

Examining Efficiency & Performance of Various Investment portfolios

(Dr. Anubha Srivastava, Assistant Professor (Finance), Amity Business School, AUUP, Noida)

Introduction

For international diversification benefits, alternatives include funds that invest in securities traded in countries outside the India, funds that buy Indian securities and foreign securities, funds that invest in developing countries (emerging country funds), funds with holdings in specific countries (e.g., Korea or Japan), or funds that invest in specific continents (e.g., Europe or Asia). Thirty years of scientific progress in financial economics has left the central problem of portfolio performance evaluation largely unresolved. This unhappy state of affairs persists despite broad agreement on an intuitive level that an actively managed portfolio with superior performance should exhibit higher returns on average than a passively managed portfolio with the same amount of risk. Unfortunately, two obstacles stand in the way of implementing this intuitive notion of superior performance to evaluate the track record of mutual funds. The first difficulty stems from disagreement on the appropriate way to quantify risk and hence on what constitutes normal performance. The second problem concerns errors in inference that can arise when portfolio managers can, in fact, outperform the market. In order to measure abnormal performance by mutual funds it is necessary to have a benchmark for normal performance. Modern portfolio theory purports to provide such a standard of comparison - that combination of the market portfolio and the riskless asset which is of comparable risk. Not surprisingly, numerous investigators have employed the Capital Asset Pricing Model (CAPM) to evaluate the performance of mutual funds. The performance of the portfolios can be measured on different dimensions 1- ability of the fund manager to assure return by accurate forecasting applying mathematical and statistical models 2- the ability to diversify the risk by anticipating the extent of co-relation among the funds.

Literature Review

Friend, Brown, Herman, and Vickers, 1962), offered the first empirical analysis of mutual funds performance. *Treynor (1965), Sharpe (1966), and Jensen (1968)* [1] developed the standard indices to measure risk adjusted mutual fund returns. Grinblatt and *Titman (1989)* [2] constructed a positive period weighting measure of fund performance. (*Chang and Lewellen, 1985*) [3], using a test procedure derived from arbitrage pricing theory, found that mutual fund portfolios did not outperform a passive buy-and-hold portfolio strategy. (*Sengupta & Sfeirt, 1987*) [4] Investment portfolios of ten mutual funds randomly selected from a set of 115 funds considered previously by *Jensen (1969) and Mains (1977)* [5] are analysed here for efficiency in diversification and robustness. Statistical tests show three broad results which emphasize the socially desirable service performed by these portfolios of mutual funds: (1) there exist mutual funds and investment portfolios which perform much better than the market portfolio insofar as diversification of insurable risk is concerned, (2) the so-called balanced funds and balanced portfolios are much more robust than the market portfolio, and (3) the risk-return efficiency frontiers provide a valuable insight to the superior performance of selected portfolios. (*Ippolito, 1989*) [6] examined the relation between mutual fund investment performance and other variables such as asset size, expenses, turnover,

and load status. Domestic mutual fund risk-adjusted returns, net of fees and expenses, were comparable to returns of index funds. However, portfolio turnover was unrelated to fund performance (**Cumby and Glen, 1990**) [7] included international mutual funds in the literature. The performance of 15 U. S.-based internationally diversified funds was compared to the Morgan Stanley Index for the U. S., the Morgan Stanley World Index, and to a benchmark combining the world index and Eurocurrency deposits. The time period analyzed was 1982-1988. Both the Jensen index and the methodology developed by **Grinblatt and Titman (1989b)** [8] were employed to measure portfolio performance. Cumby and Glen concluded the funds did not outperform the international equity index; however, there was some evidence of the funds outperforming the U.S. index.

