PERFORMANCE EVALUATION OF SELECTED SECTORAL MUTUAL FUND SCHEMES IN INDIA: AN IN-DEPTH RISK-RETURN ANALYSIS

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Abstract

Since long the performance of mutual funds has been receiving a great deal of attention from both practitioners and academics. With an aggregate investment of trillion dollars in India, the investing public's interest in identifying successful fund managers is understandable.

From an academic perspective, the goal of identifying superior fund managers is interesting as it encourages development and application of new models and theories. The idea behind performance evaluation is to find the returns earned by the sectoral mutual fund schemes and the risk levels at which they are delivered in comparison with the market and the risk free rates. It is also the aim to identify the out-performers for healthy investments. The sectoral mutual fund schemes have been ranked on basis of risk and return analysis and for better evaluation of these schemes various risk-adjusted ratios like Sharpe ratio, Jensen Measure, Fama ratio, Treynor's ratio and few others are calculated. A little work has been done which merely concentrate on multiple measures of sectoral mutual fund scheme performance evaluation. This study is a type of exploratory research using four sectors namely infrastructure, power, banking and auto sector. Judgment sampling has been used to select the sectoral mutual fund schemes for analysis. In this light attempt has been made to capture the critical measures of performance evaluation of Sectoral mutual fund schemes.

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Introduction

The performance of a portfolio can be measured by observing the combined effect of both return generated and risk associated thereby. The differential return earned by a portfolio may be due to the variance in the risk exposure from the stock exchange. In this context, the risk premium is nothing but the excess of returns generated by the mutual funds over and above the risk free rate.

The study is based on various tools like Beta, Sharpe Index, Treynor Index, Jenson model and Fama decomposition model. For this study the researcher has considered 15 Sectoral Mutual Fund Schemes from March 2007 to September 2010 by using the NAV and BSE Index from various authentic sources which have been duly acknowledged.

Objectives of the Study

1. To find out Key Investment performance measures for sectoral mutual funds schemes.
2. To make a comparative analysis of the risk and returns relationship of the selected sectoral mutual fund schemes against the benchmark index.

Literature review

Due to the great transparency and quality of financial reporting, the mutual fund industry has been subject to a large amount of research, which has over time considerably extended our knowledge of the main elements of the industry.

Abundance of research was done in the past to evaluate the performance of mutual funds in various countries using techniques of risk and return not much of research appears to have done in comparison of sectoral mutual fund schemes. An attempt has been made by the researcher to analyze the sectoral mutual fund scheme performance against the Bench mark index.

- Treynor and Mazuy (1966) evaluated the performance of 57 fund managers in terms of their market timing abilities and found that, fund managers had not successfully outguessed the market. The results suggested that, investors were completely dependent on fluctuations in the market. Improvement in the rates of return was due to the fund managers' ability to identify under-priced industries and companies. The study adopted Treynor's (1965) methodology for reviewing the performance of mutual funds.

- Jensen (1968) developed a composite portfolio evaluation technique concerning risk-adjusted returns. He evaluated the ability of 115 fund managers in selecting securities during the period 1945-66. Analysis of net returns indicated that, 39 funds had above average returns, while 76 funds yielded abnormally poor returns. Using gross returns, 48 funds showed above average results and 67 funds below average results. Jensen concluded that, there was very little evidence that funds were able to perform significantly better than expected as fund managers were not able to forecast securities price movements.

- Smith and Tito (1969) examined the inter-relationships between the three widely used composite measures of investment performance and suggested a fourth alternative, identifying some aspects of differentiation in the process. While ranking the funds on the basis of ex-post performance, alternative measures produced little differences. However, conclusions differed widely when performance were compared with the market. In view of this, they suggested modified Jensen's measure based on estimating equation and slope coefficient.

- Friend, Blume and Crockett (1970) compared the performance of 86 funds with random portfolios. The study concluded that, mutual funds performed badly in terms of total risk. Funds with higher turnover outperformed the market. The size of the fund did not have any impact on their performance.

- Carlson (1970) examined mutual funds emphasizing the effect of market series (S&P 500, NYSE composite, DJIA) during the period 1948-67. All fund groups outperformed DJIA but for a few which had gross returns better than that of S&P 500 or NYSE composite. Though there was consistency in risk and return, there was no consistency between risk-adjusted performance measures over the time period. Carlson's analysis of performance exposed relationship between cash inflows into funds and not with the size or expense ratio.

