Effectiveness of diversification in Closed End Mutual Fund Performance in Pakistan

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Introduction

Mutual funds have grasped the public's attention largely over last two decades i-e 1980s and '90s. During these years mutual fund investment has reached its record high returns. Mutual Funds are also getting the attention of researchers all over the world rapidly. Not only researchers but also the investors are showing their keen interest in mutual funds these days as they consider Mutual funds as a safe medium for long term investment.

A mutual fund is simply a financial intermediary where a fund manager invites group of investors to combine their funds together with a predetermined investment objective and invests that pooled money into specific securities usually stocks or bonds. By combining different stocks in one portfolio, mutual funds reduce their risk of investing. Bad performance of one company in a sector is counter balanced by other companies that are performing better. This is characteristic diversification strategy of mutual funds which helps in reducing the risk. With a single investment in a stock or bond, an investor essentially has all of his or her eggs in one basket. Using a mutual fund investment, the investor is exposed to a multitude of securities, thereby spreading risk across a range of securities. The rate of return on an investment and its risks are directly related. High rates of return are almost always coupled with higher risks, and lower rates of return imply lower risks. Risk should be stated clearly wherever returns are mentioned but it happens very rarely. Risks are high for uncertain future prospects generally.

Most of the financial companies emphasize on raw returns only, without considering other factors. Mutual fund advertisements proudly announce unusually high fund returns, and brokers present funds with impressive track records .but they seldom mention the high degrees of risk required to achieve such performance. Risk adjusted return solves this problem. That is why it seems to be a good measure of fund's performance as it takes into account both, risk and return.

Investor's choice of investment between mutual funds and stocks depends on how much risk they are ready to take for required return. Investors seeking high returns have to accept higher risks as well. Another factor is that for individual investments, before buying a stock, an investor is required to learn about individual companies himself which is time seeking.

However this is not so in case of mutual funds as lesser time is needed to learn about mutual funds.

Literature Review

Every investor invests with the goal of getting highest returns for the lowest possible risk. Risk is just a chance that the investment will not go well as predicted by the investor and this chance of loss cannot be eliminated from the investments. Diversification is the only way in which this risk can be minimized. It works as if a portfolio is fully diversified, and some securities are not performing well, others may outperform at the same time and overall risk is minimized. This policy is considered as the major characteristic of the Mutual funds. However, just by following diversification, any mutual fund cannot guarantee a particular level of returns or the total elimination of risk from the portfolio.

Diversification is widely considered as a key characteristic of modern portfolio management. The number of stocks held by a fund is one of many important decisions for a portfolio manager. It is also of worth importance that how much diversification should be made.A number of studies have been conducted to examine the relationship between risk and return depending on the number of stocks held in a portfolio and, therefore, the diversification benefits attached to stock portfolios(Statman,1987)

To find out appropriate number of stocks, Fisher and Lorie (1970) randomly selected a sample from New York Stock Exchange-listed companies and evaluated their return distribution for the period 1926–1965. Their results show that holding a portfolio of eight stocks instead of one stock decreases diversifiable risk by approximately 80%.

Hany A. Shawky and David M. Smith (2005) also looked into the number of stocks held by U.S. equity mutual funds from 1992 to 2000. Their hypothesis is based on the idea that there is a best possible number of stocks for each mutual fund, which reflects the trade-off between benefits obtained from diversification policy and their transaction and monitoring costs. Their study, by making arrangements for controlling fund size, market capitalization of fund holdings, and the percentage of holdings in cash, tests a nonlinear relationship between the number of stocks held and a fund's performance. The results strongly supports that there exists a quadratic relationship between the number of stocks held and risk-adjusted return.

Zakri Y.Bello (2005) compared mutual funds dealing in socially responsible stocks with some randomly selected conventional funds having net assets similar to those dealing with socially responsible stocks to find out how much the characteristics of two group of funds differs from each other with respect to their assets held, extent of portfolio diversification and inconsistent effects of diversification on investment performance. The results showed that two types of funds are not very much different from each other in any of above respects. Moreover, as both the groups underperformed during study period, the effects of diversification on investment performance are not much different from each other.

M.Jayadev (1996) evaluated the performance of two growth oriented mutual funds on the basis of their monthly returns as compared to the returns used as benchmarks by implying risk adjusted performance measures suggested by Jenson, Treynor and Sharpe. His findings are that more appropriately diversified fund succeeded in reducing its unique risk though both the funds were weak in earning better returns .The reason being their assuming, marketing or

selecting under priced securities. He concluded that, the two growth oriented funds remained unsuccessful to bring forward the advantages of diversification to the investors and did not performed well in terms of their total risk.

Performance of the mutual funds is measured by the number of models. There are different viewpoints about the measurement of performance of funds. Sharpe (1966) and Jensen (1968) both were of the view that basic reason for under performance of mutual funds in the market is the amount of expenses they charge from the investor but with the passage of time, further researches showed that mutual fund managers have an adequate amount of private information to compensate the effect of expenses they incur while dealing with investors.

