SYSTEMATIC RISK AND BUSINESS RISK : A CASE OF COMPANIES LISTED AT THE NAIROBI STOCK EXCHANGE

By: Serah N. Ndegwa

A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE BUSINESS ADMINISTRATION (MBA) AT THE UNIVERSITY OF NAIROBI, FACULTY OF COMMERCE.

OCTOBER 2001

DECLARATION

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

Signed _____ Date: 26-Oct-2001

Serah N. Ndegwa

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

Signed: _____ Date: 26 Oct 2001

TABLES

ACKNOWLEDGEMENT

I thank God for enabling me to complete this project and for all the support and the resources that He put along the way. I am grateful to God for giving me strength, patience and encouragement when I needed it.

I would like to thank my mother, Mrs. V. Ndegwa who encouraged and supported me throughout the MBA programme and this project. Together with her, my family gave me all the assistance and support that I required and therefore I am also grateful to them as well.

I would also like to thank my friends Mr and Mrs Lusui who at the start of this project not only gave me useful ideas but also gave me the resources to get started. I am also grateful to my friend E. Buri who supported me in prayer and encouragement. I also extend my sincere thanks to the Rays of Hope members who also prayed for the success of this project. I am grateful to Sylvia Bwana who let me use her printer through out the project.

I also extend my gratitude to my boss, Mr. G. V. Andedo who encouraged me to finish the project and gave me time off to do so.

Finally, I would like to thank my supervisor, Mr. Luther Otieno for his guidance and patience throughout the project.

ABSTRACT

The objectives of this study were firstly to find out whether a relationship exists between business risk and systematic risk. The other objective was to determine whether companies with high return exhibit high risk. This required the use of secondary data covering a period of five years (1996 to 2000) derived from the financial statements and from Nairobi Stock Exchange price database.

On the first objective, the study revealed that a relationship between systematic risk and business risk holds for selected and not all companies.

However for the market as whole, the study revealed that there is a relationship between systematic risk and business risk.

On the second objective the study showed that, it is not always the case that companies with high risk are those with high returns. Only a small number of companies with high risk are compensated with a high return. This was brought out by comparing the ranking of the variance of earnings against the ranking of weighted return, capital gain and non-weighted return.

TABLE OF CONTENT

1.0 CHAPTER ONE: INTRODUCTION

1.1 Background

Investors and managers need to know about risk, thus protecting their investment. This will enable them to incorporate risk in asset management. Asset management is not just about guarding against risk. It is about reducing risk exposure. Business is about making decisions about the uncertain future. The idea is to minimize risk exposure.

Risk arises due to many possible occurrences associated with an expectation i.e. whenever there exist many occurrences or possible outcomes for any event and the occurrence of any outcome is not known with certainty, this happening is said to be risky.

Risk is of different types. These include risk of inflation, risk of business failure, risk of interest rate changes, risk of asset price fluctuations and risk of illiquidity. Risk of inflation is the erosion of ones currency's purchasing power due to the rise in the level of overall prices. Risk of business failure refers to that peculiar risk of bad fortune that every business enterprise faces. If a company is outguessed by a competitor, the investor may lose when the market price of the stock adjusts itself to that of the competitor's earnings. With the risk in interest changes, if one borrows a loan to acquire an asset and the interest rates and inflation goes down, one may be saddled with debt that's larger than the value of the asset acquired. Risk of illiquidity occurs when one has to convert an asset to cash and in so doing makes a substantial loss in market value. It's therefore smart money management to hold a proportion of your assets in cash or near money instruments.

Broadly, risk of inflation and risk of interest rate changes can be classified as systematic risk because these are risks that are caused by factors affecting all assets. Risk of business failure and risk of illiquidity can be classified as unsystematic risk because these are risks that are caused by factors that are unique to the company or industry.

The focus of this study is business risk and systematic risk. The idea is to explore the relationship that may exist between business risk and market risk. If a relationship were found, then a useful input in estimating market risk would have been identified.

1.2 Types of Risks

In finance literature, we have Total Risk, Systematic Risk and Unsystematic Risk. Total risk is made up of systematic risk and unsystematic risk.

Unsystematic Risk

Unsystematic risk is that portion of total risk that is unique to a firm or industry. Such factors as management capability, consumer preferences and labor strikes introduce unsystematic variability in the returns in a firm. These unsystematic factors are independent of factors affecting asset values in general. Such independent factors can be contained thus reducing the unsystematic variability. This may only be achieved if management makes quality decisions. Business firms should be aware of their customers' preferences if they are to meet their particular needs. There should be adequate labor relations that ensure employee grievances are handled effectively to reduce time wasted in strikes and disputes. These factors affect each firm uniquely, and are examined for each firm independently. They are unique to the firm.

Unsystematic risk being risk unique to a firm includes business risk. Higher proportions of unsystematic risk are a characteristic of firms producing non-durable goods e.g. suppliers of basic necessities such as telephone, power, light and foodstuffs. Sales, profits and prices of these companies don't depend much upon the level of economic activity.

Business Risk

Business Risk is a function of the operating conditions faced by a firm and the variability that these operating conditions inject into the operating income and expected dividends. For example, if the

operating earnings are expected to increase ten percent per year over the foreseeable future, business risk would be higher if, operating earnings could grow as much as fourteen percent or as little as six percent than if the range were from a high of eleven percent to a low of nine percent. The degree of variation from the expected trend would measure business risk.

Business Risk is largely associated with the efficiency with which a firm conducts its operations and environmental factors that it must deal with. Probably the most pervasive risk factor is the business cycle.

How can a firm adjust to the business cycle? If we segregate costs of operations into fixed and variable costs, we see that as revenues change and fixed costs absorb a percentage of total costs, the firm will have difficulty curtailing expenses and production during declines in the economy. Such a firm would have large business risk relative to its ability to respond to changing business conditions. On the other hand, if revenues come from a diversified list of products, its possible that the products are not equally vulnerable to the spreading the business cycle to the same degree or at the same time. To this extent, spreading the cycle effect over multiple products or product lines reduces the business risk.

An important determinant of systematic risk is the degree of cost sensitivity (proportion of fixed to variable costs). The assertion then is that as business risk increases, the systematic risk also increases because the risk brought about by the cost sensitivity will have increased.

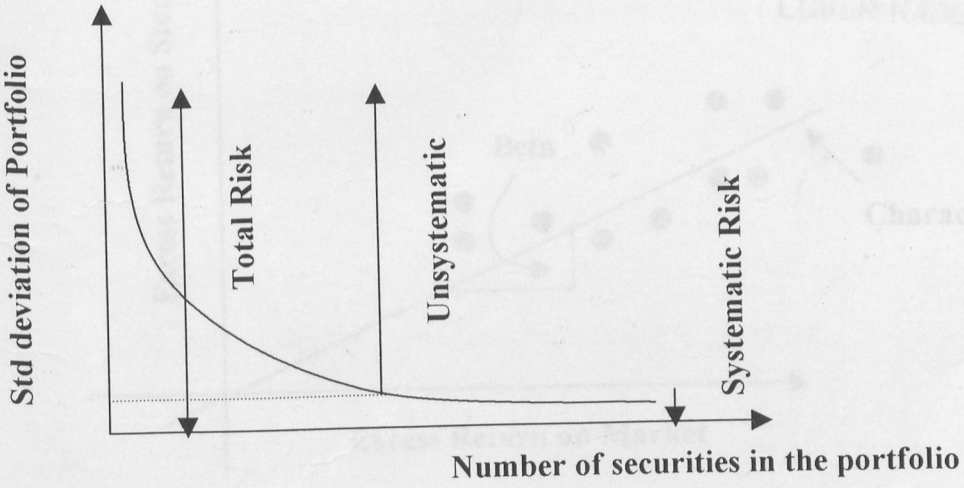
Systematic Risk

Systematic risk refers to that portion of total variability in returns from assets (investments) caused by factors affecting all assets though at different magnitude. Economics, political and sociological changes are sources of systematic risk. Their effect is to cause the value of nearly all assets to move together in the same manner. Firms with higher systematic risk tend to be those whose sales, profits and stock prices follow movements in the level of economic activity. These companies include most

firms that deal in basic industrial goods and raw materials e.g. those dealing in automobiles manufacture, steel, rubber, glass and so on.

Specific risk or unsystematic risk can be diversified away. As more and more different assets are added to a portfolio, the random fluctuations that are unique to each asset start to offset one another. For a well-diversified portfolio, the investor is left with a portfolio whose composition and returns replicate that of the overall market. That has no specific risk. What remains is systematic risk that cannot be diversified away.

Graph 1: Total, Unsystematic and Systematic risk



Source: Financial Management and Policy, James Van Horne (1991);p.67

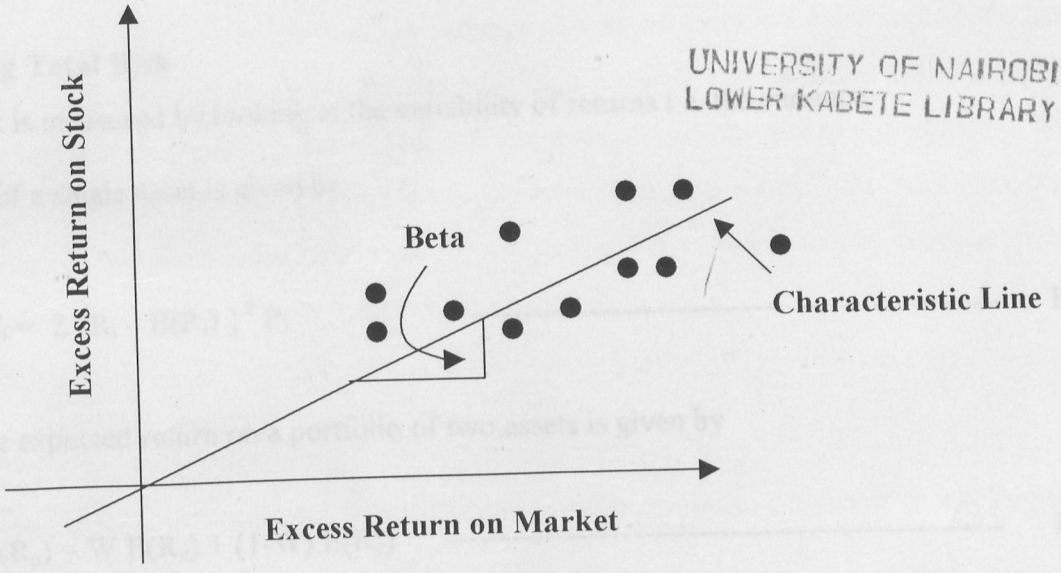
The graph above shows that risk reduces as you increase the securities. However the risk reduction is asymptotic i.e. you can't eliminate risk because of some macro factors. The residual risk is also known as market risk. Efficient diversification reduces the total risk of the portfolio to the point where only systematic risk remains.

Systematic risk is measured by beta. Market risk is computed by comparing movement in returns from an individual asset, to movement in returns from assets in the market. Beta depicts the

sensitivity of the security's excess return to that of the market portfolio, and is estimated using a regression equation or line. If the slope is one it means that the excess return of the asset vary proportionally with the excess return of the market portfolio. That is, the asset has the same unavoidable or systematic risk as the market as whole.