(Eun, Kolodny, and Resnick, 1991) [9] reported similar findings. The benchmarks used in their study were the Standard and Poor's 500 Index, the Morgan Stanley Capital International World Index, and a self-constructed index of U.S. multinational firms. For the period 1977-1986, the majority of international funds outperformed the U. S. market. However, most failed to outperform the world index. The sample consisted of 19 U. S.-based international funds, and the Sharpe measure was used to assess excess returns. **(Ippolito R. A., 1992)** [10] concluded that the investors prefer mutual funds which have a record of positive return in the past. **(Droms and Walker, 1994)** [11] used a cross-sectional/time series regression methodology. Four funds were examined over 20 years (1971-1990), and 30 funds were analyzed for a six-year period (1985-1990). The funds were compared to the Standard and Poor's 500 Index, the Morgan Stanley Europe, Australia, and Far East Index (EAFE) which proxies non-U. S. stock markets, and the World Index. Applying the Jensen, Sharpe, and Treynor indices of performance, they found that international funds have generally underperformed the U. S. market and the international market. Additionally, their results indicated that portfolio turnover, expense ratios, asset size, load status and fund size are unrelated to fund performance. **(Sapar & Narayan, 2003)** [12] evaluates the performance of 269 open ended schemes of mutual funds in a bear market using relative performance index, risk-return analysis, Treynor's ratio, Sharp's ratio, Sharp's measure, Jensen's measure, and Fama's. The results obtained advocate that most of the mutual fund schemes in the sample outperformed the investor's expectations by giving excess return over expected return based on premium for systematic risk and total risk. **(Sathya Swaroop Debasish, 2009)** [13] studied the performance of 23 schemes offered by six private sector mutual funds and three public sector of mutual funds based on risk-return relationship models and measures it over the time period of 13 years (April 1996 to March 2009). The analysis has been made on the basis of mean return, beta risk, co-efficient of determination, Sharpe ratio, Treynor ratio and Jensen Alpha. The overall analysis concludes Franklin Templeton and UTI being the best performers and Birla SunLife, HDFC and LIC mutual funds showing below-average performance when measured against the risk-return relationship models **(Dhume and Ramesh, 2011)** [14] conducted a study to analyze the performance of the sector funds. The sectors considered were Banking, FMCG, Infrastructure, Pharma and Technology. The study used different approaches of performance measures. Findings of study revealed that all the sector funds have outperformed the market except infrastructure funds. **(Agarwal, 2011)** [15] Mutual fund contributes to globalization of financial markets and is one among the main sources for capital formation in emerging economies. He analyzed the pricing mechanism of Indian Mutual Fund Industry, data at both the fund-manager and fund-investor levels.

There has been incredible growth in the mutual fund industry in India, attracting large investments from domestic and foreign investors. **(R. Anitha, et. al., 2011)** [16], in their study evaluated the performance of public-sector and privatesector mutual funds for the period from 2005 to 2007. Selected funds were analyzed using Statistical tools like Mean, Standard Deviation and Co-efficient of Variation. **(P Prajapati and K Patel, 2012)** [17] evaluated the performance of Indian mutual funds using relative performance index, risk-return analysis, Treynor's ratio, Sharp's ratio, Sharp's measure, Jensen's measure, and Fama's measure. The data used is daily closing NAVs from 1st January 2007 to 31st December, 2011 and concluded that most of the mutual funds have given positive return during the period of study.

Research Methodology

Problem Formulation

The study is done to analyze the performance of portfolios of mutual funds constructed using asset pricing model. This paper tests the portfolios for the performance of growth, balanced and secure funds on the basis of Sharpe, Treynor and Jensen ratio, in order to examine the effectiveness and efficiency of portfolio managers.

Objectives of the study

1. To construct portfolio of mutual funds using Capital Asset Pricing Model (CAPM)
2. To examine the efficiency of risk- adjusted returns of the constructed portfolios.
3. To analyse the performance of the formed portfolios using Sharpe ratio, Jensen and Treynor ratio.
4. To interpret the ratios and returns of the portfolios in comparison to each other.
5. To Comparative study of portfolio returns with that of the market return.

Nature of research and design

The research is descriptive and analytical in nature, which has used the facts and information already available to analyze the stated problem critically. Many portfolio construction techniques have been developed till date and tests for them have also been conducted. In this paper asset pricing model is used to form portfolios using mutual funds. 10 mutual funds are taken and formed into 5 portfolios. Mutual funds are selected on the basis of their annual returns, 10 mutual funds with highest annual returns in last year ,i.e. 2013 are taken. The data include monthly average mean NAV of the mutual funds. Time period of study will be 5 years. Then to check the efficiency of performance of these portfolios Sharpe, Jensen and Treynor measures are used. The present study is based on the secondary data only. No collection of primary data has been involved in the study. The data is collected from the website of Association of Mutual Funds of India, which is a registered website of India and hence authenticates the data.