Theodore,Wang and Yaxiao (2001) while focusing on the impact of portfolio composition and excess turnover on fund performance (in contrast to the lack of fund manager's ability to pick stocks being reason for underperformance), used standard portfolio optimization techniques and held that the weights allocated by fund managers to select stocks are on average inefficient. Besides the fund managers possess strong stock selection skills, according to them, significant gains could be obtained by making the allocation of mutual fund assets more efficient.

Otten and Bams (2002) carried out a study to evaluate the fund performance and to find out whether past performance of fund can be used as an indicator of future performance of fund and influence of numerous characteristics of fund? Using survivorship bias data for 506 European funds, they found that in addition to the obvious advantages of diversification and lower transaction costs, European mutual funds also provide positive risk adjusted returns to their investors.

In 2004, Roger Otten and Dennis Bams as another effort to find economic versus statistical relevance to measure mutual fund performance says that the majority of US studies have proved that ,on average, actively managed portfolios underperform market indices. He quoted the examples of the studies conducted by Jensen (1968) and Sharpe (1966). He argued that mutual funds underperform the market by the amount of expenses they charge from the investors.

S.Narayan Rao evaluated performance of Indian mutual funds in a bear market through relative performance index, risk-return analysis, Treynor's ratio, Sharpe's ratio, Sharpe's measure, Jensen's measure, and Fama's measure. The results of performance measures suggested that most of mutual fund schemes in the sample of 58 open end funds were capable of satisfying investor's expectations by giving returns in excess of expected returns based on both premiums for systematic risk and total risk.

M. Aamir Shah, 2005 conducted a study to find out the mutual funds risk adjusted performance in Pakistan, using mutual fund performance evaluation models applied on a sample of 14 mutual funds out of 33 for the period 1997-2004. The main purpose of this study is to examine the risk and return characteristics of Pakistan equity mutual funds and balanced funds. Risk-adjusted performance is evaluated using three evaluation techniques, i.e., Sharpe Ratio, Treynor Ratio, and Jensen differential. The results obtained showed that funds industry outperformed the market proxy by 0.86 percent per annum during that period. Some of the funds under performed due to diversification problem. Sharpe ratio of 0.47 and positive Jensen differential measure suggested the mutual funds as a source of value addition.

Patricia L. Chelley and James Steeley (1997) worked to find out the relationship between portfolio returns, autocorrelation and portfolio diversification in UK equity market. They established that there exists a significant relationship between these two. According to him autocorrelation of returns depends significantly on the degree of diversification. In addition, the large and statistically significant autocorrelation may be used as the predictor of portfolio returns and so super normal profits may be earned.

Simone Brands, David R. Gallagher (2005) studied the performance and diversification properties of active equity fund-of-funds (FoF) in Australia. They established that portfolio performance depends on the number of funds in the portfolio. Empirical results found that increase in the number of funds in a FoF portfolio leads to the improvement in performance in a mean–variance perspective. However, measures of skewness and kurtosis shows less positive relationship, with an investor's preference for the higher moments of the return distribution. The study also observed that benefits of diversification are truly realized with an addition of about 6 active equity funds in the FoF portfolio.

Development of Hypothesis

Mutual funds prefer to diversify as by purchasing many stocks they can reduce their risk and can increase their chances of a winning portfolio. Along with other benefits of diversification, such as Opportunity to balance portfolio risk volatility, potential to enhance portfolio, Opportunity to move towards global markets etc, effective diversification spreads investment assets among different fund categories to achieve both a variety of distinct risk/return objectives and a reduction in overall risk.

This idea gives birth to the first hypothesis of this study which is aimed at exploring the extent to which the diversification strategy followed by mutual funds is helpful in reducing their overall risk.

H_1: Diversification of portfolio reduces the risk of Mutual Funds.

Since higher rates of return can be achieved only by taking greater risk and lowering the risk can lead to reduced returns, any effort to measure performance of investment is incomplete until and unless the risk taken to achieve the return is measured. Risk adjusted return is the only measure to compare a high-risk, high-return investment with a low-risk, lower-return investment. It is basically all about finding out that how much an investment is returning with respect to the level of risk it bears.

Mutual funds are known for their diversified investments. The idea behind their diversification strategy is that by combining risky assets with less risky assets, fund managers successfully reduce level of volatility of a portfolio and, thereby, generate better risk-adjusted returns. In any given period, portfolio returns in any market, for a given period, may differ (i-e higher or lower) than returns generated for different asset classes. However, in the long run, this diversification strategy fulfills its promise of reducing portfolio volatility and enhancing risk-adjusted returns. As in Pakistan, Mutual funds are a symbol of diversification, this study is aimed at checking the extent to which the diversification strategy of mutual funds is effective in getting high risk adjusted returns.

H_2: Diversification of portfolio enhances the risk adjusted return of Mutual Funds.

Problem Statement

Performance of mutual fund and relationship of the performance with the level of diversification in closed ended mutual funds of Pakistan.

Methodology

Sample Selection:

In order to find out the relationship of diversification, risk and risk adjusted return, we started with all the Mutual funds registered with SECP and listed in Karachi Stock Exchange. There are 65 funds operating as a whole. As focus of this study is mainly the closed end funds, we considered all the 23 closed end funds out of these 65. All the closed ended mutual funds, whose data (for purpose of this study) was not available, are not included. So finally, this study is left with the analysis of 10 closed ended mutual funds currently operating in Pakistan.

