Chapter 2
REVIEW OF LITERATURE

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2.1 PORTFOLIO RETURN MEASUREMENT METRICS

The review of the available literature on performance measurement metrics revealed that later can be categorized under three distinct categories- Return, Risk and Risk-Adjusted return.

The study was carried out of various portfolio return performance metrics used by academicians and industry practitioners. Return is defined to include changes in the value of the fund over the performance period plus any income earned over that period. For calculating return of investment portfolios, Mutual Funds use the unit-value method. Rate of return \( R_p \) for a mutual fund is then simply defined as the change in net asset value NAV, plus its cash disbursements \( D_t \) and capital gains disbursements \( C_t \) divided by original NAV, and is calculated as under:

\[
R_p = \frac{(NAV_t - NAV_{t-1}) + D_t + C_t}{NAV_{t-1}}
\]

Where \( NAV_t = \) NAV at the end of period \( t \), \( NAV_{t-1} = \) NAV at the period of period \( t-1 \)

Further portfolio return is calculated under two distinct categories namely Total Return and Relative Return.

2.1.1 Total Return

Total return of portfolio is calculated under Arithmetic Mean and Geometric Mean.

**Arithmetic versus Geometric Averaging** (9)

In calculating and reporting historical performance over a given period, returns are usually averaged. In practice, this is typically done in terms of a fund’s compounded
annualized return. For example, if a fund has achieved a cumulative five year return of 60 percent. This is a geometric average return. However, for the purposes of investment decision-making, it is more appropriate to use the arithmetic average of the fund’s historical returns over short time intervals such as daily, weekly, or monthly periods of the individual interval returns divided by the number of such intervals in a year. The arithmetic average is then annualized by multiplying this number by the number of days, weeks, or months in a year. To a first order approximation, the arithmetic average is higher than the geometric average by $\frac{1}{2} \sigma^2$, where both averages are calculated over the same observation frequency (e.g. daily, weekly or monthly) and $\sigma$ is the standard deviation of the fund’s daily, weekly or monthly returns. In practice, there can be a large difference. For example, if $\sigma=20\%$ per annum the annualized arithmetic average exceeds the annualized geometric average by roughly 2% per annum.

Arithmetic Mean: The arithmetic mean of a data set $[x_1, x_2, \ldots, x_n]$ is:

$$A = \frac{(x_1, x_2, \ldots, x_n)}{n}$$

Geometric Mean: The geometric mean of a data set $[a_1, a_2, \ldots, a_n]$ is:

$$\left( \prod_{i=1}^{n} a_i \right)^{\frac{1}{n}} = \sqrt[n]{a_1 \cdot a_2 \cdots a_n}$$

In this study, data set means the rate of return based on daily/ weekly/ monthly NAVs. In case of open-ended (non- dividend) funds, rate of return of mutual fund has been calculated as:

$$R_p = \frac{NAV_t - NAV_{t-1}}{NAV_{t-1}}$$
Further, portfolio returns are computed as Money Weighted Return or Time Weighted Return. Money-Weighted Return is the same as Internal Rate of return (IRR). The IRR is the discount rate that equates the ending investment with the compounded value of the beginning market value as well as all net contributions made during the life of the investment.

Time-Weighted Return (TWR) measures the performance of the portfolio manager. The amount of funds invested is 'neutralized' in the calculation of TWR because contributions and withdrawals by the client are not under the control of Fund Manager. The time-weighted return over a certain period depends only on the length of this period and not on the amount invested - the return is time-weighted. There are number of methods of calculating TWR, one of the popular method is Modified-Dietz Method, in which each cash flow is weighted by the amount of time it is held in the portfolio. The Modified-Dietz method assumes that net contributions are invested at the end of the respective day they occur. The formula is given as:

$$r(T) = \frac{MV(T)-MV(0)-\sum|C(t)|}{MV(0)+\sum|w(t)\times C(t)|}$$

Where, $r(T)=\text{Modified Dietz return}$; $MV(T)=\text{Ending Market Value}$; $MV(0)=\text{Beginning Market Value}$; $C(t)=\text{Net Contribution occurring on day t}$; $W(t)=\text{weight of the net contribution on day t}$.

$$w(i)=\frac{T-t}{T}$$

where $T=\text{Total number of days}$, $t=\text{day the net contribution occurs}$