Analysis methods

Three measures were used to evaluate the risk-adjusted performance of the mutual funds in the sample: Sharpe's Index, Treynor's Index, and Jensen's Alpha. The Sharpe's Index was computed by applying the following:

Equation 1:

$$Sip = (Rp - Rrf) / \acute{o}p$$

where,

Sip = Sharpe's Index for portfolio p,

Rp = return on portfolio p,

Rrf = return on risk-free asset,

$\acute{o}p$ = standard deviation of portfolio p,

The numerator is the excess return above the risk-free return on a portfolio, and $\acute{o}p$ is the measure of total risk of the portfolio. Total risk is comprised of risk from any source -- systematic and unsystematic risks. A portfolio has performed better than the benchmark (usually taken as the stock market) if its Sharpe's Index is greater than that of the benchmark.

The Treynor Index is computed using the equation:

Equation 2:

$$Tlp = (Rp - Rrf) / \acute{a}p$$

where:

Tlp = Treynor Index for portfolio p,

$\acute{a}p$ = beta for portfolio p,

The numerator is the excess return on a portfolio, and the denominator is the average beta for the portfolio. If the Treynor Index is greater than that of the benchmark, the portfolio has performed better than the benchmark. The Treynor Index measures the ability of a portfolio to earn an excess return that has been adjusted for systematic risk. Finally, the Jensen's Alpha is determined by applying the market model in difference form. In computing the Jensen's Alpha, the excess return of portfolio p is regressed against the excess return of the market portfolio:

Equation 3:

$$(Rp - Rrf) = \acute{a}p + (Rm - Rrf) \cdot \acute{a}p$$

where:

Rp = return on portfolio p,

Rrf = risk-free return,

$\acute{a}p$ = alpha

$\acute{a}p$ = beta for portfolio p,

Rm = return on the market portfolio,

The intercept, α , is Jensen's Alpha and is based on the excess return of a security or portfolio relative to that of the excess return of the market. The interpretation of Jensen's Alpha is based on the sign of α and its statistical significance. For a portfolio to have a risk-adjusted return superior to the market, α must be positive and statistically significant. A negative and significant α indicates performance below that of the market portfolio. If α is statistically insignificant, the portfolio has performed as well as the market.

Limitation of the study

- The study is based on assumed weights of the mutual funds in portfolios.
- The time period of the study is limited and hence the results cannot be generalised.
- Number of mutual funds examined might not be enough to prove the conclusion.

DATA ANALYSIS

For the study of diversification and comparative analysis of portfolio return and market return 10 best performing mutual funds are taken. Time period for the study is 5 years i.e. 2009 to 2013. Input data involved in the study is the NAV of the mutual funds, taken from nseindia.com, official website of the National Stock Exchange (NSE) of India; 1-month mibor as the proxy for riskfree rate of return; S&P CNX NIFTY as the proxy for the Indian market, data for market return (return on CNX NIFTY) is also derived from NSE website; beta for the mutual funds is calculated through the returns of mutual funds and market index. The portfolios have both positive and negative returns on monthly basis and give out a positive return on annualized basis. These returns are very less as compared to market returns as they are mainly meant for long term investments. Observing the variances and returns it shows that the higher the variation, higher is the return and lower the variation, lower is the return, the risk-return trade-off. The co variances of the mutual funds are in negative also hence scope of construction of well diversified portfolio is there. Funds with least covariance can be put in one portfolio to offset the risks of each other.

Table 1: Mean, variance, covariance of mutual funds

Fund No.	Mean	Variance	Covariance	
			Maximum	Minimum
1	0.1219	0.0386	0.001525	-0.000022
2	0.0637	0.0337	0.001294	-0.000062
3	0.1420	0.0249	0.000567	-0.000022
4	0.0136	0.0429	0.001878	0.000041
5	0.0404	0.0499	0.002284	-0.000120
6	0.0501	0.0408	0.001639	-0.000133
7	0.0604	0.0427	0.001705	-0.000029

8	0.0123	0.0422	0.001740	-0.000073
9	0.0329	0.0442	0.001793	-0.000026
10	0.0591	0.0359	0.001241	0.000114
Average	0.0597	0.3957		

Portfolios are constructed on the basis of nature of return. A portfolio with balanced weights is constructed, two are secured portfolio and another two are growth portfolios. These portfolios are constructed on least variance basis consisting of different and similar funds.