- Arditti (1971) found that Sharpe's conclusion got altered when annual rate of return was introduced as a third dimension. He found that, contrary to Sharpe's findings the average fund performance could no longer be judged inferior to the performance of DJIA. Fund managers opted higher risk for better annual returns.

- Williamson (1972) compared ranks of 180 funds between 1961-65 and 1966-70. There was no correlation between the rankings of the two periods. The investment abilities of most of the fund managers were identical. He highlighted the growing prominence of volatility in the measurement of investment risk.

- Fama (1972) developed methods to distinguish observed return due to the ability to pick up the best securities at a given level of risk from that of predictions of price movements in the market. He introduced a multi-period model allowing evaluation on a period-by-period and on a cumulative basis. He branded that, return on a portfolio constitutes of return for security selection and return for bearing risk. His contributions combined the concepts from modern theories of portfolio selection and capital market equilibrium with more traditional concepts of good portfolio management.

- Klemosky (1973) analysed investment performance of 40 funds based on quarterly returns during the period 1966-71. He acknowledged that, biases in Sharpe, Treynor, and Jensen's measures, could be removed by using mean absolute deviation and semi-standard deviation as risk surrogates compared to the composite measures derived from the CAPM.

- McDonaldand John (1974) examined 123 mutual funds and identified the existence of positive relationship between objectives and risk. The study identified the existence of positive relationship between return and risk. The relationship between objective and risk-adjusted performance indicated that, more aggressive funds experienced better results.

- Gupta (1974) evaluated the performance of mutual fund industry for the period 1962-71 using Sharpe, Treynor, and Jensen models. All the funds covered under the study outperformed the market irrespective of the choice of market index. The results indicated that all the three models provided identical results. All the mutual fund subgroups outperformed the market using DJIA while income and balanced groups under performed S&P 500. Return per unit of risk varied with the level of volatility assumed and he concluded that, funds with higher volatility exhibited superior performance.

- Meyer's (1977) findings based on stochastic dominance model revalidated Sharpe's findings with the caution that it was relevant for mutual funds in the designated past rather than for the future period.

- Klemosky (1977) examined performance consistency of 158 fund managers for the period 1968-75. The ranking of performance showed better consistency between four-year periods and relatively lower consistency between adjacent two-year periods.

- Ippolito's (1989) results and conclusions were relevant and consistent with the theory of efficiency of informed investors. He estimated that risk-adjusted return for the mutual fund industry was greater than zero and attributed positive alpha before load charges and identified that fund performance was not related to expenses and turnover as predicted by efficiency arguments.

- According to Panda T (2001) there is a substantial growth in the mutual fund market due to a high level of precision in the design and marketing of variety of mutual fund products by banks and other financial institution providing growth, liquidity and return. Most of the vast literature on mutual funds focuses on microeconomic issues, such as the investment performance of mutual funds and their ability to beat or equal the market, the level of expenses and fees and the role of distribution networks, the existence of economies of scale and scope and their impact on competition and contestability.

- As per James Et al. (1999) actively managed equity funds charge higher fees than index tracking funds or bond and money market funds, reflecting the higher costs of employing investment management staff to achieve diversification and strategy .

- Fund governance has been found to play a role in fee-setting policies since funds tend to charge lower fees when they have smaller boards and a larger proportion of independent directors (Tufano and Sevick 1997).

- Larger and more mature funds as well as no-load funds have lower expense ratios (Malhotra and McLeod 1997), while there is positive interaction between high performance and marketing effort and thus between performance and fees (Sirri and Tufano 1997) Fund fees are also related to asset allocation strategies. Aggressive growth funds tend to charge higher entry and exit fees to discourage redemptions because they hold more of the smaller, less liquid stocks (Chordia 1996). Mutual funds and especially fund complexes benefit from scale and scope economies, emanating from activities that have large overheads, such as record keeping, communication and marketing, although adverse price impact and managerial diseconomies of scale place a limit on the efficient size of funds (Baumol Et al. 1990, Sirri and Tufano 1993, Collins and Mack 1997, James

Et al. 1999).

- Gupta (1994) made a household investor survey with the objective to provide data on the investor preferences on MFs and other financial assets. The findings of the study were more appropriate, at that time, to the policy makers of mutual funds to design the financial products for the future.

