CHAPTER 3
RESEARCH METHODOLOGY

The present research is an attempt to study the performance evaluation of mutual funds in India. With a view to develop a sound theoretical framework for investigation, a review of literature relating to performance evaluation of mutual funds has been done in the previous chapter.

The study limits itself to Equity and Hybrid Schemes of mutual funds and examines growth of mutual funds, regulatory framework governing mutual funds, risk-return analysis, performance evaluation of mutual funds schemes and Investors' perception regarding mutual funds in India. This chapter attempts to discuss the research methodology used for the study by elaborating sampling design, data collection, data analysis, the research tools used and limitations of the study.

3.1 SAMPLING DESIGN

To study the performance of mutual funds operating in India, we have resorted to sampling. Out of 34 mutual funds operating on 31st July, 2008, we have selected a sample of 10 mutual funds including two Bank/Institution sponsored mutual funds (out of 5), eight other mutual funds (out of 29) including two Indian private sector mutual fund, one foreign private sector mutual fund, four joint venture predominantly Indian private sector mutual funds and one joint venture predominantly foreign private sector mutual fund. In each category, the selection was made on the basis of highest number of equity and balanced schemes existing on 31/3/2003. The selected mutual fund are SBI Funds Management Pvt. Ltd., UTI Asset Management Company Ltd., Tata Asset Management Ltd., Taurus Asset Management Co. Ltd., Franklin Templeton Asset Management (India) Private Ltd., Birla Sun Life Asset Management Co. Ltd., HDFC Asset Management Co. Ltd., ICICI Prudential Asset Management Co. Ltd., Sundaram BNP Paribas Asset Management Co. Ltd. and Principal PNB Asset Management Co. Pvt. Ltd. All the equity and balanced schemes of the above mentioned funds (except 5 equity schemes in 2002-03 launched in the same year) have been studied from 2002-03 to 2010-11.
It has been an important objective of the study to examine the investors’ perceptions regarding mutual funds. For studying the perception of mutual fund investors, the study has been restricted to state of Punjab. The universe of the study consists of all mutual fund investors residing in the state of Punjab. The researcher has resorted to two stage sampling framework for the study. At the first stage, districts to be covered under primary survey have been selected. It was planned to select three districts of Punjab by giving representation to all the three belts of Punjab viz, Malwa (Barnala, Bathinda, Fatehgarh Sahib, Faridkot, Ferozepur, Ludhiana, Mansa, Moga, Muktsar, Patiala, Ropar, Sangrur, Mohali), Majha (Amritsar, Gurdaspur and Tarn Taran) and Doaba (Jalandhar, Hoshiarpur, Kapurthala and Nawanshahr). Taking population as a base, three districts namely Ludhiana from Malwa, Amritsar from Majha, and Jalandhar from Doaba have been selected for survey as these districts have the highest population in their respective belts. At second stage of sampling a sample of 200 respondents has been taken. Initially, it was decided to select the sample on random basis but due to non-availability of a sampling framework the research plan was modified and it was decided to adopt judgement sampling. As Malwa belt covers more than 60 per cent districts of Punjab, we decided to give maximum representation to Malwa belt by taking sample of 100 respondents. From Doaba and Majha a sample of 50 respondents each has been taken.

3.2 DATA COLLECTION

For the purpose of the study, two sets of data have been collected. One set of data has been collected from secondary sources which include the Capital Market, Chartered Financial Analyst, Outlook, SEBI annual reports, RBI Reports on Currency and Finance, RBI Bulletin, Management Accountant, Portfolio Organizer, Economic and Political Weekly, Finance India etc. The data relating to growth of mutual fund industry and regulatory framework of mutual fund has been collected from www.sebi.gov.in. The required data relating to Net Asset Value (NAV) of various public and private sector mutual fund schemes has been collected on quarterly basis (first date of each quarter) for the study period from the Fiancial Express, Economic Times, Business Standard and various websites such as www.amfiindia.com, www.mutualfundindia.com. In case, first day of any quarter being a holiday, NAV of the next working day was taken as NAV of a fund does not change on a holiday. For evaluating market return and risk, S&P CNX Nifty, BSE Sensex, BSE 100, BSE 200
have been taken as benchmark indices. The study covers the period from 2002-03 to 2010-11. However, growth of mutual fund industry has been studied from 2002-03 to 2011-12.

