THE EFFECT OF PORTFOLIO SIZE ON THE FINANCIAL PERFORMANCE OF PORTFOLIOS OF INVESTMENT FIRMS IN KENYA

PRESENTED BY

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DECLARATION

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

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This research project has been submitted for examination with my approval as university supervisor.

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DEDICATION

I dedicate this work to my wife and my children for their support during its preparation. Your patience and encouragement as I stayed away for long, either in class throughout the weekends, or in the field was really touching.

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A major research project like this is never the work of anyone alone. The contributions of many different people, in their different ways, have made this possible.

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ABSTRACT

The purpose of this study was to determine the effect of portfolio size on the financial performance of portfolios of investment firms in Kenya. The research question therefore was; what is the effect of portfolio size on the financial performance of portfolios of investment firms in Kenya.

The research design was descriptive survey study in nature since it focused on all investment firms in Kenya. The population of the study was all the investment firms in Kenya. This implied that the total population of this study is 90 firms as given by the Kenya Association of Investment Groups (KAIG). For representativeness purposes, the current study took a sample size of 50% of the population. This was 45 firms. This sample size was justified since this study could not anticipate how good the response rate would be. The 45 firms must have been in existence for 5 years. The study used secondary data from the financial statements of the investments firms. The selected period was 5 years. The researcher used frequencies, averages and percentages in this study. The researcher used Statistical Package for Social Sciences (SPSS) to generate the descriptive statistics and also to generate inferential results. Regression analysis was used to demonstrate the relationship between the portfolio size and the performance of investment firms

The finding reveal that investments firms in Kenya had put the biggest allocation of funds in stocks, followed by real estate portfolio and the least holding was in bond and money market funds. The findings also reveal that that the stocks portfolio generated the highest returns followed by bond and money market returns while real estate portfolio generated the least returns. The first objective of the study was to establish the optimal portfolio size for investment firms in Kenya. The findings in this study indicated that an optimal portfolio should hold between 16 and 20 stocks. The second objective of the study was to determine the effect of portfolio risk on the financial performance of the investment firms. Results indicate that there is a positive relationship between portfolio risk and return.

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CIS	Collective Investment Scheme
CMA	Capital Market Authority
EMH	Efficient Markets Hypothesis
IRR	Internal Rate of Return
NPV	Net Present Value
PI	Profitability Index
REITS	Real Estate Investment Trusts
ROA	Return on Assets
ROE	Return on Equity
SPSS	Statistical Package for Social Sciences
UITs	Unit Investment Trusts
US	United States

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Economic agents save so as to take care of future expenses which can not be estimated with accuracy. The saving are usually put into some form of an investment. Murad (1964) defines the term investment as the purchase of any income-yielding asset, such as securities or real estate. Investment can also be defined as the addition to the value of the capital equipment which has resulted from the productive activity of the period. There is a variety of reasons why an economic agent such as a household or a firm can engage in investments. The primary reason for engaging in investment is to earn returns. Another reasons for investing is to increase some ones wealth. The only way to protect savings is to invest in products that have the ability to grow at a faster rate than that of inflation. Another reason to invest is to achieve the longer term financial goals such as retiring from work to live a life of leisure. Or it can be investing the money to provide a certain level of income during retirement (Pozen and Hamacher, 2011).

The number of stocks to be included and the method to allocate funds among the selected stocks are two important criteria in forming a stock portfolio. The concern about the number of stocks stems from the theorical arguments advanced by Markowitz (1952) and his famous portfolio theory of investment. The portfolio theory argues that the concern of the investment manager should not be the return of a particular stock but rather the return of the overall portfolio. This is because a portfolio may have a lower risk and may give superior returns in the long run. According to Markowitz (1952) higher risk call for higher returns. Therefore, an investor needs to take into consideration the risk-return relationship when constructing an optimal portfolio (Gupta, 2011).

1.1.1 The Concept of Portfolio Size

Portfolio can be defined as a collection of investments all owned by the same individual or organization. These investments often include stocks, which are investments in individual businesses; bonds, which are investments in debt that are designed to earn interest; and mutual funds, which are essentially pools of money from many investors that are invested by professionals or according to indices. It can also be defined as a grouping of financial assets such

as stocks, bonds and cash equivalents, as well as their mutual, exchange-traded and closed-fund counterparts. Portfolios are held directly by investors and/or managed by financial professionals (Renshaw, 2008).

Construction of an investment portfolio is brought about by the need to diversify. Diversification is a technique that reduces risk by allocating investments among various financial instruments, industries and other categories. It aims to maximize return by investing in different areas that would each react differently to the same event. Most investment professionals agree that, although it does not guarantee against loss, diversification is the most important component of reaching long-range financial goals while minimizing risk. Obviously owning five stocks is better than owning one, but there comes a point when adding more stocks to your portfolio ceases to make a difference. There is a debate over how many stocks are needed to reduce risk while maintaining a high return. The most conventional view argues that an investor can achieve optimal diversification with only 15 to 20 stocks spread across various industries (Kapusuzogulu and Karacaer, 2009).

1.1.2 Financial Performance

There are various measures of organizational performance. However the most used is profitability. Profitability measures the extent to which a business generates a profit from the factors of production: labor, management and capital. Profitability analysis focuses on the relationship between revenues and expenses and on the level of profits relative to the size of investment in the business (Gilbert and Wheelock, 2007).

Four useful measures of firm profitability are the rate of return on firm assets (ROA), the rate of return on firm equity (ROE), operating profit margin and net firm income. The ROA measures the return to all firm assets and is often used as an overall index of profitability, and the higher the value, the more profitable the firm business. The ROE measures the rate of return on the owner's equity employed in the firm business. It is useful to consider the ROE in relation to ROA to determine if the firm is making a profitable return on their borrowed money. The operating profit margin measures the returns to capital per dollar of gross firm revenue. Recall, the two ways a firm has of increasing profits is by increasing the profit per unit produced or by increasing the volume of production while maintaining the per unit profit. The operating profit

margin focuses on the per unit produced component of earning profit and the asset turnover ratio (discussed below) focuses on the volume of production component of earning a profit (Crane, 2011).

Net firm income comes directly off of the income statement and is calculated by matching firm revenues with the expenses incurred to create those revenues, plus the gain or loss on the sale of firm capital assets. Net firm income represents the return to the owner for unpaid operator and family labor, management and owner's equity. Like working capital, net firm income is an absolute dollar amount and not a ratio, thus comparisons to other firms is difficult because of firm size differences (Gilbert and Wheelock, 2007**)**.

In investment circles, it is highly advisable to not only look at the positive aspects of investing (positive returns) but also to looks at the negative aspects of investing (risk). Therefore, performance in investment circles does not necessarily consider returns; it may as well consider the risk aspect (Domian, Louton and Racine, 2007).

1.1.3 Relationship between Portfolio Size and Performance

The mutual fund industry plays an increasingly important role in the U.S. economy. Over the past two decades, mutual funds have been among the fastest growing institutions in this country. At the end of 1980, they managed less than $150 billion, but this figure had grown to over $4 trillion by the end of 1997—a number that exceeds aggregate bank deposits (Pozen, 1998). Indeed, almost 50 percent of households today invest in mutual funds (Investment Company Institute, 2000). The most important and fastest-growing part of this industry is funds that invest in stocks, particularly actively managed ones. The explosion of newsletters, magazines, and such rating services as Morning star attests to the fact that investors spend significant resources in identifying managers with stock-picking ability. More important, actively managed funds control a sizeable stake of corporate equity and play a pivotal role in the determination of stock prices (Grinblatt et al., 1995; Gompers and Metrick, 2001). Moreover, the nature of the economies of scale in this industry may also have implications for the agency relationship between managers and investors and the optimal compensation contract between them (e.g., Brown et al., 1996; Becker and Vaughn, 2001).

Therefore, understanding the effects of fund size on fund returns is an important first step toward addressing such critical issues. While the effect of scale on performance is an important question, it has received little research attention to date. Some practitioner point out that there are advantages to scale such as, more resources for research and lower expense ratios. Others believe, however, that a large asset base erodes fund performance because of trading costs associated with liquidity or price impact (Perold and Salomon, 1991; Lowenstein, 1997). Whereas a small fund can easily put all of its money in its best ideas, a lack of liquidity forces a large fund to have to invest in its not-so-good ideas and take larger positions per stock than is optimal, thereby eroding performance. Using a small sample of funds from 1974 to 1984, Grinblatt and Sheridan Titman (1989) find mixed evidence that fund returns decline with fund size. Needless to say, there is no consensus on this issue.

1.1.4 The Context of Investment Firms in Kenya

An investment firm is a financial institution that consolidates funds from individuals and invests in securities issued by other companies. Investments companies are companies who hold security for other companies. These security holdings are strictly for investment purposes; this is the firm's main business model. They take the money given to them on behalf of the company's shares holders and invest their money, returning the share as either a profit or a loss (Fink, 2008)

There are generally three main types of investment companies: Mutual funds, or open-end management investment companies. Mutual funds are a professionally managed collective investment schemes. A mutual fund pools money from many investors into a pool, and invests in investment securities, such as stocks, bonds, other mutual funds, securities, commodity (precious metals), or a combination of all. Generally, the mutual fund will have a fund manager that trades the fund's investments in accordance with the investment objectives as set by the firm, Closed-ended funds, or closed-end management investment companies. Closed-ended funds are investment strategies with limited number of shares. Shares are not usually redeemable for cash or securities except until the fund is liquidated and new shares are rarely issued once the fund was launched and Unit investment trusts, or UITs. UITs are created for a specific time limit with a fixed portfolio – the UIT securities will not be sold or new ones will not be bought, except in certain limited situations. The portfolio may contain several different types of securities, with the two main types being stock trusts (equity) and bond trusts (fixed income). Brokers sell UITs

directly to investors, and are created by a sponsor. UITs have a set life (Pozen and Hamacher, 2011).