- Kulshreshta (1994) offers certain guidelines to the investors in selecting the mutual fund schemes. Shankar (1996) points out that the Indian investors do view Mutual Funds as commodity products and AMCs, to capture the market should follow the consumer product distribution model.

- The review of earlier studies concludes that bulk of the empirical studies undertaken finds a positive association between increase in savings behavior, financial services industry and demand for mutual fund schemes.

- In McKinsey & Co. Report (2008) it has found out that India's has huge potential of Growth through Infrastructure development and huge amount of investment is required for channelize this growth and development.

- As per Singh B.(2008) Finds in his doctoral thesis that Indian Mutual funds Managers in general could not earn return in excess of the benchmarks.

- Crisil Report (2010-2011) researched that the Indian government is increasing its focus on infrastructure sector as mutual fund industry has seen good investment opportunity in the sector with many AMC's introducing Infrastructure based thematic schemes.

Research methodology

The researcher has used non probabilistic judgmental sampling. To study the risk-return relationship, the sampling frame includes 5 Mutual fund Schemes from Infrastructure sector, 4 Mutual fund Schemes from power sector, 5 Mutual Fund Scheme from banking sector and 1 Mutual Fund Scheme from auto sector.

All these 15 sectoral schemes are shortlisted from CRISIL rating of top schemes in their respective sectors.

The schemes so selected are in existence for at least 3 years. The period has been considered from March 2007 or since launch of the scheme, whichever is later. A detailed in-depth study of all the 15 Sectoral Mutual Fund Schemes was done for arriving at the conclusion.

Thus, the sampling frame for the purpose of the study constitutes the following sectoral schemes:

	INFRASTRUCTURE SECTOR
1	Tata Infrastructure Fund
2	Principal Services Industries Fund
3	Taurus Infrastructure Fund
4	ICICI Prudential Infrastructure Fund - Institutional Option - I
5	Birla Sun Life Infrastructure Fund - Plan B
	POWER SECTOR
1	Reliance Diversified Power Sector Fund
2	Reliance Diversified Power Sector Fund - Institutional
3	Escorts Power and Energy Fund
4	Sahara Power And Natural Resources Fund
	BANKING SECTOR
1	Reliance Banking Fund - Growth
2	UTI Banking Sector Fund - Growth
3	Sahara Banking and Financial Services Fund - Growth
4	Religare Banking Fund - Regular - Growth
5	ICICI Prudential Banking and Financial Services Fund - Retail - Growth
	AUTO SECTOR
1	UTI Transportation and Logistics Fund - Growth

Data Analyses and Interpretation

- **Tools for analysis**

For analyzing risk and return attributes of the sectoral mutual fund schemes following ratios have been used as tools for analysis:

1 Treynor

2 Sharpe

3 Jensen Models.

4. Fama decomposition model

In analyzing the risk-return relationship the CAPM is used widely. The CAPM uses the concept of beta to link risk with return. Beta as a measure of systematic risk shows how the NAV of a sectoral scheme responds to changes in market performance. Using the beta concept

the CAPM helps to define the required return on a security. The equation for calculating the expected return based on CAPM is as follows:

Ri = $Rf + \beta (Rm-Rf)$

Ri = Expected return

Rf = Risk-free return

β= Measure of systematic risk

Rm = Market return

Carlson Robert S(1970), Fama Eugene(1972), Sarkar A K(1991), Shashikant Uma(1993), Yadav R A(1996), Jayadev M(1996), Wilfred L Dellava(1998), Gupta Amitabh(2000) and Sondhi H J(2005),have also applied similar tools over the time for analyzing risk and return relationship.

Quarterly **NAV** values   of the selected sectoral sample schemes along with the Quarterly BSE Indices for the period of March 2007 to August 2010 were used as per the data available.

Portfolio Return refers to the yield from the selected sectoral schemes. **Portfolio returns (Rp)** are calculated on the basis of changes in the NAV on a quarterly basis. Average of such quarterly returns (ARp) is calculated for the entire period of study as follows:

$$Rp = \frac{NAVt - NAVt-1}{NAVt-1} *100$$

Rp   is the return of the portfolio on Quarterly basis

't'   is the time period

Market Return is calculated on the basis of the changes in the BSE Index on a Quarterly basis (Rm) and the averages of such Quarterly returns (ARm) are arrived at for every year and for the total period of study. BSE   index was used as a benchmark as it is widely considered as a market proxy or benchmark for the purpose of academics, research and practicing fund managers. BSE index is used as a benchmark as it is a broad based index, consisting of 30 actively traded equity shares.