The second set of data is primary in nature and has been collected from mutual fund investors by administering a questionnaire to them. To develop the questionnaire, the researcher reviewed the existing literature and contacted many experts in the field of mutual fund industry. The observations of the researcher during his visits to offices of mutual funds, discussions held with branch managers or relationship managers and mutual fund investors also helped in preparation of questionnaire. The preliminary draft of the questionnaire was pre-tested on 25 investors. This helped in improving the questionnaire and also gave an indication as to the kind of responses that would be forthcoming. The questionnaire contains the questions relating to knowledge of the respondents regarding mutual funds, risk tolerance of the respondents, source of information used by the respondents, importance attached to various factors by the respondents while making mutual fund investments, popularity of mutual funds among the respondents, respondents’ preference for various financial assets, investment behaviour of the respondents regarding mutual funds, performance monitoring pattern of the respondents, respondents’ awareness, satisfaction and perception about quality of fund manager, respondents’ future plan in mutual fund investments, respondents’ opinion with regard to various aspects of mutual funds, respondents’ opinion regarding regulatory framework governing mutual funds in India, respondents’ perception regarding effectiveness of advertising media in relation to mutual funds and respondents’ perception regarding future of mutual funds in India. The data was collected from 200 mutual fund investors of Punjab called respondents in the study with the help of above mentioned questionnaire (see Appendix 1) by personally visiting them.

3.3 ANALYSIS OF DATA

Data has been analysed on the basis of following indicators for achieving various objectives of the study.
3.3.1 Growth of Mutual Funds has been studied on the basis of following indicators

- Total number of schemes under mutual funds
- Category-wise total number of open-ended schemes under mutual funds
- Category-wise total number of close-ended schemes under mutual funds
- Nature-wise total resources mobilised by mutual funds
- Resources mobilised by open-ended schemes
- Resources mobilised by close-ended schemes
- Category-wise resources mobilised by mutual funds

3.3.2 Regulatory Framework Governing Mutual Funds has been examined on following aspects

- Registration of mutual fund
- Constitution and management of mutual fund and operation of trustees, etc.
- Constitution and management of Asset Management Company (AMC) and custodian
- Schemes of mutual fund
- Investment objectives and valuation policies
- General obligation
- Inspection and audit
- Procedure for action in case of default

3.3.3 Risk-Return Analysis of Mutual Fund Schemes

- Risk pattern of various mutual fund schemes
- Risk pattern of growth schemes
- Risk pattern of balanced schemes
- Comparison of risk pattern of mutual fund schemes of public and private Sector
- Comparison of risk of schemes with benchmark indices
- Average quarterly returns of total schemes
- Average quarterly returns of growth schemes
• Average quarterly returns of balanced schemes
• Comparison of returns of public and private sector
• Comparison of returns of schemes with benchmark indices
• Compound annual growth rate of growth schemes
• Compound annual growth rate of balanced schemes
• Performance evaluation of individual scheme’s return with respect to benchmark indices

3.3.4 Performance Evaluation of Mutual Funds Schemes
• Comparison of Sharpe’s measure with benchmark indices
• Comparison of Treynor’s measure with benchmark indices
• Comparison of individual mutual fund schemes on the basis of Sharpe and Treynor measures based on S&P CNX Nifty
• Comparison of individual mutual fund schemes on the basis of Sharpe and Treynor measures based on BSE Sensex
• Comparison of individual mutual fund schemes on the basis of Sharpe and Treynor measures based on BSE 100
• Comparison of individual mutual fund schemes on the basis of Sharpe and Treynor measures based on BSE 200
• Comparison of Jensen Values on the basis of benchmark indices.

3.3.5 Investors’ Perception Regarding Mutual Funds

Perception of mutual fund investors have been analysed by categorising the respondents on the basis of age, occupation, savings and experience. The profile of respondents surveyed is as under:

<table>
<thead>
<tr>
<th>Table 3.1</th>
<th>General Profile of the Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>Occupation (Rs.)</td>
</tr>
<tr>
<td>Up to 30 (A₁)</td>
<td>Service (O₁)</td>
</tr>
<tr>
<td>30-40 (A₂)</td>
<td>Business (O₂)</td>
</tr>
<tr>
<td>40 &amp; Above (A₃)</td>
<td>Others (O₃)</td>
</tr>
</tbody>
</table>