A slope steeper than one means that the asset excess return varies more than proportionally with the excess return of the market portfolio. The asset has more systematic risk than the market as a whole. A slope less than one means that the asset has less or systematic risk than does the market as whole.

Graph 2: The Security Market Line



Source: Financial Management and Policy, James Van Horne (1991); p.63

The greater the slope of the characteristic line for a stock as depicted by its Beta, the greater the systematic risk. This means that for both upward and downward movements in the market excess returns, movements in excess returns for the individual stock are greater or less, depending on its Beta. If the Beta of a particular stock were 1.70 and the market excess return for a specific month were –2.00 percent this would imply as expected excess return for the stock of –3.4 percent.

Beta is therefore used as measure of the relative systematic risk of an asset. Beta is also used to value individual assets in the Capital Asset Pricing Model (CAPM). The CAPM is an equilibrium asset-pricing model, which views the rates of return on all risky assets as a function of their covariance with the market portfolio.

Therefore the Beta represents the systematic risk of asset due to underlying movements in all asset prices. This cannot be diversified away by investing in more stocks because it depends on things such as changes in the economy, political atmosphere etc which all affect stock. The beta of a stock represents its contribution to the risk of a highly diversified portfolio of stocks.

Measuring Total Risk

Total Risk is measured by looking at the variability of returns i.e. the variance.

Variance of a single asset is given by:

$$\sigma^2_i = \Sigma [R_i - E(R_i)]^2 P_i \quad \text{---------- Equation 1}$$

Whilst the expected return on a portfolio of two assets is given by

$$E(R_p) = W E(R_x) + (1-W) E(R_y) \quad \text{---------- Equation 2}$$

The variance of the portfolio is given by :

$$\sigma^2_p = W^2\sigma^2_x + (1-W)^2\sigma^2_y + 2W(1-W)CovR_xR_y \quad \text{---------- Equation 3}$$

The Covariance can further be written as follows:

$$CovR_xR_y = \Sigma [(R_x - E(R_x)(R_y - E(R_y))] P_i \quad \text{---------- Equation 4}$$

The Beta of an asset is therefore given by:

$$\beta eta = \frac{Cov\ R_x R_m}{Var R_m} \quad \text{---------- Equation 5}$$

$$= \frac{\Sigma\ [\ (R_x - E(R_x))(\ R_m - E(R_m))\ ]\ P_i}{\sigma^2_m} \quad \text{---------- Equation 6}$$

Where R_m is the return on the market and σ^2_m is the variance of the market.

For the above equations one to six, refer to appendix one for the notation of the formulae.
Equation one, two and three show how the variance of a single asset, expected return of a portfolio of two assets and the variance of a portfolio are calculated respectively. Equation four shows how the covariance between two assets is calculated and this is important because in equation five, the covariance between the asset and the market is required in calculating the beta. As mentioned earlier, the beta above is therefore being computed by comparing movement in returns from an individual asset, to movement in returns from assets in the market.

1.3 Statement of the problem

The relationship between market risk and business risk is central to efficiency in any capital market of acceptable standard. Not much is known about the relationship between systematic risk and business risk in the Kenyan market. A relationship between systematic risk and the market enables market players to price securities such as shares at the NSE. However, though systematic risk is out of the control of management it is a major determinant in asset pricing. A celebrated model such as the CAPM used in pricing assets is systematic risk driven. Each company quoted at the NSE will therefore get to know how the returns of their stock vary with that of the market.

Business risk brings out the variability that operating conditions inject into the operating income. It builds on all factors that impact on a firm, both internal and external.

Finance scholars such as Thomas E. Conine (1982), R. Hamada (1969), B. Lev (1974) and Bowman (1979) have researched on and determined theoretical relationships between systematic risk and business risk. It would be interesting to carry out an empirical study as suggested by the theoretical framework suggested by them.

In this study, an attempt is made to determine whether, at the NSE business risk is related to the market risk.

The study helps us determine the reliability of variability in earnings as a predictor of market risk.

1.4 Objective of the study

The objectives of the study were:

a) To determine whether a relationship exists between business risk and systematic risk. This was done by regressing business risk (represented by earnings variability) with systematic risk (represented by the beta).

b) To find out whether companies with high risk are those with high returns in order to know whether investors in the Kenyan market are adequately rewarded for the risk they assume.

1.5 Importance of the study

The study will reveal the extent to which we may rely on business risk in estimating market risk. The results of the study will either qualify or disqualify the findings of these scholars. Other Researchers and students of finance would find this study useful.

2. 0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter is divided into four sections. The first section covers the relationship between systematic risk and business risk as portrayed by various finance scholars. The second section looks at the determinants of systematic risk level. The third section covers systematic risk and accounting variables and finally the fourth section is the conclusion.

2.2 Business Risk And Systematic Risk

In developing the theoretical relationship between systematic risk and business risk, Thomas E. Conine (1982) incorporated prices and variable costs and their mutual dependencies with demand. Business risk was represented by taking into account the operating income of a firm. He noted that it was important for the management to fully understand how managerial decisions affect risk. His article was to increase knowledge on how management decisions and exogenous economic constraints affect risk and thus the process of generating returns in the capital market.

Turnbull (1977) developed a continuos time model of the theoretical determinants of systematic risk. His model expresses systematic risk in terms of firm's specific components and a set of economic variables such as GDP. Turnbull found a "non-positive" relationship between systematic risk and duration of a firm's earnings.

Bowman (1979) has shown that a theoretical relationship exists between a firm's systematic risk and the firm's leverage and accounting betas but that a theoretical relationship between systematic risk and earnings variability, dividends, size and growth is non existent. Conine argued that the business risk determinants often recognized to influence the expected cash flows of the firm and their associated riskiness are:

a) The degree of operating leverage (i.e. the degree of fixed costs relative to variable costs). If revenues change, and higher proportion of total cost is fixed costs, the firm will have a difficult time trying to cut down on expenses. Under such a scenario, if production declines, the greater part of total costs, which is fixed costs, will have to be incurred. In addition firms with higher proportion fixed costs, will experience greater business risk.

b) Risk in the demand for the firm's output. Where a firm experiences an increase in demand of its product, it will naturally experience increase in revenues. Firms whose stock or share prices closely follow the level of economic activity exhibit high systematic risk. During economic decline, it will most probably experience decline in demand of its product. Thus both the systematic risk and business risk will increase.

c) Risk in the price level received per unit of the firm's output. Just as in the case above, if the firm is considered to be one that has high systematic risk when the economy is at a decline, any increase in price of its output will serve to decrease the demand of the product during the decline. Thus the total risk of the firm increases as the business risk compounds the systematic risk.

d) Risk in variable costs associated with the production and marketing of the firm's output. During economic decline a firm will tend to reduce in its production thus reducing total variable costs associated with production and marketing. Therefore if this is a firm that's sales follow the level of economic activity, its systematic risk will be high as well as its business risk as brought about by the management's decision on variable costs.

2.3 Determinants Of Systematic Risk Level

Stephen Lumpy (1991) defined systematic risk as the extent to which a company's cash flow is affected by macro economic factors. Lumphy (1991) discusses two main determinants of systematic risk exposure.

1) The sensitivity of the company's revenues to the general level of economic activity in the economy and other macro economic factors and by extension variability in those earnings.
2) The relationship between fixed and variable costs (i.e. the degree of cost sensitivity)

Lumphy (1991) argued that what makes a company risky in systematic risk is the degree to which the company's revenues are determined by macro economic factors largely outside the control of management. This can either be increased or reduced by the proportion of fixed and variable costs involved. A furniture retailing company might be seen as an example of high revenue sensitivity. If the economy is booming and wage levels are rising, people will start to have spare money and their thoughts might turn to spending it by buying new furniture. However if the economy is depressed and the people are unemployed, even those with spare cash prefer to save it for the uncertain future rather than spend it on new furniture. Thus the Furniture Company's revenue is volatile, being sensitive to general economic conditions and these general economic conditions can't be diversified away.

On the other hand a food retailer (e.g. a supermarket) might be taken as an example of a business with low degree of revenue sensitivity. Generally speaking, in both good and bad times, the supermarket's revenue is likely to be little changed. In bad times people have still got to eat to live, while in good times spare cash might well be spent on other things rather than increasing the consumption of food.

The ratio of fixed to variable costs is particularly important to revenue sensitive firms. A high proportion of fixed costs in a firm with high revenue sensitivity will serve to increase the firm's

already high level of systematic risk, a downturn in the economy will bring about a downturn in the firm's revenue, but the fixed costs will tend to remain the same. Similarly a low proportion of fixed costs will help reduce the level of systematic risk of a company with high revenue sensitivity.

In terms of a firm with low revenue sensitivity, the proportion of fixed to variable costs will make little difference to its riskiness. As its revenues are relatively stable, it should at all times to be able to cover whether they are fixed or variable.

Assuming that managers like investors are risk averse, it should not surprise us that firms with high revenue sensitivity try to minimize the proportion of both fixed financing and fixed operating costs. On the other hand, the management of firms with low sensitivity can afford to be more relaxed about such issues.

Thus firms with high revenue sensitivity should try and minimize their business risk (brought about by the proportion of fixed to variable cost) as it will compound to the systematic risk.

2.4 The Beta Value

In using the market model, W. Sharpe (1964) and Lintner (1965) developed a theory of equilibrium in capital markets. This theory relates the risk premium for an individual security $E(R_i) - R_f$ where R_f is the risk free rate, to the risk premium of the market, $E(R_m) - R_f$, by the formula:

$$E(R_i) - R_f = \beta[E(R_m) - R_f] \text{ or}$$

$$E(R_i) = R_f + \beta(E(R_m) - R_f) \quad \text{---------- Equation 7}$$

Where $$\beta = \frac{\rho_{jm}\sigma_j}{\sigma_m} \quad \text{---------- Equation 8}$$

William Sharpe (1964) used the Beta coefficient as a measure of risk i.e. the Beta coefficient represented the sensitivity of the security's return to that of the market portfolio.

The risk premium for an individual security is proportional to the risk premium for the market. The constant of proportionality βi can therefore be interpreted as a measure of risk for individual securities. The numerator of the Beta value ($\rho_{jm}\sigma_j$) represents the systematic risk of company j and the denominator (σm) represents the total risk of the market portfolio, which is all systematic risk. Therefore the Beta value of company J's shares is an index of the amount of that company's systematic risk relative to that of market portfolio.

The formula above is known as the Capital Asset Pricing Model (CAPM).

Suppose we have the following data on company j.

$\sigma_j = 10\%$ $\rho_{jm} = 0.70$ $\sigma_m = 5\%$

then $$\beta = \frac{0.70 \times 10\%}{5\%} = 1.40$$

Company j has a systematic risk of $10\% \times (0.7) = 7\%$ and as the market portfolio has only 5% of systematic risk, company j has 40% more systematic risk then the market portfolio.

$$\frac{7\% - 5\%}{5\%} = 40\%$$

The company J's Beta value of 1.40 indicates company J's systematic risk is higher than market risk. The beta of the market is normally one.