 The market return is calculated as follows:

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$$Rm = \frac{\text{Market Indext} - \text{Market Indext-1}}{\text{Market Indext-1}} *100$$

Risk-free return (Rf)is the return available from zero risk investment avenues like treasury bills and bank deposits. The current rate for 91 days T-bill is 6.77 % is assumed as the risk-free rate of return as it has been constant for many years and is related with the most commonly preferred investment avenue namely bank deposits.

Return alone should not be considered as the basis of measurement of the performance of a mutual fund scheme, it should also include the risk taken by the fund manager because different funds will have different levels of risk attached to them.

For evaluating the performance of selected Sectoral Mutual Fund schemes risk-return relation models have been used like:

- Treynor Measure
- Sharpe Measure
- Jenson Model
- Fama Model

The Treynor Measure

Jack Treynor, in year 1965 developed a measure which evaluates the performance of fund using returns generated by it over and above risk free rate of return during a given period and systematic risk (Beta) associated with it. He named this measure as "Treynoe Measure". Risk free rate of return is generally the return on security backed by government as there is no credit risk is associated with it. Symbolically, it can be represented as:

Treynor's Index (Ti) = (Ri - Rf) / β

Where, Ri represents return on fund

 Rf is risk free rate of return and

β is beta of the fund.

While a high and positive Treynor's Index shows a superior risk-adjusted performance of a fund, a low and negative Treynor's Index is an indication of unfavorable performance. Therefore all risk-averse investors would like to maximize this value.

The Sharpe Measure

In this model, performance of a fund is evaluated on the basis of Sharpe measure which was developed in 1966, that depicts the ratio of returns generated by the fund over and above risk free rate of return and the total risk associated with it. According to Sharpe, it is the total risk of the fund that the investors are concerned about. So, the model evaluates funds on the basis of reward per unit of total risk. Symbolically, it can be written as:

Sharpe Index $(Si) = (Ri - Rf)/ \sigma$

Where:

Ri represents return on fund

Rf is risk free rate of return and

σ is standard deviation of the fund.

While a high and positive Sharpe Ratio shows a superior risk-adjusted performance of a fund, a low and negative Sharpe Ratio is an indication of unfavorable performance.

Sharpe and Treynor measures are similar in a way, since they both divide the risk premium by a numerical risk measure. The total risk is appropriate when we are evaluating the risk return relationship for well-diversified portfolios. On the other hand, the systematic risk is the relevant measure of risk when we are evaluating less than fully diversified portfolios or individual stocks. For a well-diversified portfolio the total risk is equal to systematic risk. Rankings based on total risk (Sharpe measure) and systematic risk (Treynor measure) should be identical for a well-diversified portfolio, as the total risk is reduced to systematic risk. Therefore, a poorly diversified fund that ranks higher on Treynor measure, compared with another fund that is highly diversified, will rank lower on Sharpe Measure.

Jenson Model

Jenson's model proposes another risk adjusted performance measure. This measure was developed by Michael Jenson in year 1968 and is also referred to as the Differential Return Method. This measure involves evaluation of the returns that the fund has generated versus the returns actually expected out of the fund given the at the given level of its systematic risk. The

surplus between the two returns is called Alpha, which measures the performance of a fund compared with the actual returns over the period.

$$\alpha = Ri - \{Rf + \beta (Rm - Rf)\}$$

Where:

Ri= Portfolio return

Rf is risk free rate of return

β is beta of the fund.

Rm is the return of the market

Rf is risk free rate of return and

Higher alpha represents superior performance of the fund and vice versa. Limitation of this model is that it considers only systematic risk not the entire risk associated with the fund and an ordinary investor cannot mitigate unsystematic risk, as his knowledge of market is primitive.

Fama Model

The Eugene Fama model is an extension of Jenson model. This model compares the performance, measured in terms of returns, of a fund with the required return commensurate with the total risk associated with it. The difference between these two is taken as a measure of the performance of the fund and is called net selectivity. The net selectivity represents the stock selection skill of the fund manager, as it is the excess return over and above the return required to compensate for the total risk taken by the fund manager. Higher value of which indicates that fund manager has earned returns well above the return commensurate with the level of risk taken by him. Net Selectivity can be calculated as:-

Net Selectivity $= Ri - \{ Rf + \sigma i/\sigma m*(Rm - Rf) \}$

Where:

Rf is risk free rate of return

σi is the standard deviation of the fund

σm is the standard deviation of the market

Rm is the return of the market and

Rf is risk free rate of return

Among the above performance measures, two models namely, Treynor measure and Jenson model use systematic risk based on the premise that the unsystematic risk is diversifiable. These models are suitable for large investors like institutional investors with high risk taking capacities

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as they do not face paucity of funds and can invest in a number of options to dilute some risks. For them, a portfolio can be spread across a number of stocks and sectors.