Note: Figures in parenthesis denote percentage.
The table 3.1 reveals a profile of the respondents. Age-wise respondents have been divided into three categories i.e. up to 30 years (A₁), 30-40 years (A₂) and 40 years and above (A₃). The table reveals that maximum respondents fall in category A₁ (49.5%), followed by category A₂ (29.5%) and category A₃ (21%). Occupation-wise respondents have been divided into three categories i.e. Service (O₁), Business (O₂) and Others (O₃). The table reveals that highest percentage of respondents is from category O₁ (46%), followed by category O₂ (31%) and category O₃ (23%). Annual-savings wise respondents have been divided into three categories i.e. up to 1,00,000 (S₁), 1,00,000-2,00,000 (S₂) and above 2,00,000 (S₃). The table reveals that maximum respondents fall in category S₁ (59.5%), followed by category S₂ (23.5%) and category S₃ (17%). Investment-experience wise respondents have been divided into three categories i.e. up to 3 years (E₁), 3-5 years (E₂) and above 5 years (E₃). The table reveals that maximum respondents fall in category E₂ (34.5%) followed by category E₁ (33.5%) and category E₃ (32%).

3.4 RESEARCH TOOLS USED

For analysis of data, the researcher has used percentage, simple growth rate, compound annual growth rate, measurement of return, measurement of risk (coefficient of variation and Beta(β)), risk adjusted performance measures (Sharpe measure, Treynor measure, Jensen measure), Chi-square test, Average Weighted Scores and Kendall’s Coefficient of Concordance. The brief details relating to some of such tools is as under:

3.4.1 SIMPLE GROWTH RATE

It simply gives the percentage increase over the previous year and is calculated as

$$g = \left( \frac{y_t - y_{t-1}}{y_{t-1}} \right) \times 100$$

where,

g = Growth rate

$y_t =$ Value of variable y in current year

$y_{t-1} =$ Value of variable y in the previous year
3.4.2 Compound Annual Growth Rate

Compound annual growth rate has been calculated as

\[ r = \left( \frac{A_n}{A_0} \right)^{1/n} - 1 \]

where

\( A_n = \) Amount/Number at the end of ‘n’ years.

\( A_0 = \) Amount/Number in the base year.

\( r = \) Rate of growth.

\( n = \) Time period in years.

3.4.3 Measurement of Return: Net Asset Value (NAV) is the most widely accepted yardstick for measuring the performance of mutual funds. The NAV is the market value of the assets of the schemes minus its liabilities. The per unit NAV is the net asset value of the scheme divided by the number of units outstanding on the valuation date. Average quarterly returns have been calculated on the basis of change in NAVs.

\[ R_P = \frac{\text{NAV}_t - \text{NAV}_{t-1}}{\text{NAV}_{t-1}} \]

\( R_P = \) Quarterly Return on a scheme

\( \text{NAV}_t = \) Net Asset Value on first date of current quarter.

\( \text{NAV}_{t-1} = \) Net Asset Value on first date of previous quarter.

\[ \text{Avg. } R_P = \frac{R_{P1} + R_{P2} + R_{P3} + R_{P4}}{4} \]

Where \( R_{P1}, R_{P2}, \ldots, R_{P4} \) are returns for first, second, third and fourth quarter respectively and \( \text{Avg } R_P \) stands for Average Quarterly Return.

For comparison of returns with benchmark indices S&P CNX Nifty, BSE Sensex, BSE 100, BSE 200 have been taken and their return has been calculated as follows
Risk free rate of return refers to that minimum return on investment that has no risk of losing the investment over which it is earned. For the present study, we have taken return on 90-days treasury bills as risk free rate and has been calculated on the basis of average of monthly returns.

3.4.4 Measurement of Risk: Risk is the variability in the actual returns in relation to the estimated returns. Risk Premium is the compensation over and above, the risk free rate of return that investors require for the risk contributed. Risk may be classified as diversifiable (unsystematic) and non diversifiable (systematic). Systematic risk implies the overall market risk that affects all securities and can not be diversified. Unsystematic risk is firm specific known as unique risk. It arises on account of unique uncertainties of individual securities. These unique uncertainties can be removed by forming well-diversified portfolios by combining large number of securities. Thus unsystematic risk can be removed through diversification.

Total Risk = Systematic Risk + Unsystematic Risk

3.4.4.1 Coefficient of Variation: To analyse the consistency of growth in variables, the coefficient of variation (C.V.) has been worked out with the help of following formula

\[
\text{Coefficient of Variation (cv)} = \frac{\sigma}{\bar{X}} \times 100
\]

\(\sigma\) = Standard Deviation of given frequency.