High Beta shares (where $\beta > 1$) will tend to out perform the return on the market portfolio and low beta shares (where $\beta < 1$) will tend to under perform the average return on the stock market. This under or

over comparison with the return on the market portfolio applies to both rise and falls in the return of the market portfolio.

2.5 Systematic Risk And Accounting Variables.

R. Hamada (1969) has researched on the relationship between portfolio analysis and corporate finance. More specifically, he has shown that the systematic risk of a firm's common stock should be positively correlated with the firm's leverage.

B. Lev (1974) has shown using the approach adopted by Hamada that a firm's operating leverage (the ratio of fixed to variable operating costs) is a variable affecting systematic risk.

Robert Bowman's (1979) paper on the theoretical relationship between systematic and financial (accounting) variables was written to provide a theoretical basis for empirical research into the relationship between systematic risk and financial (accounting) variables. Bowman's research showed that there is a theoretical relationship between a firm's systematic risk and the firm's leverage and accounting beta.

Research into the association between the market based beta and an accounting beta originated with Ball and Brown (1969) and has received considerable attention since. Accounting beta (β^A) is expressed as the covariability of a firm's accounting earnings with the accounting earnings of the market portfolio.

$$\beta^A_i = \frac{Cov\,(X_i\, X_m)}{\sigma^2(X_m)} \qquad \text{---------- Equation 9}$$

Where X_i = accounting earnings of the firm

X_m = accounting earnings of the market portfolio

β^A_i = Accounting Beta

σ^2 = Variance

Bowman (1979) established a relationship between the two betas by first assuming that there are only pure equity firms (i.e. no debt) in the market portfolio.

We know that $R_m = \frac{\Sigma X_i}{\Sigma S_i} = \frac{X_m}{S_m}$ by construction and

Where R_m = Return of the market

$\Sigma S_i = S_m$ which is the market value of the market portfolio of equity securities.

He further established that

$$\beta i = \frac{1}{S_i S_m \sigma^2(R_m)} Cov(X_i, X_m) \quad \text{---------- Equation 10}$$

$$= \frac{S_m}{S_i} \cdot \frac{Cov(X_i, X_m)}{\sigma^2(X_m)} \quad \text{---------- Equation 11}$$

Using the definition of accounting beta established above, we have

$$\beta i = \frac{S_m}{S_i} \beta_i^A \quad \text{---------- Equation 12}$$

The market based measure of systematic risk is directly related to the accounting beta. The result above still holds when we allow debt in the firm's capital structure.

Conclusion

In conclusion Bowman (1979) suggested that a theoretical relationship exists between a firm's systematic risk and the firm's leverage and accounting betas but that a theoretical relationship between systematic risk and earnings variability, dividends, size and growth is non existent.

Steven Lumpy (1991) suggested that the two main determinants of systematic risk exposure include the sensitivity of the company's revenues to the general level of economic activity in the economy and the relationship between fixed and variable costs. He suggested that assuming that managers like investors are risk averse, it should not surprise us that firms with high revenue sensitivity should try and minimize their business risk as it will compound the systematic risk.

R. Hamada (1969) showed that the systematic risk of a firm's common stock should be positively correlated with the firm's leverage.

B. Lev (1974) showed that a firm's operating leverage is a variable affecting systematic risk.

William Sharpe (1964) used the beta coefficient as a measure of risk where it represented sensitivity of the security's return to that of the market portfolio.

3.0 CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Population

The whole population of quoted companies is used in this study. Currently there are 46 quoted companies at the NSE and therefore this will form the population.

3.2 Data Collection Method and Modeling

The data to be used will be secondary data. This will be derived from the financial statements of the companies quoted at the NSE and from NSE share price database. From the data the business risk and systematic risk is calculated over a period of 5 years. The business risk of the firms is the variance of the firm's earnings. Interim earnings and Final earnings will be plotted to get the monthly earnings.

Systematic risk will be measured using the covariance between the return of the market and the return of the firm divided by variance of the return on the market portfolio. A linear regression is employed in approximating the beta coefficient. This will give the beta coefficient that depicts the sensitivity of the security's return to that of the market as a whole.

Other test carried out relating return and risk involve regressing either capital gain, weighted return or non-weighted return with risk. In this test, capital gain, weighted return and non-weighted return all represent compensation to the investor while standard deviation of earnings represent the risk.

Non-weighted return refers to a return that results from change in value of a security plus any distribution received. This is expressed as a fraction of the original value and as percentage for comparison purposes.

Weighted return is that return weighted by the number of shares held for each type of security.

Capital gain is that change in the value of the security held over a period of time.

3.3 Data Analysis

The statistical tool used to model out the relationship between business risk and systematic risk is regression analysis. Regression analysis can be used to estimate relationships between variables. There are two types of regression analysis.

1) Bivariate regression analysis – this uses one independent variable and one dependent variable
2) Multiple regression analysis – this uses more than one independent variable and one dependent variable.

This research study shall use the bivariate regression analysis. This requires the use of an independent variable (variable X) to predict the dependent variable (variable Y). It assumes that a set of two measurements can be obtained for each element in the population. In this research study, the two sets of measurements for each element will be the business risk measure and the systematic risk measure.

The regression model will take the following form.

$$Y = a + bX + e$$

Where Coefficient a = Y intercept

Coefficient b = The relationship between change in Y and change in X

X = Independent Variable

Y = The dependent variable

E = Residual error

In this study, variable X will be the business risk measure while variable Y will be the systematic risk measure.

Data will not always fall on the regression line (predicted Line) and therefore the regression line is an approximate predictor.

The measure of dispersion around the regression value measures the deviations around the Y_x line whose value at any point is dependent on the given value X. The deviations of the Y value from the regression line are relatively small if the relationship between X and Y is close. This measure of deviation around the regression value gives the standard error of estimate.

The statistical measures that will be used include t-ratios, R^2 (coefficient of determination) and F value.

T significant test will examine whether the estimated coefficient in the regression is significant at a given level of significance. R2 (coefficient of determination) will show the proportion of the variation in Y, which can be explained by relating Y to X.

For robustness purposes, Cross tabulation is employed to gain insight into the hypothesised relationship. A Cross Tab is a table that shows the number of cases that have different combinations of value of two or more variables.

3.4 Hypothesis

Alternate Hypothesis:

There is no relationship between systematic risk and business risk and therefore business risk cannot be used to predict systematic risk

Null Hypothesis:

There is a relationship between systematic risk and business risk and therefore business risk can be used to predict systematic risk.

This can be done with the following model

$$Y = a + bX + e$$

4.0 CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

The data used for this study was secondary data that was extracted from the financial Statements of 46 companies quoted at the Nairobi Stock Exchange (NSE). The data was derived from a five-year period from 1996 to 2000. In addition to the earnings that were readily available from the statements, other variables were calculated and these included the Standard deviation of the earnings, Capital gains, Weighted Return and Non Weighted Return. These were derived from share prices of companies quoted at the NSE. The beta, which is a measure of market risk was computed from capital gains (returns).

Further in each year (1996 – 2000), data for each company was regressed and tabulated as shown in Appendix 3 to 7. Thereafter for each company, the earnings and the resulting betas were regressed so as to determine the relationship between the earnings (business risk) and the beta (systematic risk) within that five-year period. The results have been tabulated in Appendix 8.

4.2 Return and Risk Profiles

Though our first objective was to determine the existence or non-existence of the relationship between systematic risk and business risk, we thought it would make sense starting with the second objective. The second objective enables us to have a deeper comprehension of risk profile of companies in this study.

4.2.1 Ranking results

The companies quoted at the Nairobi Stock Exchange were ranked based on their capital gain earnings, weighted return, non-weighted return and the standard deviations of the earnings. (Appendix 2). The

idea is to see whether companies with high risk have high returns. The assumption is that investors are only compensated for risk that they cannot diversify away.

The companies were then categorized into four quartiles namely on the basis of their earnings, weighted return, non-weighted return and standard deviations as follows:

Table 1: Categorization into Quartiles

Ranking	Quartile
1 - 11	1
12 - 23	2
24 - 35	3
36 - 46	4

A cross tabulation between the following quartiles was done

a) Earnings variability quartile (STDevP) and Weighted Return Quartile (WRrP)

b) Earnings variability quartile (STDevP) and Non-weighted Return quartile (NWRP)

c) Earnings variability quartile (STDevP) and Capital gains quartile (CGAP)

A cross tab shows the number of cases that have different combinations of value of two or more variables. Cross tabulation show the companies that compensated a high return for high risk.

a) Earnings variability (STDevP) and Weighted Return (WRrP)

There were seven companies in the first quartile for both earnings variability and weighted return ranking, three in the second, two in the third and two in the fourth. (See table 2a below). One would expect that if the assumption that high risk is rewarded with high return holds, then each quartile would contain a higher number of companies (close to ten companies) being ranked in the same quartile for both earnings variability and weighted return.

Table 2a: Cross tab between Earnings variability and Weighted Return

Number of Companies					
WRrP Qrt / STDevP Qrt	1	2	3	4	Total
1	7	1		3	11
2	2	3	5	2	12
3	1	5	2	4	12
4	1	3	5	2	11
Total	11	12	12	11	46

Table 2b: Cross tab between Earnings variability and Weighted Return

Probabilities					
WRrP Qrt / STDevP Qrt	1	2	3	4	Total
1	0.15	0.02		0.07	0.24
2	0.04	0.07	0.11	0.04	0.26
3	0.02	0.11	0.04	0.09	0.26
4	0.02	0.07	0.11	0.04	0.24
Total	0.24	0.26	0.26	0.24	1

The Table 2b above show that there is a low probability of a company being ranked within the same quartile for both earnings variability and weighted return ranking. However the only relatively high probability of the same ranking was found in the 1st quartile where seven companies were ranked in this quartile for both the earnings variability and weighted return. This companies include Housing Finance Company Ltd, Unga Ltd, National Bank of Kenya, Kenya Power and Lighting Co., Total Ltd, Kenya Airways Ltd and East Africa Portland Cement Ltd. The Table 2b above also shows that there is

a thirty percent chance that a company will be ranked in the same quartile for Weighted return as that of the Earnings variability. It would appear that the assumption that companies with high risk as measured by variability in earnings are the same ones with high weighted return only holds for thirty seven percent, taking into account only those companies ranked in the first and second quartile as the high-risk companies. These results reveal that it is not always the case that companies with high risk are the ones that enjoy a high return in the Kenyan market.

b) **Earnings variability ranking (STDevP) and Non-Weighted Return ranking (NWRP)**

Table 3a below shows that there were three companies in the first quartile for both earnings variability ranking and non-weighted return ranking, two in the second, three in the third and three in the fourth. The results are shown below. Apart from the first quartile for both earnings variability and non-weighted return, the results for the other quartiles compare quite closely with those of the earnings variability and weighted return. These quartiles all show a very small number of companies that are ranked within the same quartile for both earnings variability and non-weighted return.

