gives radically different classification results. In this study most of Box's M tests are significant.

4.5 Discriminant Functions

The discriminant classification functions coefficients are used to assign cases to groups. There is a separate function for firms classified as having high book to price ratio (1) and those classified as having low book to price ratio (0). The functions obtained for year 1996 to 2003 are as follows: -

1996

0: $Z = -2.554 - 2.721X_1 + 12.160X_2 + 1.732X_3 - 0.021X_4 + 1.658X_5$

1: $Z = -4.826 - 3.641X_1 + 11.965X_2 + 12.235X_3 + 0.022X_4 + 2.062X_5$

1997

0: $Z = -3.540 - 9.649X_1 + 15.040X_2 + 3.463X_3 + 0.254X_4 + 2.837X_5$

1: $Z = -6.592 - 6.718X_1 + 17.010X_2 + 8.457X_3 + 0.372X_4 + 3.546X_5$

1998

0: $Z = -2.991 - 5.106X_1 + 8.601X_2 + 1.664X_3 + 0.258X_4 + 2.919X_5$

1: $Z = -6.401 - 8.936X_1 + 8.201X_2 + 9.844X_3 + 0.391X_4 + 4.768X_5$

1999

0: $Z = -2.185 + 3.257X_1 + 4.970X_2 - 4.409X_3 + 0.223X_4 + 1.845X_5$

1: $Z = -3.335 + 2.633X_1 + 7.698X_2 + 1.323X_3 + 0.211X_4 + 2.112X_5$

2000

0: $Z = -2.227 + 5.417X_1 + 2.969X_2 - 7.511X_3 + 0.488X_4 + 1.821X_5$

1: $Z = -3.443 + 3.320X_1 + 2.148X_2 + 0.420X_3 + 0.763X_4 + 2.308X_5$

2001

0: $Z = -2.454 + 3.001X_1 + 5.701X_2 + 2.564X_3 + 0.044X_4 + 1.888X_5$

1: $Z = -3.365 + 1.062X_1 + 4.692X_2 - 1.923X_3 + 0.376X_4 + 2.182X_5$

2002

0: $Z = -3.122 + 4.984X_1 + 9.343X_2 + 6.262X_3 + 0.091X_4 + 2.281X_5$

1: $Z = -6.074 + 3.903X_1 + 10.890X_2 + 15.824X_3 + 0.421X_4 + 3.217X_5$

2003

0: $Z = -3.243 + 5.627X_1 + 8.192X_2 - 3.193X_3 + 0.173X_4 + 2.094X_5$

1: $Z = -4.122 + 4.662X_1 + 3.474X_2 - 2.048X_3 + 0.468X_4 + 2.848X_5$

Where: -

Z is the discriminant score

X_1 is Working Capital to Total Assets

X_2 is Retained Earnings to Total Assets.

X_3 is Earnings Before Interest and Taxes to Total assets.

X_4 is Market Value of Equity to Book Value of Total Debt.

X_5 is Sales to Total Assets.

The classification score is computed for each function and the model assign the case to the group whose classification obtained the highest score. For 1996 function obtained above the results indicate that except for working capital to total assets (X_1) and Retained Earnings to Total Assets (X_2), the coefficients of all other predictor variables, X_3 to X_5, are smaller for firms with low X2 to X_5 ratio are likely to have low book to market price ratio and vice versa. It also suggests that firms with high book to price ratio tend to have lesser working capital when compared to those with low book to market ratio.

For the 1997 function, the results indicate that coefficients for firms with high book to market ratio are higher than those compared to firms with low book to market ratio suggesting the latter have higher working capital, retained earnings, market value of equity and high sales. For the 1998 function the results indicate that coefficient for working capital to total assets (X_1) and Retained Earnings to Total Assets (X_2) is lower for firms with high book to market ratio when compared to firms with low book to market ratio suggesting that the latter have more working capital and Retained Earnings.

In 1999, the function obtained suggests mixed results. For example high book to market ratio firms have less working capital and equity value to total debt ratio but more retained earnings, earnings before interest and taxes and sales value. The 2000 function obtained suggests that except for X_3, X_4 andX_5, firms with high book to market value have less working capital and retained earnings compared to firms with low book to market value. In year 2001, the function obtained suggests that except for market value of equity value to book value of total debt (X_4) and Sales to Total assets (X_5), high book to market ratio firms have less working capital, retained earnings and earnings before interest and taxes.

The function obtained above for year 2002 suggests that except for Working Capital to Total Assets(X1), high book to market ratio firms have more retained earnings, earnings before interest and taxes, higher market value of equity value to book value of total debt (X_4) and Sales to Total assets (X_5).

In year 2003, the function obtained suggests that except for Earnings before interest and Taxes to Total assets (X_2), Market Value of Equity value to Book value of total debt (X_4) and Sales to Total assets (X_5), high book to market ratio firms have less working capital and retained earnings.

4.6 Conanomical Discriminant and Standardized Co-efficient

These measure variables at different scale. They allow us to compare discriminating power of variables on different scales. Co-effecients with large absolute values correspond to variables with greater discriminating ability. In 1996 the standardized Canonical Discriminant function co-efficient confirm that variables EBtTA and EQtTD have relatively high discriminating power i.e. they have the highest co-efficient as shown below (see **table 4**):

Table 4: Standardized Canonical Discriminant Function Coefficients

Variables	1996	1997	1998	1999	2000	2001	2002	2003
WCtTA	-0.110	0.301	-0.449	-0.122	-0.397	-0.325	-0.160	-0.152
REtTA	-0.022	0.198	-0.044	0.494	-0.151	-0.136	0.176	-0.720
EBtTA	0.837	0.376	0.720	0.731	0.826	-0.262	0.528	0.101
EQtTD	0.291	0.468	0.463	-0.054	0.613	0.979	0.811	0.956
SAtTA	0.271	0.423	0.871	0.260	0.475	0.206	0.640	0.614

In 1997 the results show that the variables EQtTD and SatTA have higher discriminating power than EBtTA, WCtTA and REtTA in that order. In 1998 the results show that the variables EBtTA and SAtTA have higher discriminating power than EQtTD. WCtTA and REtTA have least discriminating ability. In 1999 the results show that the variables EBtTA and REtTA have greater discriminating ability as they have the highest coefficients. In 2000 the results show that the variables EBtTA, EQtTD and SAtTA have greater discriminating ability than WCtTA and REtTA as they have the highest coefficients. In 2001 the results show that the variables EQtTD and SAtTA have greater discriminating ability than all the other variables. In 2002 and 2003, SAtTA has the best discriminating ability followed by EQtTD.

4.7 Structure Matrix.

This matrix shows the correlation of each predictor (independent) variable with the discriminating function. As shown in **table 5** below, In 1996 EBtTA has the highest correlation (+0.934) with the standardized canonical discriminant function; and REtTA is the lowest (+0.435). In 1997 WCtTA has the highest correlation (+0.798) with the standardized

canonical discriminant function; and SAtTA is the lowest (+0.258. In 1998 SAtTA has the highest correlation (+0.706) with the standardized canonical discriminant function; and EQtTD is the lowest (+0.079). In 1999 EBtTA has the highest correlation (+0.861) with the standardized canonical discriminant function; and EQtTD is the lowest (+0.198. In 2000 EBtTA has the highest correlation (+0.696) with the standardized canonical discriminant function; and WCtTA is the lowest (+0.104). In 2001 EQtTD has the highest correlation (+0.785) with the standardized canonical discriminant function; and EBtTA is the lowest (-0.553).

Table 5: Structure matrix function 1

	1996	1997	1998	1999	2000	2001
WCtTA	0.497	0.798	0.123	0.387	0.104	-0.105
REtTA	0.435	0.625	0.206	0.740	0.398	-0.131
EBtTA	0.934	0.724	0.573	0.861	0.696	-0.553
EQtTD	0.562	0.545	0.079	0.198	0.683	0.785
SAtTA	0.439	0.258	0.706	0.246	0.227	0.167

4.7.1 Eigen Values

Eigen values provide information about relative efficacy (effectiveness) of each discriminant function. The canonical correlation is the most useful measure and was 0.510 in 1996, 0.523 in 1997, 0.536 in 1998, 0.379 in 1999, 0.402 in 2000 and 0.439 in 2001.

4.7.2 Wilks' Lambda

Wilks' Lambda approximate how well each function separate cases into groups i.e. test of function. It is the proportion of the total variance in the discriminant scores not explained by differences among the groups. The smaller the Wilks' Lambda co-efficient, the greater the discriminatory ability of the function. It was 0.739, 0.727, 0.713, 0.856, 0.839 and 0.807 in 1996, 1997, 1998, 1999, 2000 and 2001 respectively.

4.7.3 Chi - Square

The Chi-square statistic tests the hypothesis that the means of the functions are equal across the groups. A small significance value (p-value < 0.10) indicates that discriminant function does better than chance of separating 0's from 1's. In 1996 the reported significance is 0.140 and greater than 0.10 meaning chance could play a role. The same results are obtained for 1997 (p = 0.105), 1999 (p = 0.449), 2000 (p = 0.353) and in 2002 (p = 0.275). However in 1998 the p value is 0.075 suggesting that the discriminant function does better that chance in discriminating between the 0's and 1's. Details in appendix----

4.8 Overall Classification Results.

The classification table below (**table 8**)shows the practical results using the discriminant model.