Yearly reports of closed end mutual funds for the period of 2005-2009 have been used for data collection. Data for period 2005-2009 has been studied. Data has been taken for each year. Total investment by mutual funds in each industry has been identified separately for each quarter. Level of diversification has been checked out by finding out weights of investment made by these funds. For this purpose two sources have been used; Asset Management Companies of the funds, and Internet. Net asset values are also collected from respective websites of the funds and the quarterly reports.

Relationship of Variables:

The variables identified for the purpose of this study are:

- Diversification
- Risk
- Risk adjusted return.

These variables are described below:

Diversification: Diversification here refers to spread of money over a variety of assets and asset classes rather than investing whole amount in one potentially high return stock, with an objective of risk minimization.

Risk: Risk, here, is a chance that investments actual return will be different than expected one.

Risk Adjusted Return: Risk adjusted return refers to a measure of return on an investment in relation to the risk connected with that particular investment. It is used here for comparing performance of mutual funds i-e its risks and returns.

This study is examining the relationship of diversification, risk and the risk adjusted return. It means that diversification has a positive relationship with risk adjusted returns and a negative relationship with risk associated with the investment.

Methodology

In order to check the level of diversification in closed end mutual funds during year 2004-05, first of all we collected market value of the shares in hand at end of each quarter. Weight of each investment is obtained by dividing market value for each investment with the sum of all the market values, during a quarter. Sum (of investment) of individual sectors, for all the mutual funds, at end of each quarter is then calculated. These sector wise sums of investments, made by mutual funds during the quarter are then plotted on graph to check the ratio of diversification which is shown by a separate shaded portion for each sector in which investment is made.

For second hypothesis, Risk and return for the mutual funds investing in different asset classes is calculated. Risks and returns for each mutual fund have been calculated separately to find out the risk adjusted return as an indicator of performance of mutual fund due to diversification. First of all share prices for all the companies (in which investments are made) were collected at end of each quarter to find out the returns of those companies. Weights and returns of each individual company are then multiplied to get weighted returns at end of each quarter, for each investment. Then Net Asset Values for all mutual funds, for each quarter were collected. Using these NAV, mean, covariance, and beta for each mutual fund were calculated. Based on these calculations, three ratios i-e Sharpe ratio, Treynor ratio, and Jensen's alpha have been calculated to measure the risk adjusted return as an effect of diversification.

These ratios are calculated as follows:

Sharpe Ratio $\dfrac{(R_p - R_f)}{\delta_p}$

Treynor Ratio $\dfrac{(R_p - R_f)}{\beta}$

Jensen Measure $R_p\text{-}R_f = \alpha_p + \beta_p\,(R_m\text{-}R_f)$

Where:

R_p..... Portfolios return

R_f..... Risk free rate

α_p….. Standard deviation of portfolio

β_p….. Beta of the Portfolio

Rm….Expected Market Return

Empirical Analysis

Under this section both hypothesis will be discussed separately in the light of tests conducted on the data set under observation.

H_1: Diversification of mutual funds reduces the risk of portfolio.

Diversification here refers that as we increase the number of securities in a portfolio, the variability of the portfolio's returns declines. This decline has to do with the covariance of one security with another. When the securities are not correlated with each other, some of the up and down movements of one security in a portfolio are cancelled by the up and down movements of the other securities. As the number of securities is increased the decline in the standard deviation of the portfolio's returns lower down due to this diversification.

Table – A

Average Returns for the year computed for 10 mutual funds for the period 2005-09

Names of the funds	*YEARS 2005-2009*					*Average*
	YEAR I	*YEAR II*	*YEAR III*	*YEAR IV*	*YEAR V*	
First Dawood Mutual Fund	0.8600	0.7169	0.6135	0.3860	0.0827	0.6441
Golden Arrow	0.3669	0.1891	0.2163	-0.1538	0.0775	0.1546
UTP-LCF	0.2564	0.1595	0.1903	-0.1036	0.0502	0.1257
First capital mutual fund	0.1927	0.1466	0.1918	-0.1146	0.0861	0.1041
BSJS balance fund	0.1407	0.1573	0.1712	-0.1182	0.0502	0.0878
PICIC Investment fund	0.1359	0.1279	0.0969	-0.1417	0.0775	0.0547
Pakistan strategic allocation fund	0.1202	0.0775	0.1128	-0.1348	0.1279	0.0439
Meezan Balance Fund	0.1062	0.0927	0.1212	-0.1494	0.1573	0.0427
PICIC Growth Fund	0.0861	0.1050	0.1125	-0.1730	0.1513	0.0327
Atlas Fund of Funds	0.0502	0.0827	-0.0194	-0.0352	0.1521	0.0196

Success of any fund is rated on the basis that how effectively it is diversifying its risk and how much return it is getting as a result of diversification. To find out the effect of diversification we have calculated the weighted return for each mutual fund, for each quarter during period 2005-09, and then mean return is calculated for the year. These results are shown in Table-A.