Table 3a: Cross tab between Earnings variability and Non-weighted Return

Number of Companies					
NWRP Qrt / STDevP Qrt	**1**	**2**	**3**	**4**	**Total**
1	3	4	2	2	**11**
2	3	2	4	3	**12**
3	2	4	3	3	**12**
4	3	2	3	3	**11**
Total	**11**	**12**	**12**	**11**	**46**

Table 3b: Cross tab between Earnings variability and Non-weighted Return

Probabilities					
WRP Qrt / STDevP Qrt	1	2	3	4	Total
1	0.07	0.09	0.04	0.04	**0.24**
2	0.07	0.04	0.09	0.07	**0.26**
3	0.04	0.09	0.07	0.07	**0.26**
4	0.07	0.04	0.07	0.07	**0.24**
Total	**0.24**	**0.26**	**0.26**	**0.24**	**1**

Similarly, Table 3b above shows that there is a very low probability of a company being ranked within the same quartile for both earnings variability ranking and the non-weighted return ranking. Seven percent of the companies were ranked in the first quartile for both earnings variability ranking and non-weighted return ranking, four percent in the second quartile, seven percent in the third and another seven percent in the forth. In total there is a twenty five percent chance that a company will be ranked in the same quartile for the non-weighted return ranking as that of the earnings variability. These results also confirm that not all companies with high risk will be compensated with high return in the Kenyan market.

c) Earnings variability ranking (STDevP) and Capital gains ranking (CGAP)

Table 4a below shows that there were four companies in the first quartile for both earnings variability ranking and capital gains ranking, two in the second quartile, two in the third quartile and three in the fourth quartile.

Table 4a: Cross tab between Earnings variability and Capital Gains

Number of Companies					
CGAP Qrt / STDevP Qrt	1	2	3	4	Total
1	4	3	3	1	11
2	2	2	5	3	12
3	2	4	2	4	12
4	3	3	2	3	11
Total	11	12	12	11	46

Table 4b: Cross tab between Earnings variability and Capital Gains

Probabilities					
CGAP Qrt / STDevP Qrt	1	2	3	4	Total
1	0.09	0.07	0.07	0.02	0.24
2	0.04	0.04	0.11	0.04	0.26
3	0.04	0.09	0.04	0.09	0.26
4	0.07	0.07	0.04	0.07	0.24
Total	0.24	0.26	0.26	0.24	1

Again as shown in Table 4b, there is a low probability of a company being ranked within the same quartile for both earnings variability ranking and Capital gain ranking. Nine percent of the companies were ranked in the first quartile for both earnings variability ranking and Capital gains ranking, four percent ranked in the second quartile, another four percent in the third and seven percent in the fourth. In total there is a twenty four percent chance of a company being ranked within the same quartile for both earnings variability ranking and capital gain ranking. Up to this point, it is not always the case that companies high systematic risk are the ones with high return. The relationship between earnings

variability (systematic risk) and the return as demonstrated by weighted return, non-weighted return and capital gain is very small.

Robert Bowman (1979) in his paper on the "Theoretical relationship between systematic risk and financial accounting variables", expected a positive relationship between the variability of a firm's earnings and systematic risk. His findings were however that there is no direct relationship between the earnings variability and systematic risk.

The findings above are consistent with Bowman's (1979) findings as they show that there is relatively little likelihood that a company will be ranked within the same quartile for both earnings variability ranking and either weighted return ranking, non-weighted return ranking and capital gain ranking.

4.2.2 Predicting Returns using Risk Measures

The other approach to detecting a relationship is by determining the extent to which one variable can be used in predicting another.

Table 5: Regression Results

Regression Equation	Std Dev Constant	Std Dev Variable	S	R^2 %	R^2 Adj (%)	t-ratio	Comment
CgainR=22.5+0.044StDevR	4.065	0.1506	13.56	0.2	0.0	0.29	NOT SIG
WR=0.734-0.00459StDevR	0.1854	0.006871	0.6187	1.0	0.0	-0.67	NOT SIG
CgainR=2.58+0.890NWR	1.854	0.06871	6.187	79.2	78.8	12.95	SIG
CgainR=27.5-0.171CovR	4.009	0.1485	13.38	2.9	0.7	-1.15	NOT SIG
Cgain=1.10+0.00031StDevR	0.2499	0.009259	0.8337	0.0	0.0	0.03	SIG

a) Capital gain (CgainR) and Earnings variability (StDevR)

The regression equation has a positive sign suggesting that as the risk (earnings variability) increases, the return also increases (capital gain). However, capital gain is not closely related to earnings

variability as the variations in capital gains that can be explained by variations in earnings variability is only 0.2 percent. This means that there is no correlation between the capital gains ranking and the earnings variability ranking. Further, the results show a t-ratio of 0.29 that is not significant implying that the earnings variability ranking does not have a valid, stable and long term relationship with capital gain ranking.

b) Weighted return (WR) and Earnings variability (StDevR)

The regression equation has a negative sign suggesting that as risk (earnings variability) increases, the weighted return decreases. Similarly, the weighted return is not related to the earnings variability as the variations in weighted return that can be explained by the variations in earnings variability is only 1 percent. There is therefore no correlation between weighted return ranking and earnings variation ranking. Further, the results show a t-ratio of –0.67 that is also not significant. It appears that the earnings variability does not have a valid, stable long-term relationship with the weighted return.

c) Capital gain (CgainR) and the Non-weighted return (NWR)

The regression equation has a positive sign, as the non-weighted return increases the capital gain also increases. Unlike all other relationships, there is a close relationship between the capital gains and the non-weighted return. The variations in the capital gains that can be explained by variations in the non-weighted return, is seventy nine percent. There is a high correlation between the capital gain and the non-weighted return. This is mainly because capital gain and non-weighted return almost measure the same thing and also that they are derived from the same variables. This close relationship can also be explained by the significant t-ratio of 12.95. This implies that the non-weighted return ranking has a valid and stable relationship with the capital gains ranking.

d) Capital gain (CgainR) and Covariance (CovR)

The regression equation has a negative sign suggesting that as the covariance increases, the capital gain decreases. Capital gain is not related to the covariance, as the variations in capital gain that can be explained by the variations in covariance, is nil. The results also show a non significant t-ratio of –1.15 implying that the covariance ranking is not a reliable factor in determining capital gain ranking

e) Capital gain (Cgain) and Earnings variability ranking (StDevR)

Capital gain is not related to earnings variability ranking as the variations in capita gains that can be explained by variations in earnings variation ranking, is also nil. This suggests that the impact of earnings variability on share prices is almost zero. The results also show a non significant t-ratio of 0.03 meaning that the earnings variability ranking is not a reliable determinant of capital gain ranking.

4.3 Systematic Risk and Earnings

Beta as a measure of market risk was calculated for each company, each year 1996 to 2000. The earnings for the same period were extracted from the financial statements. On regressing earnings to beta we find that out of the forty-three companies studied, thirteen (thirty percent) had a significant t-ratio. This means that the relationship between beta and earnings only hold for those companies. The remaining thirty (seventy percent) had insignificant t-ratios. This implies that only thirty percent of these companies have earnings that had a valid, stable and long-term relationship with systematic risk. For these thirteen companies, their findings are consistent with those of Bowman (1979) who suggested a theoretical relationship between a firm's systematic risk and financial variables.

Table 6: Relationship between Earnings and Systematic risk

Company	Coefficient Beta	Coefficient Earnings	R^2	Std Error	t-ratio	Comment
Barclays Bank Ltd	5.299	-0.0017	0.486	2.543	2.056	SIG
Car & General (K) Ltd	3.654	0.0000282	0.365	1.593	2.288	SIG
E.A. Portland Cement Ltd	2.053	0.000001544	0.212	0.750	2.736	SIG
National Bank of Kenya	0.484	-0.000000058	0.142	0.160	3.029	SIG
Sasini Tea & Coffee Ltd	1.476	-0.000028152	0.535	0.571	2.587	SIG
Standard Newspapers Group	2.601	-0.000016841	0.771	0.300	8.672	SIG
Total Kenya Ltd	1.285	-0.000000783	0.195	0.564	2.278	SIG
CFC Bank Ltd	1.997	-0.000002951	0.104	0.647	3.087	SIG
E.A. Packaging Ltd	0.401	0.000003163	0.252	0.169	2.365	SIG
Express Ltd	1.444	-0.000038523	0.291	0.663	2.177	SIG
George Williamson Kenya	0.962	-0.000009152	0.260	0.370	2.599	SIG
Housing Finance Co. Ltd	4.186	-0.000049081	0.648	1.059	3.953	SIG
Kenya Commercial Bank	1.037	-0.000000229	0.077	0.332	3.123	SIG

Of these thirteen companies only two have earnings that have a relatively high correlation to systematic risk.

These are Standard Newspaper Group with an R squared of 0.77, which means that seventy-seven percent of the variations in systematic risk can be explained by the variations in its earnings. Housing Finance Company yielded an R squared of 0.648, which means that sixty-five percent of the variations in systematic risk can be explained by variations in its earnings.

Many of the above companies have a significant relationship between systematic risk and earnings mainly because economic factors affecting systematic risk will have a direct impact or effect on their earnings. These include Barclays Bank Ltd, Car & General Ltd, E. A. Portland Cement Ltd, Total Kenya Ltd, CFC Bank, E. A. Packaging Ltd, Express Ltd and Housing Finance Co. Ltd. The earnings of these companies heavily depend on how the economy is performing thus there will be a significant relationship between systematic risk brought about by economical factors and their earnings.

Other companies such as National Bank Ltd and Kenya Commercial Bank Ltd have a significant relationship between systematic risk and earnings because of the political inclination that surround

them. The systematic risk of these two companies is mostly brought about by this political interference. As a result, the earnings have been affected directly by this political influence.

Standard Newspaper Group may be having significant relationship between systematic risk and earnings because of both economic and social factors. Economical factors bring about systematic risk and also affect earnings. In addition, social factors especially people's preference to their product, also contribute to the systematic risk. People's preference also affects earnings. Generally, people feel inclined to purchase the Standard Newspaper more for the entertainment and tabloid stories in them. Thus, where people's preference are inclined to such tastes, then their Standard Newspaper Group's earnings increase.

The above results suggest that while thirty percent of the companies studied have earnings that have a valid, stable and long-term relationship with their systematic risk, only five percent of these companies (Standard Newspapers Group and Housing Finance Company) have earnings that have a relatively high correlation to their systematic risk.

R. Hamada (1969) found that systematic risk of a firm's common stocks should be positively correlated to the firm's leverage. The findings above are not consistent with what R. Hamada found because only two companies (five percent) of the companies studied had a relatively high correlation between systematic risk and earnings (which are affected by the leverage).

B. Lev (1974) stated that a firm's leverage is a variable affecting systematic risk. For the thirteen companies shown on Table 6, his findings are consistent with the relationship between systematic risk and earnings of these companies.

However, these companies only represent thirty percent of companies studied. It therefore means that his findings cannot apply for the remaining seventy percent of the companies which do not show a significant relationship between earnings and systematic risk.