A measure that is basic to the performance appraisal process is the rate of return earned on the assets employed over a period of time. This return should be time-weighted to adjust for any cash flow in or out of the plan over the period. This calculation becomes complex and tedious where there are significant flows of cash (15).
2.1.2. Benchmark Relative Return

A benchmark is a frame of reference, a context and a standard that allows us to compare a fund's performance. In case of equity funds, this benchmark is usually an index, such as the BSE Sensex, the Nifty and others. These indices are a collection of stocks, which together are meant to represent the equity market. The fund manager's responsibility is to manage his portfolio in such a manner that over time, he or she is able to generate returns that are superior to that of the benchmark indices. At the core of the fund management business, is the idea of beating the market indices. Thus, each fund chooses a particular benchmark index and tries to outperform it. So, while checking the performance of actively managed fund, we check how it performs against its benchmark.

Another use of a benchmark is to see how a fund's portfolio is spread out in comparison to the benchmark. A fund manager tries to beat the market index by being overweight in some sectors and underweight in other sectors. What this basically means is that if the fund is bullish on banking, the fund manager will allocate a greater proportion of his funds to banking stocks as compared to the index. Every fund has its own benchmark and fund manager needs to measure the performance of fund with respect to benchmark. If it is positive, the fund has given higher return than benchmark. If it is negative, lower than benchmark.

Portfolio return when computed relative to benchmark is also known as Active Return.

Active return = Portfolio return – Benchmark return

2.2 RETURN DISTRIBUTION

Study on Portfolio / Benchmark return distribution revealed that they fall under Symmetrical/Asymmetrical categories.

Symmetrical Distribution / Asymmetrical Distribution is characterized by the properties of kurtosis and skew of distribution falling within the specified limits. In
case of Symmetrical Distribution, Kurtosis \( \leq 3; \) Skew \( \geq 0 \) and in case of Asymmetrical Distribution, Kurtosis > 3, Skew < 0

2.3. PORTFOLIO RISK MEASUREMENT
Research on the subject, revealed that academicians and practitioners follow different definitions of risk. Further, selection of risk metrics depends upon the nature of distribution of fund.

Risk has been defined in different ways by academicians. As per practitioners, Risk is the chance, that an investment's actual return will be different than expected. This includes the possibility of losing some or all of the original investment.

The two most widely used measurements of a fund’s risk are its beta (\( \beta \)) and its standard deviation of returns-sigma (\( \sigma \)). A fund’s beta is measured with respect to a given risk factor (e.g., overall stock movement) and represents the fund’s exposure to that risk. It measures the extent to which the factor will affect the value of fund. A fund’s sigma, on the other hand, reflects the total risk of fund, and includes not only the fund’s exposure to a given risk factor, but also the idiosyncratic residual risk that is unique to the fund.

**Standard Deviation**
Standard deviation measures total risk. It is used to measure the variation in individual return from the average expected return over a certain period. A large standard deviation supposedly shows a more risky fund than a smaller one. It is used to measure the variation in individual return from the average expected return over a certain period. Lower the investor risk tolerance, less likely it is that he or she will hold the riskier fund long enough to achieve its ultimate return.

The factors which affect the variability of the performance of an investment are: the kind of stocks in the portfolio, the degree to which a fund diversifies the degree to
which a manager uses leverage of borrowing in an effort to enhance performance, and the extent to which the manager tries to time the market.

Broadly, risk can be divided into two types:

- Systematic Risk (non-diversifiable risk)
- Unsystematic Risk (diversifiable risk)

**Systematic Risk (non-diversifiable risk)**

The risk inherent to the entire market or entire market segment is also known as "un-diversifiable risk" or "market risk." Interest rates, recession and wars all represent sources of systematic risk, because they affect the entire market and cannot be avoided through diversification. Whereas this type of risk affects a broad range of securities, unsystematic risk affects a very specific group of securities or an individual security. Only being hedged can mitigate systematic risk.

\[
\text{Systematic risk} = \text{Beta of fund} \times \text{Variance of market}
\]

**Beta**

Beta coefficients compare the variability of fund return to the market/benchmark as a whole. It is a relative measure unlike absolute one. It is calculated from the linear regression analysis of returns of portfolio with benchmark return. The regression line is then called security characteristic line.

\[
\text{Expected Return } R = \alpha + \beta \times R_m + \epsilon
\]

where \(\alpha\) is fund alpha, \(\beta\) is beta coefficient and \(\epsilon\) is error.