The results (Table A) shows that fund having highest average return i-e 64% has made the investments in most diversified manner (Annexure I) i-e about 25 -26 different industries throughout the year whereas the fund with lowest average return i-e about 2% has invested in 3-5 industries throughout the year. The degree of diversification in each quarter can be seen from the pie charts plotted for each fund (Annexure I)

As the main objective of diversification is to minimize the risk, more diversification means that fund has succeeded in minimizing its risk to the lowest possible point and so there is an increase in its returns.

H_2: Diversification of mutual funds leads to higher risk adjusted returns.

Results obtained for each ratio are discussed below individually.

Sharpe ratio

It measures the portfolio manager's ability on the basis of rate of return performance and diversification by taking into account total risk of the portfolio. In this ratio standard deviation is taken as a measure of risk. Standard deviation captures the overall variability of returns. A fundamental result of investments is that diversification reduces risk of a portfolio. That is, as we increase the number of securities in a portfolio the variability of the portfolio's returns declines.

Table – B

Sharpe Ratios for 10 closed end Mutual Funds for the period 2005-09

Names of the funds	*Rp*	*Std Deviation*	*Sharp Ratio*
Atlas Fund of Funds	0.1694	0.0581	*1.5216*
Meezan Balance Fund	0.1518	0.0759	*0.9329*
First Dawood Mutual Fund	0.1624	0.0909	*0.8956*
BSJS Balance Fund	0.0886	0.0106	*0.7159*
First Capital Mutual Fund	0.0618	0.1186	*-0.1620*
PICIC Investment Fund	0.0674	0.0548	*-0.2485*
PICIC Growth Fund	-0.1250	0.1356	*-1.5196*
Golden Arrow	-0.3227	0.2338	*-1.7268*
UTP-LCF	-0.2731	0.1362	*-2.6001*
Pakistan Strategic Allocation Fund	-0.4424	0.1560	*-3.3549*

Treynor Ratio

Trynor model is used here to measure the performance of a managed portfolio in respect of return per unit of risk (systematic risk). In this way the mutual fund provides the highest return per unit of risk (systematic risk) will be preferred as compared to the fund provides low return per unit of risk. Treynor ratio uses Beta as a risk measure which captures that component of the risk that cannot be diversified away.

Alternatively, beta is defined as the risk that a security brings to a well-diversified portfolio. This ratio also measures the portfolio manager's ability on the basis of rate of return performance and diversification by taking into account systemic risk of the portfolio.

This study computes the ratio of the historical returns, in excess of the risk-free rate to the systemic risk of the portfolio returns of the closed end funds for the period 2005-06. Results of Treynor Ratio (Table C) shows, that some funds are effectively following diversification policy and due to this they are successfully reducing their risk. However there are some funds which have negative value of Treynor Ratio as well.

Table – C

Treynor Ratio Calculated for 10 Mutual Funds for the period 2005-09

Names of the funds	*Rp*	*Beta*	*Treynor Ratio*
Atlas Fund of Funds	0.1694	0.3461	*0.2553*
First Dawood Mutual Fund	0.1624	0.5653	*0.1440*
Meezan Balance Fund	0.1518	0.5008	*0.1415*
BSJS balance fund	0.0886	0.0630	*0.1199*
First capital mutual fund	0.0618	0.6878	*-0.0279*
PICIC Investment fund	0.0674	0.1089	*-0.1249*
PICIC Growth Fund	-0.1250	0.8606	*-0.2394*
Golden Arrow	-0.3227	1.5378	*-0.2625*
UTP-LCF	-0.2731	0.8959	*-0.3952*
Pakistan strategic allocation fund	-0.4424	1.0053	*-0.5207*

Our results for Sharpe and Treynor Ratio are almost same i-e the funds having positive Sharpe ratio also have the positive Treynor ratio and vice versa.

Jensen Alpha

Jensen alpha is used to measure the abnormal return of a portfolio i-e difference between the actual average return earned by a portfolio and the return that should have been earned by the portfolio given the market conditions and the risk of the portfolio.

Jensen Alpha calculated for our sample of 10 mutual funds for the period 2005-06 (Table-D) shows all the positive values. It means that the funds outperformed the market in the given period, in given conditions. An increased average return as compared to expected returns is the outcome of the effectively diversified portfolio.

Table – D

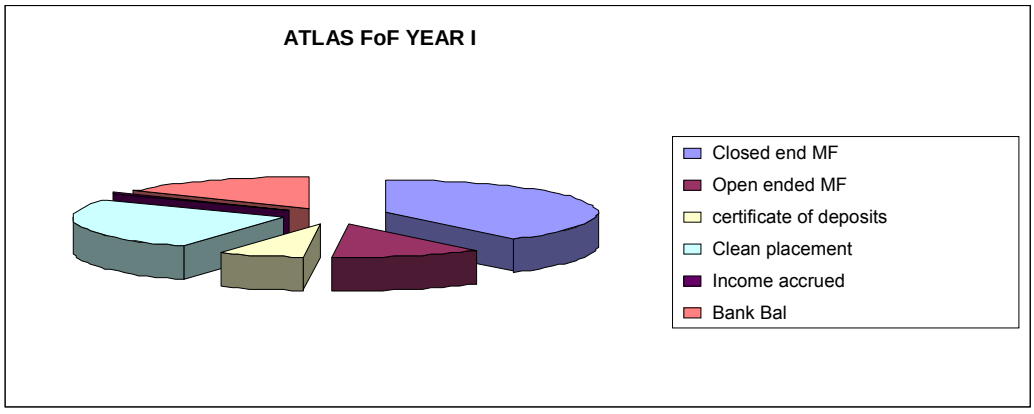
Jensen Alpha Calculated for 10 Mutual Funds for the period 2005-09