Of these remaining seventy percent (thirty companies) that showed a low t-ratio and therefore a insignificant relationship between earnings and systematic risk, ICDC Investments Ltd yielded a relatively high correlation of 0.688 which means that sixty-nine percent of the variations in systematic risk can be explained by the variations in earnings.

4.4 Systematic risk and Business Risk

Earnings variability as a proxy of business risk was calculated and regressed with the beta as a measure of systematic risk for the same period.

Out of the forty-five companies in this study, seven (fifteen percent) of these companies had a significant t-ratio while the remaining thirty-eight (eighty-five percent) had insignificant t-ratios. This implies that only fifteen percent of these companies have business risk that has a valid long-term relationship with systematic risk. For these seven companies their findings are consistent with Bowman's (1979) who suggested a theoretical relationship between a firm's systematic risk and business risk.

Table 7: Business risk and Systematic risk.

Company	Coefficient of Beta	Coefficient of Earnings	R^2	Standard Error	t-ratio	Comment
National Bank of Kenya	0.4088	0.0000002104	0.2987	0.17006	2.4041	SIG
Uchumi Ltd	2.9458	-0.0000648609	0.5287	1.31962	2.2323	SIG
Dunlop Ltd	20.666	-0.004216428	0.6436	8.18732	2.5241	SIG
Housing Finance Co. Ltd	5.7947	-0.0000004771	0.4063	2.84042	2.0409	SIG
ICDC	2.1818	-0.0000159876	0.3836	0.82083	2.6580	SIG
Kenol Ltd	5.0314	-0.0000855623	0.6815	1.73638	2.8976	SIG
Kenya Airways Ltd	-1.8571	0.00000537191	0.8572	0.63823	-2.9098	SIG

Out of the seven companies listed in Table 7, only two also had a significant relationship between systematic risk and earnings as shown in Table 6. These are National Bank of Kenya (NBK) and Housing Finance Company Ltd (HFCK).

Kenya Airways Ltd with an R square of 0.85 implies that eighty-five percent of the variations in systematic risk can be explained by the variations in business risk. Kenol with an R square of 0.68 implies that sixty-eight percent of the variations in systematic risk can be explained by the variations in business risk. Dunlop Ltd with an R square of 0.64 implies that sixty-four percent of the variations in systematic risk can be explained by the variations in business risk.

The finding reveal that only one company (Kenya Airway Ltd) can be said to have a very high correlation between business risk and systematic risk. For Dunlop Ltd and Kenol Ltd , the correlation between business risk and systematic risk is fairly high.

Once again the above results suggest that while fifteen percent of the companies studied have business risk that has a valid, stable and long-term relationship with systematic risk, only one (fourteen percent- Kenya Airways) has business risk that has a relatively high correlation with systematic risk.

This is therefore implying that this is the only company whose findings are consistent with those of R. Hamada (1969) who expected companies to have a correlation between systematic risk and business risk. For the seven companies listed in Table 7, B. Lev's (1974) findings are consistent with their results which shows that business risk is indeed a variable affecting systematic risk.

4.5 Market as whole

A further study on the relationship between systematic risk and business risk for the market as whole was also carried out. The results and shown in Table 8 below revealed that for each year the t-rations showed a significant relationship between the systematic risk and business risk. This is very much unlike most relationships between the systematic risk and business risk for individual companies. However observing the R^2 for each year, none of the periods show a significant percentage of variation in systematic risk that can be explained in the variations in business risk.

Table 8: Systematic risk and Business risk for the market as whole

Year	Coefficient of Beta	Coefficient of Earnings	R^2	Standard Error	t-ratio	Comment
1996	0.9812	0.00000002286	0.0608	0.16441	5.9681	SIG
1997	0.9773	0.00000000154	0.0001	0.22564	4.3315	SIG
1998	1.0870	0.00000000187	0.0006	0.16075	6.7621	SIG
1999	1.0512	0.00000000884	0.0099	0.19381	5.4239	SIG
2000	1.0823	0.00000000359	0.0008	0.27623	3.9181	SIG

Summary

To achieve the first objective, earnings were regressed to beta and the results revealed that only thirty percent of the companies had a significant relationship between systematic risk and earnings. This implies that the relationship between systematic risk and earnings holds for some and not all companies.

Earnings variability as proxy of business risk beta as a measure of systematic risk was also regressed and the study revealed that only fifteen percent of the companies have a significant relationship between business risk and systematic risk. Just as in the case of earnings and systematic risk relationship, the relationship between business risk and systematic risk holds for some companies only and not all.

Further, on regressing business risk to systematic risk for the market as whole, the study revealed that the relationship between systematic risk and business risk holds for the market as whole.

To achieve the second objective, return and risk profiles for each company was ranked on the basis of their capital gain, weighted return, non-weighted return and earning variability. The results showed that only thirty percent of the companies ranked in the same quartile for both earnings variability ranking and weighted return ranking, twenty-five percent ranked in the same quartile for both earnings variability ranking and non-weighted return ranking and, twenty-four percent ranked in the same

quartile for both earnings variability ranking and capital gain ranking. This implies that in the Kenyan market, it is not always the case that a company with high risk will be compensated with high return.

5.0 CHAPTER FIVE: CONCLUSION, LIMITATION AND RECOMMENDATION

5.1 Conclusion

The results of the study show that generally there is a very low relationship between earnings variability (business risk) and systematic risk.

R. Bowman (1979) expected a positive relationship between earnings variability and systematic risk and found that there was direct relationship between these two. The study revealed that when companies were ranked based on earnings variability, weighted return, non-weighted return and capital gains, the probability of a company being ranked in the same quartile with that of earnings variability ranking was thirty percent for the weighted return ranking, twenty-five percent for the non-weighted return ranking and twenty-four percent for the capital gain ranking. This implies that companies with high risk do not always get compensated with high return.

One can also conclude that the relationship between systematic risk and earnings variability (business risk) only holds for some companies while it does not hold for other companies. The important thing to note is that this relationship only holds for a small proportion of the population.

However when the study was carried out on the market as whole it revealed that there was a significant relationship between business risk and systematic risk.

The results of the study also reveal that the relationship between systematic risk and earnings only hold for some companies as well because only thirty percent of these companies had a significant relationship between systematic risk and earnings.

REFERENCES

1. Thomas E. Conine Jnr., Summer 1982, Theoretical Relationship between Business Risk and Systematic Risk, Journal of Business and Finance and Accounting, Vol. 9 No. 2
2. Abraham Beja, March 1972, Systematic and Unsystematic components of Financial Risk, The Journal of Finance
3. Marshall E. Blume, March 1971, The Assessment of Risk, The Journal of Finance
4. Robert G. Bowman, June 1979, The Theoretical Relationship Between Systematic Risk and Financial (Accounting) Variables, The Journal of Finance
5. James Van Horne, 1991, Financial Management and Policy, Prentice Hall, 8th Edition
6. Stanley B. Block and Geoffrey A. Hirt, 1992, Foundations of Financial Management, Richard D. Irwin Inc, 6th Edition
7. J. R. Franks, J. E. Broyles & W. T. Carleton, 1985, Corporate Finance: Concepts & Applications, Kent Publishing Company
8. Stephen Lumphy, 1991, Investment Appraisal and Financing Decisions, Page Bros, 4th Edition
9. Byron L. Newton, 1973, Statistics for Business, Science Research Associates Inc.
10. C. B. Gupta, 1992, An Introduction to Statistical Methods, Vikas Publishing house PVT Ltd, 8th Edition
11. Otieno L. Odhiambo, (March-April 2001), Measures of Market Risk, Business And Investment Insight
12. B. Lev, September 1974, Association Between Operating Leverage and Risk, The Journal of Finance
13. R. Hamada, March 1969, Portfolio Analysis, Market Equilibrium and Corporation Finance, The Journal of Finance

14. William Sharpe, September 1964, Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, The Journal of Finance.

15. J. Linter, December 1965, Security Prices, Risk and Maximal Gains from Diversification, The Journal of Finance.

16. J. Linter, February 1965, The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets, The Review of Economics and Statistics.

17. R. Ball and P. Brown, Autumn 1969, Portfolio Theory and Accounting, Journal of Accounting Research.

18. S. Turnbull, September 1977, Market Value and Systematic Risk, The Journal of Finance.

APPENDICES

APPENDIX 1

Notations and Formulas

σ^2_i = Variance of asset i
R_i = Return of asset i
$E(R_i)$ = Expected Return of asset i
P_i = Probability
$E(R_p)$ = Expected return on Portfolio
W = Weight or proportion of asset x
(1-W) = Proportion of asset y
$E(R_x)$ = Expected return on asset x
$E(R_y)$ = Expected return on asset y
σ^2_p = Variance of the portfolio
σ^2_x = Variance of the return on asset x
σ^2_y = Variance of the return on asset y
$CovR_xR_y$ = Covariance of the return on asset x and y
σ_i = Standard Deviation of the asset i
σ_m = Standard Deviation of the market
ρ_{im} = Coefficient Correlation of the asset i and the market
E = Expected
Var = Variance
Cov = Covariance
σ = Standard Deviation
T = Corporate Tax rate
F = Total Fixed Costs
$\rho R_u, R_m$ = Correlation Coefficient between return on unlevered firm and market portfolio.
$\rho Q, R_m$ = Correlation Coefficient between demand and return on market portfolio.
σR_m = Standard deviation of the return on the market portfolio.
Su = Market value of Unlevered Equity
D = Market value of Debt
S_L = Market Value of Levered Equity
X = Net Operating Income
P = Price per unit sold
V = Variable Cost per unit
Q = Quantity Demanded
R_u = Return on Unlevered Stock
β = Systematic Risk

CROSS TABS BETWEEN EARNINGS VARIABILITY AND WEIGHTED RETURN, NON WEIGHTED RETURN AND CAPITAL GAINS

STDEVrP by WRrP

DEVrP \ WRrP	1	2	3	4	Row Total
1	HFCK UNGA NBK KPL TOTAL KENAIR EAPORT	KCB		CTRUST PAN AFR LIMTEA	11
2	FIREST BAMB	SCBK KNM ICDC	EABL BAT DTK BBOND KAKUZI	MARSH GWK	12
3	CFC	SNG KENOL UCHUMI SASINI NIC	REAVIP EXPRES	NMG EAPACK CARGEN	12
4	DUNLOP	JUB CARB EACABL	CMC SERENA CBERG ARM BBK	KAPCHO ABAUM	11
Column	11	12	12	11	46

STDEVrP by NWrP

STDEVrP \ NWrP	1	2	3	4	Row Total
1	UNGA KPL TOTAL	HFCK KCB NBK EAPORT	CTRUST KENAIR	PANAFR LIMTEA	11
2	FIREST BAMB ICDC	KNM DTK	SCBK BAT GWK KAKUZI	EABC BBOND MARSH	12
3	SNG CFC	CARGEN KENOL SASINI NIC	UCHUMI REAVIP EXPRES	NMG EAPACK BOC	12
4	CARB EACABL DUNLOP	JUB ARM	CMC SERENA CBERG	KAPCHO ABAUM BBK	11
Column	11	12	12	11	46