By convention, market will have beta of 1.0. A fund with a beta greater than 1 is considered more volatile than the market; less than 1 means less volatile. If a fund has beta of 0.86, it can be said that fund has 86 percent of the volatility of the market i.e.,
relative to the market index. It will capture only 86 percent of the gain in up market and by 86 percent of the drop in the index in down markets.

**Unsystematic Risk (diversifiable risk)**
The risk of price change due to the unique circumstances of a specific security, as opposed to the overall market, is unsystematic risk. This risk can be virtually eliminated from a portfolio through diversification.

\[
\text{Unsystematic risk} = \text{Total risk of fund} - \text{Systematic risk}
\]

2.4 PORTFOLIO RISK ADJUSTED MEASUREMENT METRICS
As portfolio performance is measured by return and risk characteristics of fund, it become difficult to take an investment decision based on any one characteristic. Keeping in view of this difficulty, academicians evolved the concept of risk-adjusted performance metrics. Risk-adjusted performance measures are metrics taking into account the risk and return characteristics of an investment and allowing producing a ranking of investment opportunities in a consistent manner.

Risk-adjusted performance = performance / risk

A universal performance measure does not exist and will never exist because 'risk' and 'return' are highly context dependent concepts (the 'risk' of a mutual fund for the fund company is very different than the 'risk' of the fund to the client).

There are number of methods of assessing risk-adjusted performance. Further based on whether distribution is symmetrical or asymmetrical, different types of metrics are employed by academicians and practioners.
2.4.1 Symmetrical Distribution

Commonly used risk-adjusted metrics in case of symmetrical distribution are:

a. Return per Unit of Risk

The first of the risk-adjusted performance measures is the type that assesses the performance of a fund in terms of return per unit of risk. The technique here is to relate the absolute level of return achieved to the level of risk incurred to develop a relative risk-adjusted measure for ranking fund performance. According to this method, funds that provide the highest return per unit of risk would be judged as having provided the best performance and those providing the lowest return per unit of risk would be judged as the poorest performers. There are two alternative, yet similar, methods of measuring return per unit of risk:

(1) The reward-to-variability ratio developed by William Sharpe, referred to as the Sharpe ratio, and

(2) The reward-to-volatility ratio developed by Jack Treynor, referred to as the Treynor ratio.

The Sharpe ratio is the ratio of the reward, (defined as the realized portfolio return \( R_p \) in excess of the risk-free rate \( R_f \)), to the variability of return (measured by the standard deviation of return \( \sigma_p \)). Similarly, the Treynor ratio is the ratio of the reward, (defined as the realized portfolio return \( R_p \) in excess of the risk-free rate \( R_f \)), to the volatility of return (measured by the portfolio beta \( \beta_p \)).
The two performance ratios thus differ only in that one considers total risk as measured by standard deviation, but the other considers only market risk as measured by beta.

b. Differential Return - Fund Alpha

The goal of most performance measurement approaches is to determine a differential return (fund alpha \( \alpha \)), the amount by which the fund has outperformed or under performed its investment benchmark. Determining the appropriate benchmark is usually the most difficult part of performance measurement. A benchmark is typically chosen so as to represent investments with a similar level of risk as the fund, and to represent the universe of investments from which the fund manager chose the fund's holdings.

\[
\text{Fund Alpha} = \text{Realized Return} - \beta \times R_{bm}
\]

Where \( \beta \) is the beta of portfolio and \( R_{bm} \) is the benchmark return. It must be clarified that Fund Alpha is not just the excess return but also the excess return when adjusted for beta exposures.

c. Jensen's Alpha

Jensen's alpha (or Jensen's Performance Index) is used to determine the excess return of a stock, other security, or portfolio over the security's required rate of return as determined by the Capital Asset Pricing Model. To calculate Jensen Alpha, the following inputs are needed:
1. the realized return (on the portfolio),
2. the market return,
3. the risk free rate of return, and
4. the beta of the portfolio.