Currently, there are 16 collective investment schemes registered under the CMA Act. There is an additional 74 firms which undertake investments on behalf of their clients. This brings to a total of 90 firms that undertake investing in Kenya. The 90 firms are listed members of the Kenya association of investment groups and can be accessed at http://www.kaig.org/.

1.2 Statement of the Problem

According to Gupta (2011) putting all your eggs in one basket is a risky decision. Therefore, an important principle of investment is to diversify your portfolio. Spreading investments over multiple, unrelated products reduce the risk of a sudden, unexpected outcome. In a diversified portfolio, a loss (risk) in one product is offset by gains from another product. As such one can expect to get decent returns, though the returns would not be exceptionally high or exceptionally low. However, the question in the mind of investment managers has been as to how many individual stocks or investments are needed to compose an optimal portfolio. An optimal portfolio is preferred over a maximized portfolio due to the risk return tradeoff. Investments firms in Kenya have grown in count. In addition, the capital outlays and contributions of their members have increased. However, investment managers of investment firms in Kenya always have an uphill task of deciding the number of stocks to include in a portfolio as well as the composition of a portfolio.

The number of stocks to be included and the method to allocate funds among the selected stocks are two important criteria in forming a stock portfolio. Many of the studies conducted to find optimal portfolio size do not reach a consensus, and some even suggested that large portfolios with 30 stocks or more may not be well diversified (Domian, Louton and Racine, 2007, Statman 1987). Another dimension of problem to portfolio formation is that the unconstrained portfolio optimization as implied in the Markowitz's mean-variance approach introduces difficulty in arriving at an optimal solution that is practical (Chang, Meade, Beasley, and Sharaiha 2000). Many studies Statman (1987) and Wagner and Lau (1971) compared the risk performance of portfolio in the context of the modern portfolio theory where risk (typically the variance) is minimized for a given level of expected return. Studies such as Ng. (2008) show that both mean

returns and variance were shown to decline as portfolio size increases. Global studies indicate that the question of the optimal portfolio size is an elusive one and that empirical studies have always shown a difference in opinions.

Locally, Nyenze (2010) investigated the effect of assets allocation on retirement benefits fund performance in Kenya but failed to conclude on the number of stocks that make up an optimal portfolio. In addition, the author could not establish whether the size of a portfolio affects performance. Another local study, Kagunda (2010) did a comparison of performance between unit trusts and a market portfolio of shares at NSE but failed to underscore the issue of the optimal portfolio size and its effect on performance. Ngacha (2009) conducted a comparative study on performance between value & growth stocks at the NSE but failed to investigate the effect of portfolio size and composition on the performance of investment schemes in Kenya. Pudha (2010) conducted a survey on the factors that motivate local individual investors to invest in shares of companies quoted at the NSE and concluded that investors were motivated by returns among other factors. However, the study failed to investigate the effect of portfolio size and composition on the performance of investment schemes in Kenya.

Therefore, the difference in opinions in global studies and the inadequacies of local studies form the research gap that this study wishes to address. The research question therefore was; what is the effect of portfolio size on the financial performance of portfolios of investment firms in Kenya.

1.3 Research Objectives

The main research objective was to investigate the effect of portfolio size on the financial performance of portfolios of investment firms in Kenya

1.3.1 Specific Research Objectives

i. To establish the optimal portfolio size for investment firms in Kenya.

ii. To determine the effect of portfolio risk on the financial performance of the investment firms.

1.4 Value of the Study

The current study may have implications for policy and practice. First, the study may assist the regulators to make investment guidelines for investment firms with a public orientation. For instance, insurance firms and retirement investment firms may need guidance on how many portfolios to hold and how to ensure that the risk is minimized.

The study may inform practice as investment managers may use the findings of the study to construct optimal portfolios. Such optimal portfolios may bring sustainability and competitive advantage to investment firms as results of superior financial returns.

The study may have implications for theory building as it may contribute to the discussion on optimal portfolio selection academic discussion. The study results may reduce the inconclusiveness and the wide controversy surrounding the discussion of the optimal portfolio size. The study finding may also validate theories of portfolio investing such as Markowitz portfolio theory, Sharpe ratio and its relevance to portfolio optimization among other theories.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The chapter explored the literature that focuses on the area of optimal portfolio size and the relationship of portfolio composition on the performance of investment firms. The chapter commenced by reviewing the theories that informed the discussion on portfolio size. It then dwelt on the empirical studies that discuss the link between portfolio composition and performance of investment firms.

2.1 Theoretical Review

The study was hinged on various investments theories; these are Markowitz portfolio theory, Capital Assets Pricing Model (CAPM) and Tobin Theory of Investment

2.1.1 Markowitz Portfolio Theory

Portfolio theory was first discovered and developed by Harry Markowitz in the 1950's. His work forms the foundation of modern Finance. The resulting theory as modified and extended by many researchers is often called Modern Portfolio Theory." In portfolio theory it is often assumed for the sake of simplicity that returns are normally distributed over the time period under analysis. With this assumption, portfolio efficiency is determined by simply compounding expected returns and the standard deviations of the compounded returns. The additional assumption of negative exponential utility leads to portfolio optimization problems that are linear in return and variance.

The assumption of normally distributed returns leads to problems when trying to extend the analysis to longer time periods or to multiple time periods, since long-term returns are far from normally distributed. Indeed, even over a single year, the lognormal distribution implied by the random walk model, while still not perfect, is a much better approximation to the distribution of observed historical returns for common financial assets like stocks and bonds. Lognormal returns are also consistent with the Central Limit Theorem and with limited liability, two theoretical issues which also cause problems if we assume normally distributed returns.

In the random walk model, portfolio efficiency is determined by instantaneous expected returns and the standard deviations of these returns. The additional assumption of iso-elastic utility leads to portfolio optimization problems that are linear in return and variance.

2.1.2 The Capital Asset Pricing Model

Sharpe (1964) formalized the Capital Asset Pricing Model (CAPM). This makes strong assumptions that lead to interesting conclusions. Not only does the market portfolio sit on the efficient frontier, but it is actually Tobin's super-efficient portfolio. According to CAPM, all investors should hold the market portfolio, leveraged or de-leveraged with positions in the risk-free asset. CAPM also introduced beta and relates an asset's expected return to its beta.

The risk and return model that has been in use the longest and is still the standard in most real world analyses is the Capital Asset Pricing Model. There are several assumptions made by the model. While diversification reduces the exposure of investors to firm specific risk, most investors limit their diversification to holding only a few assets. Even large mutual funds rarely hold more than a few hundred stocks and many of them hold as few as ten to twenty. There are two reasons why investors stop diversifying. One is that an investor or mutual fund manager can obtain most of the benefits of diversification from a relatively small portfolio, because the marginal benefits of diversification become smaller as the portfolio gets more diversified. Consequently, these benefits may not cover the marginal costs of diversification, which include transactions and monitoring costs. Another reason for limiting diversification is that many investors and fund managers believe they can find undervalued assets and thus choose not to hold those assets that they believe to be fairly or overvalued. The capital asset pricing model assumes that there are no transactions costs, all assets are traded and investments are infinitely divisible (i.e., you can buy any fraction of a unit of the asset). It also assumes that everyone has access to the same information and that investors therefore cannot find under or overvalued assets in the market place. Making these assumptions allows investors to keep diversifying without additional cost. At the limit, their portfolios will not only include every traded asset in the market but will have identical weights on risky assets. The fact that this diversified portfolio includes all traded assets in the market is the reason it is called the market portfolio, which should not be a surprising result, given the benefits of diversification and the absence of transactions costs in the capital asset pricing model. If diversification reduces exposure to firm-

specific risk and there are no costs associated with adding more assets to the portfolio, the logical limit to diversification is to hold a small proportion of every traded asset in the market. If this seems abstract, consider the market portfolio to be an extremely well diversified mutual fund that holds stocks and real assets, and treasury bills as the riskless asset. In the CAPM, all investors will hold combinations of treasury bills and the same mutual fund.

2.1.3 Tobin Theory of Investment

James Tobin (1958) expanded on Markowitz's work by adding a risk-free asset to the analysis. This made it possible to leverage or deleverage portfolios on the efficient frontier. This leads to the notions of a super-efficient portfolio and the capital market line. Through leverage, portfolios on the capital market line are able to outperform portfolio on the efficient frontier.

James Tobin (1958) added the notion of leverage to portfolio theory by incorporating into the analysis an asset which pays a risk-free rate. By combining a risk-free asset with a portfolio on the efficient frontier, it is possible to construct portfolios whose risk-return profiles are superior to those of portfolios on the efficient frontier

2.2 Empirical Studies

Grinblatt and Titman (1989) and Gorman (1991) found associations between portfolio size and both the average performance and systematic risk of US mutual funds, although their interpretations of the results differed. Grinblatt and Titman (1989) examined portfolio size-return relationships for a sample of 274 funds divided into five portfolio size categories for the period 1975-1984. The study also investigated the relationship of expense ratios, management fees and fund turnover to asset size. Their results showed that, gross of expenses, the smallest funds achieved significantly better gross risk adjusted return performance (2.5%) than larger funds.

The concentration of aggressive growth funds among the small fund category may help to explain the inverse relationship between portfolio size and gross returns. But even with this factor removed, smaller funds still generated higher returns than larger funds. Consequently, the authors concluded that both net asset value and investment objective are determinants of abnormal performance. While smaller funds showed superior gross performance, they also incurred the highest transactions costs. The high transactions costs erode the superior returns, so

that the net return to investors did not differ from that of the larger funds. Consequently, investors cannot take advantage of superior performance of these smaller fund managers by purchasing shares in their funds.

Gorman (1991) also found that smaller funds achieved higher returns. She then tested whether superior performance came from running portfolios with higher systematic risk profiles by modeling a fund manager's excess returns using the capital asset pricing model with a portfolio size variable added. The results showed that higher risk did not completely explain superior performance. Even after allowance for time related variations in beta (short-run versus long-run), the portfolio size effect remained. Using an historical beta of 0.8 and weighted least squares estimates, the estimated 12 year return for a $10 million fund was 40% higher than for a billion dollar fund.