\(\bar{X}\) = average mean of given frequencies
where, Standard Deviation (\(\sigma\)) = \(\sqrt{\frac{\sum(X - \bar{X})^2}{N}}\)

\(\bar{X} = \frac{\sum X}{N}\)

N represents number of years,

X represents variables and

\(\bar{X}\) stands for mean value.

There is inverse relationship between the coefficient of variation and consistency. Higher the value of coefficient of variation, lesser will be the consistency and vice-versa.

### 3.4.4.2 Beta (\(\beta\))

Beta reflects the systematic risk, which cannot be reduced. It measures the risk (volatility) of an individual asset relative to the market portfolio. In terms of security market line, beta is a ratio of the covariance of returns of a security \(R_p\) and the market portfolio return \(R_m\) to the variance of return of the market portfolio. A beta of 1.0 indicates average level of risk while more than 1.0 means that the security’s return fluctuate more than that of the market portfolio. Assets with beta less than one are called defensive assets. Assets with beta greater than one are called aggressive assets. Risk free assets have a beta equal to one. Beta of the market portfolio is one. Beta shows the volatility of the scheme over the market.

\[\beta_p = \frac{\text{Cov}(R_p, R_m)}{(\sigma_m)^2} = \frac{\sigma_p \sigma_m \text{Cor}_{pm}}{(\sigma_m)^2}\]

\(\beta_p\) = Systematic Risk

\(\text{Cov}(R_p, R_m)\) = Covariance of Scheme return and market portfolio return

\((\sigma_m)^2\) = Variance of return of market portfolio

\(\sigma_p\) = Standard deviation of return of security

\(\sigma_m\) = Standard deviation of return of market portfolio

\(\text{Cor}_{pm}\) = Correlation coefficient between return on security and market portfolio
3.4.5 Risk Adjusted Performance Measures

3.4.5.1 Sharpe’s Measure: The reward to variability ratio attempted by Sharpe is known as Sharpe ratio. This ratio is simply the ratio of reward, defined as the realized portfolio return \((\text{Avg.R}_p)\) in excess of the risk-free rates \((\text{Avg.R}_f)\), to the variability of return as measured by the standard deviation of return \((\sigma_p)\). The Sharpe ratio is important from small investors’ point of view who seek diversification through mutual fund and choose mutual fund that represents the majority of their investments. The ratio is defined as

\[
S_p = \frac{\text{Avg R}_p - \text{Avg R}_f}{\sigma_p}
\]

Where

\(S_p\) = Sharpe measure

\(\text{Avg R}_p\) = Average quarterly return on a scheme

\(\text{Avg R}_f\) = Average risk free return

\(\sigma_p\) = Standard deviation of a scheme

Benchmark comparison

\[
S_m = \frac{\text{Avg R}_m - \text{Avg R}_f}{\sigma_m}
\]

\(S_m\) = Sharpe’s measure of market

\(\text{Avg R}_m\) = Average quarterly return of market

\(\text{Avg R}_f\) = Average risk free return

\(\sigma_m\) = Standard deviation of market.

If \(S_p > S_m\), a fund’s performance is better than market.
3.4.5.2 **Treynor’s Measure:** According to Treynor’s Ratio, the additional return of the portfolio (fund) over the risk free return is expressed in relation to portfolio’s systematic risk measured by Beta ($\beta$). This is known as reward to volatility and expressed as

$$T_p = \frac{Avg R_p - Avg R_f}{\beta_p}$$

Where

- $T_p$ = Treynor measure
- $Avg R_p$ = Average quarterly return on a scheme
- $Avg R_f$ = Average risk free return
- $\beta_p$ = Systematic risk of a portfolio.

Benchmark for comparison

$$T_m = \frac{Avg R_m - Avg R_f}{\beta_m}$$

- $T_m$ = Treynor measure of market
- $Avg R_m$ = Average quarterly return of market
- $Avg R_f$ = Average risk free return
- $\beta_m$ = Systematic risk of a market.

As $\beta_m = 1$

So $T_m = Avg R_m - Avg R_f$

If the $T_p$ is greater than the benchmark $T_m$ then the portfolio (fund) has outperformed the market; otherwise it has not.
3.4.5.3 **Jensen Measure:** Jensen attempted to construct a measure of absolute performance on a risk adjusted basis that is, definite standard against which performance of various funds can be measured. It attempts to determine whether more than expected returns are being earned for the portfolio’s riskiness. The measure is derived from capital asset pricing model (CAPM). This involves running a regression with excess return on security and that on the market acting as dependent and independent variables respectively, where excess return is computed with reference to return on a risk free return. According to Jensen, equilibrium average return on a portfolio would be a benchmark. Equilibrium average return is the return of the portfolio by the market with respect to systematic risk of the portfolio. This is a return the portfolio should earn with the given systematic risk.

\[
\text{EAR}_p = R_f + (R_m - R_f)\beta_p
\]

\[
\alpha_p = \text{Avg.R}_p - \text{EAR}_p
\]

Where,

\(\text{EAR}_p\) is equilibrium average return of the portfolio.