However, Sharpe measure and Fama model that consider the entire risk associated with fund are suitable for small investors, as the ordinary investor lacks the necessary skill and resources to diversify. Moreover, the selection of the fund on the basis of superior stock selection ability of the fund manager will also help in safeguarding the money invested to a great extent. The investment in funds that have generated big returns at higher levels of risks leaves the money all the more prone to risks of all kinds that may exceed the individual investors' risk appetite.

BETA

Beta measures a stock's volatility, the degree to which its price fluctuates in relation to the overall market. In other words, it gives a sense of the stock's market risk compared to the greater market. Beta is used also to compare a stock's market risk to that of other stocks. It is represented by using the Greek letter 'ß' to represent beta.

This measure is calculated using regression analysis. A beta of 1 indicates that the security's price tends to move with the market. A beta greater than 1 indicates that the security's price tends to be more volatile than the market, and a beta less than 1 means it tends to be less volatile than the market.

$\beta = (r_{im} * \sigma_i * \sigma_m) / \sigma^2_m$

Where:

r_{im} is correlation coefficient between market returns and fund returns.

σ_i is standard deviation of fund returns.(Si)

σ_m is standard deviation of market returns.(Sm)

σ^2_m is market variance.

Coefficient of Correlation (r) measures the nature and the extent of relationship between stock market index return and the scheme's return for a particular period. The co-movement of schemes Performance with that of market index is studied with the help of a simple linear regression analysis using the following formula:

$$r = (\textstyle\sum x\, y\,) / (\sqrt{\textstyle\sum x^2 * \textstyle\sum y^2})$$

Coefficient of Determination r^2 measure of reliability of Beta

Beta depends on the index used to calculate it. It can happen that the index bears no correlation with the movements in the fund. Due to this reason, it is essential to take a look at statistical value called Coefficient of Determination along with Beta. It shows how reliable the beta number is. It varies between zero and one.

Value of **1** indicates perfect correlation with the index. Thus, **r^2=0.64** it implies that 64% of the variation in the portfolio returns is due to variations in the market returns. Mathematically it is the square of correlation coefficient(R).

$$ r = \frac{n\sum\{(x - x_{mean}) \times (y - y_{mean})\}}{\sqrt{\sum(x - x_{mean})^2 \times \sum(y - y_{mean})^2}} $$

Where X and Y are returns on the portfolio and returns on the market respectively.

Beta and (R^2) should thus be used together when examining a fund's risk profile.

Standard Deviation- a measure of Total Risk

Standard Deviation is the most common statistical measure of judging a fund's volatility and risk. It measures a fund's total risk i.e. sum of systematic risk and unsystematic risk.

$$ SD = \sqrt{\frac{1}{n}\sum(x_i - x_{mean})^2} $$

Where:

$\sum(x_i - x_{mean})^2$ gives the square of the sum of differences of each value in the sample from the mean of the sample of 'n' element.

For analyzing the Risk-Return analysis of sectoral mutual fund schemes in comparison to the Benchmark Index following **null hypothesis** was formulated:

H_01:   There is no significant difference between investment performance measures (**risk and return**) of sectoral mutual fund schemes and the benchmark portfolio.

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H$_a$1: There is significant difference between investment performance measures (risk & return) of sectoral mutual fund schemes and the benchmark portfolio.

Analysis & Computation

Risk and Return Analysis

Table 1.1 presents the risk and return statistics for the selected sectoral mutual fund schemes and the market portfolio. Out of 15 sectoral schemes, all schemes have delivered greater return than the market return.

- 6 (40%) schemes have given greater return than risk free return and 9 (60%) schemes performed poorer i.e. not able to give at least risk free return.
- Banking & Power sector schemes performed better in terms of Average return and risk-free returns; whereas Infrastructure and Auto sector schemes were underperformers.
- Birla Sunlife from Infrastructure sector, Reliance diversified power and Escort power from Power sector and Sahara Banking & Financial Services, Religare Banking & ICICI Prudential Banking and Financial series from Banking were Outperformer both in comparison of Risk free and Market return.