Table 8: Overall Classification results

Year	cBtM	No.of Correctly Classified firms	No.of Incorrectly Classified firms	Total	Overall Correctly Classified	Overall Incorrectly Classified
1996	0	18	4	22	78.1%	21.9%
	1	7	3	10		
1997	0	19	4	23	78.8%	21.2%
	1	7	3	10		
1998	0	24	1	25	85.7%	14.3%
	1	6	3	9		
1999	0	18	6	24	73.5%	26.5%
	1	7	4	11		
2000	0	17	7	24	69.4%	30.6%
	1	8	4	12		
2001	0	23	5	28	76.5%	23.5%
	1	3	3	6		
2002	0	20	4	24	84.4%	15.6%
	1	7	1	8		
2003	0	17	4	21	78.1%	21.9%
	1	8	3	11		

In 1996 of the 22 firms that were classified as exhibiting low book to market price ratio 18 of them are correctly classified. In the same year of the 10 firms categorised as high book to market price ratio, 7 are correctly classified.

Overall, in 1996, 78.1% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 1996 is roughly correct in about 8 (eight) out of 10 (ten) times.

In 1997 of the 23 firms that were classified as exhibiting low book to market price ratio 19 of them are correctly classified. In the same year of the 10 firms categorised as high book to market price ratio, 7 are correctly classified. Overall, in 1997, 78.8% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 1997 is roughly correct in about 8 (eight) out of 10 (ten) times.

In 1998 of the 25 firms that were classified as exhibiting low book to market price ratio 24 of them are correctly classified. In the same year of the 9 firms categorised as high book to market price ratio, 6 are correctly classified. Overall, in 1998, 85.7% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 1998 is roughly correct in about 8 (eight) out of 10 (ten) times.

In 1999 of the 24 firms that were classified as exhibiting low book to market price ratio 18 of them are correctly classified. In the same year of the 11 firms categorised as high book to market price ratio, 7 are correctly classified. Overall, in 1999, 73.5% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 1999 is roughly correct in about 7 (seven) out of 10 (ten) times.

In 2000 of the 24 firms that were classified as exhibiting low book to market price ratio 17 of them are correctly classified. In the same year of the 12 firms categorised as high book to market price ratio, 8 are correctly classified. Overall, in 2000, 69.4% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 2000 is roughly correct in about 7 (seven) out of 10 (ten) times.

In 2001 of the 28 firms that were classified as exhibiting low book to market price ratio 23 of them are correctly classified. In the same year of the 6 firms categorised as high book to market price ratio, 3 are correctly classified. Overall, in 2001, 76.5% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 2001 is roughly correct in about 7 (seven) out of 10 (ten) times.

In 2002 of the 28 firms that were classified as exhibiting low book to market price ratio 20 of them are correctly classified. In the same year of the 8 firms categorised as high book to market price ratio, 7 are correctly classified. Overall, in 2002, 84.4% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 2001 is roughly correct in about 9 (nine) out of 10 (ten) times.

In 2003 of the 21 firms that were classified as exhibiting low book to market price ratio 17 of them are correctly classified. In the same year of the 11 firms categorised as high book to market price ratio, 8 are correctly classified. Overall, in 2003, 78.1% of original group cases are correctly classified. This suggests that overall, the discriminant model generated in 2003 is roughly correct in about 8 (eight) out of 10 (ten) times.

On average, between 1996 and 2003, the discriminant function generated was correct by 78.1% suggesting that in roughly eight(8) out of ten(10) times, Altman's ratios can be useful in discriminating between high book to market value firms and low book to market value firms.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The objective of this study was to determine the discriminating ability of Altman's Z score ratios in separating firms with low book to market value ratio from those having high book to market ratio. My findings suggest that that to some extent Altman's ratios can be useful in grouping firms into low and high book to market ratio.

The above results are useful given the findings that were obtained by Obell (2004) in which he found the usefulness of price to book ratio as a measure of risk, after using standard deviation as a measure of risk. This result of this study suggest that Altman's Z score can be useful in making investment decisions in choosing between low and high risk assets

The results obtained in this study also serves to warn investors that Altman's Z score alone cannot be used to make investment decisions. Other factors also play a role, the reason it was not possible to achieve 100% accuracy using Z score to discriminate between firms

5.2 Limitations of the Study

This study only covered a period of eight years using annual data. This is a limitation as it can lead to inappropriate conclusions since only a limited period has been covered. A study covering a longer period is likely to have results different from the one in this study. Secondly this study has relied on Altman's Z score alone to arrive at a conclusion. The results may not be too reliable as would been if other measures of Book to market ratio would have been studied at the same time. Thirdly, the use of accounting earnings and estimates derived from published historical information may not give appropriate comparison

between firms because of possible differences in accounting policies used in preparing financial statements and different industries.

5.3 Recommendations For Further Research

A logical suggestion for further research is to consider the use of weekly or monthly book to market ratios rather than annual book to market ratios. Also, a better study may consider the use of all ratios, not just Altman's ratios.

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Appendix 1

Casewise Statistics - 1996

	Case Number	Actual Group	Highest Group					Second Highest Group		Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
			Predicted Group	P(D>d | G=g) p	df	P(G=g | D=d)	Squared Mahalanobis Distance to Centroid		P(G=g | D=d)		
Original	2	1	1	0.008	1	0.983	6.948	0	0.017	15.024	3.489
	3	1	0	0.933	1	0.660	0.007	1	0.340	1.338	-0.304
	6	1	1	0.718	1	0.771	0.130	0	0.229	2.564	1.214
	7	1	1	0.025	1	0.972	5.013	0	0.028	12.104	3.092
	8	1	1	0.932	1	0.660	0.007	0	0.340	1.333	0.767
	9	0	1	0.573	1	0.518	0.318	0	0.482	0.458	0.289
	11	0	0	0.831	1	0.738	0.046	1	0.262	2.113	-0.601
	12	0	0	0.577	1	0.519	0.311	1	0.481	0.466	0.170
	13	1	0	0.329	1	0.879	0.951	1	0.121	4.909	-1.363
	15	0	1	0.671	1	0.560	0.180	0	0.440	0.666	0.428
	16	0	0	0.811	1	0.616	0.057	1	0.384	1.003	-0.149
	17	0	0	0.171	1	0.922	1.875	1	0.078	6.809	-1.757
	19	0	1	0.539	1	0.502	0.378	0	0.498	0.391	0.238
	20	1	1	0.579	1	0.520	0.308	0	0.480	0.469	0.297
	21	1	1	0.421	1	0.854	0.648	0	0.146	4.183	1.658
	22	0	0	0.484	1	0.837	0.490	1	0.163	3.764	-1.087
	23	1	0	0.659	1	0.789	0.195	1	0.211	2.828	-0.829
	25	1	1	0.729	1	0.584	0.120	0	0.416	0.798	0.506
	26	0	0	0.569	1	0.814	0.325	1	0.186	3.277	-0.958
	27	0	0	0.629	1	0.797	0.233	1	0.203	2.969	-0.871
	32	0	0	0.572	1	0.517	0.320	1	0.483	0.455	0.178
	33	0	0	0.853	1	0.731	0.034	1	0.269	2.033	-0.573
	35	0	0	0.756	1	0.760	0.096	1	0.240	2.404	-0.698
	36	0	0	0.576	1	0.812	0.313	1	0.188	3.239	-0.947
	37	0	1	0.836	1	0.625	0.043	0	0.375	1.067	0.646
	38	0	0	0.711	1	0.577	0.138	1	0.423	0.755	-0.016
	39	0	0	0.536	1	0.823	0.382	1	0.177	3.454	-1.006
	41	0	0	0.909	1	0.713	0.013	1	0.287	1.835	-0.502
	42	0	0	0.547	1	0.505	0.363	1	0.495	0.406	0.215
	43	0	0	0.882	1	0.642	0.022	1	0.358	1.193	-0.240
	44	0	0	0.877	1	0.723	0.024	1	0.277	1.946	-0.542
	45	0	0	0.722	1	0.770	0.126	1	0.230	2.545	-0.743
**	Misclassified case										