\[
\text{Jensen Alpha} = \text{Realized Return} - \text{Expected Return}
\]

\[
\text{Expected Return } R = R_f + \beta (R_m - R_f) + \xi
\]

where \( R_f \) = Risk Free Return, \( \beta \) = Beta of Portfolio, \( R_m \) = Market Return, \( \xi \) = error

d. Information Ratio

In managing a portfolio, it is desirable that the portfolio risk be minimized while attempting to add value (alpha) to the portfolio. When portfolio risk is low, there is greater confidence that the alpha is sustainable, whereas high residual risk creates uncertainty about the significance of the value added to the portfolio. In order to increase confidence in the performance measurement, the objective should be to maximize the ratio of value added (alpha) to residual risk incurred. The Information Ratio (also known as Appraisal Ratio) is basically a risk-adjustment of Alpha. It measures the Alpha per unit of active risk. The Information Ratio measures the excess return of an investment manager divided by the amount of risk the manager takes relative to a benchmark. It is used in the analysis of performance of mutual funds, hedge funds, etc. This ratio is calculated as:

\[
\text{Information Ratio} = \frac{\text{Portfolio Alpha}}{\text{Portfolio Risk}}
\]

\[
= \frac{\text{Portfolio Return} - \text{Benchmark Return}}{\text{Standard Deviation (Portfolio Return-Benchmark Return)}}
\]

It is important to keep in mind that the above measures are complements and not substitutes.
2.4.2 Asymmetrical Distribution
Commonly used risk-adjusted measurement metrics in case of asymmetrical distribution are:

i. Sortino Ratio
The Sortino ratio is a measure of a risk-adjusted return of an investment asset. It is an extension of the Sharpe ratio. While the Sharpe ratio takes into account any volatility in return of an asset, Sortino ratio differentiates volatility due to up and down movements. The up movements are considered desirable and not accounted in the volatility. That is, the Sortino ratio does not penalize a fund for its upside volatility.

\[
\text{Sortino Ratio} = \frac{\text{Portfolio Return} - \text{Risk Free Return}}{\text{Semi Standard Deviation of Portfolio}}
\]

Where as \( \sigma_d \) is the downside volatility. The downside volatility is computed using the standard deviation formula, keeping only the contribution of negative excess returns.

\[
\text{ROAS} = \frac{R_p - R_f}{\text{AS}}
\]

where \( \text{AS} = \text{Average } [(T - R_p) : T > R_p] \) and \( T = \text{Target value of rate of return} \)

iii. ROPS Ratio

\[
\text{ROPS} = \frac{R_p - R_f}{\text{PS}}
\]
where $PS = \frac{\text{Frequency of return value} < \text{Target value}}{\text{Frequency of all return values}}$

iv. **TREYNOR(SSD) Ratio**

\[
\text{TREYNOR(SSD) Ratio} = \frac{R_p - R_f}{\beta_p^{\text{SSD}}}
\]

where $\beta_p^{\text{SSD}}$ is calculated on semi standard deviation (SSD)

v. **Calmar Ratio**

A Calmar ratio used to determine return relative to drawdown (downside) risk.

It is calculated as

Calmar Ratio = \frac{\text{Compounded Annual Return/ maximum drawdown \{using absolute value\}}}{MDD}

vi. **Sterling Ratio**

This risk reward measure determines which funds have the highest returns, while enduring the least amount of volatility. The formula is as follows:

\[
\text{Sterling Ratio} = \frac{\text{Compounded Annual return}}{\text{Average Maximum Drawdown} - 10\%}
\]

**Comparison of Various Performance Metrics (49)**

Wymen Mercer Oliver, in their research report year 2003 has carried out the comparison of various performance metrics on various parameters like appropriateness, foundation and International comparison. Comparison is shown in table 2.1
Table 2.1: Comparison of Various Performance metrics

<table>
<thead>
<tr>
<th></th>
<th>Appropriateness in Non-MV Space</th>
<th>Foundation Theory</th>
<th>International Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharpe Ratio</td>
<td>X</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Treynor Index</td>
<td>X</td>
<td>P</td>
<td>X</td>
</tr>
<tr>
<td>Jensen’s Alpha</td>
<td>X</td>
<td>P</td>
<td>X</td>
</tr>
<tr>
<td>ROAS</td>
<td>P</td>
<td>P</td>
<td>X</td>
</tr>
<tr>
<td>ROPS</td>
<td>P</td>
<td>P</td>
<td>X</td>
</tr>
<tr>
<td>Sortino Ratio</td>
<td>P</td>
<td>P</td>
<td>X</td>
</tr>
<tr>
<td>Treynor (SSD)</td>
<td>P</td>
<td>P</td>
<td>X</td>
</tr>
<tr>
<td>Jensen (SSD)</td>
<td>P</td>
<td>P</td>
<td>X</td>
</tr>
<tr>
<td>Information Ratio</td>
<td>X</td>
<td>X</td>
<td>P</td>
</tr>
<tr>
<td>Calmar Ratio</td>
<td>P</td>
<td>X</td>
<td>P</td>
</tr>
<tr>
<td>Sterling Ratio</td>
<td>P</td>
<td>X</td>
<td>P</td>
</tr>
</tbody>
</table>

X denotes relative weakness, P denotes relative strength.