The negative size effect was explained in three ways. First, lower returns could reflect a large size effect. Investing large blocks of funds requires high capitalization stocks to avoid price reactions which increase investment costs. Large capitalization stocks are less costly but may also give less return per investment dollar in comparison to smaller companies which generate higher returns but significantly increasing portfolio risk. Thus smaller funds are likely to run higher return/higher risk portfolios than large funds. Madden et al (1986) found a consistent and significant inverse relationship between mutual fund performance and the market capitalization (size) of constituent equities. Second, the size variable may reflect fund purpose. Size is a function of managerial policies, incentive structures and organizational overhead. Compensation schemes of large and small funds place different weights on investment performance. Finally, smaller funds may experience higher returns since personality traits common to successful managers may attract them to small funds through congenial working conditions.

Bird, Chin and McCrae (1983) tested for a correlation between fund size and performance based on quarterly rates of return from January 1973 to June 1981 for 15 pooled superannuation fund managers who had continuous returns over the period. They found no significant relationship between fund size and manager performance over the 34 quarters. However, during the second half of the period they found a positive relationship using risk adjusted performance measures and a negative relationship on a non-risk adjusted basis. The smaller funds generated higher returns but ran higher risk portfolios than larger funds. These results may suffer from

survivorship bias since they were based on a sample of only 15 managers with continuous returns over the period. No tests were conducted to ascertain whether the exclusion of non-survivors or managers who operated over only part of the period introduced over-performance bias (Grinblatt and Titman 1995, Garcia and Gould 1993, Brown et al 1992).

Elton and Gruber (2002) conducted a study on risk reduction and portfolio size an analytical solution. The relationship between risk of a portfolio and the number of securities in that portfolio has been of interest to economist for a number of years. Weiss and Nikitin (2001) conducted a study on effects of ownership composition on firm performance: evidence from the Czech Republic and concluded that when foreigners become the major shareholders of Czech firms the performance of those firms improves, as does their investment rates. Concentrated ownership or control by investment funds, or any other entities except possibly municipalities, did not have any beneficial effects. There has been considerable controversy about foreigners gaining control of domestic companies in less-developed countries. We find that when the foreigners become the major shareholder in Czech firms, profitability increases, as does the investment rate.

Zuqaier and Ziud (2011) conducted a study on the effect of diversification on achieving optimal portfolio. The object of this study was to examine the effect of diversification, as the number of stocks increases, on the riskiness of the portfolio at Amman Stock Exchange (ASE) over the period 2005 to 2010. To test the hypotheses, a sample of 100 listed companies weekly closing prices were used. In order to trace the relationship between portfolio size and portfolio risk; researches depend on Markowitz model in computing the variance of simulated portfolios. The results assured the existence of a significant statistical relationship between portfolio size and the risk reduction. Diversification benefits can be obtained when the portfolio consists of 15-16 stocks. Results revealed that diversification benefits increases with at a decreasing rate. The study has recommended activating the bonds market, using new investment instruments, and trying to diversify internationally.

Vora and Mcginnis (2000) conducted a study on the asset allocation decision in retirement: lessons from dollar-cost averaging. The author investigated the question of how should a retiree allocate his wealth between stocks and bonds. They addressed this question by studying whether it would have been better to have consumed periodically from stocks than from bonds over the

seven decades of U.S. financial markets beginning in 1926 and ending in 1995. The findings indicated that retirees would have consistently done better by investing in stocks as opposed to bonds. When the authors analyzed dispersion in consumption around its mean, they found that there are greater chances for low consumption from the bond portfolio and greater chances for high consumption from the stock portfolio. Thus, we challenge the conventional wisdom that one should move away from stocks and towards bonds as one age.

Woerheide and Persson (2000) conducted a study on an index of portfolio diversification. The authors asserted that a recurring question in the literature concerning diversification is what is the minimum number of securities required to achieve adequate diversification? Complete diversification would be achieved if one held a share of the "market" portfolio, defined as the portfolio of all assets. Adequate diversification is achieved when the variability of one's portfolio is not significantly different than that of the market portfolio. The two classic studies which define the "minimum" portfolio size to be adequately diversified are Evans and Archer (E&A) (1968) and Fisher and Lorie (F&L) (1970). The word "minimum" is used in the sense that diversification beyond this size has little economic value in terms of risk reduction and may contain significant costs in terms of transaction fees and monitoring activity. The problem is that studies on this topic assume equally distributed holdings. In reality, portfolios are not evenly divided. The purpose of their paper was to evaluate the ability of five different measures of diversification to provide meaningful information about the degree of diversification of an unevenly distributed stock portfolio. The complement of the Herjindahl index was found to be the best of the five measures and its explanatory power was deemed to be adequate for general use.

Fisher and Lorie (F&L) (1970) measure risk by examining various measures of dispersion for wealth ratios over various time periods for portfolios of sizes 1, 2, 8, 16, 32, and 128 securities. For our purposes, their most significant result probably is the observation that approximately 80 percent of the achievable reduction in dispersion can be attained by holding eight stocks (the reductions range from 65 to 91 percent).

In a follow-up study to Evans and Archer (E&A) (1968), Upson, Jessup, and Matsumoto (1975) looked at the standard deviation of the standard deviations, and concluded that portfolio

managers should diversify among more than 16 stocks, and that diversifying among even 30 or more stocks can be worthwhile in terms of risk reduction.

Statman (1987) argues that a well-diversified portfolio must include at least 30 to 40 stocks. Statman's analysis is based on the assumption that all investors have the opportunity to buy no-load index funds, and thus the cost of adding assets combined with the risk reduction benefits of adding these assets must be compared to the cost and risk of portfolios that combine the risk-free asset with an index fund.

A variation on Statman's study by Shanker (1989) shows that the conclusions about portfolio size are dependent on the size of the benchmark portfolio used for comparison and the assumed size of transaction fees. Smaller benchmark portfolios suggest smaller optimal portfolio sizes, and smaller transaction fees imply larger optimal portfolios. A follow-up study by Murphy (1991) questions the validity of the numbers used by Statman, and concludes that portfolios of the size suggested by E&A and F&L may in fact provide the minimum necessary degree of diversification.

Much of the literature on portfolio size examines what happens to the standard deviation function in the E&A study if various conditions are placed on the types of stocks in the portfolio. In one of the most cited studies, Solnik (1974) shows that more efficient diversification is possible when one considers foreign securities, particularly if one hedges for exchange rate risk. The greater efficiency in diversification is demonstrated by the result that E&A's standard deviation curve declines at a faster rate and to a lower level when foreign securities are added to the stock population.

Wagner and Lau (1971) show that far fewer stocks are necessary to achieve a specific level of diversification when the portfolio consists of stocks rated highly by the Standard & Poor Stock Guide than those rated poorly. Klemkosky and Martin (1975) show that diversification can be more readily achieved with low-beta stocks than with high-beta stocks. They also show that diversification can be more readily achieved when stock classifications are considered. Their stock classifications included growth stocks, cyclical stocks, stable stocks, and oil stocks.

All of the above studies are empirical. There are some theoretical studies that have shed light on the topic of portfolio size and diversification, Goldsmith (1976) shows that not only do

transaction fees limit the size of the number of securities in a portfolio, but they will also cause the optimal number of securities to hold in a portfolio a function of an investor's initial wealth.

Conine and Tamarkin (1981) show that investor preference for positive skewness combined with other assumptions of perfect capital market may severely restrict the number of securities held by an individual even without transaction fees. Gupta, Koon and Shahnon (2001) conducted a study on the number of securities that make a diversified portfolio in KLSE stocks. The author period of study was September 1988 to June 1997. A sample of 213 stocks traded on the Kuala Lumpur Stock Exchange-KLSE are considered to form portfolio sets using the random diversification method of Statman (1987).The study found out that on average, a well diversified stocks of the Malaysian funds consists of 27 randomly selected securities.

Surz and Price (2000) point out that industry rules-of-thumb on the number of stocks needed for a well-diversified portfolio are simply not adequate. These rules-of-thumb most often state that 15 to 30 stocks are enough. To determine the number of stocks required to achieve a desired level of portfolio diversification, Surz and Price computed all possible combinations of NYSE and NASD traded stock portfolios of various sizes for the 1986 to 1999 period. They argued that a diversification rule-of-thumb commonly used in investment management – that 30 randomly chosen stocks will achieve 95% of diversification – is inadequate. Using tests of statistical significance and market tracking error, Surz and Price found that the number of stocks required to achieve diversification is much higher than commonly thought. Surz and Price found that the average randomly chosen 30-stock portfolio achieved only about 85% of possible diversification. A 60-stock portfolio achieved about 88% of possible diversification. Using computer optimization techniques and favoring large capitalization stocks both helped to improve portfolio diversification, when compared with randomly selected portfolios.

Rahman and Kader (2010) conducted a study on how many stocks make a well diversified portfolio by evaluating evidence from Dhaka Stock Exchange (DSE) The authors argued that advantages of diversification attracted investors ever since the inception of this concept. However, the problem is in the determination of the exact size of well diversified portfolio. In literature, there are ad hoc as well as empirical suggestions but those studies are not done on Bangladeshi data. Their paper adds in the literature with theoretical derivation and empirical estimation of the size of well diversified portfolio. They found that theoretical derivation does

not point to a particular portfolio size as well diversified. It does not even conclusively confirm the existence of such portfolio. For empirical estimation, the authors have included data of 226 actively traded DSE listed stocks from 1997 to 2008. Forming equal weighted portfolio with randomly picked shares Rahman and Kader (2010) found that advantages of diversification significantly drop once we include 50 to 60 shares in our portfolio.