Casewise Statistics - 1997

	Case Number	Actual Group	Highest Group				Squared Mahalanobis Distance to Centroid	Second Highest Group		Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
			Predicted Group	P(D>d | G=g) p	df	P(G=g | D=d)			P(G=g | D=d)		
Original	2	1	1	0.223	1	0.918	1.487	0	0.082	6.315	2.121
	3	1	0(**)	0.431	1	0.865	0.621	1	0.135	4.333	-1.180
	6	1	1	0.903	1	0.730	0.015	0	0.270	2.005	1.024
	7	1	1	0.463	1	0.856	0.539	0	0.144	4.111	1.636
	8	1	0(**)	0.564	1	0.522	0.334	1	0.478	0.513	0.186
	9	1	1	0.949	1	0.680	0.004	0	0.320	1.511	0.837
	11	0	0	0.570	1	0.828	0.323	1	0.172	3.468	-0.961
	12	0	1(**)	0.601	1	0.540	0.273	0	0.460	0.595	0.379
	13	1	0(**)	0.210	1	0.921	1.574	1	0.079	6.492	-1.646
	15	0	1(**)	0.823	1	0.633	0.050	0	0.367	1.144	0.678
	16	0	1(**)	0.713	1	0.788	0.135	0	0.212	2.760	1.269
	17	0	0	0.324	1	0.892	0.973	1	0.108	5.199	-1.379
	19	1	1	0.157	1	0.935	2.006	0	0.065	7.344	2.318
	20	0	0	0.936	1	0.719	0.006	1	0.281	1.888	-0.473
	21	1	1	0.088	1	0.955	2.919	0	0.045	9.013	2.610
	22	0	0	0.763	1	0.610	0.091	1	0.390	0.984	-0.090
	23	0	0	0.479	1	0.852	0.501	1	0.148	4.005	-1.100
	25	1	1	0.834	1	0.752	0.044	0	0.248	2.259	1.111
	26	0	0	0.662	1	0.567	0.191	1	0.433	0.733	0.045
	29	0	0	0.438	1	0.863	0.602	1	0.137	4.281	-1.168
	31	0	0	0.739	1	0.780	0.111	1	0.220	2.645	-0.725
	32	0	0	0.645	1	0.807	0.212	1	0.193	3.076	-0.852
	33	0	0	0.995	1	0.696	0.000	1	0.304	1.656	-0.385
	35	0	0	0.442	1	0.862	0.592	1	0.138	4.256	-1.161
	36	0	0	0.926	1	0.672	0.009	1	0.328	1.443	-0.300
	37	0	1	0.842	1	0.749	0.040	0	0.251	2.229	1.101
	38	0	0	0.965	1	0.686	0.002	1	0.314	1.561	-0.348
	39	0	0	0.605	1	0.818	0.268	1	0.182	3.280	-0.910
	41	0	0	0.660	1	0.803	0.193	1	0.197	3.004	-0.832
	42	0	0	0.238	1	0.914	1.394	1	0.086	6.122	-1.573
	43	0	0	0.820	1	0.632	0.052	1	0.368	1.137	-0.165
	44	0	0	0.531	1	0.507	0.392	1	0.493	0.446	0.234
	45	0	0	0.928	1	0.673	0.008	1	0.327	1.449	-0.302

** Misclassified case

Casewise Statistics - 1998

	Case Number	Actual Group	Highest Group				Squared Mahalanobis Distance to Centroid	Second Highest Group		Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
			Predicted Group	P(D>d | G=g) p	df	P(G=g | D=d)			P(G=g | D=d)		
Original	2	1	1	0.051	1	0.976	3.815	0	0.024	11.223	2.980
	3	1	0(**)	0.570	1	0.854	0.322	1	0.146	3.860	-0.938
	6	1	1	0.030	1	0.982	4.720	0	0.018	12.741	3.200
	7	1	1	0.773	1	0.799	0.083	0	0.201	2.838	1.315
	8	1	1	0.225	1	0.935	1.471	0	0.065	6.811	2.240
	9	1	1	0.900	1	0.690	0.016	0	0.310	1.615	0.901
	11	0	0	0.976	1	0.718	0.001	1	0.282	1.868	-0.340
	12	0	1(**)	0.640	1	0.836	0.219	0	0.164	3.476	1.495
	13	0	0	0.526	1	0.865	0.402	1	0.135	4.124	-1.004
	15	1	1	0.868	1	0.678	0.028	0	0.322	1.514	0.861
	16	0	0	0.906	1	0.758	0.014	1	0.242	2.295	-0.488
	17	0	0	0.662	1	0.590	0.191	1	0.410	0.922	0.067
	19	0	0	0.601	1	0.561	0.274	1	0.439	0.763	0.153
	20	1	0(**)	0.671	1	0.594	0.181	1	0.406	0.944	0.056
	21	0	0	0.707	1	0.611	0.142	1	0.389	1.041	0.007
	22	0	0	0.857	1	0.673	0.032	1	0.327	1.480	-0.190
	23	0	0	0.668	1	0.593	0.184	1	0.407	0.937	0.059
	25	1	0	0.317	1	0.915	1.003	1	0.085	5.751	-1.371
	26	0	0	0.769	1	0.800	0.086	1	0.200	2.856	-0.663
	29	0	0(**)	0.709	1	0.817	0.139	1	0.183	3.131	-0.742
	31	0	0	0.908	1	0.693	0.013	1	0.307	1.642	-0.254
	32	0	0	0.823	1	0.784	0.050	1	0.216	2.626	-0.594
	33	0	0	0.695	1	0.821	0.154	1	0.179	3.200	-0.762
	35	0	0	0.179	1	0.946	1.808	1	0.054	7.515	-1.714
	36	0	0	0.713	1	0.614	0.135	1	0.386	1.059	-0.002
	37	0	0	0.523	1	0.521	0.408	1	0.479	0.575	0.269
	38	0	0	0.783	1	0.796	0.076	1	0.204	2.797	-0.645
	39	0	0	0.678	1	0.598	0.172	1	0.402	0.964	0.045
	41	0	0	0.716	1	0.815	0.133	1	0.185	3.101	-0.734
	42	0	0	0.852	1	0.672	0.035	1	0.328	1.466	-0.184
	43	0	0	0.685	1	0.824	0.164	1	0.176	3.247	-0.775
	44	0	0	0.656	1	0.587	0.199	1	0.413	0.904	0.076
	45	0	0	0.882	1	0.683	0.022	1	0.317	1.560	-0.222
	47	0	0	0.083	1	0.968	3.004	1	0.032	9.796	-2.103

** Misclassified case

Casewise Statistics - 1999

	Case Number	Actual Group	Highest Group				Squared Mahalanobis Distance to Centroid	Second Highest Group		Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
			Predicted Group	P(D>d | G=g)		P(G=g | D=d)			P(G=g | D=d)		
				p	df						
Original	2	1	1	0.042	1	0.892	4.127	0	0.108	8.345	2.619
	5	1	0(**)	0.740	1	0.657	0.110	1	0.343	1.413	-0.601
	6	1	1	0.378	1	0.755	0.778	0	0.245	3.024	1.470
	7	1	1	0.768	1	0.650	0.087	0	0.350	1.326	0.882
	8	1	1	0.482	1	0.725	0.493	0	0.275	2.432	1.290
	9	1	1	0.402	1	0.747	0.701	0	0.253	2.871	1.425
	11	1	1	0.803	1	0.538	0.062	0	0.462	0.369	0.338
	12	1	1	0.159	1	0.828	1.982	0	0.172	5.130	1.995
	13	1	0(**)	0.022	1	0.912	5.266	1	0.088	9.935	-2.564
	15	0	0	0.198	1	0.813	1.653	1	0.187	4.593	-1.555
	16	0	1(**)	0.690	1	0.506	0.159	0	0.494	0.210	0.189
	17	0	0	0.862	1	0.554	0.030	1	0.446	0.467	-0.096
	19	0	0	0.715	1	0.513	0.134	1	0.487	0.242	0.096
	20	0	0	0.809	1	0.540	0.058	1	0.460	0.379	-0.028
	21	0	0	0.841	1	0.549	0.040	1	0.451	0.431	-0.068
	22	1	0(**)	0.797	1	0.537	0.066	1	0.463	0.360	-0.012
	23	1	0(**)	0.914	1	0.613	0.012	1	0.387	0.931	-0.377
	25	0	0	0.702	1	0.667	0.147	1	0.333	1.538	-0.652
	27	0	0	0.677	1	0.503	0.173	1	0.497	0.194	0.147
	29	0	0	0.754	1	0.654	0.098	1	0.346	1.369	-0.582
	31	0	0	0.939	1	0.575	0.006	1	0.425	0.610	-0.193
	32	0	0	0.782	1	0.647	0.076	1	0.353	1.285	-0.546
	33	0	0	0.980	1	0.586	0.001	1	0.414	0.693	-0.245
	34	0	1(**)	0.777	1	0.531	0.080	0	0.469	0.329	0.304
	35	0	0	0.670	1	0.501	0.181	1	0.499	0.186	0.157
	36	0	0	0.761	1	0.652	0.093	1	0.348	1.349	-0.574
	37	0	1(**)	0.361	1	0.760	0.836	0	0.240	3.138	1.502
	38	0	1(**)	0.763	1	0.527	0.091	0	0.473	0.308	0.286
	39	0	0	0.829	1	0.546	0.046	1	0.454	0.412	-0.054
	41	0	0	0.410	1	0.745	0.680	1	0.255	2.829	-1.094
	42	0	0	0.154	1	0.830	2.030	1	0.170	5.208	-1.694
	43	0	1(**)	0.676	1	0.502	0.174	0	0.498	0.193	0.170
	44	0	0	0.265	1	0.790	1.240	1	0.210	3.885	-1.383
	45	0	1(**)	0.945	1	0.577	0.005	0	0.423	0.622	0.519
	47	0	0	0.422	1	0.742	0.644	1	0.258	2.754	-1.072