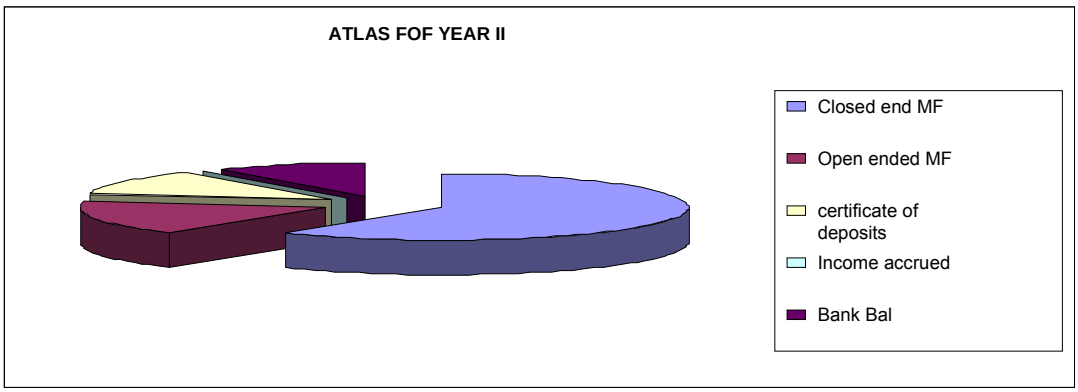
Names of the funds	*Jensen Alpha*	*Beta*

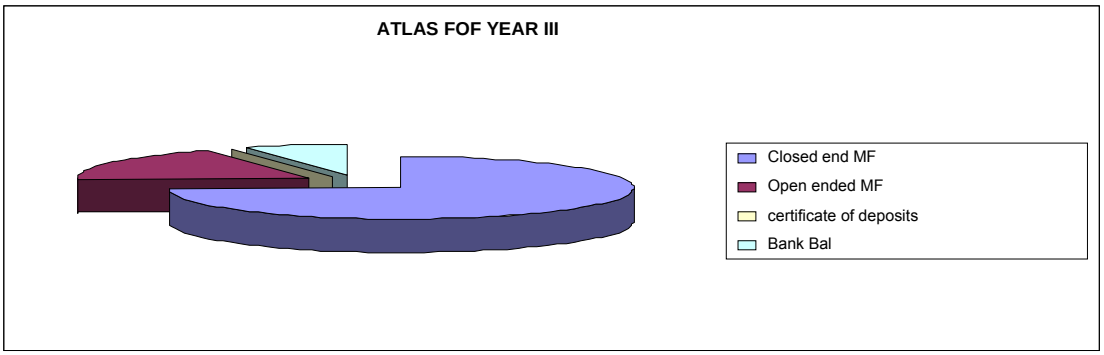
Atlas Fund of Funds	0.0947	0.3461
First Dawood Mutual Fund	0.0918	0.5653
Meezan Balance Fund	0.0800	0.5008
BSJS balance fund	0.0087	0.0630
First capital mutual fund	-0.0066	0.6878
PICIC Investment fund	-0.0116	0.6878
PICIC Growth Fund	-0.1903	0.8606
UTP-LCF	-0.3377	0.8959
Golden Arrow	-0.3756	1.5378
Pakistan strategic allocation fund	-0.5050	1.0053

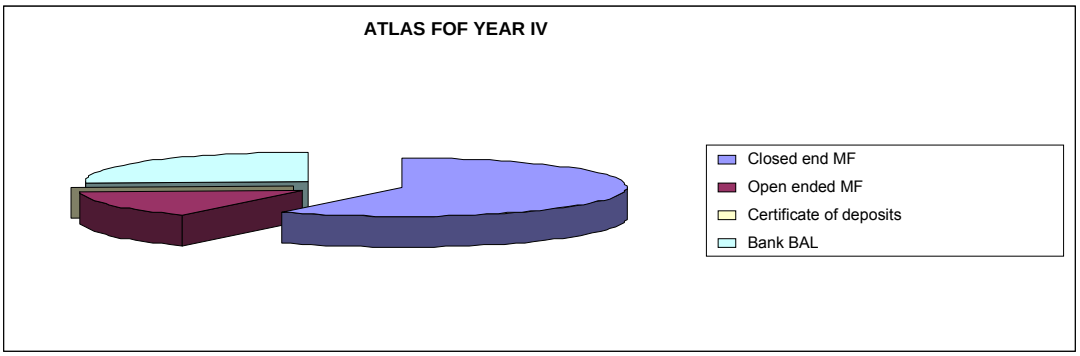
Diversification and Performance of Mutual Funds

We used three different measures to rank performance of the mutual funds. Sharpe ratio test indicate that top three funds are *Atlas Fund of Funds, Meezan Balance Fund, First Dawood Mutual Fund.* According to treynor ratio ranking, top three are *Atlas Fund of Funds, First Dawood Mutual Fund and Meezan Balance Fund.* Jensen alpha test also confirms the same result. Now we relate these to the level of diversification, for this purpose studied the composition of fund during the period. An analysis of the portfolio of the top ranking *Atlas Fund of Funds* reveals that it invested significant portion of the available amount in the closed ended mutual funds and open ended mutual funds as evident from following graphs.