Further, company made key observations on the subject as under:

Key Observations

- All ‘practitioner’ measures use absolute returns rather than ‘relative to risk-free’
- Concept of Risk-free return is relevant in International Comparisons for capturing inflation
- CAPM – dependent measure are relevant for the market portfolio in International comparisons
- No single measure satisfies all criteria
- General hypothesis– Use Sharpe Ratio if MV satisfied, otherwise select carefully an alternative metric.

2.5. PERFORMANCE ATTRIBUTION TECHNIQUE

Fama’ Decomposition Method is explained in appendix 1.
2.6. LEADING MUTUAL FUND EVALUATION METHODOLOGIES PREVAILING IN INDIA

Literature review of CRISIL, Value Research and ICRA, leading Indian Mutual Fund rating companies was carried out. Details of review are discussed as under:

CRISIL- Composite Performance Ranking Methodology (11)
CRISIL is India's leading rating, research, risk and policy advisory company. CRISIL provides rating and risk assessment services to manufacturing companies, banks, non-banking financial companies, and financial institutions, housing finance companies, municipal bodies and companies in the infrastructure sector. Brief explanation of composite ranking methodology is given in appendix 2.

Value Research Methodology (46)
Value Research is the independent provider of investment information. Founded in 1990, it capitalizes on its unique position. It the first dedicated fund research company in India. Closely tracking the universe of Indian mutual funds, it has emerged as the most trusted provider of mutual fund information in India. It is well known for fund performance reporting and fund ratings - the first risk-adjusted rating system for managed funds since 1994. It is the most widely used mutual fund performance attribution in India and publishes the mutual fund data, ratings and commentary through Internet and print services. Mutual Fund rating methodology is briefly explained in appendix 3

ICRA Online Methodology for Ranking Mutual Fund Schemes (19)
ICRA Limited (an Associate of Moody's Investors Service) was incorporated in 1991 as an independent and professional company. ICRA is a leading provider of investment information and credit rating services in India. In addition to being a leading credit rating agency with expertise in virtually every sector of the Indian economy, ICRA has broad-based its services for the corporate and financial sectors, both in India and overseas, and currently offers its services under the following banners:

- Rating Services
ICRA Mutual Fund rating methodology is explained in appendix 4.

2.7. LEADING MUTUAL FUND EVALUATION METHODOLOGIES

PREVAILING ABROAD

Study of leading Mutual Fund rating companies in United States, Morningstar, Lipper and S&P and Euro Performance and Edhec of France was conducted. Brief summary is discussed as under:

Morningstar, U.S

Equity Research Methodology (29) and Morningstar’s Rating for Funds (30)

Morningstar Inc is a leading provider of independent investment research in the United States and in major international markets. Morningstar is a trusted source for insightful information on stocks, mutual funds, variable annuities, closed-end funds, exchange-traded funds, separate accounts, hedge funds, and 529 college savings plans.

Individuals use Morningstar to make educated investment decisions. These investors want all the pertinent facts, as well as the assurance that their information source is completely independent. The primary tool for individual investors is Morningstar.com, which consistently ranks among the best investment sites on the Web. Financial advisors and other investment professionals turn to Morningstar for tools that help them research, analyze, present, and support their investment ideas. The main tools for advisors are Morningstar Advisor Workstation™, a Web-based investment planning system, and Principia, CD-ROM-based investment research software. Morningstar also offer an asset management service, Morningstar Managed Portfolios™, to help advisors construct investment portfolios for their clients. Institutions, including mutual fund companies, retirement plan providers, banks,
insurance companies, brokerage firms, and others, value our independence, breadth of information, and customized services. For institutional clients, Morningstar offer investment consulting services, which draw on its extensive industry knowledge to help clients create and maintain investment products; Morningstar Direct®, a Web-based institutional research platform; and Licensed Data, a set of investment data spanning eight core databases.

Morningstar Mutual Fund style analysis and ranking methodology is explained briefly on page 56. Number of researchers has made detailed analysis of Morningstar methodology. Their analysis in brief is covered on page 58-64.