** Misclassified case

Casewise Statistics - 2000

	Case Number	Actual Group	Highest Group				Squared Mahalanobis Distance to Centroid	Second Highest Group		Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
			Predicted Group	P(D>d | G=g) p	df	P(G=g | D=d)			P(G=g | D=d)		
Original	2	1	1	0.002	1	0.960	9.351	0	0.040	15.698	3.661
	5	1	0(**)	0.735	1	0.672	0.115	1	0.328	1.545	-0.640
	6	1	1	0.246	1	0.811	1.347	0	0.189	4.263	1.763
	7	1	1	0.733	1	0.672	0.116	0	0.328	1.550	0.944
	8	1	1	0.877	1	0.567	0.024	0	0.433	0.562	0.448
	9	1	1	0.760	1	0.533	0.094	0	0.467	0.358	0.297
	11	1	0(**)	0.531	1	0.726	0.392	1	0.274	2.342	-0.928
	12	1	1	0.902	1	0.574	0.015	0	0.426	0.610	0.479
	13	0	0	0.900	1	0.628	0.016	1	0.372	1.060	-0.427
	15	0	0	0.167	1	0.840	1.906	1	0.160	5.220	-1.682
	16	1	0(**)	0.718	1	0.521	0.130	1	0.479	0.295	0.060
	17	1	1	0.789	1	0.542	0.072	0	0.458	0.405	0.335
	19	0	1(**)	0.969	1	0.592	0.001	0	0.408	0.749	0.564
	20	0	1(**)	0.280	1	0.800	1.165	0	0.200	3.934	1.682
	21	0	0	0.908	1	0.626	0.013	1	0.374	1.041	-0.417
	22	0	0	0.220	1	0.820	1.506	1	0.180	4.542	-1.528
	23	1	1	0.550	1	0.721	0.358	0	0.279	2.258	1.201
	25	0	0	0.254	1	0.809	1.304	1	0.191	4.186	-1.443
	26	1	0(**)	0.932	1	0.619	0.007	1	0.381	0.979	-0.387
	27	0	1(**)	0.572	1	0.715	0.320	0	0.285	2.160	1.168
	29	0	1(**)	0.727	1	0.523	0.122	0	0.477	0.308	0.254
	31	0	0	0.661	1	0.503	0.192	1	0.497	0.217	0.137
	32	0	0	0.535	1	0.725	0.385	1	0.275	2.325	-0.922
	33	0	0	0.662	1	0.691	0.191	1	0.309	1.797	-0.738
	34	0	0	0.187	1	0.832	1.744	1	0.168	4.949	-1.622
	35	0	1(**)	0.743	1	0.528	0.107	0	0.472	0.333	0.275
	36	0	1(**)	0.995	1	0.599	0.000	0	0.401	0.806	0.596
	37	0	1(**)	0.986	1	0.605	0.000	0	0.395	0.851	0.621
	38	0	0	0.713	1	0.677	0.135	1	0.323	1.619	-0.669
	39	0	0	0.736	1	0.526	0.114	1	0.474	0.321	0.036
	41	0	0	0.891	1	0.571	0.019	1	0.429	0.588	-0.164
	42	0	0	0.894	1	0.572	0.018	1	0.428	0.595	-0.168
	43	0	0	0.766	1	0.663	0.089	1	0.337	1.445	-0.599
	44	0	0	0.677	1	0.687	0.174	1	0.313	1.746	-0.718
	45	0	0	0.869	1	0.636	0.027	1	0.364	1.142	-0.466
	47	0	0	0.484	1	0.739	0.490	1	0.261	2.574	-1.002

** Misclassified case

Casewise Statistics - 2001

	Case Number	Actual Group	Highest Group				Squared Mahalanobis Distance to Centroid	Second Highest Group		Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
			Predicted Group	P(D>d | G=g) p	df	P(G=g | D=d)			P(G=g | D=d)		
Original	2	1	1	0.000	1	0.998	17.853	0	0.002	29.925	5.251
	5	1	0(**)	0.941	1	0.704	0.006	1	0.296	1.741	-0.294
	6	1	1	0.762	1	0.598	0.091	0	0.402	0.889	0.723
	7	0	0	0.573	1	0.814	0.317	1	0.186	3.269	-0.783
	8	0	0	0.792	1	0.610	0.069	1	0.390	0.964	0.044
	9	0	0	0.574	1	0.814	0.316	1	0.186	3.265	-0.782
	11	1	1	0.782	1	0.606	0.077	0	0.394	0.938	0.749
	12	1	0(**)	0.793	1	0.751	0.069	1	0.249	2.273	-0.482
	13	0	0	0.773	1	0.757	0.083	1	0.243	2.351	-0.508
	15	0	1(**)	0.585	1	0.524	0.298	0	0.476	0.488	0.479
	16	0	0	0.896	1	0.719	0.017	1	0.281	1.891	-0.350
	19	0	0	0.518	1	0.829	0.417	1	0.171	3.577	-0.866
	20	0	1(**)	0.854	1	0.633	0.034	0	0.367	1.125	0.841
	21	0	0	0.600	1	0.807	0.275	1	0.193	3.130	-0.744
	22	0	0	0.563	1	0.817	0.335	1	0.183	3.325	-0.798
	23	0	1(**)	0.807	1	0.616	0.060	0	0.384	1.001	0.781
	25	0	0	0.778	1	0.605	0.079	1	0.395	0.928	0.062
	26	1	0(**)	0.670	1	0.561	0.182	1	0.439	0.671	0.206
	27	0	1(**)	0.941	1	0.664	0.005	0	0.336	1.371	0.951
	29	0	0	0.851	1	0.632	0.035	1	0.368	1.117	-0.032
	31	0	0	0.867	1	0.728	0.028	1	0.272	1.994	-0.387
	32	0	0	0.950	1	0.701	0.004	1	0.299	1.709	-0.282
	33	0	0	0.956	1	0.670	0.003	1	0.330	1.417	-0.165
	34	0	0	0.886	1	0.645	0.020	1	0.355	1.215	-0.077
	35	0	0	0.441	1	0.850	0.594	1	0.150	4.063	-0.990
	36	0	0	0.740	1	0.589	0.110	1	0.411	0.834	0.112
	37	0	0	0.624	1	0.800	0.240	1	0.200	3.012	-0.710
	38	0	0	0.570	1	0.815	0.323	1	0.185	3.290	-0.788
	39	0	0	0.960	1	0.698	0.003	1	0.302	1.678	-0.270
	41	0	0	0.831	1	0.624	0.046	1	0.376	1.063	-0.006
	42	0	0	0.563	1	0.514	0.334	1	0.486	0.445	0.359
	43	0	0	0.482	1	0.839	0.494	1	0.161	3.793	-0.922
	44	0	1	0.671	1	0.561	0.181	0	0.439	0.672	0.600
	45	0	0	0.482	1	0.839	0.493	1	0.161	3.793	-0.922

** Misclassified case

Casewise Statistics - 2002

	Case Number	Actual Group	Highest Group Predicted Group	P(D>d | G=g) p	df	P(G=g | D=d)	Squared Mahalanobis Distance to Centroid	Second Highest Group	P(G=g | D=d)	Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
Original	2	1	1	0.127	1	0.941	2.328	0	0.059	7.871	2.486
	5	1	0(**)	0.553	1	0.829	0.352	1	0.171	3.507	-0.913
	6	1	1	0.723	1	0.590	0.125	0	0.410	0.857	0.606
	7	1	1	0.645	1	0.804	0.212	0	0.196	3.030	1.421
	8	0	1(**)	0.851	1	0.641	0.036	0	0.359	1.191	0.771
	9	1	1	0.619	1	0.811	0.248	0	0.189	3.160	1.458
	11	0	0	0.111	1	0.946	2.542	1	0.054	8.260	-1.914
	12	1	1	0.584	1	0.821	0.300	0	0.179	3.341	1.508
	13	0	0	0.358	1	0.880	0.844	1	0.120	4.834	-1.239
	15	1	1	0.567	1	0.521	0.328	0	0.479	0.500	0.387
	16	1	1	0.816	1	0.627	0.054	0	0.373	1.095	0.727
	19	0	0	0.932	1	0.717	0.007	1	0.283	1.863	-0.405
	20	0	1(**)	0.095	1	0.951	2.793	0	0.049	8.708	2.631
	21	0	0	0.571	1	0.824	0.320	1	0.176	3.407	-0.886
	22	0	0	0.428	1	0.862	0.628	1	0.138	4.295	-1.113
	23	0	0	0.800	1	0.621	0.064	1	0.379	1.053	-0.066
	25	0	0	0.236	1	0.912	1.404	1	0.088	6.075	-1.505
	26	0	0	0.957	1	0.708	0.003	1	0.292	1.779	-0.374
	27	0	1(**)	0.930	1	0.670	0.008	0	0.330	1.422	0.872
	29	0	0	0.913	1	0.723	0.012	1	0.277	1.929	-0.429
	31	0	0	0.927	1	0.718	0.008	1	0.282	1.882	-0.412
	32	0	0	0.724	1	0.781	0.125	1	0.219	2.665	-0.673
	33	0	0	0.550	1	0.830	0.358	1	0.170	3.526	-0.918
	35	0	0	0.679	1	0.572	0.172	1	0.428	0.749	0.094
	36	0	0	0.323	1	0.889	0.976	1	0.111	5.141	-1.308
	37	0	1(**)	0.546	1	0.831	0.365	0	0.169	3.547	1.564
	38	0	0	0.850	1	0.743	0.036	1	0.257	2.159	-0.510
	39	0	0	0.522	1	0.837	0.410	1	0.163	3.686	-0.960
	41	0	0	0.887	1	0.654	0.020	1	0.346	1.293	-0.177
	42	0	0	0.768	1	0.608	0.087	1	0.392	0.969	-0.024
	43	0	0	0.920	1	0.721	0.010	1	0.279	1.905	-0.420
	45	0	0	0.966	1	0.682	0.002	1	0.318	1.531	-0.278