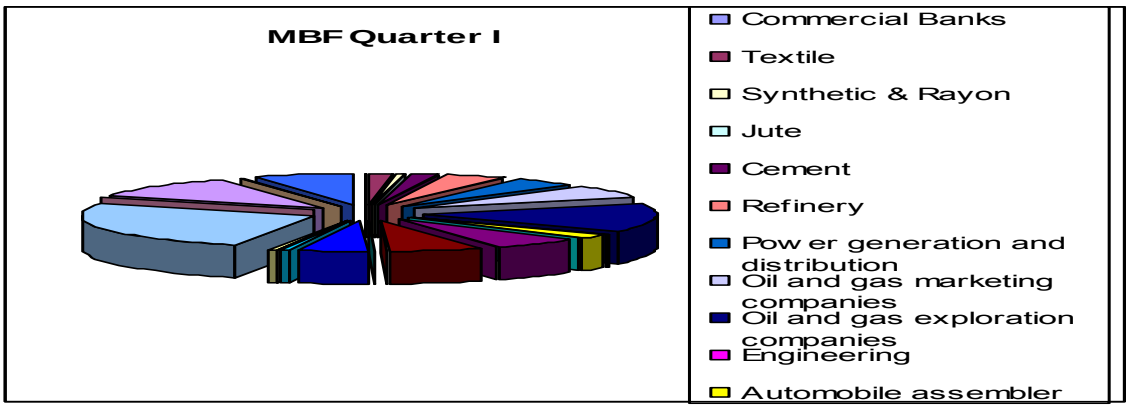


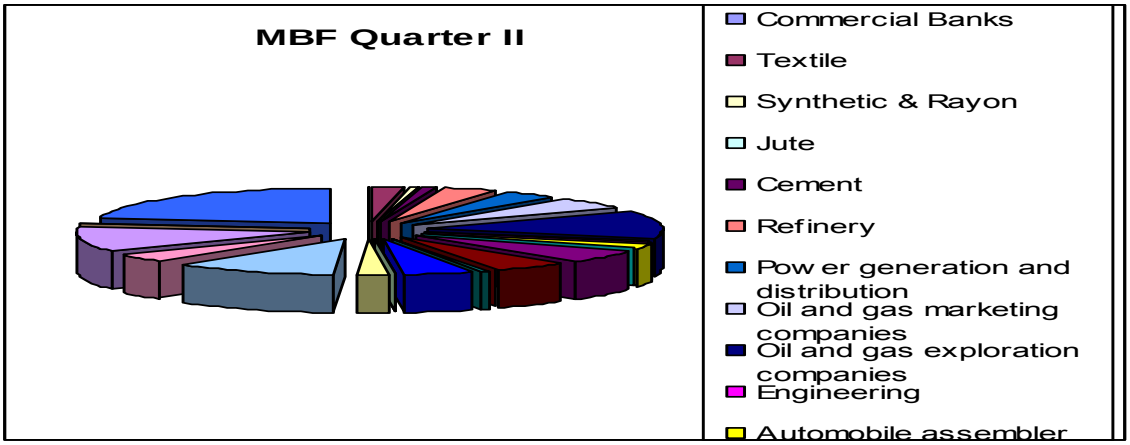


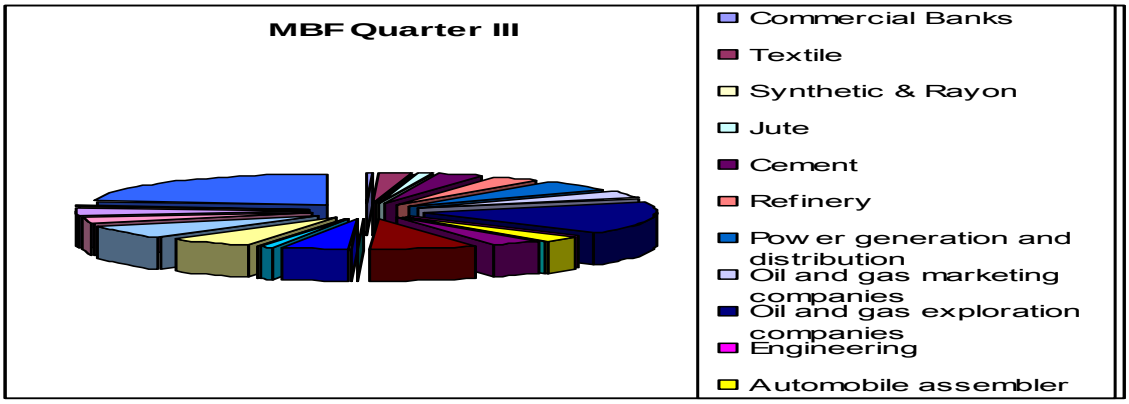


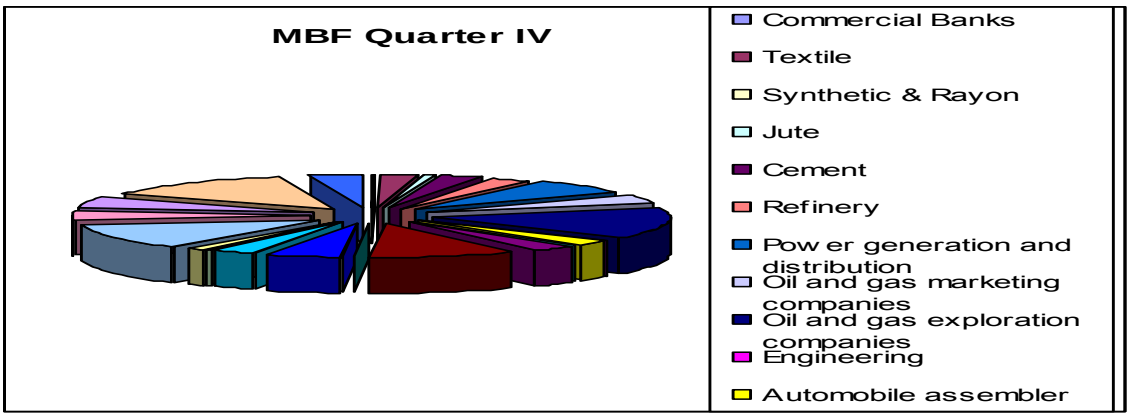
This investment in mutual funds is in fact two tier diversification. First, Atlas Fund of Funds invested in set of diversified portfolio. Secondly each portfolio was itself set of diversified set of securities. This two tier diversification led to the reduction of the risk thus Sharpe ratio and treynor ratio shows highest level of return per unit of risk thus diversification let achieve the high rate of return for a given level of risk.