Statman (2004) conducted a study on the portfolio diversification puzzle. The author suggested that the levels of diversification in U.S. investors' equity portfolios present a puzzle. Today's optimal level of diversification, measured by the rules of mean–variance portfolio theory, exceeds 300 stocks, but the average investor holds only 3 or 4 stocks. The diversification puzzle can be solved, however, in the context of behavioral portfolio theory. In behavioral portfolio theory, investors construct their portfolios as layered pyramids in which the bottom layers are designed for downside protection and the top layers are designed for upside potential. Risk aversion gives way to risk seeking at the uppermost layer as the desire to avoid poverty gives way to the desire for riches. But what motivate this behavior is the aspirations of investors, not their attitudes toward risk. Some investors fill the uppermost layer with the few stocks of an undiversified portfolio; others fill it with lottery tickets. Neither lottery buying nor undiversified portfolios are consistent with mean–variance portfolio theory, but both are consistent with behavioral portfolio theory.

Ordegard (2009) present his argument in form of a picture. This picture is then used to introduce the difference between systematic and unsystematic risk, where the unsystematic risk is the risk that can be diversified away by increasing the number of stocks in the portfolio.

Ordegard (2009) argued that the curve always has the same shape, the portfolio standard deviation decreases with the number of stocks, but flattens out after a while. The number of stocks at which the curve flattens out is used as a measure of how many stocks are "enough" to achieve most of the diversification. In US papers there is some variation in this number, for example Evans and Archer (1968) argues for 10 stocks being enough, Wagner and Lau (1971) concludes that most of the diversification is achieved at 15 stocks, while Statman (1987) argues for 30 stocks.

2.3 Chapter Summary

In finance, diversification means reducing risk by investing in a variety of assets. If the asset values do not move up and down in perfect synchrony, a diversified portfolio will have less risk than the weighted average risk of its constituent assets, and often less risk than the least risky of its constituents. Therefore, any risk-averse investor will diversify to at least some extent, with more risk-averse investors diversifying more completely than less risk-averse investors. Diversification is one of two general techniques for reducing investment risk. The other is hedging. Diversification relies on the lack of a tight positive relationship among the assets' returns, and works even when correlations are near zero or somewhat positive. Hedging relies on negative correlation among assets, or shorting assets with positive correlation.

Nyenze (2010) investigated the effect of assets allocation on retirement benefits fund performance in Kenya but failed to conclude on the number of stocks that make up an optimal portfolio. In addition, the author could not establish whether the size of a portfolio affects performance. Another local study, Kagunda (2010) did a comparison of performance between unit trusts and a market portfolio of shares at NSE but failed to underscore the issue of the optimal portfolio size and its effect on performance. Ngacha (2009) conducted a comparative study on performance between value & growth stocks at the NSE but failed to investigate the effect of portfolio size and composition on the performance of investment schemes in Kenya. Pudha (2010) conducted a survey on the factors that motivate local individual investors to invest in shares of companies quoted at the NSE and concluded that investors were motivated by returns among other factors. However, the study failed to investigate the effect of portfolio size and composition on the performance of investment schemes in Kenya. Therefore, the difference in opinions in global studies and the inadequacies of local studies form the research gap that this study wishes to address. The research question therefore is; what is the effect of portfolio size on the financial performance of portfolios of investment firms in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discussed the type of research design, population, and target population, sampling frame, sample, sample size, sampling technique, instruments to be used, pilot test and data analysis.

3.2 Research Design

Research design refers to how data collection and analysis are structured in order to meet the research objectives through empirical evidence economically (Chandran, 2004; Cooper and Schindler, 2006).

The current study took a descriptive survey design. A survey is a research design that involves the analysis or study of more than one unit/organization, individual. A descriptive survey research is a research design that attempts to show the status quo of study items. (Sekaran 2006; Cooper and Schindler, 2006).

3.3 Population

A population refers to an entire group of individuals, events or objects having a common observable characteristic (Mugenda & Mugenda, 2003). The population of the study was all the investment firms in Kenya. This implied that the total population of this study is 90 firms as given by the Kenya Association of Investment Groups (KAIG).

3.4 Sample

A sampling frame is a list of population from which a sample was drawn (Leary, 2001).It is the source material or device from which list of all elements within a population that can be sampled is drawn.

Random sampling was used to select the 45 firms. According to the Australian Bureau of Statistics (2006), a random sample is a method of sampling that involves the selection of sample

units in the most unbiased way possible. Examples of random sampling techniques include; the lottery method.

3.5 Data Collection Procedure

The study used secondary data from the financial statements of the investments firms. The selected period was year 2007 to year 2011 (5 years).

3.6 Data Analysis

The researcher used frequencies, averages and percentages in this study. The researcher used Statistical Package for Social Sciences (SPSS) to generate the descriptive statistics and also to generate inferential results. Regression analysis was used to demonstrate the relationship between the portfolio size and the performance of investment firms. According to Mugenda and Mugenda (2003), the regression technique is used to analyze the degree of relationship between two variables.

3.6.1 Conceptual Model:

Financial performance =f (portfolio size and risk, e)

Financial performance was measured by 2 indicators; Return on Assets and Standard Deviation of Returns.

Studies use simulation techniques in order to investigate the relationship between portfolio size and risk. Such studies include; Zuqaier and Ziud (2011), Evan and Archer (2010) and Elton and Gurber (1977).

This study used the model generated by Zuqaier and Ziud (2011).

This model was;

$$Y_i = \beta_1 \left(\frac{1}{X_i}\right) + a$$

Source: Zuqaier and Ziud (2011).

Where;

X_i: is the size of portfolio i
Y_i: is the computed mean portfolio standard deviation at each level of X_i
a: is constant
β_i: are the parameters of the model

3.6.2 Empirical model:

The empirical model was assumed to be an inverse relationship as suggested by Zuqaier and Ziud (2011).

The empirical model was as follows;

$$Standard\ Deviation\ of\ Returns(risk) = a + \beta_1 \left(\frac{1}{Portfolio\ Size}\right) + e \ldots\ldots\ldots\text{model 1}$$

Standard Deviation=is the deviation of return from the mean

β_1 *= regression coefficient*

e=error term

a *= constant*

The second model is in line with the Capital Asset Pricing Model (CAPM). According to CAPM, the higher the risk the higher the return;

Return= Risk free asset +b_1Risky Assets+ e

ROA= a*+* β_1*Standard Deviation of Portfolio +*e

Where;

ROA= Return on Assets

β_n *= regression coefficient*

e=error term

a= constant

Expected relationship;

Expectation 1: As portfolio size increases, the standard deviation of returns decreases

Expectation 2: As portfolio risk increases, the return increases

Evaluation of Significance;

The significance of the relationship between Standard Deviation and portfolio size was evaluated using the p values. P values of less than 0.05 implied that portfolio size is a significant determinant of risk.

The significance of the relationship between ROA and portfolio risk will be evaluated using the p values. P values of less than 0.05 implied that portfolio risks are significant determinant of returns.

CHAPTER FOUR
DATA ANALYSIS

4.0 Introduction

This chapter presents the results of the study. The descriptive statistics were presented first followed by the model results. The interpretation and discussion of the results were presented in a separate section. The chapter summary was also given.

4.1 Descriptive Results

This section presents the descriptive results. The measures of central tendency were presented first followed by the trend analysis.

4.1.1 Measures of Central Tendency

Results in table 4.1 indicate that the 36 investment firms had a minimum of 4 stocks and a maximum of 38 stocks. On average, the mean number of stock held by each firm was 12.72.

The mean equity portfolio holding for the 36 firms was ksh 42,502,242 while the mean bond and money market assets portfolio holding was ksh 14,167,414. The mean real estate portfolio holding was ksh 21,251,121 while the mean total portfolio holding was ksh 70,837,071.

The mean return on equity portfolio for the 36 investment firms was14.7506%. The average risk (standard deviation) of the equity portfolio for the 36 firms was 1.9798. The average bond and money market return for the 36 firms was 8.95%. The average real estate return for the 36 firms was 6.72%.

Table 4. 1: Descriptive Statistics for Returns and Portfolio value

	N	Minimum	Maximum	Mean	Std. Deviation
Number of Stocks	36	4	38	12.72	8.703
Equity Value	36	2192251	184221553	42,502,242.78	4.544E7
Bonds and money market Assets	36	730750	61407184	14,167,414.26	1.515E7
Real Estate Value	36	1096126	92110777	21,251,121.39	2.272E7
Total Portfolio	36	3653752	307035922	70,837,071.30	7.574E7
Return on Equity Portfolio	36	7.14	32.28	14.7506	5.86445
Standard Deviation (Equity Portfolio Risk)	36	.35	4.36	1.9798	1.20537
Bond and Money Return	36	8.08	9.84	8.9529	.55560
Real Estate Returns	36	4.68	12.40	6.7297	2.33929
Valid N (listwise)	36				

Results in table 4.2 indicate that 5 firms had a stock portfolio size of 0 to 5 stocks with a mean return of 25.8494 and a risk (standard deviation) of 4.358. This category had diversified 45% of the unsystematic risk.

Results also indicate that 17 firms had a stock portfolio size of 6 to 10 stocks with a mean return of 15.6294 and a risk (standard deviation) of 2.253. This category of firms had diversified 69% of the unsystematic risk.

Table 4.2 also indicates that 5 firms had a portfolio of 11 to 15 stocks with a mean return of 12.168 and a risk (standard deviation) of 1.158. This category of firms had diversified 81% of the unsystematic risk away.

Results also indicated that 3 firms had a portfolio of 16 to 20 stocks with a mean return of 9.64 and a risk (standard deviation) of 0.99. This category of firms had diversified 91% of the unsystematic risk away.

Results also indicated that 2 firms had a portfolio of 21 to 25 stocks with a mean return of 8.32 and a risk (standard deviation) of 0.504. This category of firms had diversified 96% of the unsystematic risk away.