** Misclassified case

Casewise Statistics - 2003

	Case Number	Actual Group	Highest Group Predicted Group	P(D>d | G=g) p	df	P(G=g | D=d)	Squared Mahalanobis Distance to Centroid	Second Highest Group	P(G=g | D=d)	Squared Mahalanobis Distance to Centroid	Discriminant Scores Function 1
Original	2	1	1	0.994	1	0.662	0.000	0	0.338	1.347	0.759
	5	1	1	0.844	1	0.611	0.039	0	0.389	0.944	0.570
	6	1	1	0.315	1	0.865	1.009	0	0.135	4.721	1.771
	7	1	1	0.860	1	0.708	0.031	0	0.292	1.807	0.943
	8	0	1(**)	0.987	1	0.660	0.000	0	0.340	1.327	0.750
	9	1	0(**)	0.966	1	0.653	0.002	1	0.347	1.267	-0.359
	11	1	1	0.825	1	0.604	0.049	0	0.396	0.896	0.545
	12	1	1	0.755	1	0.740	0.097	0	0.260	2.192	1.079
	13	1	0(**)	0.915	1	0.636	0.011	1	0.364	1.128	-0.295
	15	1	0(**)	0.640	1	0.534	0.218	1	0.466	0.492	0.065
	16	1	1	0.876	1	0.623	0.024	0	0.377	1.026	0.611
	17	0	0	0.891	1	0.699	0.019	1	0.301	1.705	-0.539
	19	0	0	0.903	1	0.632	0.015	1	0.368	1.096	-0.280
	20	0	1(**)	0.093	1	0.934	2.815	0	0.066	8.101	2.445
	21	0	0	0.671	1	0.765	0.181	1	0.235	2.539	-0.827
	22	0	0	0.074	1	0.941	3.192	1	0.059	8.732	-2.188
	23	0	0	0.938	1	0.684	0.006	1	0.316	1.554	-0.480
	25	0	0	0.856	1	0.615	0.033	1	0.385	0.973	-0.220
	26	0	0	0.049	1	0.952	3.875	1	0.048	9.841	-2.370
	27	1	1	0.048	1	0.952	3.915	0	0.048	9.903	2.745
	29	0	1(**)	0.945	1	0.646	0.005	0	0.354	1.209	0.698
	32	0	0	0.870	1	0.620	0.027	1	0.380	1.010	-0.238
	33	0	0	0.310	1	0.866	1.031	1	0.134	4.768	-1.417
	35	0	0	0.525	1	0.806	0.405	1	0.194	3.257	-1.038
	36	0	0	0.982	1	0.670	0.000	1	0.330	1.417	-0.424
	37	0	0	0.800	1	0.595	0.064	1	0.405	0.837	-0.148
	38	0	0	0.918	1	0.690	0.011	1	0.310	1.615	-0.504
	39	0	0	0.595	1	0.787	0.283	1	0.213	2.892	-0.934
	41	0	1(**)	0.767	1	0.583	0.088	0	0.417	0.761	0.471
	42	0	0	0.569	1	0.504	0.325	1	0.496	0.358	0.168
	43	0	0	0.337	1	0.859	0.922	1	0.141	4.531	-1.362
	45	0	0	0.687	1	0.553	0.163	1	0.447	0.585	0.002

** Misclassified case

Appendix 2

Eigen values

Year	Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1996	1	.352(a)	100	100	0.51
1997	1	.376(a)	100	100	0.523
1998	1	.403(a)	100	100	0.536
1999	1	.168(a)	100	100	0.379
2000	1	.192(a)	100	100	0.402
2001	1	.239(a)	100	100	0.439

Wilks' Lambda

Year	st of Function	Wilks' Lambda	Chi-square	df	Sig.
1996	1	0.739	8.303	5	0.14
1997	1	0.727	9.101	5	0.105
1998	1	0.713	10	5	0.075
1999	1	0.856	4.736	5	0.449
2000	1	0.839	5.542	5	0.353
2001	1	0.807	6.331	5	0.275

Appendix 3

Discriminant Functions Coefficients (1996 - 2003)

		WCtTA	REtTA	EBtTA	EQtTD	SAtTA	Constant
cBtM	0	3.257	4.970	-4.409	0.223	1.845	-2.185
1996	1	2.633	7.698	1.323	0.211	2.112	-3.335
cBtM	0	-9.649	15.040	3.463	0.254	2.837	-3.540
1997	1	-6.718	17.010	8.457	0.372	3.546	-6.592
cBtM	0	-5.106	8.601	1.664	0.258	2.919	-2.991
1998	1	-8.936	8.201	9.844	0.391	4.768	-6.401
cBtM	0	3.257	4.970	-4.409	0.223	1.845	-2.185
1999	1	2.633	7.698	1.323	0.211	2.112	-3.335
cBtM	0	5.417	2.969	-7.511	0.488	1.821	-2.277
2000	1	3.320	2.148	0.420	0.763	2.308	-3.443
cBtM	0	3.001	5.701	2.564	0.044	1.888	-2.454
2001	1	1.062	4.692	-1.923	0.376	2.182	-3.365
cBtM	0	4.984	9.343	6.262	0.091	2.281	-3.212
2002	1	3.903	10.889	15.824	0.421	3.217	-6.074
cBtM	0	5.627	8.192	-3.193	0.173	2.094	-3.243
2003	1	4.662	3.474	-2.048	0.468	2.848	-4.122

Appendix 4

Book to Market Value Ratios (1996 - 2003)

Security	BtM2003	BtM2002	Btm2001	BtM2000	BtM1999	BtM1998	BtM1997	BtM1996	BtMAvr
BOC	20.20	8.00	6.20	6.00	14.00	1.31	1.45	1.43	7.32
Limuru	6.02	7.97	13.06	3.96	4.06	4.73	5.36	10.70	6.98
Lonhro						1.91	6.11	1.95	3.32
SCHB	6.83	3.39	2.50	2.57	1.42	2.08	2.35	2.88	3.00
BBK	4.12	2.07	1.66	1.83	2.56	3.24	3.41	3.52	2.80
Uchumi	2.54	1.79	1.99	3.54	1.87	3.58	3.69	2.49	2.69
Fires	2.65	2.42	1.02	1.73	1.72	2.38	2.59	3.45	2.24
Total	1.82	1.20	0.91	1.85	1.81	2.56	3.20	3.89	2.16
NMG	4.13	2.01	0.75	1.31	2.02	3.20	1.84	1.30	2.07
NBK	8.03	0.42	0.25	0.19	0.57	4.23	0.75	0.85	1.91
KPLC	4.79	0.43	1.38	3.79	1.56	1.09	1.00	0.55	1.83
BAT	4.93	1.27	1.31	1.45	1.33	0.87	0.99	1.31	1.68
EAPort	3.02	0.68	0.46	0.69	1.53	1.24	2.80	1.95	1.55
DTB	2.17	0.65	0.59	0.91	1.82	1.84	2.15	1.44	1.45
SNGroup	10.10	4.85	-0.71	-0.59	-7.84	3.23	1.28	0.98	1.41
Bamburi	3.19	1.60	0.89	1.33	1.01	1.24	1.24	0.69	1.40
Car and Ge	0.95	1.10	3.33	1.20	0.91	0.94	1.03	0.99	1.31
NIC	1.22	0.69	0.53	0.66	1.45	1.39	1.93	1.78	1.21
CARB	2.24	1.10	0.63	0.76	1.12	1.13	1.50	1.14	1.20
ICDC	1.35	0.69	0.86	0.89	0.80	2.04	1.26	1.61	1.19
EACAB	0.81	0.79	0.71	0.66	0.96	1.16	1.80	2.45	1.17
Eagads	0.97	1.07	1.09	1.07	1.48	1.29	1.01	1.14	1.14
Bbond	1.29	0.66	0.82	1.15	1.28	1.30	1.02	1.57	1.14
HFCK	1.50	0.64	1.37	0.89	1.00	1.20	1.20	1.29	1.13
Dunlop	0.61	0.52	0.77	0.65	0.91	1.89	1.93	1.60	1.11
Kapchorua	0.62	0.65	1.17	1.42	1.41	1.12	1.02	0.79	1.02
Express	3.87	0.43	0.30	0.45	0.33	0.39	0.78	0.91	0.93
CFC	1.31	0.48	0.48	0.58	0.47	0.89	1.19	1.60	0.88
ARM	2.34	0.54	0.44	0.36	0.69	0.69	0.95		0.86
KCB	1.69	0.42	0.29	0.64	0.85	0.86	0.88	0.99	0.83
TPS		0.81	0.69	0.68	0.61	1.09	1.01		0.81
Rea	0.74	0.39	0.41	0.42	0.71	0.77	1.07	1.38	0.74
Kakuzi	0.40	0.31	0.34	0.50	0.78	1.13	0.80	1.15	0.68
EAPack			0.19	0.27	0.25	0.44	1.33	1.39	0.64
EABL	0.83	0.82	0.78	0.72	0.75	0.48	0.43	0.22	0.63
Sasini	0.42	0.30	0.27	0.58	0.95	1.18	0.68	0.43	0.60
Kenol	1.21	0.52	0.38	0.43	0.51	0.46	0.62	0.63	0.60
KenAir	0.550	0.466	0.460	0.477	0.480	0.518	0.713	0.889	0.57
GWK	0.44	0.28	0.52	0.56	0.41	0.97	0.61	0.57	0.54
CityTrust	0.49	0.44	0.34	0.41	0.50	0.54	0.62	0.87	0.53
Marshall	0.63	0.48	0.21	1.06	0.84	0.29	0.37	0.30	0.52
Unga	1.24	0.23	0.28	0.47	0.59	0.77	0.40	0.15	0.52
CMC	0.84	0.27	0.11	0.12	0.34	0.64	0.78	0.71	0.48
Knmill			0.21	0.22	0.38	0.74	0.66	0.56	0.46
Cberg	0.39	0.41	0.40	0.42	0.31	0.31	0.37	0.37	0.37
Jubilee				0.19	0.28	0.38	0.38	0.64	0.37
Bauman				0.12	0.14	0.14	0.44	0.11	0.19