On the other hand, a sectoral scheme assumes to take more risk in giving higher return to the investors. In this light all sectoral schemes have taken higher risk than the market.

- In Infrastructure sector except Birla Sun life other schemes are not able to provide excess return on taking huge risk for getting extra return.
- In power sector only Escort power/Energy fund was the outperformer in taking less risk as compared to market risk and providing high return to investors.
- In Banking and Financial services sector Reliance Banking & Financial Services and UTI Banking sector schemes were underperformer in delivering high return to the investors even after taking more risk than the market. In this sector Sahara Banking & Financial Services Schemes delivered extra-ordinary return of 17.49% against any other sectoral schemes even after having high exposure to risk.

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- In auto sector the UTI Transportation scheme was also underperformer in delivering high return after assuming same level of risk.

- It appears that sectoral mutual fund schemes are not properly concentrating on investing into sector scripts rather diversifying their portfolio as it is reflected by the Co-efficient of Determination (R^2). All the schemes have almost 0.90 R^2 value but Sahara Banking & Financial Services have 0.78 R^2 values which means that in comparison amongst other sectoral schemes this scheme has again outperform in banking category.

Table 1.1: Risk and Return of Sample Mutual Fund Schemes

Name of Scheme	Risk Free Return	Scheme Return	Market Return	Market Risk	Scheme Risk	Beta	Co-Efficient. of Correlation	R^2
Tata Infrastructure fund (Growth)	6.77	6.08	4.04	19.76	23.84	1.15	0.96	0.91
Tauras Infrastructure fund (Growth)	6.77	6.52	4.04	19.76	32.18	1.57	0.96	0.93
Principal service industries fund (Growth)	6.77	4.07	4.04	19.76	21.63	1.07	0.98	0.95
ICICI Pru Infra. Institutional Fund	6.77	4.69	4.04	19.76	18.89	0.88	0.92	0.85
Birla sun life infra. Plan A (Growth)	6.77	7.51	4.04	19.76	31.46	1.49	0.94	0.88
Relaince Diversified power sector (Growth) inst	6.77	9.46	4.04	19.76	24.52	1.17	0.94	0.88
Escort Power/Energy Fund (Growth)	6.77	9.21	9.74	14.49	13.55	0.86	0.91	0.84
Relaince Diversified Power	6.77	4.04	2.82	25.47	25.52	0.99	0.99	0.98

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Sector (Growth) Retail							
Sahara Power & Natural Resources (Growth)	6.77	6.41	5.25	21.34	25.96	1.19	0.98	0.95
Relaince Banking & Financial Services (Growth)	6.77	5.1	0.57	18.29	18.47	0.9	0.90	0.8
UTI Banking sector (Growth)	6.77	5.99	3.11	20.48	25.51	1.15	0.92	0.85
Sahara Banking & Financial Services fund Growth	6.77	17.49	6.63	22.66	28.41	1.11	0.88	0.78
Religare Banking Regular Growth Fund	6.77	8.1	5.25	21.34	17.74	0.67	0.81	0.66
ICICI Pru. Banking & Financial Services Retail- G	6.77	10.15	5.77	27.98	27.98	0.99	0.99	0.98
UTI Transportaion & Logistic Fund(G)	6.77	5	4.04	19.76	19.76	0.89	0.89	0.79

➢ **Results of Sharpe and Treynor Ratio**

Table 1.2 in gives Sharpe and Treynor result for the selected sectoral mutual fund schemes.

- Out of 15 sectoral schemes 6(40%) schemes have outperformed in terms of both systematic risk and total risk resulted in positive values whereas remaining failed to deliver in Sharpe and Treynor performance evaluation criteria.

- 3 mutual fund schemes from Banking sector and 2 from Power sector are amongst the top 5 schemes. All sectoral mutual fund schemes have high Treynor ratio which signifies high level of systematic risk

- Birla Sunlife Infrastructure Plan from Infrastructure sector, Reliance diversified power sector, Escort Power/ Energy from power sector; Sahara Banking & Financial Services Fund Growth, ICICI Prudential Banking & Financial Services Retail- Growth, Religare Banking Regular Growth Fund from banking sector were outperformers both from the point of view of Sharpe and Treynor ratio.