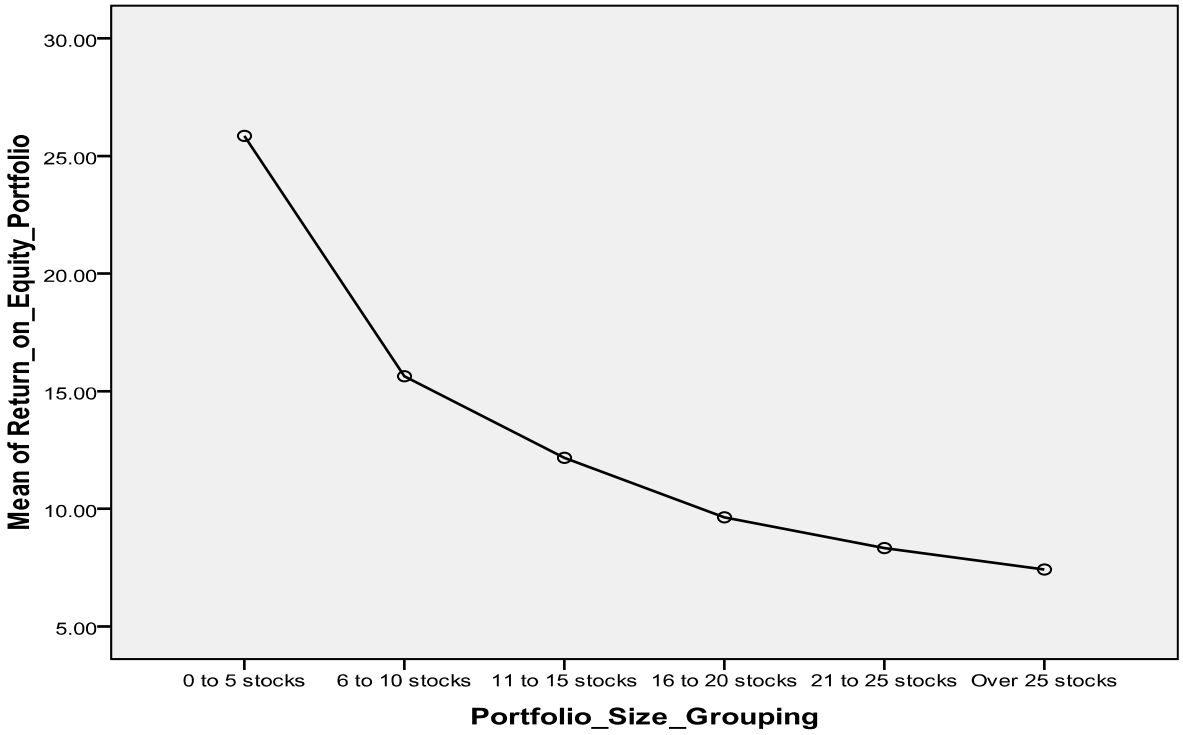
Results also indicated that 4 firms had a portfolio of over 25 stocks with a mean return of 7.14 and a risk (standard deviation) of 0.35. This category of firms had diversified 100% of the unsystematic risk away.

Table 4. 2: Descriptive statistics for stock portfolio

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	% Risk Diversified	Cumulative % risk diversified
					Lower Bound	Upper Bound				
0 to 5 stocks	5	25.8494	4.35852	1.94919	20.4376	31.2612	21.79	32.28	45%	45%
6 to 10 stocks	17	15.6294	2.25354	0.54656	14.4707	16.788	13.26	20.75	23%	69%
11 to 15 stocks	5	12.168	1.15835	0.51803	10.7297	13.6063	10.56	13.09	12%	81%
16 to 20 stocks	3	9.64	0.99081	0.57204	7.1787	12.1013	8.51	10.36	10%	91%
21 to 25 stocks	2	8.3265	0.50417	0.3565	3.7967	12.8563	7.97	8.68	5%	96%
Over 25 stocks	4	7.4153	0.3507	0.17535	6.8572	7.9733	7.14	7.88	4%	100%
Total	36	14.7506	5.86445	0.97741	12.7663	16.7348	7.14	32.28	100%	

Figure 4.1 presents the graphical relationship between portfolio size grouping and the mean return of Equity Portfolios. The figure indicates that there is a negative relationship between size of portfolio and the mean return. A portfolio of 0 to 5 stocks has the highest return (25.8494%) while a portfolio of over 25 stocks has the lowest returns (7.4153%).

Figure 4. 1: Graphical relationship between portfolio size grouping and the mean return of Equity Portfolios



4.1.2 Annual Trends for Returns

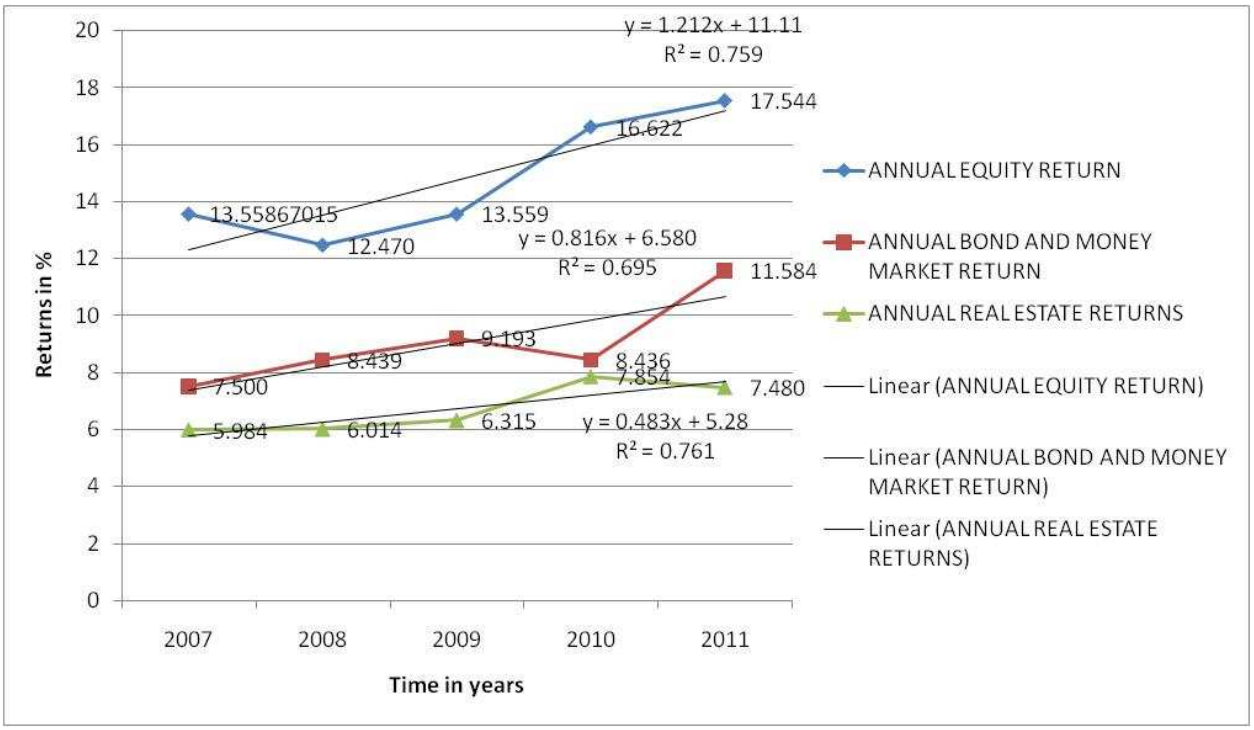
Figure 4.2 indicates that Equity portfolio returns for the 36 firms have gradually increased since year 2007. However, the trend also indicates that there was a drop in returns in the year 2008. This may be explained by the negative effect of 2007 post election violence.

Results also indicate that annual bond and money market returns for the 36 firms have gradually risen since 2007. However, there was a drop in returns in the year 2010 followed by a rise in returns in year 2011. The rise of returns in year 2011 may be explained by the increase in interest rates which could have boosted the money market returns.

Real estate returns trends also indicate that there has been a gradual increase in real estate returns since year 2007.

Overall, the equity returns were superior to bond and market returns and to real estate returns. The real estate portfolio offered the lowest returns.

Figure 4. 2: Trend of Bond and Money Market Return and Real Estate Returns.



4.2 Model Results

This section presented the model results. The results of effect of portfolio size on risk are presented first followed by results on effect of portfolio risk on return.

4.2.1 Effect of Portfolio size on Risk

An inverse model was applied in determining the relationship between the effects of portfolio size on risk. Result in table 4.2 indicates that the goodness of fit of the model was satisfactory. This finding was supported by an r squared of 0.918. An r squared of 0.918 indicates that 91.8% of variation in portfolio risk is explained by portfolio size.

Table 4. 3: Goodness of Fit for the Model

R	R Square	Adjusted R Square	Std. Error of the Estimate
.958	.918	.916	.349

The independent variable is Number of Stocks.

An Analysis of Variance (ANOVA) results in table 4.4 indicates that the overall model was significant. This was supported by an f statistic of 383.114 (p value = 0.000). The ANOVA results demonstrated that the independent variable (portfolio size) is a good predictor of portfolio risk.

Table 4. 4: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	46.707	1	46.707	383.114	.000
Residual	4.145	34	.122		
Total	50.852	35			

The independent variable is Number_of_Stocks.

Regression results in table 4.5 indicate that the inverse of portfolio size is positively related to portfolio risk. This was evidence by a regression coefficient of 18.565 (p value = 0.000). The relationship was significant at 0.05 critical value since the reported p value 0.000 was less that the critical value of 0.05. An increase in portfolio size by one unit leads to a decrease in return by 18.565 units.