Table 2: Portfolios construction

Portfolio No.	Funds Included
1(Growth)	All 10 funds, 1,2,3,4,5,6,7,8,9,10
2(Growth)	All except 3, 1,2, 4,5,6,7,8,9,10
3(Balanced)	2,3,5,6
4(Secured)	1,4,8,9
5(Secured)	3,4,7,10

Many investors mistakenly base the success of their portfolios on returns alone. Few consider the risk that they took to achieve those returns. Since the 1960s, investors have known how to quantify and measure risk with the variability of returns, but no single measure actually looked at both risk and return together. We have three sets of performance measurement tools to assist us with our portfolio evaluations. The Treynor, Sharpe and Jensen ratios combine risk and return performance into a single value, but each is slightly different. The higher the Treynor measure, the better the portfolio. Because this measure only uses systematic risk, it assumes that the investor already has an adequately diversified portfolio and, therefore, unsystematic risk (also known as diversifiable risk) is not considered. As a result, this performance measure should really only be used by investors who hold diversified portfolios. Unlike the Treynor measure, the Sharpe ratio evaluates the portfolio manager on the basis of both rate of return and diversification (as it considers total portfolio risk as measured by standard deviation in its denominator). The Jensen ratio measures how much of the portfolio's rate of return is attributable to the manager's ability to deliver above-average returns, adjusted for market risk. The higher the ratio, the better the risk-adjusted returns. A portfolio with a consistently positive excess return will have a positive alpha, while a portfolio with a consistently negative excess return will have a negative alpha. Like the Treynor measure, however, Jensen's alpha calculates risk premiums in terms of beta (systematic, undiversifiable risk) and therefore assumes the portfolio is already adequately diversified. As a result, this ratio is best applied with diversified portfolios, like mutual funds.

Table 3: Risk-Adjusted Measures for 2009

	1	2	3	4	5
Rm	0.5495	0.5495	0.5495	0.5495	0.5495
Rf	0.0398	0.0398	0.0398	0.0398	0.0398
Rp	0.6077	0.6113	0.5772	0.5551	0.4020
S.D.	0.0801	0.0809	0.0745	0.0657	0.0492
Beta	0.8132	0.8199	0.7613	0.6709	0.4838
CAPM	0.4543	0.4577	0.4278	0.3818	0.2864
Sharpe	7.0874	7.0623	7.2111	7.8445	7.3634
Treynor	0.6983	0.6970	0.7059	0.7681	0.7487
Alpha	0.1534	0.1536	0.1493	0.1733	0.1156

where,

Rm = Market return

Rf = Risk free rate

Rp = portfolio return

S.D. = variation of portfolio

Alpha = Jensen Measure

2009 being the year of global meltdown resulted in the down turn of complete economy. A lot of outflow from the mutual funds was observed and especially the equity mutual funds. Markets saw a serious fall generating high levels of market risk. Still the wise could sail away and the incompetent drowned. The mutual funds taken in the present study were the best performing mutual funds over the last five years and this can be proved by the above results. The portfolio returns of all the portfolios except for portfolio 5 are above the market return. The returns are even better than the expected returns as signified by the jensen's alpha. The alpha values of all the folios are positive showing that the portfolios are formed by superior and robust assets and also there have been active management. Such a high value of sharpe index shows that the funds are highly risk adjusted. Funds 4 and 5 have highest value of sharpe index and treynor ratio signifying that they have minimised both the systematic and unsystematic risk. Beta of portfolio 4 and 5 are the lowest hence it can be concluded that funds 1, 2 and 3 are moving in line with the market with high volatility and still earning the high returns whereas on the other hand funds 4 and 5 with low returns have managed to have good ratios only because their unsystematic risk is low as compared to others. This conclusion also re-establishes the fact that low risk give low returns and for high returns high risk is to be accepted. Also considering the fact that the funds 1 and 2 are growth funds they performed well and 4 and 5 being the secure funds also performed accordingly with less volatility. Fund 3 being a balance fund exhibited balanced performance, i.e. between the growth and the secure funds. Hence it can be said that the performance of portfolios have been satisfactory, as the excess return is not much but considering the fact that it had been a bad year funds gave out positive returns.