Table 1.2   Sharpe and Treynor Ratio Ranking

Name of Scheme	Sharpe Ratio	Ranking	Treynor Ratio	Ranking
Tata Infrastructure fund (Growth)	-0.03	9	-0.59	9
Tauras Infrastructure fund (Growth)	-0.01	7	-0.16	7
Principal service industries fund (Growth)	-0.12	15	-2.53	14
ICICI Pru Infra. Institutional Fund	-0.11	14	-2.36	13
Birla sun life infra. Plan A (Growth)	0.02	6	0.49	6
Relaince Diversified power sector (Growth) inst	0.11	4	2.3	4
Escort Power/Energy Fund (Growth)	0.18	2	2.85	3
Relaince Diversified power sector (Growth) retail	-0.107	13	-2.75	15
Sahara Power & Natural Resources (Growth)	-0.01	8	-0.3	8
Relaince Banking & Financial Services (Growth)	-0.09	11	-1.86	11
UTI Banking sector (Growth)	-0.03	10	-0.68	10
Sahara Banking & Financial Services fund Growth	0.38	1	9.67	1
Religare Banking Regular Growth Fund	0.07	5	1.97	5
ICICI Pru. Banking & Financial Services Retail- G	0.12	3	3.41	2
UTI Transportaion & Logistic Fund(G)	-0.09	12	-2	12

➢ **Result of Jensen Alpha Model**

Result of Jensen Alpha is given in Table 4.3. Except one scheme all schemes have positive Alpha's which indicates Superior performance. Hence these funds have generated returns in excess of equilibrium returns. The equilibrium return of a scheme is the return that is expected to earn with the given level of systematic risk. However from Infrastructure sector, two schemes namely Tauras Infrastructure Fund and Birla Sun life Infrastructure Plan have shown a significant performance. Amongst power and banking sector Reliance Diversified Power Sector and Sahara Banking & Financial Services respectively outperformed with an Alpha value of 5.87 and 10.88.

Table 1.3   Jensen Alpha

Name of Scheme	Jenson Alpha Model
Tata Infrastructure fund (Growth)	2.46
Tauras Infrastructure fund (Growth)	4.03
Principal service industries fund (Growth)	0.21
ICICI Pru Infra. Institutional Fund	0.32
Birla sun life infra. Plan A (Growth)	4.81
Relaince Diversified power sector (Growth) inst	5.87
Escort Power/Energy Fund (Growth)	-0.1
Relaince Diversified power sector (Growth) retail	1.19
Sahara Power & Natural Resources (Growth)	1.45
Relaince Banking & Financial Services (Growth)	3.89
UTI Banking sector (Growth)	3.44
Sahara Banking & Financial Services fund Growth	10.88
Religare Banking Regular Growth Fund	2.35
ICICI Pru. Banking & Financial Services Retail- G	4.38
UTI Transportaion & Logistic Fund(G)	0.65

➢ **Fama's Component of Investment Performance**

The overall performance is broken down into various components such as risk-free return, risk premium, diversification and selectivity.

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o **Performance on Risk**

The performance on risk assess the returns generated by fund managers on the basis of decision taken by them in selection of fund. They assume risk in the hope of generating extra returns on their portfolio.

Table 4 shows that all the selected sectoral mutual funds schemes suffered negative performance on account of risk bearing activity of their fund manager except for Escort power/ energy fund from Power sector. Reliance banking and UTI Banking fund from banking sector suffered the highest negative performance in this respect.

o **Performance on Diversification**

Performance on Diversification measures additional return that compensates the portfolio manager for bearing diversifiable risk. Here too, except Escort Power/ Energy Fund, the other entire scheme have suffered on diversification. This signifies that there has been a negligible diversification which is a good characteristic   of fund being sectoral. **Performance on Net Selectivity**

After accounting for diversification, the residual performance on selectivity is attributed to Net selectivity. A positive net selectivity indicates superior performance. However, in case net selectivity is negative, then it means that fund manager have taken diversifiable risk, which has not been compensated by the extra returns.

From Infrastructure sector it can be seen that Birla Sunlife Infra Plan have high positive selectivity measure whereas in power sector Reliance diversified power sector is amongst the top and from banking sector Sahara Banking & Financial Services lead with the highest selectivity of 10.90 reflecting superior sectoral stock selection ability on the part of fund manager.