Categorization of firms Into low book to market ratio (0) and high book to market ratio (1)

Security	cBtM2003	cBtM2002	cBtm2001	cBtM2000	cBtM1999	cBtM1998	cBtM1997	cBtM1996	cBtMAvr
BOC	1	1	1	1	1	0	1	0	1
Limuru	1	1	1	1	1	1	1	1	1
Lonhro						1	1	1	1
SCHB	1	1	1	1	1	1	1	1	1
BBK	1	1	1	1	1	1	1	1	1
Uchumi	1	1	1	1	1	1	1	1	1
Fires	1	1	0	1	1	1	1	1	1
Total	0	0	0	1	1	1	1	1	1
NMG	1	1	0	1	1	1	1	1	1
NBK	1	0	0	0	0	1	0	0	1
KPLC	1	0	1	1	1	0	0	0	1
BAT	1	1	1	1	1	0	0	0	1
EAPort	1	0	0	0	1	0	1	1	1
DTB	0	0	0	0	1	1	1	0	1
SNGroup	1	1	0	0	0	1	0	0	1
Bamburi	1	1	0	1	0	0	0	0	0
Car and Ge	0	0	1	1	0	0	0	0	0
NIC	0	0	0	0	1	1	1	1	0
CARB	0	0	0	0	0	0	1	0	0
ICDC	0	0	0	0	0	1	0	1	0
EACAB	0	0	0	0	1	0	1	1	0
Eagads	0	0	0	0	1	0	0	0	0
Bbond	0	0	0	1	1	0	0	1	0
HFCK	0	0	1	0	0	0	0	0	0
Dunlop	0	0	0	0	0	1	1	1	0
Kapchorua	0	0	1	1	1	0	0	0	0
Express	1	0	0	0	0	0	0	0	0
CFC	0	0	0	0	0	0	0	1	0
ARM	0	0	0	0	0	0	0	0	0
KCB	0	0	0	0	0	0	0	0	0
TPS		0	0	0	0	0	0	0	0
Rea	0	0	0	0	0	0	0	0	0
Kakuzi	0	0	0	0	0	0	0	0	0
EAPack			0	0	0	0	0	0	0
EABL	0	0	0	0	0	0	0	0	0
Sasini	0	0	0	0	0	0	0	0	0
Kenol	0	0	0	0	0	0	0	0	0
KenAir	0	0	0	0	0	0	0	0	0
GWK	0	0	0	0	0	0	0	0	0
CityTrust	0	0	0	0	0	0	0	0	0
Marshall	0	0	0	0	0	0	0	0	0
Unga	0	0	0	0	0	0	0	0	0
CMC	0	0	0	0	0	0	0	0	0
Knmill			0	0	0	0	0	0	0
Cberg	0	0	0	0	0	0	0	0	0
Jubilee				0	0	0	0	0	0
Bauman				0	0	0	0	0	0

Working Capital to Total Assets Ratios (1996 -2003)

Security	WCtTA03	WCtTA02	WCtTA01	WCtTA00	WCtTA99	WCtTA98	WCtTA97	WCtTA96	AvrWCtTA
BOC	0.349	0.336	0.318	0.370	0.359	0.342	0.288	0.221	0.32
Limuru	0.400	0.489	0.443	0.353	0.351	0.259	0.215	0.230	0.34
Lonhro						-0.090	-0.012	0.032	-0.02
SCHB	0.060	0.049	0.053	0.061	0.089	0.065	0.046	0.028	0.06
BBK	0.072	0.075	0.101	0.122	0.101	0.078	0.071	0.066	0.09
Uchumi	-0.407	-0.338	-0.186	-0.040	0.032	0.181	0.124	0.186	-0.06
Fires	0.383	0.364	0.357	0.336	0.286	0.275	0.262	0.367	0.33
Total	0.181	0.124	-0.023	0.012	0.041	0.022	0.038	0.068	0.06
NMG	0.164	0.216	0.158	0.148	0.073	0.180	0.174	0.155	0.16
NBK	0.006	-0.002	-0.010	0.025	0.002	0.149	0.112	0.114	0.05
KPLC	-0.060	0.042	-0.247	-0.096	-0.042	-0.019	-0.017	0.020	-0.05
BAT	0.127	0.168	0.157	0.174	0.264	0.204	0.162	0.165	0.18
EAPort	0.157	0.147	0.109	0.093	0.064	0.029	0.001	0.066	0.08
DTB	0.085	0.127	0.142	0.171	0.119	0.083	0.055	0.018	0.10
SNGroup	-0.046	-0.115	-0.352	-0.189	-0.106	-0.002	0.112	0.096	-0.08
Bamburi	0.105	0.069	0.057	0.075	0.056	0.137	0.187	0.214	0.11
Car and Gen	0.103	-0.021		-0.054	-0.057	-0.106	0.000	0.006	-0.02
NIC	0.182	0.213	0.235	0.234	0.218	0.195	0.154	0.114	0.19
CARB	0.226	0.151	0.498	0.435	0.495	0.444	0.403	0.290	0.37
ICDC	0.015	0.064	-0.073	0.001	0.045	-0.023	-0.015	-0.004	0.00
EACAB	0.473	0.505	0.552	0.525	0.444	0.546	0.560	0.628	0.53
Eagads	0.256	0.292	0.262	0.245	0.201	0.252	0.227	0.201	0.24
Bbond	0.137	0.107	0.072	0.074	0.053	0.012	-0.048	-0.019	0.05
HFCK	0.060	0.048	0.022	0.036	0.022	0.024	0.042	0.026	0.03
Dunlop	0.299	0.293	0.310	0.366	0.382	0.406	0.438	0.562	0.38
Kapchorua	0.125	0.108	0.150	0.171	0.156	0.164	0.193	0.181	0.16
Express	-0.259	-0.242	-0.220	-0.191	-0.178	-0.039	-0.037	-0.042	-0.15
CFC	0.843	0.805	0.716	0.713	0.651	0.660	0.761	0.804	0.74
ARM	0.118	0.076	0.083	0.055	-0.086	-0.086	-0.005	-0.149	0.001
KCB	0.009	-0.004	0.062	0.074	0.078	0.094	0.100	0.085	0.06
TPS		0.008	-0.006	-0.048	-0.012	-0.013	-0.018		-0.01
Rea	0.062	0.098	0.058	0.037	-0.065	-0.031	0.036	0.078	0.03
Kakuzi	-0.104	-0.089	-0.049	-0.023	0.010	-0.023	0.027	0.059	-0.02
EAPack			-0.022	-0.012	0.112	0.131	0.213	0.200	0.10
EABL	0.213	0.168	0.162	0.066	-0.007	0.041	0.076	0.049	0.10
Sasini	0.151	0.101	0.095	0.104	0.091	0.078	0.091	0.076	0.10
Kenol	0.116	0.075	0.121	0.198	0.309	0.283	0.272	0.264	0.20
KenAir	-0.050	0.047	0.158	0.200	0.120	0.085	0.093	0.160	0.10
GWK	0.117	0.118	0.112	0.063	0.039	0.069	-0.011	-0.002	0.06
CityTrust	0.027	0.099	0.123	0.166	0.155	0.155	0.868	0.877	0.31
Marshall	-0.157	-0.177	-0.166	-0.160	-0.131	0.113	0.131	0.147	-0.05
Unga	0.001	0.005	0.014	-0.028	-0.066	-0.070	-0.043	0.088	-0.01
CMC	0.263	0.280	0.222	0.135	0.122	0.232	0.198	0.192	0.21
Knmill			-0.067	-0.076	-0.124	-0.077	0.080	0.042	-0.04
Cberg	0.265	0.369	0.293	0.242	0.214	0.184	0.182	0.199	0.24
Jubilee				0.054	0.055	0.058	-0.023	0.004	0.03
Bauman		0.152	0.121	0.125	0.159	0.205			0.15