STDEVrP by CGAP

STDEVrP \ CGAP	1	2	3	4	Row Total
1	UNGA KPL TOTAL EAPORT	HFCK PANAFR KCB	CTRUST NBK KENAIR	LIMTEA	11
2	BAMB ICDC	KNM FIREST	SCBK BAT DTK GWK KAKUZI	EABL BBOND MARSH	12
3	SNG CFC	KENOL UCHUMI SASINI NIC	CARGEN EXPRES	NMG EAPACK REAVIP BOC	12
4	CARB EACABLE DUNLOP	JUB SERENA ARM	CMC CBERG	KAPCHO ABAUM BBK	11
Column	11	12	12	11	46

1996 COMPANY DATA

Dependent Variable	Predictor Variable	Alpha	Earnings	Beta	R-Squared	Std Error of Estimate	Std Error of Alpha	Error Beta	t-Ratio Beta
BBKr	MReturn	-0.382	2,477	0.702	0.083	2.0162	0.325	0.383	1.834
BBONDr	MReturn	-0.00152	-13,138	0.348	0.040	1.4830	0.239	0.281	1.237
BOCr	MReturn	-0.273	55,022	-0.139	0.004	1.8058	0.291	0.343	-0.405
CARBr	MReturn	1.549	55,900	1.410	0.051	5.2409	0.844	0.995	1.417
CARGENr	MReturn	0.145	-106,520	0.879	0.051	3.2800	0.529	0.622	1.412
CBERGr	MReturn	-1.889	5,303	1.786	0.066	5.8393	0.941	1.108	1.612
BAMBr	MReturn	0.291	46,104	1.364	0.120	3.1989	0.515	0.607	2.247
BATr	MReturn	-0.221	41,357	0.419	0.026	1.5572	0.251	0.295	1.417
ABAUMr	MReturn	-0.155	-13,949	0.142	0.008	1.3986	0.225	0.265	0.535
UCHUMlr	MReturn	0.112	62,981	0.946	1.631	3.9737	0.640	0.754	2.163
TOTALr	MReturn	-0.672	28,969		0.000	2.8301	0.456	0.537	-0.094
SNGr	MReturn	-0.999	17,041	2.554	0.068	8.1632	1.315	1.549	0.108
SCBr	MReturn	0.120	35,095	1.388	0.210	2.3304	0.375	0.442	3.140
SASINlr	MReturn	0.373	482	1.893	0.159	3.7763	0.608	0.717	2.641
REAVr	MReturn	-0.752	20,724	-1.073	0.094	2.8885	0.481	0.562	-1.911
EAPORTr	MReturn	0.405	67,211	2.140	0.130	4.7913	0.772	0.909	2.354
PANAFRr	MReturn	-0.672	6,983	0.956	0.069	3.0437	0.490	0.578	1.655
OLPEJr	MReturn	0.813		1.023	0.128	2.3132	0.373	0.439	2.331
NMGr	MReturn	0.763	27,497	0.661	0.060	2.2751	0.367	0.432	1.532
NICr	MReturn		24,332	5.067	0.394	5.4423	0.877	1.033	4.906
NBKr	MReturn	-0.849	43,582	0.672	0.017	4.4217	0.717	0.839	0.801
MARSHr	MReturn	0.504	14,222	0.137	0.002	2.7803	0.448	0.528	0.260
KAPCHOr	MReturn	0.204	5,377	-0.110	0.012	0.8723	0.141	0.166	-0.663
KNMr	MReturn	-0.221	31,147	0.452	0.027	2.3293	0.375	0.442	1.022
KENOLr	MReturn	-0.177	29,630	0.436	0.159	0.8693	0.140	0.165	2.643
KENAIRr	MReturn	-1.366	42,835	-0.201	0.001	4.4320	0.811	1.083	-0.186
KCBr	MReturn	0.538	10,565	1.886	0.088	5.2741	0.850	1.001	1.884
KAKUZlr	MReturn	0.194	15,051	0.858	0.059	2.9818	0.480	0.566	1.517
JUBr	MReturn	-0.573	35,635	0.857	0.046	3.3836	0.545	0.642	1.335
ICDCr	MReturn	0.350	114,276	0.751	0.026	4.0132	0.647	0.762	0.986
HFCKr	MReturn	0.559	38,808	2.717	0.096	7.2367	1.166	1.373	1.979
GWKr	MReturn	0.512	14,185	1.177	0.094	3.1733	0.511	0.602	1.955
FIRESTr	MReturn	0.377	34,278	3.206	0.163	6.2949	1.014	1.195	2.684
EXPRESr	MReturn	0.479	33,519	0.641	0.044	2.6039	0.420	0.494	1.298
EAPACKr	MReturn		49,104	0.305	0.700	0.9612	0.155	0.182	1.675
EACABLEr	MReturn	-0.288	8,243	0.994	0.083	4.3548	0.702	0.826	1.202
EABLr	MReturn	0.525	46,771	0.404	0.005	5.0133	0.808	0.951	0.424
DUNLOPr	MReturn		15,273	0.203	0.011	1.6523	0.266	0.314	0.647
DTKr	MReturn	-0.839	-147,286	1.684	0.142	3.5895	0.578	0.681	2.472
CTRUSTr	MReturn	-0.156	8,303	1.380	0.070	4.3747	0.705	0.830	1.663
CMCr	MReturn		605	1.081	0.128	2.4412	0.393	0.463	2.334
CFCr	MReturn	-0.744	57,069	1.608	0.083	4.0124	0.647	0.761	2.112
UNGAr	MReturn	0.145	-26,791		0.000	1.6031	0.258	0.304	0.010
KPLCr	MReturn	1.304	2,178	1.166	0.090	3.2054	0.516	0.608	1.918

1997 COMPANY DATA

Dependent Variable	Predictor Variable	Alpha	Earnings	Beta	R-Squared	Std Error of Estimate	Std Error of Alpha	Error Beta	t-Ratio Beta
BBKr	MReturn	-0.462	2,687	1.112	0.339	2.8731	0.484	0.255	4.355
BBONDr	MReturn	-0.729	-229,069	-0.178	0.012	3.0161	0.509	0.268	-0.665
BOCr	MReturn	0.140	5,243	0.173	0.024	2.0218	0.341	0.180	0.961
CARBr	MReturn	-0.278	59,102	0.234	0.033	2.3265	0.392	0.207	1.130
CARGENr	MReturn	-0.496	-121,247	-0.046	0.001	3.0370	0.512	0.270	-0.171
CBERGr	MReturn	0.674	44,443	-0.277	0.009	5.3700	0.906	0.477	-0.581
ATHlr	MReturn	-0.320		-3.595	0.079	9.0215	3.460	5.482	-0.656
BAMBr	MReturn	0.295	59,104	3.039	0.453	6.1844	1.043	0.549	5.530
BATr	MReturn	-1.314	44,225	1.415	0.281	4.1879	0.702	0.372	3.802
ABAUMr	MReturn	-1.135	-7,851	0.759	0.016	10.9637	1.849	0.974	0.779
UCHUMlr	MReturn	-0.296	28,340	0.990	0.210	3.5524	0.599	0.316	3.137
TOTALr	MReturn	-1.900	-4,563	2.917	0.516	4.7723	0.805	0.424	6.880
SNGr	MReturn	4.588	34,165	1.149	0.031	11.9484	2.015	1.062	1.083
SERENAr	MReturn	-1.009	45,314	0.786	0.041	3.7217	0.916	0.875	0.898
SCBr	MReturn	-0.932	16,214	1.344	0.359	3.3233	0.560	0.295	4.550
SASINlr	MReturn	0.633	36,229	0.975	0.166	4.0491	0.683	0.360	2.711
REAVr	MReturn	-0.887	55,625	1.433	0.160	6.0776	1.025	0.540	2.653
EAPORTr	MReturn	1.165	24,963	0.594	0.025	6.8340	1.152	0.607	0.979
PANAFRr	MReturn	0.356	38,932	0.119	0.001	5.7572	0.971	0.512	0.233
OLPEJr	MReturn	0.764		0.122	0.006	2.9342	0.495	0.261	0.467
NMGr	MReturn	1.828	22,156	-0.240	0.007	5.3131	0.896	0.472	-0.507
NICr	MReturn	0.04629	5,345	0.828	0.076	5.3459	0.901	0.475	1.743
NBKr	MReturn	-0.195	60,012	0.245	0.011	4.3917	0.741	0.390	0.627
MARSHr	MReturn	1.970	6,948	0.366	0.006	8.8490	1.492	0.706	0.465
LTEAr	MReturn	-0.745	21,412	0.09804	0.004	3.0440	0.513	0.270	0.362
KAPCHOr	MReturn		18,872						
KNMr	MReturn	-0.0902	42,137	0.223	0.005	5.7571	0.971	0.512	0.436
KENOLr	MReturn	-0.737	4,961	2.155	0.404	4.8444	0.817	0.430	5.007
KENAIRr	MReturn	-0.219	64,568	0.997	0.058	7.4601	1.258	0.663	1.503
KCBr	MReturn	0.111	10,508	0.681	0.075	4.4424	0.749	0.395	1.726
KAKUZlr	MReturn	1.088	22,263	0.176	0.005	4.8016	0.810	0.427	0.412
JUBr	MReturn	-0.763	10,313	2.192	0.284	6.4395	1.086	0.572	3.830
ICDCr	MReturn	0.001999	108,695	2.048	0.250	6.5707	1.108	0.584	3.507
HFCKr	MReturn	-0.535	52,624	1.223	0.327	3.2426	0.547	0.288	4.244
GWKr	MReturn	1.443	60,366	0.284	0.013	4.6621	0.786	0.414	0.685
FIRESTr	MReturn	-0.348	15,161	0.202	0.003	7.0868	1.195	0.630	0.321
EXPRESr	MReturn	-1.103	17,683	0.395	0.034	3.9030	0.658	0.347	1.140
EGAADr	MReturn	1.790		-0.148	0.001	10.6044	1.788	0.942	-0.157
EAPACKr	MReturn	-0.327	6,461	0.738	0.031	7.6901	1.297	0.683	1.081
EACABLEr	MReturn	-0.407	63,930	0.965	0.146	4.3092	0.727	0.383	2.520
EABLr	MReturn	-0.457	54,630	0.599	0.071	4.0152	0.677	0.357	1.678
DUNLOPr	MReturn	1.157	8,711	2.063	0.046	17.4344	2.940	1.549	1.332
DTKr	MReturn	-1.487	-334,646	1.825	0.323	4.8912	0.825	0.435	4.199
CTRUSTr	MReturn	0.174	51,435	0.954	0.279	2.8382	0.479	0.252	3.781
CMCr	MReturn	-0.972	57,445	0.878	0.108	4.6617	0.786	0.414	2.119
CFCr	MReturn	-1.533	31,886	3.327	0.634	4.6796	0.789	0.416	8.001
UNGAr	MReturn	0.02183	51,263	0.146	0.026	1.6530	0.279	0.147	0.997
KPLCr	*MReturn*	*-0.0829*	*46,700*	*6.996*	*0.596*	*10.6497*	*1.796*	*0.946*	*7.393*

