International Journal of
Finance and Accounting
(IJFA)

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International Journal of Finance and Accounting
ISSN 2518-4113 (online)
Vol.1, Issue No.2, pp 77 - 94, 2016

www.iprjb.org

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

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Abstract

Purpose The purpose of this study was to determine the effect of portfolio size on the financial performance of portfolios of investment firms in Kenya.

Methodology: The research design adopted a descriptive survey study. 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. 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.

Results: 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.

Unique contribution to theory, practice and policy: 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.

Keywords: *Portfolio, Collective Investment Scheme, Return On Assets, Return On* Equity

International Journal of Finance and Accounting
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1.0 INTRODUCTION

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).

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). 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) 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

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/

1.1 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

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.

2.0 LITERATURE REVIEW

2.1 Theoretical Foundations of the Study

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.

2.2 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

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.

3.0 RESEARCH METHODOLOGY

The research design was descriptive survey study. 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. 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 study adopted the following conceptual model **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 Xi
a: is constant βi: are the parameters of the model

International Journal of Finance and Accounting
ISSN 2518-4113 (online)
Vol.1, Issue No.2, pp 77 - 94, 2016
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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;

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

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 risk are significant determinant of returns.

4.0 RESULTS AND DISCUSSIONS

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%.

International Journal of Finance and Accounting
ISSN 2518-4113 (online)
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Table 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 , 83 7,071.30	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 1 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 1 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 2: Descriptive statistics for stock portfolio

N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum

					Lower Bound	Upper Bound			% Risk Diversified	Cumulative % risk diversified
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	16.7888	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 2 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%).

International Journal of Finance and Accounting
ISSN 2518-4113 (online)
Vol.1, Issue No.2, pp 77 - 94, 2016

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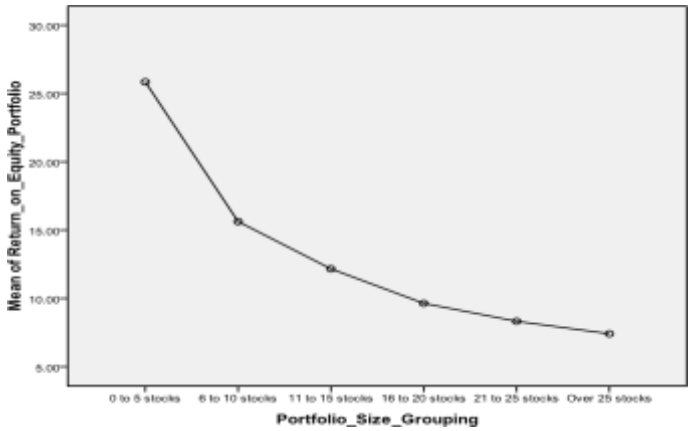
Figure 1: Graphical relationship between portfolio size grouping and the mean return of Equity Portfolios



4.1.2 Annual Trends for Returns

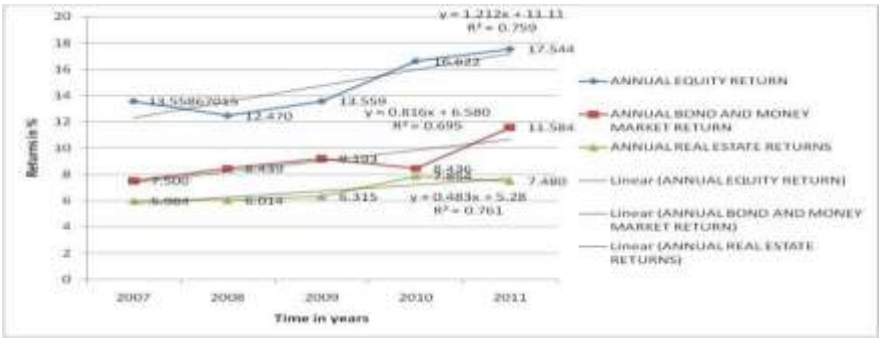
Figure 4.2 indicates that Equity portfolio returns for the 36 firms have gradually increased since year 2007. However, the trend also indicates that there was a drop-in returns in the year 2008. This may be explained by the negative effect of 2007 post-election violence.

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 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.

International Journal of Finance and Accounting
ISSN 2518-4113 (online)
Vol.1, Issue No.2, pp 77 - 94, 2016

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.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: 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 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

International Journal of Finance and Accounting
ISSN 2518-4113 (online)
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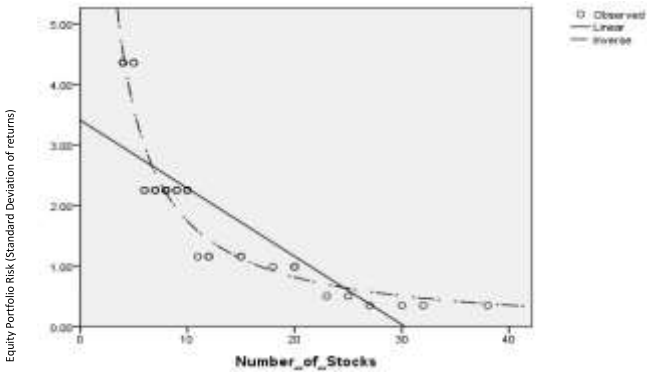
Figure.3 is a graphical illustration of the relationship between portfolio risk and portfolio size indicates that there is an inverse relationship. A linear trend superimposed on the inverse trend indicates a negative relationship between risk and portfolio size.

Figure 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 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 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 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 agrees 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 agrees 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 welldiversified stock 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 increase 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 sizereturn 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.

5.0 DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

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.

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