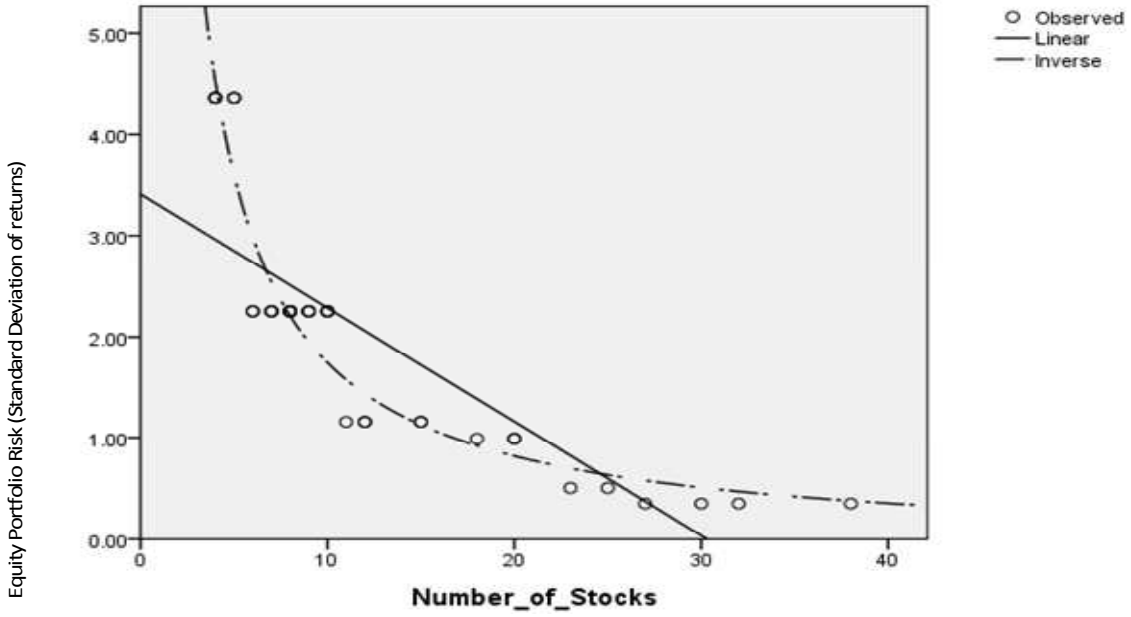
$$Portfolio\ Risk = -0.110 + 18.565\frac{1}{Portfolio\ Size}$$

Table 4. 5: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 / Number_of_Stocks	18.565	.949	.958	19.573	.000
(Constant)	-.110	.122		-.908	.370

Figure 4.3 is a graphical illustration of the relationship between portfolio risk and portfolio size indicates that there is an inverse relationship. A linear trend superimposed on the inverse trend indicates a negative relationship between risk and portfolio size.

Figure 4. 3: graphical illustration of the relationship between portfolio risk and portfolio size



4.2.2 Effect of Portfolio Risk on Return

The study also estimated the relationship between portfolio risk and return. Result in table 4.6 indicates that the goodness of fit of the model was satisfactory. This finding was supported by an r squared of 0.854. An r squared of 0.854 indicates that 85.4% of variation in portfolio return is explained by portfolio risk.

Table 4. 6: Goodness of Fit of the Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.924[a]	.854	.850	2.27325

a. Predictors: (Constant), Standard Deviation (Equity Portfolio Risk)

An Analysis of Variance (ANOVA) results in table 4.7 indicates that the overall model was significant. This was supported by an f statistic of 198.932 (p value = 0.000). The ANOVA results demonstrated that the independent variable (portfolio risk) is a good predictor of portfolio return.

Table 4. 7: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1028.010	1	1028.010	198.932	.000[a]
	Residual	175.700	34	5.168		
	Total	1203.711	35			

a. Predictors: (Constant), Standard Deviation (Equity Portfolio Risk)

b. Dependent Variable: Return on Equity Portfolio

Regression results in table 4.8 indicate that there is a positive relationship between portfolio risk and return. This was evidence by a regression coefficient of 4.496 (p value = 0.000). The relationship was significant at 0.05 critical value since the reported p value 0.000 was less that the critical value of 0.05. An increase in portfolio risk by one unit leads to an increase in return by 4.496 units.

$$Portfolio\ Return = 5.849 + 4.496 Portfolio\ Risk$$

Table 4. 8: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.849	.736		7.946	.000
	Standard Deviation (Equity Portfolio Risk)	4.496	.319	.924	14.104	.000

a. Dependent Variable: Return on Equity Portfolio

4.3 Summary and Interpretation of Findings

This section summarizes the results of the study. Results indicate that 36 investment firms had a minimum of 4 stocks and a maximum of 38 stocks. On average, the mean number of stock held by each firm was 12.72. The finding implies that majority of firms had allocated their stock investments into approximately 13 stocks.

The mean equity portfolio holding for the 36 firms was ksh 42,502,242 while the mean bond and money market assets portfolio holding was ksh 14,167,414. The mean real estate portfolio holding was ksh 21,251,121 while the mean total portfolio holding was ksh 70,837,071. This finding implies that investments firms in Kenya had put the biggest allocation of funds in stocks, followed by real estate portfolio and the least holding was in bond and money market funds.

The mean return on equity portfolio for the 36 investment firms was14.75%. The average bond and money market return for the 36 firms was 8.95%. The average real estate return for the 36 firms was 6.72%. The findings imply that the stocks portfolio generated the highest returns followed by bond and money market returns while real estate portfolio generated the least returns.

Results indicate that 5 firms had a stock portfolio size of 0 to 5 stocks with a mean return of 25.8494 and a risk (standard deviation) of 4.358. This category had diversified 45% of the unsystematic risk. Results also indicate that 17 firms had a stock portfolio size of 6 to 10 stocks with a mean return of 15.6294 and a risk (standard deviation) of 2.253. This category of firms had diversified 69% of the unsystematic risk. Results also indicate that 5 firms had a portfolio of 11 to 15 stocks with a mean return of 12.168 and a risk (standard deviation) of 1.158. This category of firms had diversified 81% of the unsystematic risk away. Results also indicated that 3 firms had a portfolio of 16 to 20 stocks with a mean return of 9.64 and a risk (standard deviation) of 0.99. This category of firms had diversified 91% of the unsystematic risk away. Results also indicated that 2 firms had a portfolio of 21 to 25 stocks with a mean return of 8.32 and a risk (standard deviation) of 0.504. This category of firms had diversified 96% of the unsystematic risk away. Results also indicated that 4 firms had a portfolio of over 25 stocks with a mean return of 7.14 and a risk (standard deviation) of 0.35. This category of firms had diversified 100% of the unsystematic risk away.

The findings in this study indicated that an optimal portfolio should hold between 16 and 20 stocks. Essentially, this implies that a properly diversified portfolio in Kenya should hold approximately 30% to 37% percent of the total number of stocks in the Nairobi Securities

Exchange (16/54 and 20/54). This further implies that holding such a number of stocks diversifies approximately 91% of unsystematic risk.

The finding agree with those in Upson, Jessup, and Matsumoto (1975) who noted that managers should diversify among more than 16 stocks, and that diversifying among even 30 or more stocks can be worthwhile in terms of risk reduction. The findings agree with those in Wagner and Lau (1971) who concluded that most of the diversification is achieved at 15 stocks. The finding also agree with those in Zuqaier and Ziud (2011) who noted that diversification benefits can be obtained when the portfolio consists of 15-16 stocks.

The findings differ with those in Fisher and Lorie (F&L) (1970) who noted that approximately 80 percent of the achievable reduction in dispersion can be attained by holding eight stocks (the reductions range from 65 to 91 percent). The findings also contrast with Statman (1987) who argues that a well-diversified portfolio must include at least 30 to 40 stocks. The findings differ with those in Gupta, Koon and Shahnon (2001) who found that found out that on average, a well diversified stocks of the Malaysian funds consists of 27 randomly selected securities.

4.3.1 Portfolio size and Risk

Results indicated that the inverse of portfolio size is positively related to portfolio risk. This was evidence by a regression coefficient of 18.565 (p value = 0.000). The relationship was significant at 0.05 critical value since the reported p value 0.000 was less that the critical value of 0.05. An increase in portfolio size by one unit leads to a decrease in return by 18.565 units.

The findings agree with those in Elton and Gruber (2002) who conducted a study on risk reduction and portfolio size and concluded that an increase in portfolio size led to an decrease in unsystematic risk . The results also agree with those in Zuqaier and Ziud (2011) who noted that results assured the existence of a significant statistical relationship between portfolio size and the risk reduction. Their results revealed that diversification benefits increases with at a decreasing rate

4.3.2 Portfolio Return (ROA) and Risk

Results indicate that there is a positive relationship between portfolio risk and return. This was evidence by a regression coefficient of 4.496 (p value = 0.000). The relationship was significant at 0.05 critical value since the reported p value 0.000 was less that the critical value of 0.05. An

increase in portfolio risk by one unit leads to an increase in return by 4.496 units. The findings are consistent with Portfolio Theory of Markowitz (1951) who empirically noted a risk return trade off in stocks. According to Markowitz theory, the higher the portfolio risk, the higher the portfolio return.

The findings agree with those in Grinblatt and Titman (1989) who examined the portfolio size-return relationships and concluded that the smallest funds achieved significantly better gross risk adjusted return performance (2.5%) than larger funds. This implied that the small the size of funds (higher undiversified risk) the higher the average return.

The findings also agree with those in Gorman (1991) who also found that smaller funds achieved higher returns. The findings agree with those in Bird, Chin and McCrae (1983) who tested for a correlation between fund size and performance and concluded that the smaller funds generated higher returns but ran higher risk portfolios than larger funds.

CHAPTER FIVE
SUMMARY AND CONCLUSIONS

5.1 Summary

Chapter one discussed the problem statement and the objectives of the study. The study aimed to determine the effect of portfolio size on the financial performance of portfolio of investment firms in Kenya.

Chapter two discussed the literature review, that is, the theories backing the study. These theories were Markowitz Portfolio Theory, Capital Asset Pricing Model and Tobin Theory of Investment. The empirical evidence of the study was also given.

Chapter three presented the research methodology. The chapter discussed the type of research design, population, and target population, sampling frame, sample, sample size, sampling technique, instruments to be used, pilot test and data analysis.