1998 COMPANY DATA

Dependent Variable	Predictor Variable	Alpha	Earnings	Beta	R-Squared	Std Error of Estimate	Std Error of Alpha	Error Beta	t-Ratio Beta
BBKr	MReturn	0.093	3,000	0.141	0.007	2.8056	0.449	0.287	0.492
BBONDr	MReturn	0.504	43,064	0.427	0.076	2.3983	0.384	0.246	1.739
BOCr	MReturn	0.186	21,483	0.02677	0.001	1.6192	0.259	0.166	0.162
CARBr	MReturn	-0.00656	15,318	0.574	0.083	3.0680	0.491	0.314	1.827
CARGENr	MReturn	-0.237	-33,839	1.350	0.053	9.1415	1.464	0.936	1.442
CBERGr	MReturn	-0.260	22,610	0.973	0.112	4.3963	0.704	0.450	2.163
ATHlr	MReturn	-0.610		1.782	0.117	6.1660	0.988	0.631	2.823
BAMBr	MReturn	-0.469	43,712	1.325	0.102	6.3138	1.011	0.646	2.051
BATr	MReturn	0.130	42,802	-0.241	0.037	1.9872	0.318	0.203	-1.186
ABAUMr	MReturn	-0.004	3,393	0.037	0.007	0.7196	0.115	0.074	0.504
UCHUMlr	MReturn	0.254	50,468	0.747	0.050	5.2050	0.834	0.533	1.401
TOTALr	MReturn	-0.759	-817,549	1.381	0.261	3.7355	0.598	0.382	3.612
SNGr	MReturn	-2.678	-2,696	3.155	0.180	10.8180	1.733	1.107	2.849
SERENAr	MReturn	-0.286	826	0.893	0.047	6.4741	1.037	0.663	1.347
SCBr	MReturn	-0.432	19,743	0.433	0.048	3.0839	0.494	0.316	1.372
SASINlr	MReturn	0.854	58,781	0.0915	0.000	8.2000	1.313	0.839	0.109
REAVr	MReturn	-0.565	44,084	0.562	0.046	4.1293	0.616	0.423	1.329
EAPORTr	MReturn	0.615	48,027	3.933	0.289	9.9014	1.586	1.014	3.881
PANAFRr	MReturn	-1.216	29,762	0.03985	0.000	2.9569	0.474	0.303	0.132
OLPEJr	MReturn	0.03554		0.07583	0.008	1.3936	0.223	0.143	0.532
NMGr	MReturn	1.853	64,356	-0.00866	0.000	10.3676	1.661	1.061	-0.008
NICr	MReturn	-0.832	48,565	1.354	0.114	6.0553	0.970	0.620	2.185
NBKr	MReturn	-0.951	-2,821,773	0.462	0.013	6.4966	1.041	0.665	0.694
MARSHr	MReturn	-0.996	36,638	0.505	0.027	4.8275	0.773	0.494	1.022
LTEAr	MReturn	0.03519	52,805	0.01991	0.011	0.3090	0.050	0.032	0.629
KAPCHOr	MReturn	0.798	9,037	-0.0413	0.000	3.0355	0.486	0.311	-0.133
KNMr	MReturn	0.01997	-795,066	2.254	0.176	7.8344	1.255	0.802	2.810
KENOLr	MReturn	0.575	39,343	1.003	0.113	4.5082	0.722	0.461	2.174
KENAIRr	MReturn	0.159	3,280	1.073	0.063	6.6487	1.065	0.681	1.577
KCBr	MReturn	-0.650	62,832	0.904	0.143	3.5498	0.569	0.363	2.489
KAKUZlr	MReturn	1.187	11,561	1.218	0.105	5.7217	0.916	0.586	2.080
JUBr	MReturn	0.07758	11,372	0.526	0.112	2.3812	0.381	0.244	2.156
ICDCr	MReturn	0.125	149,744	2.207	0.300	5.4156	0.864	0.554	3.980
HFCKr	MReturn	-0.029	63,037	1.018	0.098	4.9564	0.794	0.507	2.006
GWKr	MReturn	1.302	27,157	0.977	0.079	5.3464	0.856	0.547	1.784
FIRESTr	MReturn	0.363	22,528	0.662	0.022	7.0122	1.123	0.718	0.922
EXPRESr	MReturn	-1.496	13,277	0.952	0.049	6.7622	1.083	0.692	1.376
EGAADr	MReturn	0.177		-0.144	0.003	4.3153	0.691	0.442	-0.325
EAPACKr	MReturn	-2.131	-37,557	-0.028	0.000	5.6583	0.906	0.579	-0.047
EACABLEr	MReturn	-0.862	63,685	0.382	0.025	3.8194	0.612	0.391	0.977
EABLr	MReturn	0.343	20,078	0.673	0.065	4.1047	0.657	0.420	1.601
DUNLOPr	MReturn	1.083	6,047	3.154	0.080	17.2088	2.756	1.762	1.790
DTKr	MReturn	-0.251	9,956	0.673	0.125	2.8585	0.458	0.293	2.299
CTRUSTr	MReturn	1.043	16,203	2.756	0.042	21.0072	3.365	2.150	1.282
CMCr	MReturn	0.02879	23,824	1.724	0.206	5.4271	0.869	0.556	3.103
CFCr	MReturn	-0.219	279,350	1.228	0.160	4.5257	0.725	0.463	2.651
UNGAr	MReturn	4.001	840,032	4.064	0.092	20.5260	3.288	2.101	1.934
KPLCr	MReturn	0.09928	22,483	0.727	0.083	3.3660	0.539	0.345	2.109

1999 COMPANY DATA

Dependent Variable	Predictor Variable	Alpha	Earnings	Beta	R-Squared	Std Error of Estimate	Std Error of Alpha	Error Beta	t-Ratio Beta
BBKr	MReturn	-0.391	2,254	0.509	0.039	3.4973	0.575	0.417	1.219
BBONDr	MReturn	-0.410	23,136	0.966	0.076	4.6472	0.765	0.555	1.742
BOCr	MReturn	0.261	14,185	0.686	0.054	3.9537	0.650	0.472	1.455
CARBr	MReturn	-0.0467	43,010	0.241	0.012	3.0120	0.496	0.359	0.671
CARGENr	MReturn	1.449	16,155	1.795	0.018	18.5134	3.046	2.209	0.812
CBERGr	MReturn	1.685	42,956	2.399	0.098	10.0172	1.648	1.195	2.007
ATHlr	MReturn	1.037		2.046	0.050	12.2622	2.017	1.463	1.398
BAMBr	MReturn	-0.310	60,640	1.279	0.114	4.9088	0.808	0.586	2.184
BATr	MReturn	0.240	57,750	-0.124	0.001	4.7473	0.781	0.566	-0.219
ABAUMr	MReturn	-0.378	12,678	-0.282	0.045	1.7825	0.293	0.213	-1.327
UCHUMlr	MReturn	0.126	47,781	0.04768	0.001	1.7950	0.295	0.214	0.223
TOTALr	MReturn	0.623	-423,422	2.022	0.206	5.4651	0.899	0.652	3.101
SNGr	MReturn	0.557	-120,571	4.406	0.183	12.8085	2.107	1.528	2.883
SERENAr	MReturn	0.456	13,800	1.165	0.125	4.2394	0.697	0.506	2.303
SCBr	MReturn	0.213	49,700	-0.0676	0.001	3.2180	0.529	0.384	-0.176
SASINlr	MReturn	-0.606	21,384	0.06021	0.001	2.7863	0.458	0.332	0.181
REAVr	MReturn	-0.365	-6,603	0.463	0.033	3.4735	0.571	0.414	1.116
EAPORTr	MReturn	-0.00377	-878,586	1.067	0.018	10.9927	1.809	1.312	0.814
PANAFRr	MReturn	2.163	10,647	1.994	0.055	11.3819	1.873	1.358	1.468
OLPEJr	MReturn								
NMGr	MReturn	-0.279	50,992	1.084	0.098	4.5341	0.746	0.541	2.004
NICr	MReturn	-0.282	38,679	-0.01854	0.000	5.5864	0.919	0.667	-0.028
NBKr	MReturn	-1.718	-2,428,762	0.673	0.018	6.8208	1.122	0.814	0.827
MARSHr	MReturn	-0.140	-211,118	-0.402	0.038	2.7828	0.458	0.332	-1.210
LTEAr	MReturn	-0.364	59,991	-0.0705	0.002	2.1615	0.356	0.258	-0.273
KAPCHOr	MReturn	1.156	23,600	0.257	0.007	4.3718	0.719	0.522	0.494
KNMr	MReturn	-2.375	-363,344	0.142	0.000	10.1510	0.167	1.211	0.117
KENOLr	MReturn	0.740	14,524	0.560	0.016	6.0367	0.993	0.720	0.777
KENAIRr	MReturn	-0.695	27,352	0.335	0.009	4.7500	0.781	0.567	0.591
KCBr	MReturn	-0.700	-1,554,665	1.553	0.197	4.3214	0.711	0.516	3.012
KAKUZlr	MReturn	-0.769	37,892	0.0692	0.000	4.6184	0.760	0.551	0.126
JUBr	MReturn	0.265	44,666	1.909	0.243	4.6475	0.765	0.555	3.443
ICDCr	MReturn	0.440	27,336	-0.00434	0.000	1.1615	0.191	0.139	-0.031
HFCKr	MReturn	-0.636	38,192	1.942	0.251	4.6236	0.761	0.522	3.520
GWKr	MReturn	-0.292	61,316	0.474	0.041	3.1499	0.518	0.376	1.260
FIRESTr	MReturn	-0.0354	62,609	1.577	0.228	3.9958	0.657	0.477	3.308
EXPRESr	MReturn	0.146	-13,399	3.432	0.347	6.4846	1.067	0.774	4.435
EGAADr	MReturn	-0.672		0.305	0.003	7.2748	1.197	0.868	0.352
EAPACKr	MReturn	-0.707	-26,204	0.630	0.020	6.0387	0.994	0.721	0.874
EACABLEr	MReturn	1.940	21,849	5.543	0.448	8.4689	1.393	1.011	5.484
EABLr	MReturn	0.717	13,818	-0.202	0.008	3.0026	0.494	0.358	-0.563
DUNLOPr	MReturn	-0.388	7,572	2.437	0.371	4.3702	0.719	0.521	4.674
DTKr	MReturn	0.437		0.607	0.059	3.3287	0.548	0.397	1.528
CTRUSTr	MReturn	-0.065	10,528	0.122	0.001	4.5653	0.751	0.545	0.224
CMCr	MReturn	-0.475	36,599	-0.0814	0.001	3.3014	0.543	0.394	-0.207
CFCr	MReturn	0.481	9,653	1.974	0.307	4.0876	0.673	0.488	4.046
UNGAr	MReturn	-1.686	483,500	1.326	0.075	6.4606	1.056	0.766	1.731
KPLCr	MReturn	-0.342	60,078	1.154	0.292	2.4763	0.407	0.295	3.905