Table 4: Risk-Adjusted Measures for 2010

	1	2	3	4	5
Rm	0.1699	0.1699	0.1699	0.1699	0.1699
Rf	0.0854	0.0854	0.0854	0.0854	0.0854
Rp	0.1792	0.1800	0.1520	0.1362	0.1270
S.D.	0.0362	0.0365	0.0354	0.0345	0.0350
Beta	0.7026	0.7073	0.6470	0.6777	0.6918
CAPM	0.1448	0.1451	0.1401	0.1426	0.1438
Sharpe	2.5887	2.5918	1.8800	1.4714	1.1907
Treynor	0.1335	0.1337	0.1030	0.0749	0.0602
Alpha	0.0345	0.0348	0.0120	-0.0065	-0.0168

As compared with the performance in 2009 the performance in 2010 the market and the funds have depreciated a lot with a plunge of almost 69%. The effect is evident from the statistics observed. The effects of meltdown were actually observed in this year. The sharpe index, treynor ratio and alpha values have come down as a result of excessive market risk. The recovery phase started from 2010 but leaving behind its traces for sure. Fund 3, 4 and 5 could not outperform the market and had low returns. Fund 3 could still earn a return more than expected return according to CAPM model but 4 and 5 could not perform good and had a negative alpha value. The growth funds exhibiting high sharpe ratio signify that they have minimised the systematic risk. Comparing the volatility of the funds they all have nearly same level of risk but given this level of risk 1 and 2 could manage the risk and yield better returns as compared to 4 and 5 which have nearly same level of volatility but were poorly managed. Portfolio 3 being a moderate performer explained by the fact that it is a balance fund and hence performs on line of market and fails to fight the market risk. Treynor ratio values are high for funds 1 and 2 indicating that they have managed to dodge the market risk and made out maximum returns by actively being managed.

Table 5: Risk-Adjusted Measures for 2011

	1	2	3	4	5
Rm	-0.2757	-0.2757	-0.2757	-0.2757	-0.2757
Rf	0.0980	0.0980	0.0980	0.0980	0.0980
Rp	-0.1418	-0.2025	-0.2302	-0.2461	-0.1216
S.D.	0.0421	0.0467	0.0477	0.0502	0.0420

Beta	0.6017	0.6950	0.6832	0.7690	0.5836
CAPM	-0.1269	-0.1617	-0.1573	-0.1894	-0.1201
Sharpe	-5.6991	-6.4282	-6.8851	-6.8544	-5.2260
Treynor	-0.3985	-0.4324	-0.4804	-0.4475	-0.3763
Alpha	-0.0150	-0.0408	-0.0729	-0.0568	-0.0015

The markets had not yet picked up from the 2009 crisis that the eurozone crisis took place. This 2011 crisis led to total fall in the markets leaving behind no individual unaffected. The results for this year have been startling with all negative returns and measures. The picture of this year had been a totally opposite one as compared to that of 2009's. All measures have been negative with a very high magnitude. The market return has dropped down by more than 200%. Volatility and beta of the portfolio are in same direction and portfolios on higher sides wore the maximum risk and maximum loss. In this year the least performing fund had been on a safer side and experienced least losses. Alpha of all the portfolios are negative but fund 5 has the least magnitude, meaning that the loss incurred is not much in excess as compared to the market loss. All the portfolios have incurred less losses as compared with the market but maximum is by balanced fund (3) and least is by secure fund (5). The pattern of sharpe index values and treynor measure values is almost same signifying the adjustment of total risk of the funds. Fund 3 has maximum negative magnitude of the sharpe and treynor index values indicating that it is most badly hit by the market risk and also did not adjust its unsystematic risk. Portfolios 1 and 5 have least magnitude of the sharpe and treynor index values signifying that they were actively managed and the diversification effect helped them to adjust their systematic and unsystematic risk.

Table 6: Risk-Adjusted Measures for 2011

	1	2	3	4	5
Rm	0.2553	0.2553	0.2553	0.2553	0.2553
Rf	0.0870	0.0870	0.0870	0.0870	0.0870
Rp	0.3173	0.3240	0.2807	0.2051	0.2550
S.D.	0.0557	0.0580	0.0434	0.0436	0.0431
Beta	0.8112	0.8105	0.6862	0.6546	0.6419
CAPM	0.2235	0.2234	0.2025	0.1972	0.1950
Sharpe	4.1351	4.0861	4.4606	2.7090	3.8963
Treynor	0.2839	0.2924	0.2823	0.1805	0.2617
Alpha	0.0937	0.1006	0.0782	0.0080	0.0600

Positive returns and positive measures show that the recovery of the past two crises has actually started. The markets have shown an upward trend and the returns of the funds are also positive. Markets have pumped back with a recovery of about 190% of returns as compared to previous year. The index values of sharpe and treynor and alpha value are all positive and with a conforming magnitude. Positive alpha values prove that portfolios have outperformed the expected return and fund two has the highest alpha value with a highest volatility measure also. All the portfolios have outperformed the market except for the secure funds. Secure funds 4 and 5 have underperformed the market. This is also evident with the lowest volatility measure. They have low value of standard deviation and hence low returns. These funds even have the lowest beta values as compared to others, thus they do not move much in line with the market. Portfolio 2 has the highest positive alpha value and the highest return as compared to others as it has highest volatility and also a high beta value.