Retained Earnings to Total Assets Ratios (1996-2003)

Security	REtTA03	REtTA02	REtTA01	REtTA00	REtTA99	REtTA98	REtTA97	REtTA96	AvrREtTA
BOC	0.514	0.540	0.531	0.557	0.544	0.496	0.432	0.384	0.500
Limuru	0.269	0.338	0.312	0.523	0.547	0.410	0.343	0.454	0.399
Lonhro						0.022	0.104	0.151	0.092
SCHB	0.063	0.055	0.059	0.060	0.089	0.066	0.058	0.047	0.062
BBK	0.076	0.082	0.101	0.101	0.102	0.090	0.087	0.078	0.090
Uchumi	-0.149	0.049	0.143	0.164	0.161	0.180	0.141	0.107	0.100
Fires	0.209	0.196	0.194	0.180	0.168	0.184	0.302	0.256	0.211
Total	0.140	0.163	0.135	0.130	0.196	0.181	0.151	0.152	0.156
NMG	0.502	0.526	0.605	0.507	0.484	0.512	0.460	0.390	0.498
NBK	-0.204	-0.220	-0.224	-0.237	-0.099	-0.071	0.035	0.039	-0.123
KPLC	-0.160	-0.076	-0.018	0.093	0.191	0.221	0.176	0.178	0.076
BAT	0.312	0.322	0.310	0.308	0.369	0.258	0.176	0.141	0.274
EAPort	0.057	0.015	0.007	-0.086	-0.046	0.104	0.057	0.049	0.019
DTB	0.087	0.123	0.140	0.149	0.108	0.074	0.046	0.039	0.096
SNGroup	0.456	0.442	0.102	0.116	0.112	0.131	0.144	0.172	0.209
Bamburi	0.303	0.292	0.274	0.266	0.254	0.301	0.242	0.225	0.270
Car and Gen	0.233	0.141		0.007	0.036	-0.176	-0.092	-0.077	0.010
NIC	0.144	0.164	0.175	0.181	0.164	0.133	0.096	0.100	0.145
CARB	0.476	0.307	0.459	0.473	0.000	0.394	0.323	0.300	0.342
ICDC	0.398	0.454	0.396	0.390	0.351	0.296	0.318	0.353	0.370
EACAB	0.257	0.296	0.349	0.337	0.280	0.403	0.385	0.377	0.336
Eagads	0.419	0.333	0.329	0.334	0.351	0.328	0.298	0.283	0.334
Bbond	0.340	0.230	0.182	0.153	0.132	0.081	0.075	0.104	0.162
HFCK	0.029	0.024	0.016	0.034	0.034	0.029	0.047	0.035	0.031
Dunlop	0.085	0.058	0.001	0.060	0.136	0.148	0.459	0.637	0.198
Kapchorua	0.578	0.385	0.126	0.151		0.280	0.274	0.251	0.292
Express	-0.015	0.066	0.197	0.105	0.106	0.147	0.141	0.137	0.110
CFC	0.077	0.095	0.104	0.101	0.133	0.137	0.115	0.106	0.108
ARM	0.098	0.033	0.025	0.011	-0.013	0.052	0.046	0.040	0.036
KCB	0.059	0.054	0.096	0.088	0.093	0.105	0.109	0.093	0.087
TPS		0.174	0.148	0.129	0.124	0.150	0.088		0.136
Rea	0.103	0.090	0.064	0.072	0.090	0.145	0.130	0.099	0.099
Kakuzi	0.359	0.338	0.212	0.216	0.216	0.315	0.320	0.360	0.292
EAPack			0.156	0.116	0.250	0.275	0.304	0.282	0.230
EABL	0.257	0.247	0.241	0.205	0.160	0.070	0.124	0.090	0.174
Sasini	0.253	0.234	0.210	0.202	0.181	0.173	0.182	0.155	0.199
Kenol	0.430	0.364	0.323	0.420	0.412	0.368	0.349	0.331	0.375
KenAir	0.198	0.221	0.227	0.216	0.304	0.314	0.314	0.306	0.262
GWK	0.295	0.296	0.245	0.206	0.276	0.344	0.272	0.248	0.273
CityTrust	0.745	0.823	0.836	0.855	0.779	0.778	0.726	0.717	0.782
Marshall	0.074	0.070	0.057	0.058	0.051	0.030	0.020	0.019	0.047
Unga	0.086	0.122	-0.149	-0.121	-0.102	-0.001	-0.036	0.129	-0.009
CMC	0.336	0.338	0.303	0.254	0.219	0.244	0.222	0.210	0.266
Knmill			-0.234	-0.202	-0.196	-0.124	0.063	0.090	-0.101
Cberg	0.068	0.083	0.253	0.221	0.185	0.170	0.148	0.097	0.153
Jubilee				0.087	0.085	0.093	0.099	0.099	0.093
Bauman				0.000	0.000	0.186	0.234	0.273	0.139

Earnings Before Interest and Taxes to Total Assets Ratios (1996-2003)

Security	EBtTA03	EBtTA02	EBtTA01	EBtTA00	EBtTA99	EBtTA98	EBtTA97	EBtTA96	AvrEBtTA
BOC	0.111	0.107	0.075	0.059	0.094	0.195	0.182	0.150	0.122
Limuru	0.170	0.055	-0.085	0.346	0.315	0.592	0.519	0.374	0.286
Lonhro						-0.018	0.034	0.118	0.045
SCHB	0.063	0.052	0.059	0.064	0.058	0.060	0.054	0.057	0.058
BBK	0.050	0.030	0.058	0.043	0.049	0.060	0.066	0.069	0.053
Uchumi	-0.174	-0.037	0.034	0.042	0.170	0.166	0.198	0.224	0.078
Fires	0.100	0.128	0.158	0.153	0.221	0.348	0.376	0.495	0.247
Total	0.099	0.109	0.037	0.073	0.196	0.196	0.140	0.156	0.126
NMG	0.207	0.159	0.131	0.112	0.133	0.256	0.249	0.197	0.180
NBK	0.139	0.134	0.094	0.069	0.093	-0.030	0.021	0.037	0.070
KPLC	-0.088	-0.080	-0.120	-0.073	0.093	0.103	0.111	0.090	0.005
BAT	0.264	0.206	0.145	0.099	0.261	0.284	0.190	0.191	0.205
EAPort	0.023	0.059	0.041	0.069	-0.195	0.115	0.029	0.021	0.020
DTB	0.024	0.018	0.009	0.039	0.026	0.032	-0.044	-0.014	0.011
SNGroup	0.105	0.002	0.034	-0.229	-0.210	0.052	0.190	0.137	0.010
Bamburi	0.119	0.142	0.100	0.063	0.072	0.050	0.128	0.133	0.101
Car and Gen	0.130	0.086		0.070	0.113	0.109	0.070	-0.058	0.074
NIC	0.033	0.036	0.045	0.061	0.064	0.059	0.074	0.081	0.057
CARB	0.210	0.103	0.096	0.187	0.251	0.227	0.203	0.188	0.183
ICDC	0.052	0.041	0.021	0.062	0.045	0.209	0.167	0.205	0.100
EACAB	0.024	-0.025	0.052	0.105	0.043	0.271	0.283	0.347	0.138
Eagads	-0.115	0.028	0.024	0.010	0.020	0.308	0.191	0.068	0.067
Bbond	0.017	0.035	0.047	0.099	0.055	0.081	0.065	0.038	0.055
HFCK	0.009	0.009	-0.022	0.006	0.009	0.033	0.054	0.053	0.019
Dunlop	0.114	0.018	-0.140	0.000	0.035	0.072	0.084	0.258	0.055
Kapchorua	0.057	0.052	-0.027	0.022	0.019	0.033	0.183	0.055	0.049
Express	-0.134	-0.056	-0.036	-0.007	-0.043	0.067	0.074	0.058	-0.010
CFC	0.029	0.027	-0.024	-0.004	-0.004	0.061	0.072	0.054	0.026
ARM	0.091	0.071	0.060	0.073	0.064	0.048	0.085	0.067	0.070
KCB	0.013	-0.070	0.006	-0.010	-0.030	0.018	0.068	0.059	0.007
TPS		0.081	0.076	0.079	0.054	0.068	0.128		0.081
Rea	0.096	0.079	0.026	-0.017	0.022	0.094	0.116	0.180	0.075
Kakuzi	0.036	0.022	0.001	0.008	0.026	0.064	0.115	0.092	0.045
EAPack			0.005	-0.148	0.039	0.030	0.078	0.133	0.023
EABL	0.215	0.194	0.173	0.142	0.120	0.060	0.115	0.107	0.141
Sasini	-0.046	-0.031	0.011	0.061	0.020	0.082	0.069	0.043	0.026
Kenol	0.169	0.167	0.164	0.142	0.183	0.197	0.223	0.207	0.181
KenAir	0.035	0.055	0.088	0.073	0.054	0.101	0.121	0.164	0.087
GWK	0.027	-0.011	0.091	0.050	0.028	0.229	0.080	0.049	0.068
CityTrust	0.057	0.036	0.047	0.048	0.051	0.188	0.182	0.450	0.132
Marshall	0.071	0.082	0.053	-0.011	-0.082	0.066	0.091	0.100	0.046
Unga	0.006	-0.001	-0.019	-0.035	-0.105	-0.007	-0.067	0.140	-0.011
CMC	0.060	0.073	0.072	0.069	0.072	0.120	0.122	0.128	0.090
Knmill			-0.037	-0.092	-0.021	-0.089	0.137	0.049	-0.009
Cberg	0.113	0.119	0.093	0.078	0.131	0.124	0.136	0.082	0.109
Jubilee				0.023	0.026	0.040	0.044	0.046	0.036
Bauman				0.010	0.025	0.009	-0.004	-0.023	0.003