2000 COMPANY DATA

Dependent Variable	Predictor Variable	Alpha	Earnings	Beta	R-Squared	Std Error of Estimate	Std Error of Alpha	Error Beta	t-Ratio Beta
BBKr	MReturn	0.978	2,068	2.446	0.119	5.3900	0.907	1.094	2.235
BBONDr	MReturn	-0.439	61,448	0.05991	0.000	5.5849	0.939	1.134	0.053
BOCr	MReturn	-0.323	9,179	2.392	0.221	3.6404	0.612	0.739	3.236
CARBr	MReturn	0.0480	26,677	0.945	0.030	4.3575	0.733	0.885	1.068
CARGENr	MReturn	3.244	-4,287	7.205	0.124	15.4977	2.607	3.146	2.290
CBERGr	MReturn	-0.234		0.806	0.055	2.6978	0.454	0.548	1.472
ATHIr	MReturn	0.308		2.741	0.140	5.5003	0.925	1.117	2.455
BAMBr	MReturn	0.572	42,320	-0.151	0.004	1.9255	0.324	0.391	-0.386
BATr	MReturn	1.333	58,422	2.721	0.208	4.2962	0.723	0.872	3.120
ABAUMr	MReturn	-0.646	4,302	-0.228	0.026	1.1402	0.192	0.231	-0.985
UCHUMIr	MReturn	0.378	57,904	-0.00284	0.000	2.0918	0.352	0.425	-0.007
TOTALr	MReturn	0.519	1,018,253	0.262	0.002	4.4875	0.755	0.911	0.288
SNGr	MReturn	-0.196		2.957	0.145	5.8074	0.977	1.179	2.508
SERENAr	MReturn	-0.056	17,516	-0.423	0.027	2.0664	0.348	0.420	-1.008
SCBr	MReturn	1.333	52,593	1.0750	0.038	4.3534	0.732	0.884	1.217
SASINIr	MReturn	-0.632	43,104	-0.143	0.001	4.7802	0.804	0.970	-0.147
REAVr	MReturn	-0.408	-34,010	0.545	0.006	5.7675	0.970	1.171	0.465
EAPORTr	MReturn	0.497	-419,468	0.745	0.021	4.1323	0.965	0.839	0.888
PANAFRr	MReturn	-0.989	10,647	-0.147	0.001	3.7049	0.623	0.752	-0.196
OLPEJr	MReturn								
NMGr	MReturn	-0.993	3,492	0.00509	0.000	2.8832	0.485	0.585	0.009
NICr	MReturn	0.242	50,445	1.719	0.086	4.5296	0.762	0.920	1.869
NBKr	MReturn	-0.315	-2,206,254	0.794	0.031	3.6115	0.607	0.733	1.084
MARSHr	MReturn	-0.291	-104,235	1.003	0.055	3.3574	0.565	0.682	1.472
LTEAr	MReturn		27,536						
KAPCHOr	MReturn		14,867						
KNMr	MReturn	1.527	-589,729	4.715	0.149	9.1135	1.533	1.850	2.548
KENOLr	MReturn	0.337	23,058	-0.670	0.033	3.2996	0.555	0.670	-1.117
KENAIRr	MReturn	0.825	38,416	1.708	0.106	4.0205	0.676	0.816	2.093
KCBr	MReturn	-0.193	-464,469	0.602	0.008	5.5018	0.925	1.117	0.539
KAKUZIr	MReturn	-1.249	-23,631	-0.0092	0.000	3.4829	0.586	0.707	0.131
JUBr	MReturn	-0.553	12,743	0.956	0.057	3.1440	0.529	0.638	1.497
ICDCr	MReturn	0.354	59,623	0.92600	0.020	5.2022	0.875	1.056	0.877
HFCKr	MReturn	-0.255	56,344	1.811	0.088	4.7193	0.794	0.958	1.890
GWKr	MReturn	-0.587	16,179	0.256	0.004	3.1732	0.534	0.644	0.398
FIRESTr	MReturn	-0.3960	30,340	0.756	0.008	6.6939	1.126	1.359	0.557
EXPRESr	MReturn	-0.321	-5,973	0.064	0.001	2.0191	0.340	0.410	0.156
EGAADr	MReturn	-0.0197		0.02049	0.011	0.1565	0.026	0.032	0.645
EAPACKr	MReturn	0.363	-99,618	0.017	0.000	1.6821	0.283	0.341	0.050
EACABLEr	MReturn	1.032	30,394	4.897	0.106	11.5445	1.942	2.344	2.090
EABLr	MReturn	0.288	60,685	-0.319	0.009	2.6929	0.453	0.547	-0.584
DUNLOPr	MReturn	-0.569		0.307	0.007	2.9407	0.495	0.597	0.514
DTKr	MReturn	-1.623		-1.980	0.115	4.4439	0.748	0.902	-2.195
CTRUSTr	MReturn	-0.150	27,241	0.385	0.066	1.1715	0.197	0.238	1.617
CMCr	MReturn	-1.519	56,922	-0.2300	0.001	4.8650	0.818	0.988	-0.233
CFCr	MReturn	-0.176	38,302	0.618	0.017	3.7848	0.637	0.768	0.804
UNGAr	MReturn	0.672	-2,626,235	5.507	0.256	7.6016	1.279	1.543	3.568
KPLCr	MReturn	-1.718	-1,607,982	0.498	0.010	4.0491	0.681	0.821	0.548

REGRESSION RESULTS OF RELATING EARNINGS TO BETA

Dependent Variable	Coefficient Beta	Coefficient Earnings	R-Squared	Std Error Beta	Std Error Alpha	t-ratio Beta	t-ratio Earnings	P-Value Beta	P-Value Earnings	COMMENT
BBK	5.229	-0.001700792	0.486	2.543	0.001009705	2.056	-1.684	0.132	0.191	SIG
BBOND	0.373	0.000002097	0.332	0.186	0.000001719	1.999	1.220	0.140	0.310	NOT SIG
BOC	1.162	-0.000025414	0.241	0.719	0.000026059	1.617	-0.975	0.204	0.401	NOT SIG
CARB	0.657	0.000000603	0.001	0.668	0.000015399	0.983	0.039	0.398	0.971	NOT SIG
CARGEN	3.654	0.000028200	0.365	1.593	0.000021497	2.288	1.312	0.106	0.281	SIG
CBERG	1.259	-0.000005260	0.011	0.837	0.000028360	1.503	-0.185	0.230	0.865	NOT SIG
EAPORT	2.053	0.000001544	0.212	0.750	0.000001717	2.736	0.899	0.072	0.435	SIG
KNM	0.352	-0.000003599	0.464	1.055	0.000002234	0.333	-1.611	0.761	0.206	NOT SIG
MARSH	0.423	-0.000001970	0.161	0.278	0.000002600	1.524	0.757	0.225	0.504	NOT SIG
NBK	0.484	-0.000000058	0.142	0.160	0.000000082	3.029	-0.705	0.056	0.532	SIG
NMG	0.054	0.000007317	0.102	0.501	0.000012532	0.107	0.584	0.921	0.600	NOT SIG
PANAFR	1.208	-0.000031751	0.253	0.729	0.000031498	1.658	-1.008	0.196	0.388	NOT SIG
REAVP	0.298	0.000005534	0.050	0.507	0.000013891	0.587	0.398	0.599	0.717	NOT SIG
SASINI	1.476	-0.000028152	0.535	0.571	0.000015160	2.587	-1.857	0.081	0.160	SIG
SCB	1.222	-0.000011184	0.087	0.790	0.000020931	1.547	-0.534	0.220	0.630	NOT SIG
SERENA	0.398	0.000055631	0.024	0.468	0.000020701	0.851	0.269	0.457	0.806	NOT SIG
SNG	2.601	-0.000016841	0.771	0.300	0.000005303	8.672	-3.176	0.003	0.050	SIG
UCHUMI	1.077	-0.000010744	0.086	1.031	0.000020247	1.045	-0.531	0.373	0.632	NOT SIG
TOTAL	1.285	-0.000000783	0.195	0.564	0.000000919	2.278	-0.852	0.107	0.457	SIG
KPLC	2.482	0.000001265	0.114	1.464	0.000002033	1.695	0.622	0.189	0.578	NOT SIG
UNGA	1.951	-0.000001009	0.315	1.074	0.000000858	1.816	-1.175	0.167	0.325	NOT SIG
CFC	1.997	-0.000002951	0.104	0.647	0.000004994	3.087	-0.591	0.054	0.596	SIG
CMC	1.319	-0.000018381	0.287	0.687	0.000016710	1.921	-1.100	0.151	0.352	NOT SIG
CTRUST	1.308	-0.000008306	0.020	0.931	0.000033636	1.405	-0.247	0.255	0.821	NOT SIG
DTK	-0.059	-0.000006578	0.414	0.739	0.000004520	-0.080	1.455	0.941	0.242	NOT SIG
DUNLOP	1.808	-0.000023299	0.009	1.240	0.000138126	1.458	-0.169	0.241	0.877	NOT SIG
EABL	0.282	-0.000001296	0.003	0.550	0.000012646	0.513	-0.102	0.644	0.925	NOT SIG
EACABLE	4.287	-0.000046010	0.223	2.176	0.000049625	1.970	-0.927	0.143	0.422	NOT SIG
EAPACK	0.401	0.000003163	0.252	0.169	0.000003149	2.365	1.005	0.099	0.389	SIG
LTEA	0.045	-0.000001102	0.198	0.050	0.000001279	0.905	-0.861	0.432	0.452	NOT SIG
ABAUM	0.078	-0.000027427	0.485	0.154	0.000016314	0.504	-1.681	0.649	0.191	NOT SIG
BAT	-1.987	0.000057765	0.155	3.857	0.000077944	-0.515	0.074	0.642	0.512	NOT SIG
BAMB	-2.901	0.000084804	0.435	2.845	0.000055794	-1.020	1.520	0.383	0.226	NOT SIG
EXPRES	1.444	-0.000038523	0.291	0.663	0.000034701	2.177	-1.110	0.012	0.348	SIG
FIREST	0.317	0.000029202	0.199	1.241	0.000033782	0.256	0.864	0.815	0.451	NOT SIG
GWK	0.962	-0.000009152	0.260	0.370	0.000008920	2.599	-1.026	0.080	0.380	SIG
HFCK	4.186	-0.000049081	0.648	1.059	0.000020863	3.953	-2.353	0.029	0.100	SIG
ICDC	-0.282	0.000015960	0.688	0.631	0.000006210	-0.447	2.570	0.685	0.082	NOT SIG
JUB	1.092	0.000008546	0.036	0.689	0.000025463	1.584	0.336	0.211	0.759	NOT SIG
KENOL	1.390	-0.000031095	0.163	1.026	0.000040611	1.355	-0.766	0.268	0.500	NOT SIG
KENAIR	0.852	-0.000001985	0.004	0.766	0.000018860	1.114	-0.105	0.347	0.923	NOT SIG
KCB	1.037	-0.000000229	0.077	0.332	0.000000457	3.123	-0.501	0.052	0.651	SIG
KAKUZI	0.434	0.000002221	0.009	0.330	0.000013821	1.316	0.161	0.280	0.883	NOT SIG

Out of 43 observations, 13 (30%) have a significant t-ratio while the remaining 30 (70%), are not significant.