In case of meezan Islamic funds we see that they designed a portfolio by investing in various sectors of the market and thus reduced the risk of putting all eggs in one basket and ultimately achieved the high ranking in risk adjusted returns. Following pie chart indicates the spread of investment in various segments of market.



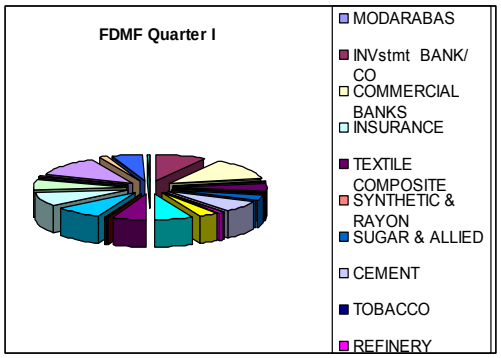


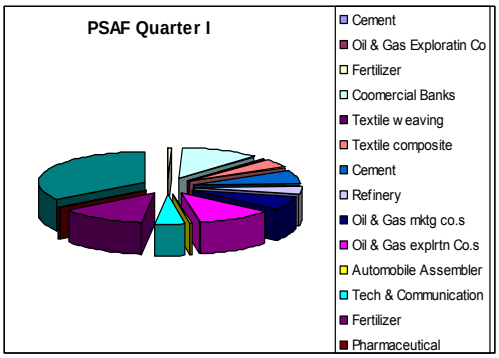




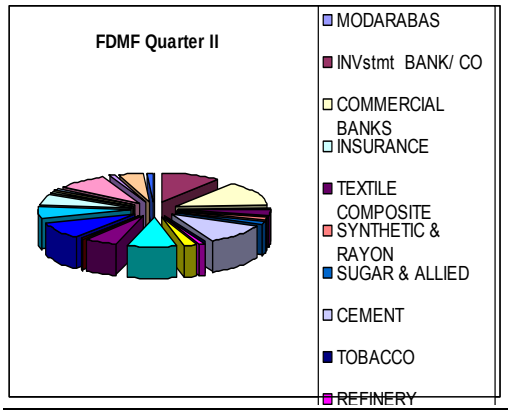
The graph is self explanatory with reference to the diversified set of investment. Similarly a comparison of the *First Dawood Mutual Fund* with a low performer