Market Value of Equity to Total Debt Ratios (1996 -2003)

Security	EQtTD03	EQtTD02	EQtTD01	EQtTD00	EQtTD99	EQtTD98	EQtTD97	EQtTD96	AvrEQtTD
BOC	5.919	2.325	1.673	1.910	4.176	5.630	5.581	6.337	4.194
Limuru	8.060	12.743	22.465	8.014	9.821	7.799	6.821	49.103	15.603
Lonhro						0.279	1.821	0.489	0.863
SCHB	0.632	0.282	0.239	0.274	0.196	0.245	0.257	0.286	0.301
BBK	5.558	2.575	1.706	1.405	2.167	3.648	3.426	3.653	3.017
Uchumi	0.000	0.653	0.977	1.735	2.150	1.484	2.353	2.450	1.475
Fires	7.577	6.416	2.143	3.794	3.285	5.758	5.284	7.570	5.229
Total	1.610	1.253	0.402	0.358	0.613	0.924	1.021	1.256	0.930
NMG	5.677	3.267	1.755	2.318	3.888	7.427	3.158	1.613	3.638
NBK	0.728	0.034	0.029	0.019	0.052	0.068	0.090	0.127	0.143
KPLC	0.098	0.054	0.054	0.698	0.562	0.441	0.325	0.154	0.298
BAT	7.101	1.998	1.877	2.018	2.096	1.839	1.605	1.740	2.534
EAPort	1.102	0.227	0.199	0.173	0.242	0.517	0.955	0.617	0.504
DTB	0.376	0.157	0.166	0.282	0.425	0.319	0.268	0.238	0.279
SNGroup	3.838	1.230	0.119	0.130	0.382	0.739	0.607	0.379	0.928
Bamburi	7.664	3.355	1.932	2.530	2.177	12.875	19.938	9.790	7.533
Car and Gen	1.450	1.163		1.359	1.015	0.735	1.091	1.090	1.129
NIC	0.345	0.237	0.203	0.280	0.574	0.488	0.524	0.292	0.368
CARB	7.738	1.337	3.407	4.403	9.544	18.883	22.507	11.907	9.966
ICDC	17.947	14.334	5.405	8.507	17.571	6.715	4.706	4.114	9.912
EACAB	1.465	1.968	2.490	2.402	2.080	5.750	11.069	9.448	4.584
Eagads	0.859	0.767	0.805	0.743	1.100	0.848	0.749	1.031	0.863
Bbond	4.059	3.511	5.183	4.749	6.996	8.781	4.126	5.798	5.400
HFCK	0.164	0.070	0.140	0.108	0.135	0.164	0.204	0.226	0.151
Dunlop	0.641	0.387	0.956	1.191	2.959	7.286	9.034	3.502	3.244
Kapchorua	1.226	1.272	2.353	2.631	3.071	10.967	2.653	4.277	3.556
Express	0.055	0.040	0.089	0.142	0.103	0.160	0.328	0.401	0.165
CFC	0.242	0.115	0.127	0.154	0.158	0.295	0.336	0.392	0.227
ARM	4.597	1.828	1.866	1.693	1.705	2.108	3.035		2.405
KCB	0.169	0.040	0.043	0.082	0.113	0.128	0.136	0.134	0.106
TPS		0.693	0.591	0.623	0.750	1.250	1.368		0.879
Rea	0.759	0.442	0.432	0.461	0.650	1.166	1.615	2.263	0.974
Kakuzi	0.354	0.244	0.628	0.915	1.563	4.765	5.170	5.603	2.405
EAPack			0.083	0.120	0.182	0.356	1.177	1.096	0.502
EABL	1.563	1.069	1.379	1.423	1.078	1.058	0.820	0.433	1.103
Sasini	4.143	1.499	2.684	4.644	8.879	14.628	10.029	8.645	6.894
Kenol	1.262	0.485	0.378	0.629	0.739	0.793	0.888	1.125	0.787
KenAir	0.229	0.227	0.222	0.221	0.368	0.489	0.801	1.107	0.458
GWK	2.516	1.586	2.392	2.724	2.691	2.768	1.934	1.734	2.293
CityTrust	2.690	5.333	4.889	12.995	4.039	3.803	3.445	5.090	5.286
Marshall	0.165	0.101	0.080	0.337	0.337	0.298	0.380	0.297	0.249
Unga	0.492	1.766	0.377	0.348	0.450	0.525	0.782	0.804	0.693
CMC	0.651	0.255	0.097	0.083	0.196	0.318	0.331	0.297	0.279
Knmill			0.221	0.204	0.235	0.516	0.832	0.569	0.429
Cberg	0.591	0.641	0.550	0.521	0.485	0.468	0.426	0.334	0.502
Jubilee				0.508	0.490	0.999	0.958	1.197	0.830
Bauman				0.711	0.295	0.513	1.154	0.408	0.616

Sales to Total Assets Ratios (1996-2003)

Security	SAtTA03	SAtTA02	SAtTA01	SAtTA00	SAtTA99	SAtTA98	SAtTA97	SAtTA96	AvrSAtTA
BOC									
Limuru	0.838	0.988	0.962	1.147	1.132	1.293	1.077	1.484	1.115
Lonhro						0.764	0.902	0.991	0.886
SCHB									
BBK	0.083	0.090	0.110	0.124	0.118				0.105
Uchumi	2.439	2.590	3.125	3.841	3.392	3.586	3.018	3.035	3.128
Fires	1.022	1.074	1.088	0.980	0.998	1.245	1.374	1.681	1.183
Total	2.374	2.073	1.994	1.826	1.852	2.440	2.448	3.300	2.288
NMG	1.141	1.136	1.211	1.035	0.913	1.094	1.086	1.045	1.083
NBK									
KPLC	0.745	0.791	0.978	0.924	0.851	0.861	0.830	0.839	0.853
BAT	1.486	1.492	1.537	1.522	1.546	1.814	1.770	0.730	1.487
EAPort	0.514	0.433	0.390	0.361	0.391	0.376	0.314	0.292	0.384
DTB									
SNGroup	2.114	1.794	1.832	2.029	1.939	1.988	2.774	2.920	2.174
Bamburi	0.676	0.667	0.570	0.545	0.492	0.429	0.491	0.571	0.555
Car and Gen	0.872	0.755		0.612	0.608	0.852	0.903	0.882	0.783
NIC									
CARB	0.365	0.228	0.210	0.307	0.313	0.352	0.330	0.318	0.303
ICDC	0.077	0.064	0.052	0.081	0.056	0.245	0.198	0.233	0.126
EACAB	1.204	1.174	1.062	1.107	0.924	1.206	1.379	1.591	1.206
Eagads	0.280	0.405	0.331	0.305	0.255	0.623	0.437	0.289	0.366
Bbond	0.826	0.683	0.671	0.625	0.512	0.693	0.677	0.765	0.681
HFCK									
Dunlop	1.033	1.166	0.484	0.444	0.584	0.591	0.686	0.973	0.745
Kapchorua	0.419	0.432	0.611	0.541	0.569	0.559	0.631	0.634	0.550
Express	4.889	4.700	3.985	3.676	3.693			0.668	3.601
CFC									
ARM	0.787	0.796	0.694	0.701	0.553	0.505	0.496	0.367	0.612
KCB									
TPS		0.683	0.712	0.745	0.758	1.019	1.217		0.856
Rea	0.794	0.809	0.702	0.701	0.530	0.614	0.687	0.760	0.700
Kakuzi	0.608	0.465	0.394	0.366	0.333	0.415	0.467	0.469	0.440
EAPack			1.440	1.586	1.649				1.558
EABL	0.215	0.194	0.173	0.142	0.120	0.060	0.115	0.107	0.141
Sasini	0.448	0.382	0.354	0.399	0.312	0.375	0.259	0.218	0.343
Kenol	2.740	2.254	2.363	2.171	1.246	1.539	2.035	2.147	2.062
KenAir	1.132	1.146	0.968	0.778	0.747	0.870	0.957	0.994	0.949
GWK	0.404	0.438	0.509	0.453	0.410	0.636	0.583	0.474	0.488
CityTrust									
Marshall	1.702	1.376	1.184	1.216	1.220	0.967	1.021	1.075	1.220
Unga	1.482	1.577	1.780	1.852	1.517	1.308	1.595	2.110	1.653
CMC	0.864	1.021	0.971	0.844	0.844	0.992	1.191	1.343	1.009
Knmill			1.874	1.506	1.536	1.825	2.659	2.052	1.909
Cberg	1.247	1.249	1.091	1.100	1.287	1.266	1.099	0.952	1.161
Jubilee									
Bauman				0.223	0.212	0.396	0.467	0.512	0.362