Funds 3, 4 and 5 have same level of volatility and beta but still fund 3 outperforms the other two. This is the first time that a balanced portfolio outperforms secure portfolios in a growth market. Fund 3 has the highest sharpe ratio indicating that its risk adjustment is robust and it had minimised total risk, whereas fund 4 has the least sharpe value. Treynor ratio is almost at similar level for funds 1, 2 and 3, fund 4 having the lowest value. According to treynor ratio fund 4 has been highly hit by the market risk while other tackled it.

Table 7: Risk-Adjusted Measures for 2013

	1	2	3	4	5
Rm	0.0699	0.0699	0.0699	0.0699	0.0699
Rf	0.0902	0.0902	0.0902	0.0902	0.0902
Rp	0.1089	0.0796	0.0620	0.1011	0.1182
S.D.	0.0216	0.0362	0.0307	0.0372	0.0203
Beta	0.3918	0.7909	0.6194	0.8112	0.2171
CAPM	0.0823	0.0742	0.0776	0.0737	0.0858
Sharpe	0.8674	-0.2915	-0.9193	0.2926	1.3788
Treynor	0.0478	-0.0134	-0.0456	0.0134	0.1288
Alpha	0.0267	0.0055	-0.0157	0.0273	0.0324

A drastic drop down in the market is observed in 2013. The returns have plunged by approx. 72% and also the returns of portfolio have dropped down. This fall might be a regular volatility in the market and the returns of the portfolios can be explained by their betas and risk-adjusted measures. Fund 3 has lowest returns followed by fund 2 and 5 has the highest returns followed by fund 4. Returns are not in line with the level of standard deviation, as

these have lowest risk and highest returns. Also beta for fund 1 and 5 are on lower level indicating that both the funds do not move on the lines of the market. Probably both the funds have actively minimised their unsystematic risk. Alpha values of fund 5 and 4 are the highest again to prove that they have outperformed the market. As in all the funds except fund 3 have outperformed the market but 4 and 5 have had much excess returns then the benchmark. Fund 3 has a negative alpha value, as it is a balanced portfolio and not actively managed. Fund 2 and fund 4 have a contrasting performance. Both have similar level of systematic risk, similar unsystematic risk and similar expected return but still fund 4 has a better return and positive sharpe and treynor index values, whereas fund 2 has negative sharpe and treynor measure with almost similar magnitude. This shows that the growth fund was unable to handle its systematic and unsystematic risk, whereas secure fund took an edge above and earned profit under similar risk. Fund 3 has negative sharpe and treynor measure proving the balanced fund to be the worst as it had lowest unsystematic risk and a moderate beta but it got penalised with the market risk. Fund 5 has the highest sharpe and treynor measure followed by fund 1 resulted from proper diversification, active portfolio management, risk adjustment. On compiling the results of all the 5 years we observe that the mutual funds have outperformed the market maximum number of times. The sharpe and treynor ratios indicate the risk tolerance and avoidance of the portfolios while jensen's alpha reveals the magnitude of excess return earned by the portfolio as compared to the benchmark. It is not necessary that what these measures indicate it is true all the time, or the reason for the performance is the same and not by chance. To remove these questions R-squared is studied. It is the correlation between the risk-adjusted market return and the portfolio return, greater the value of R-square stronger is the correlation. Adjusted R-square values for the portfolios over the 5 years are-0.994, 0.992, 0.991, 0.990 and 0.956 respectively. All these explain that there is a strong correlation between market and the portfolios and these measures are true and not by mere coincidence. From all the above analysis this is evident that different type of portfolios perform differently in different situations. A portfolio performing extremely good in high times need not necessarily be performing well at low times and vice- a versa.