Alpha represents the difference between average return and equilibrium average return of the portfolio. Positive value of alpha means that portfolio has performed better and the manager produced return greater than expected for the risk taken. Negative value of alpha means that it has not shown performance up to benchmark, i.e. market index. A zero value of alpha indicates neutral performance.

3.4.6 **Chi-square test**

The Chi-square test has been applied to study the differences with regard to various responses given by the respondents in the questionnaire. It has been worked out as follows:

\[
\chi^2 = \frac{\Sigma(O - E)^2}{E}
\]
Where, \( \chi^2 \) = Chi-square value

\[ O = \text{Observed Frequencies} \]

\[ E = \text{Expected Frequencies}. \]

A proper application of the chi-square test requires that the expected frequencies in each cell are not too small. When the theoretical frequencies are less than 10 and especially less than 5, the ordinary table values of \( \chi^2 \) are less reliable. This is especially true for 1 degree of freedom, it is true to a lesser extent for two or three degrees of freedom. However, the error is negligible for more than three degrees of freedom (Gupta, 2005: p. 959). Cochran (1954) recommends that in chi-square tests for which the degrees of freedom are greater than 1, no cell should have an expected frequency of less than 1 (Siegel and Castellan, 2002, p. 199).

### 3.4.7 Average Weighted Scores

Average weighted scores have been calculated at suitable places where the respondents were asked to rank or rate different attributes relating to the various factors while investing in mutual funds according to their degree of importance. Where five point scale has been used to measure the degree of importance or degree of agreement regarding different attributes relating to selected factors, the weighted scores have been calculated by assigning weights 5 for ‘highly important’, 4 for ‘important’, 3 for ‘neither important nor unimportant’, 2 for ‘unimportant’ and 1 for ‘highly unimportant’. Similarly, the weights 5, 4, 3, 2, and 1 have been assigned to ‘strongly agree’ ‘agree’ ‘neither agree nor disagree’ ‘disagree’ and ‘strongly disagree’ respectively. On the basis of frequency of ratings for each attribute, average weighted scores have been calculated with the help of following formula:

\[
W = \frac{\sum wfw}{\sum Fw}
\]

Where, \( W = \text{Average Weighted Score} \)

\( w = \text{weight given to an attribute} \)

\( Fw = \text{number of respondents who attached weight to the attribute}. \)
3.4.8 Kendall’s Coefficient of Concordance

In order to sharpen the inferences drawn on the ranking/rating basis Kendall’s coefficient of concordance has been calculated by using formula:

\[ W = \frac{12 \sum R_j^2 - 3k^2N(N+1)^2}{k^2N(N^2-1)-k\sum T_j} \]

Where, \( k = \) number of sets of ranking

\( N = \) number of objects to be ranked

\( \sum R_j^2 = \) sum of the squared sums of ranks for each of the \( N \) objects

\( \sum T_j = \) Sum of the correction factor for tied observations.

In case \( N \) is greater than 7, value of Chi-square has been calculated as under

\[ \chi^2 = k(n - 1)W \]

\( \chi^2 = \) Chi-square

3.5 LIMITATIONS OF STUDY

1. Any primary data based study through pre-designed questionnaire suffers from the basic limitation of the possibility of difference between what is recorded and what is truth, no matter how carefully the interview has been conducted, the questionnaire has been designed and field investigation has been done. The same may be with the present study because the people may not deliberately report their true opinion due to some biasness.

2. The study has used some secondary data. Thus, the limitations of using secondary data may affect the results. In certain cases, data was not available.

3. Due to the non-availability of sampling frame, the researcher has resorted to judgment sampling in the selection of respondents.
4. A large number of income and debt schemes have been operating in India but the present study has not covered all those schemes.

5. Returns have been calculated on the basis of quarterly net asset values only. Alternatively these can be calculated from daily NAV.

6. The performance of mutual funds has been appraised in relation to benchmarks S&P CNX Nifty, BSE Sensex, BSE 100 and BSE 200 only.