Table 1.4   Fama's Component of Investment Performance

Name of Scheme	Risk free Return	Compensation for Systematic Risk or Risk premium	Compensation for Diversification	Net superior return due to selectivity	Scheme Return
Tata Infrastructure fund (Growth)	6.77	-3.15	-0.15	2.61	6.08
Tauras Infrastructure fund (Growth)	6.77	-4.29	-0.16	4.19	6.51

Principal service industries fund (Growth)	6.77	-2.91	-0.07	0.28	4.07
ICICI Pru Infra. Institutional Fund	6.77	-2.41	-0.20	0.53	4.69
Birla sun life infra. Plan A (Growth)	6.77	-4.08	-0.27	5.08	7.50
Relaince Diversified power sector (Growth) inst	6.77	-3.19	-0.20	6.07	9.46
Escort Power/Energy Fund (Growth)	6.77	2.54	0.24	-0.34	9.21
Relaince Diversified power sector (Growth) retail	6.77	-3.92	-0.03	1.22	4.03
Sahara Power & Natural Resources (Growth)	6.77	-1.81	-0.05	1.50	6.41
Relaince Banking & Financial Services (Growth)	6.77	-5.56	-0.70	4.59	5.10
UTI Banking sector (Growth)	6.77	-4.22	-0.33	3.77	5.99
Sahara Banking & Financial Services fund Growth	6.77	-0.15	-0.02	10.90	17.49
Religare Banking Regular Growth Fund	6.77	-1.03	-0.24	2.59	8.10
ICICI Pru. Banking & Financial Services Retail- G	6.77	-1.00	-0.01	4.38	10.15
UTI Transportaion & Logistic Fund(G)	6.77	-2.41	-0.31	0.95	5.00

Conclusion:

The researcher has made an attempt to evaluate the performance of mutual funds using NAV and BSE indices as base for selected sample of 15 sectoral schemes. in this context four major ratios viz Shaper ratio, Treynor ratio, Jensen Alpha Model and Fama decomposition model have been calculated to judge the performance. The study has indicated that 60% of sectoral mutual fund schemes have not earned even equivalent to risk free return.

Banking Mutual fund schemes are amongst the top in comparison to other sectors. In terms of **total risk** again the Banking schemes are able to deliver superior return in comparison to other sectors.

In terms of **Sharpe and Treynor ratio** s 6 (40%)Sectoral Mutual Fund Schemes have outperformed in terms of both systematic risk and total risk as depicted by there positive values .

In terms of **Jensen Alpha**, a positive and significant alpha indicates superior performance. Almost all fund have positive alpha value which signifes ability of fund manager to give superior return to investors. Again banking sector performs exceptionally in this regard.

In terms of **Fama's Component** of Investment performance, all the schemes have suffered negative performance on account of risk bearing activity of their fund managers. Only one fund earned a positive return on diversification which is a positive sign from sectoral point of view that fund managers have not diversifed their portfolio in other sectors. For **Net Selectivity** almost all funds showed positive returns on net selectivity skills by fund manager.

When seen in **conjunction with Jensen's Alpha measure**, it appears that sectoral mutual funds managers possess sectoral stock selection skills.

On the basis of overall analysis in can be inferred here that the additional return on sampled schemes and the market over risk free return was **significantly low** during the study period. This indicates that the majority of schemes have shown underperformance in comparison with risk free return. In most of the cases risk free return was higher than the fund return during the study period.   It implies that the mutual funds were not able to compensate the investors for the additional risk that they have taken. The fund managers failed to generate positive return even after exposing their portfolios to a higher risk level.

The study also found the fund managers have failed to compensate the investors' expected risk by their portfolio investment.   The overall analysis indicates that though the fund managers

were successful in performing better than the market expected risk, yet the expected return on their portfolio was much lower than the risk free return.

It can be inferred here that the overall market has influenced quite significantly in the performance of portfolio of the funds, hence the Null hypothesis is rejected. It shows that there is a significant difference between investment performance measures (risk and return) of sectoral mutual fund schemes and the benchmark portfolio.

The analysis of the study also indicates that the diversification process undertaken by the fund managers has not provided any additional return which compensates investors for the diversifiable risk.

It is evident from the above analysis that the influence of market factor was more severe during negative performance of the funds while the impact selectivity skills of fund managers was more than the other factors in the fund performance in times of generating positive return by the funds. It can also be observed from the study, that selectivity, expected market risk and market return factors have shown closer correlation with the fund return.

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