Chapter four presented the findings. Regression analysis was carried out to determine the relationship between portfolio size and the mean return of equity portfolios. Results indicated that there is a negative relationship between size of portfolio and the mean return. A portfolio of 0 to 5 stocks has the highest return (25.8494%) while a portfolio of over 25 stocks has the lowest returns (7.4153%).

An inverse model was applied in determining the relationship between the effects of portfolio size on risk. Result in table 4.2 indicated that the goodness of fit of the model was satisfactory. This finding was supported by an r squared of 0.918. An r squared of 0.918 indicates that 91.8% of variation in portfolio risk is explained by portfolio size.

An Analysis of Variance (ANOVA) results indicated that the overall model was significant. This was supported by an f statistic of 383.114 (p value = 0.000). The ANOVA results demonstrated that the independent variable (portfolio size) is a good predictor of portfolio risk.

Regression results indicated that the inverse of portfolio size is positively related to portfolio risk. This was evidence by a regression coefficient of 18.565 (p value = 0.000). The relationship

was significant at 0.05 critical value since the reported p value 0.000 was less that the critical value of 0.05. An increase in portfolio size by one unit leads to a decrease in return by 18.565 units.

Results indicated that there is an inverse relationship between portfolio risk and portfolio size. A linear trend superimposed on the inverse trend indicates a negative relationship between risk and portfolio size.

Regression analysis was conducted to determine the relationship between portfolio risk and return. Result indicated that the goodness of fit of the model was satisfactory. This finding was supported by an r squared of 0.854. An r squared of 0.854 indicates that 85.4% of variation in portfolio return is explained by portfolio risk.

An Analysis of Variance (ANOVA) results indicated that the overall model was significant. This was supported by an f statistic of 198.932 (p value = 0.000). The ANOVA results demonstrated that the independent variable (portfolio risk) is a good predictor of portfolio return.

Regression results indicate that there is a positive relationship between portfolio risk and return. This was evidence by a regression coefficient of 4.496 (p value = 0.000). The relationship was significant at 0.05 critical value since the reported p value 0.000 was less that the critical value of 0.05. An increase in portfolio risk by one unit leads to an increase in return by 4.496 units.

5.2 Conclusions

The study concluded that Equity portfolio returns for the thirty six firms have gradually increased since year two thousand and seven. However, the trend also indicates that there was a drop in returns in the year two thousand and eight. This may be explained by the negative effect of two thousand and seven post election violence.

It was also concluded that annual bond and money market returns for the thirty six firms have gradually risen. However, there was a drop in returns in the year two thousand and ten followed by a rise in returns two thousand and eleven. The rise of returns in year two thousand and eleven may be explained by the increase in interest rates which could have boosted the money market

returns. Real estate returns trends also indicate that there has been a gradual increase in real estate returns since year two thousand and seven.

It was also possible to conclude that there was a negative relationship between size of portfolio and the mean return equity portfolio. From the study it was possible to conclude that investments firms in Kenya did not hold optimal portfolios. It was concluded that majority of investments firms held an average of thirteen stocks which was too low and this left a lot of room of diversification. It was also possible to conclude that for investments to hold optimal portfolios, they need to hold an average of sixteen to twenty stocks.

It was possible to conclude that the equity returns were superior to bond and market returns and to real estate returns. Real estate portfolio offered the lowest returns, bond and market returns offered moderate returns and the highest returns were offered by equity portfolios.

It was also possible to conclude that there was an inverse relationship between portfolio size and risk. Therefore, the bigger the portfolio, the lower the portfolios risk. An increase in portfolio size by one unit leads to a decrease in return by eighteen point five units. The inverse relationship is statistically significant.

It was also concluded that there is a positive relationship between portfolio risk and return. An increase in portfolio risk by one unit leads to an increase in return by four point five units. Therefore, the higher the portfolio risk, the higher the portfolios return.

5.3 Policy Recommendations

It was recommended that investment managers should consider increasing the number of stocks from the current average of 13 stocks to between 16 to 20 stocks. Such a portfolio size would be optimal since approximately 91% of risk would have been diversified. This will solve the question in mind of investment managers which has been as to how many individual stocks or investments are needed to compose an optimal portfolio. An optimal portfolio is preferred over a maximized portfolio due to the risk return tradeoff.

Investment firms should also consider allocating more funds into equity portfolios as doing so would fetch a higher rate of return. However, this may increase the risk and the managers should therefore be guided by their risk appetite as stipulated in the individual firm investments strategy.

The numbers of stocks to be included and the method to allocate funds among the selected stocks are two important criteria in forming a stock portfolio. The study informs practice as investment managers use the findings of the study to construct optimal portfolios. Such optimal portfolios may bring sustainability and competitive advantage to investment firms as results of superior financial returns.

The investment firms should consider constructing portfolios with the three assets classes. Hence, the real estate class may be used to reduce the risk as the returns show minimal variance. The returns of real estate arise from the guaranteed rent and the appreciation of property.

It is also recommended that investment firms wishing to pursue a moderate risk strategy should consider investing in bonds. Bonds usually have a fixed return. However, the lower risk is offset by the lower returns of bonds. Investment firms should therefore consider constructing moderate risk portfolio by including the bond class of assets.

Investment firms should consider hedging the portfolio risk through combining those asset classes that have negative correlation. This implies that if the returns of one asset are going up, then the returns of the other assets are going down, thereby offsetting the risk of the portfolio.

The investment firms should also consider other diversification strategies such as managerial diversification. To achieve this, they require putting their portfolio under more than manager to ensure that the decisions of the managers are optimized.

5.4 Limitations of the study

One of the limitations of the study was that the study did not investigate on the influence of high growth and value stocks on the risk and return of portfolios. High growth stocks may influence the risk and return on portfolios. Therefore, a model that does not take into account the effect of high growth and value stocks.

Another limitation was that the study did not establish the correlation of returns between the three asset classes of stocks. These classes of asset include market returns, bond and real estate. Therefore, the study felt short of recommending which asset class should be combined with which asset class in an effort of optimal diversification of risk. For instance, the study failed to show whether bonds as an asset class can be used to hedge against fluctuations in equity returns.

The study did not consider the possible effect of global financial crisis of year 2008 to 2009 and the post election violence of year 2007/2008. It may be that the returns of the portfolios were affected in one way or the other by these events. Hence, the model of returns is not fully explained**.**

The study did not consider the role of corporate governance and other internal factors and how they affected the return of portfolios. Perhaps, governance, cash flows, competition, operating efficiency could have influenced the returns of the portfolios.

5.5 Suggestions for Further Research

Suggested further areas of study should be on the influence of high growth stocks on the risk and return of portfolios. High growth stocks may influence the risk and return on portfolios. Therefore, future models should take into account the effect of high growth and value stocks.

Furthermore, further studies should be on the correlation of returns between the three asset classes as this may shed light on whether real estate can be used to diversify the risk of an equity portfolio. Therefore, further studies should focus on the optimal mix of assets.

In addition, such study would give insights as to whether bond and money market returns can be used to diversify the risk of an equity portfolio. For instance, future studies should highlight the optimal hedging strategies for such classes.

Further studies should include the post election violence effect and the global financial classes of 2008/2009. The other factors that need to be considered include governance, cash flows, competition, operating efficiency and how they could have influenced the returns of the portfolios.

REFERENCES

Alexander, Gordon, and R. Stover. (1980). "Consistency of Mutual Fund Performance during Varying Market Conditions." Journal of Economics and Business 32: 219-266.

Becker, Stan and Vaughan, Greg (2001). "Small Is Beautiful." *Journal* of Portfolio Management, 2001, 27(4), pp. 9–18.

Bird, R., H. Chin and M. McCrae (1983), "The Performance of Australian Superannuation Funds." Australian Journal of Management.

Brown, Keith C.; Harlow, W. V. and Starks, Laura T. "Of Tournaments and Temptations: An Analysis of Managerial Incentives in the Mutual Fund Industry." Journal of Finance, 1996, 51(1), pp. 85–110.

Brown, S., W. Goetzman, R. Ibbotson and S. Ross, [1992], "Survivorship Bias in Performance Studies", Review of Financial Studies Vol. 5, No.4, pp.553-580.

Carhart, Mark M. 1997. "On Persistence in Mutual Fund Performance." Journal of Finance 52: 57-82.

Chandran, E. (2004). Research Methods: A Quantitative Approach with Illustrations from Christian Ministries Nairobi: Daystar University.

Chang, Eric, and Wilbur Lewellen. 1984. "Market Timing and Fund Investment Performance."Journal of Business 57: 57-72.

Chang, T. J. Meade, N. Beasley, J.E. and Sharaiha Y.M.(2000). Heuristics for cardinality constrained portfolio optimisation. *Comput. Oper. Res.* 2000, 27(13): 1271-1302.

Conine, T. E., and M. J. Tamarkin. 1981. "On Diversification Given Asymmetry in Returns," Journal of Finance, 36: 1143-l 155.

Cooper, D. & Schindler, P. (2007).*Business Research Methods* (3rd Ed.). New Delhi: Tata McGraw-Hill.

Cooper, D.R and Schindler, P.S (2006).*"Business Research Methods",* 9th, edition. McGraw-Hill Publishing, Co. Ltd. New Delhi-India

Crane L.M. (2011). Measuring Financial Performance: A Critical Key to Managing Risk National Crop Insurance Services, Inc.

Davis J. (2009). The Importance of a Truly Diversified Investment Portfolio.

Diltz, J. David, 1995, Does social screening affect portfolio performance? The Journal of Investing 4, 64–69.

Domian, D.L.. Louton, D.A Racine. M.D. (2007). Diversification in portfolios of individual stocks: 100 stocks are not enough. *Financial Review* 2007, 42(4): 557-570.

Elton, E.J. and M.J. Gruber. (1977) “Risk Reduction and Portfolio Size: an Analytical Solution.” Journal of Business vol. 50, pp. 415-437.