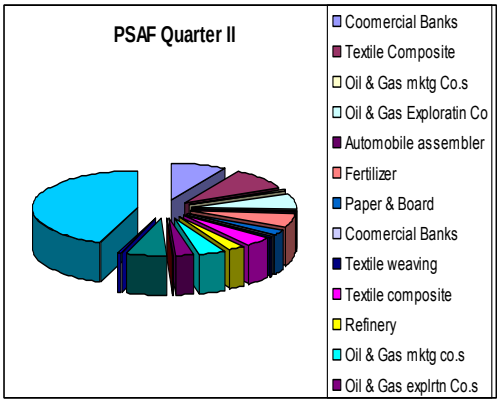
Comparison of first quarter



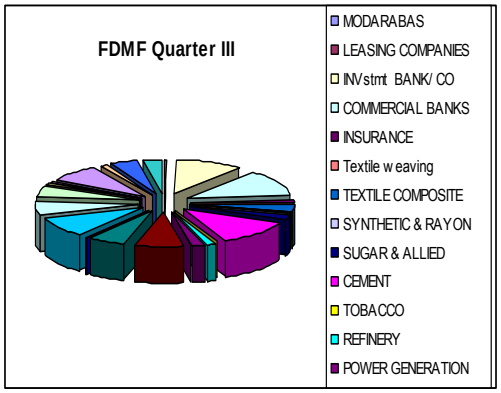


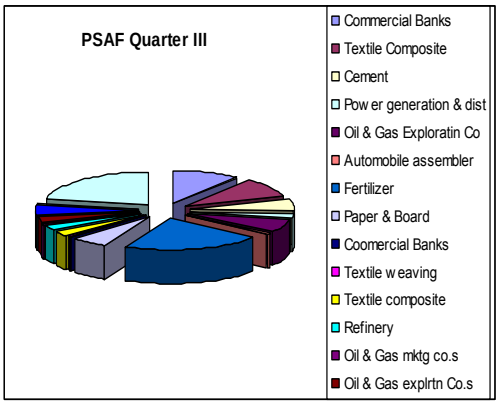
Comparison of second quarter



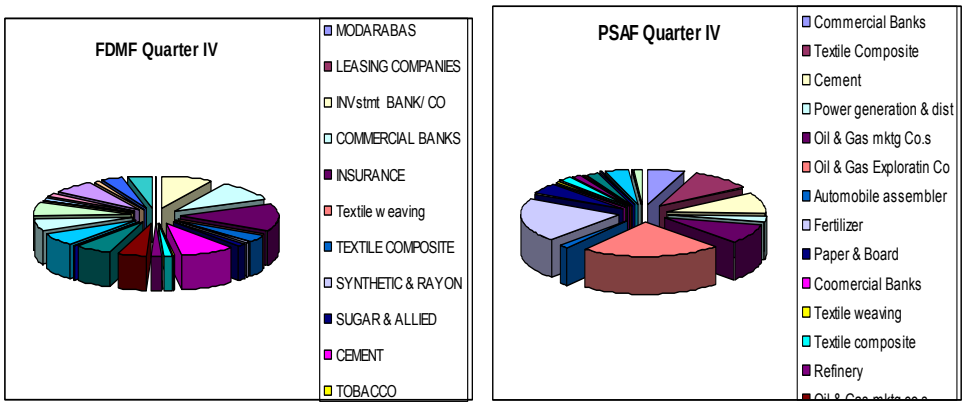


Comparison of third quarter





Comparison of fourth quarter



Above comparison categorically indicates that *First Dawood Mutual Fund* is a more diversified portfolio in comparison to *Pakistan strategic allocation fund.* The high ranking of *First Dawood Mutual Fund* in comparison to ranking of to *Pakistan strategic allocation fund* is clear indication to the fact that mutual funds that are more diversified offer higher risk adjusted return in comparison to less diversified portfolios. Annexure I provide details of the set of investments for other mutual funds studied and it again confirms the result that more diversified portfolios offer higher risk adjusted returns.

Conclusion

This study examines the performance of mutual fund and relationship of the performance with the level of diversification. Three different techniques are used to measure performance of the mutual funds Performance of the mutual funds is ranked by ascertaining risk adjusted returns derived by using Sharpe ratio and Treynor ratios. These ratios use standard deviation and beta as a measure of risk respectively. Sharpe ratio test indicate that top three funds are *Atlas Fund of Funds, Meezan Balance Fund, and First Dawood Mutual Fund*. According to treynor ratio ranking, top three are *Atlas Fund of Funds, First Dawood Mutual Fund and Meezan Balance Fund*. Jensen alpha test also confirms the same result.

In order to identify the relationship of performance with diversification, composition of the portfolios is studied in detail. Analysis of top ranking *Atlas Fund of Funds* reveals that it invested significant portion of the available amount in the closed ended mutual funds and open ended mutual. This investment in mutual funds is in fact two tier diversification. First, *Atlas Fund of Funds* invested in set of diversified portfolio. Secondly each portfolio is itself set of diversified set of securities. This two tier diversification led to the reduction of the risk thus Sharpe ratio and Treynor ratio shows highest level of return per unit of risk. Therefore more diversification led to achieve the high rate of return for a given level of risk. Similarly comparison of other fund reveals that mutual fund which are more diversified they offer high risk adjusted returns. Thus we can conclude that diversification has direct relationship with performance measured in terms of risk adjusted returns.

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Abstract

This study examines the performance of mutual fund and relationship of the performance with the level of diversification. A sample of closed end Mutual Funds for the period 2005-09 has been studied. Three different techniques are used to measure performance of the mutual funds. Performance of the mutual funds is ranked by ascertaining risk adjusted returns derived by using Sharpe ratio, Treynor ratios and Jensen alpha using standard deviation and beta as a measure of risk. All three ratios reveal the same results that diversification leads to the achievement of high rate of return for a given level of risk. The two tier diversification of mutual funds led to the reduction of the risk thus Sharpe ratio and Treynor ratio shows highest level of return per unit of risk. Comparison of other funds reveals that there exists a direct relationship of diversification with the performance of mutual funds measured in terms of risk adjusted returns.

Key words: mutual funds, risk, return, diversification

JEL classification: G21