Conclusions and Recommendations

In this study the top performing mutual funds were taken to form portfolios and classified growth, balanced and secure portfolios. The performance of the funds has been immense. They outperformed the market maximum number of times. The funds had been made with minimum variance and maximum diversification. Also portfolios were actively managed in every year for maximum return and minimum variance. The risk-adjusted measures reveal that if portfolios are actively managed then returns can be earned even at the time of recession and if not then losses can definitely be minimised. Also the type of portfolio defines its performance in different scenarios. A growth fund best performs in boom period only, a balanced fund earns when the market is stable and the benefits of a secure fund is best seen at the recession or crisis time. Since the study is spread across five years and among those five years two years were badly hit by recession and dividing the years in recession and recovery period and different funds perform differently in each scenario thus, one best portfolio cannot be defined in this study. The measures analysed in the study are of robust nature, this has been verified by adjusted R-square value which is

very strong for all the portfolios to prove that the performance of the funds are connected with that of the market and that the results are actual and not by mere coincidence. Also the regression significance and p-value is considerably for all portfolios to further confirm the genuineness of the statistics.

Recommendations-

- Number of mutual funds can be increased to make the study more relevant.
- More number of portfolios can be formed.
- Funds from different sectors and international funds can also be included in the study so that diversification is better.
- Other tools and models can be applied to study the performance of funds.
- Tests to check the robustness of the measures can be applied.

References

Books & references

1. Sharpe, W.F., "Mutual Fund Performance," *Journal of Business* 39, 1966, pp. 119-38.
2. Mark Grinblatt, Sheridan Titman "Mutual Fund performance -An analysis of quarterly portfolio holding " *The Journal of business*, VOL 62, No.3 (July 1989) Pg No. 393-416
3. Chang, E.C. and W.C. Lewellen, "An Arbitrage Pricing Approach to Evaluating Mutual Fund Performance," *Journal of Financial Research* 8, Spring 1985, pp. 15-30.
4. Sengupta, J. K., & Sfeirt, R. E. (1987). Evaluation of investment portfolios: some tests of robustness and diversification. *Applied Economics*, 179-190.
5. Treynor, Jensen .L. and F. Mazuy, "Can Mutual Funds Outguess the Market?" *Harvard Business Review* 44, 1966, pp. 131-136.
6. Ippolito, R.A., "Efficiency With Costly Information: A Study of Mutual Fund Performance, 1965-1984," *Quarterly Journal of Economics* 104, 1989, pp. 1-23.
7. Cumby, R.E. and J.D. Glen, "Evaluating the Performance of International Mutual Funds," *Journal of Finance* 45, June 1990, pp. 497-521.
8. Grinblatt, M. and S. Titman, "Portfolio Performance Evaluation: Old Issues and New Insights," *Review of Financial Studies* 2, 1989b, pp. 393-421
9. Eun, C.S., R. Kolodny and B.G. Resnick, "U.S. Based International Mutual Funds: A Performance Evaluation," *The Journal of Portfolio Management* 17, Spring 1991, pp. 88-94.
10. Ippolito R A., "Consumer Reaction to Measure of Poor Quality: Evidence from the Mutual Fund Industry", *Journal of Law and Economics*, Vol. 35, pp. 45-70, 1992.
11. Droms, W.G. and D.A. Walker, "Investment Performance of International Mutual Funds," *Journal of Financial Research* 17, Spring 1994, pp. 1-14.

12. Sapar, Narayan Rao and Madava, Ravindran, "Performance Evaluation of Indian Mutual Funds".
13. Sathya Swaroop Debasish "Investigating Performance of Equity-based Mutual Fund Schemes in Indian Scenario", KCA Journal of Business Management. Vol. 2, Issue 2 (2009), pp. 1-15
14. Pournima S. Shenvi Dhume and Prof. B. Ramesh (2011), "Performance Analysis of Indian Mutual Funds with a Special Reference to Sector Funds", The Indian Journal of Commerce, Vol. 64, No. 9, July- September 2011.
15. Deepak Agrawal, "Measuring Performance of Indian Mutual Funds" Finance India, June 2011.
16. R. Anitha, C. Radhapriya and T. Devasenathipathi, "A Comparative Analysis of Market Returns and Fund Flows with Reference to Mutual Funds" International Journal Of Research In Commerce, It & Management, Volume no. 1, Issue no. 4, September, 2011.
17. Kalpesh P Prajapati and Mahesh K Patel (2012), Comparative Study On Performance Evaluation Of Mutual Fund Schemes Of Indian Companies, Researchers world, Journal of Arts, Science & Commerce Vol-III, Issue3(3), July 2012, pp. 47-59

Websites

- www.imfindia.com
- www.nseindia.com
- www.bseindia.com
- www.moneycontrol.com