Evans and Archer, (1968), Diversification and Reduction of Dispersion An Empirical Analysis, Journal of Finance, vol.23, pp.761-766.

Fink, M. P. (2008). The Rise of Mutual Funds. Oxford University Press.

Fisher, and Lorie (1970) “Some Studies of Variability of Returns on Investments in Common Stocks.” Journal of Business Vol 43.

Garcia, C. and F. Gould, [1993], "Survivorship Bias", *Journal of Portfolio Management*, Spring, pp. 52-56.

Gilbert R. A and Wheelock D.C (2007). Measuring Commercial Bank Profitability: Proceed with Caution. Federal Reserve Bank of St. Louis *Review*, November/December 2007, *89*(6), pp. 515-32.

Goldsmith, David. 1976. “Transactions Costs and the Theory of Portfolio Selection,” Journal of Finance, 31: 1127-1139.

Gompers, Paul A. and Metrick, Andrew. “Institutional Investors and Equity Prices.” Quarterly Journal of Economics, 2001, 116(1), pp.229–59.

Gorman, L. [1991], "A Study of the Relationship Between Mutual Fund Return and Asset Size, 1974-1987, Akron Business and Economic Review, Winter, Vol. 22, No.4, pp.53-61.

Grinblatt, M. and S. Titman, [1989a], "Mutual Fund Performance: An Analysis of Quarterly Portfolio Holdings", *Journal 0/ Business,* July, Vol. 62, No.3, pp. 393416.

Grinblatt, M., and S. Titman, [1995]], "Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior", *American Economic Review,* December, pp. 1088-1105.

Guerard, John B., 1997, Additional evidence on the cost of being socially responsible in investing, *The Journal of Investing* 6, 31–36.

Gupta A. (2011). Diversification of portfolio important principle of investment. The economic Times Bureau.

Gupta.G.S, Koon.C.H and Shahnon.S (2001) “How many securities make a diversified portifolio in KSLE talks” Asian Academy of management journal Vol 6, No. 1, January 2001

Investment Company Institute. Mutual fund fact book Washington, DC: Investment Company Institute, 2000.

Ippolito, Richard A. 1993. “On Studies of Mutual Fund Performance, 1962-1991.” Financial Analysts Journal 49: 42-50.

Jensen, Michael C. “The Performance of Mutual Funds in the Period 1945–1964.” Journal of Finance, 1968, 50, pp. 549–72.

Kagunda P.K (2010) A Comparison Of Performance Between Unit Trusts And A Market Portfolio Of Shares At NSE .Unpublished MBA Thesis. University of Nairobi

Kapusuzoğlu A and Karacaer S. (2009). The Process of Stock Portfolio Construction with Respect to the Relationship between Index, Return and Risk Evidence from Turkey. International Research Journal of Finance and Economics ISSN 1450-2887 Issue 23 (2009)

Klemkosky, R.C. and J.D. Martin (1975), "The Adjustment of Beta Forecasts", Journal of Finance, pp. 1123 - 1128.

Kon, Stanley. 1983. “The Market Timing Performance of Mutual Fund Managers.” Journal of Business 56: 323-347.

Lowenstein, Roger. “Frightened Funds: Is There a Master in the House?” Wall Street Journal. November 20, 1997, p. C1.

Madden, G., K. Nunn and A. Wiemann, [1986], "Mutual Fund Performance and Market Capitalisation", *Financial Analysts Journal*, July/ August Vol. 42, No.4, pp. 67-70

Malkiel, Burton G. 1995. “Returns from Investing in Equity Mutual Funds.” Journal of Finance 50: 549-572.

Markowitz, Harry M. (1952). Portfolio selection, *Journal of Finance*, 7 (1), 77-91.

Mugenda, O. M. &Mugenda, A.G. (2003). Research Methods: Quantitative and Qualitative Approaches (2nd Ed) Nairobi: Acts.

Ng. K.Y. (2008) The effect of size, selection strategy and allocation method on stock portfolio performance. Research Paper, Faculty of Economics & Administration, University of Malaya. 2008.

Ngacha Z.W. (2009). Comparative study on performance between value & growth stocks at the NSE. Unpublished MBA Thesis. University of Nairobi

Nyenze J. (2010) The Effect Of Assets Allocation On Retirement Benefits Fund Performance In Kenya. Unpublished MBA Thesis. University of Nairobi

Ødegaard B. A (2009)" How many stocks are necessary for a well diversified portfolio at the Oslo Stock Exchange? January 2009

Perold, Andre and Salomon, Robert S. "The Right Amount of Assets under Management." Financial Analysts Journal, 1991, 47(3), pp. 31–39.

Pozen, R. and Hamacher, T. (2011). The Fund Industry: How Your Money is Managed. John Wiley & Sons.

Pozen, Robert C. The mutual fund business.Cambridge and London: MIT Press, 1998.

Pudha E.O (2010). A survey on the factors that motivate local individual investors to invest in shares of companies quoted at the NSE. Unpublished MBA Thesis. University of Nairobi

Renshaw A. (2008). Real word case studies in portfolio construction optimization using robust optimization. Axioma Research Paper. No 007.

Sekaran,(2006).Research Methods for Business: A Skill Building Approach, fourth edition, John Willey and Sons, Ltd., New Delhi-India.

Sharpe W., [1966], "Mutual Fund Performance", Journal of Business, January, Vol. 39,No.1, pp. 119-138

Sharpe, William F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk, *Journal of Finance*, 19 (3), 425-442.

Social Investment Forum, 2006, 2005 report on socially responsible investing trends in the United States, SIF Industry Research Program, http://www.socialinvest.org/.

Solnik, B.H. (1974). Why not diversify internationally rather than domestically? Financial Analysts Journal, 30,

Statman. Meir. (1987). How many stocks make a diversified portfolio? *J. Financial Quantity Analysis.* 1987, 22(3): 353-363.

Surz R. and M. Price (2000). "The Truth about Diversification by the Numbers" Journal of Investing pp 15-19.

Tobin, James (1958). Liquidity preference as behavior towards risk, *The Review of Economic Studies*, 25, 65-86.

Upson, R.B., P.F. Jessup, and K. Matsumoto (1975). Portfolio diversification strategies, Financial Analysts Journal, 31, pp. 86-88.

Volkman, David A. 1999. "Market Volatility and Perverse Timing Performance of Mutual Fund Managers" Journal of Financial Research 22: 449-470

Vora, Premal P., and McGinnis, John D. (2000), “The Asset Allocation Decision in Retirement lessons from Dollar Cost Averaging,” Financial Services Review, 9 pp 47-63.

Wagner W. H. and Lau S.C.(1971). The effect of diversification on risk. *Financial Analysis J.* 1971, 27(6): 48-53.

Woerheide, Walt and Don Persson, (2000), An Index of Portfolio Diversification, Financial Review Services 2, 73-85.

Zuqaier.F and Ziud. H (2011). “The Effect of Diversification on Achieving Optimal Portfolio” European Journal of Economics, Finance and Administrative Sciences ISSN 1450-2275 Issue 32 (2011)

APPENDIX I: POPULATION

1. African Alliance Kenya Securities
2. Amana Capital Limited.
3. AON Minet
4. BAAM
5. Bank Of Africa
6. Bora Capital Ltd
7. Centum Investment Company
8. Chase Bank
9. Genghis Capital
10. Fechim Investment Ltd
11. Gee Ten
12. Home Africa
13. Investeq Capital Limited
14. Kenya Commercial Bank
15. Maanzoni Lodge Ltd
16. Nairobi Securities Exchange
17. NIC Securities Ltd
18. Olympia Capital Ltd
19. Origins IGA Ltd
20. Pan Africa Life Assurance Ltd
21. Petken Ltd
22. Standard Investment Bank
23. Sterling Securities Ltd
24. Synergy Management Ltd
25. Vidmerck Limited
26. Africa Advance Investment Ltd
27. Athi Boys Investments Group
28. Avec Investment Ltd
29. Amalgamated Chama
30. BDS Capital LLC
31. Bridge Investment Group Ltd
32. Capital Wide Investment Ltd
33. Cayenne Ltd
34. Centive Investment Limited
35. Chairman Investment Ltd
36. Confer Limited
37. Consolidated Securities Limited
38. Critical Mass Growth Ltd (CMG)
39. Divas Investment Ltd
40. Dolphin Ventures Ltd
41. Exemplar Limited
42. Futures Investment Ltd
43. Glenmore Trading Company Ltd
44. Greater Heights Investments Limited
45. Gufi Company Limited
46. Insight Investments Limited
47. Insights Investments Ltd
48. Kenya Women Investment Company Ltd.

49. Kweoya Investment Ltd
50. LADS Investment Ltd
51. Laibon Ninety Three Ltd
52. La Palm Ltd
53. Lavant-Garde Investment Ltd
54. Lesfre'res CO.Ltd
55. Maboiz Association
56. Mali Rasili
57. Manifest Destiny Ltd
58. Mapato Group
59. Mapato Investment
60. Mbarets Investment Ltd
61. Mhasibu Investment Co.Ltd
62. Muthuuri n Company Investments Limited
63. Milele Alliance Ltd
64. New Era Self Help Group
65. Old Mutual Company Ltd
66. Prosperous Ventures Limited
67. Ramlinks Ltd
68. Rubie Fortis
69. Shabaha Sorority Limited
70. Shangwe Investment Ltd
71. SIAM Investment Ltd
72. The African Collection
73. The Investor Network
74. Thibiz Patnership
75. Third Alternative Investment Ltd
76. Thureya Co. Ltd
77. Transcentury
78. Transmillenia Investments Ltd
79. Transmillenium Investments Ltd
80. Umeme Pamoja Ltd
81. Veterinarians Investment Group Limited
82. Vipepeo Investments Limited
83. Visionary Investment Ltd
84. Wallace Five Ltd
85. Wealth Creators (2010) Kenya
86. Weleven Women Group
87. Widows Own Group
88. Windsor Dam
89. Winton
90. Wosia Ventures