**Lipper Analytical Services, U.S (10)**

Lipper, a Reuter’s company, is a global leader in supplying mutual fund information, analytical tools, and commentary. Lipper's benchmarking provides "the trusted guidepost to asset managers, fund companies, financial intermediaries, traditional media, websites, and individual investors. Lipper provides unparalleled expertise and insight to the funds industry. Lipper Mutual Fund ranking methodology is explained briefly in appendix 5.

**Standard & Poor's (S&P), U.S (43)**

It is the world's foremost provider of independent credit ratings, indices, risk evaluation, investment research and data. S&P Mutual Fund ranking methodology is explained briefly in appendix 6.

**Euro Performance and Edhec, France (10)**

In 2002, Euro Performance, which is the leading French firm for the dissemination of mutual fund data, approached the Edhec Research Centre to consider the implementation of a value-added offering in the area of external analysis of the performance and risks of European investment funds. Euro Performance and Edhec Mutual Fund ranking methodology is explained briefly in appendix 7. In their report on ‘Comparison of various Rating Agencies’ provided comparison of leading global Mutual Fund rating methodologies, which is reproduced in table 2.2.
Table 2.2: Comparison on leading global Mutual Fund rating methodologies

<table>
<thead>
<tr>
<th>Provider</th>
<th>S &amp; P</th>
<th>Morningstar</th>
<th>Lipper</th>
<th>Aptimum Performance</th>
<th>Edhec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure of risk actually taken</td>
<td>Poor</td>
<td>Average</td>
<td>Poor</td>
<td>Very Good</td>
<td>Very Good</td>
</tr>
<tr>
<td>Measure of extreme risks</td>
<td>No</td>
<td>No</td>
<td>Average</td>
<td>No.</td>
<td>Good</td>
</tr>
<tr>
<td>Measure of performance persistence</td>
<td>No.</td>
<td>No.</td>
<td>Very Good</td>
<td>Good</td>
<td>Very Good</td>
</tr>
<tr>
<td>Robustness and confidence</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Good</td>
<td>Very Good</td>
</tr>
<tr>
<td>Transparency and comprehensibility</td>
<td>Very Good</td>
<td>Very Good</td>
<td>Good</td>
<td>Poor</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

2.8 INDIAN MUTUAL FUNDS

Study of Indian Mutual funds was carried out as under:

- History of Indian Mutual Fund Industry has been discussed in the Introduction Chapter.
- Classification of Mutual Funds is exhibited in appendix 8.
- Characteristics of various types are explained in appendix 9.
- Classified Inventory of available Mutual Funds in India is exhibited in appendix 10.

2.9 SUMMARY OF BOOKS, RESEARCH PAPERS, AND COMPANY REPORTS STUDIED

Study of various books, research papers and company reports on the subject have been summarized under various sub-headings: Portfolio Performance and Evaluation, Style Analysis and Mutual Fund Rating Methodologies. Summary is as under:
Portfolio Performance Measurement and Evaluation

Leland Hayne E, in his research article on Portfolio Performance Measurement and Evaluation (25) shows that severe miss measurement of risk and performance occurs when conventional measures based on the capital asset pricing model (CAPM) are used to evaluate portfolios that include options or that use dynamic strategies. He develops alternative risk and performance measures those incorporate investors' preferences for skewness (upside risk being less important than downside risk). The modified measures require no more data than the CAPM measures do. The author also shows that the differences between the CAPM measures and the modified measures are small when returns are distributed jointly log normally with market returns, but for skewed returns, substantial differences exist between the measures.

Golac Joseph H in his research paper on 'The Effects of Mutual Fund Managers' Characteristics on Their Portfolio Performance, Risk and Fees (17) carried out study on: whether Mutual Fund managers' Characteristics help to explain fund performance, risk and fees.

Israelsen Craig L., in his research article on Characteristics of Winning Mutual Funds (22) Over the period from January 1, 1992, to December 31, 1996, mutual funds with the following characteristics produced, on average, higher returns. As such, the following fund characteristics may represent useful "screening" criteria when evaluating and comparing the vast number of mutual funds now available.

- True no-load (no front load, deferred load, or 12b-1 fee)
- Annual expense ratio less than or equal to 1.22 percent
- Net assets greater than or equal to $235 million
- Manager tenure greater than or equal to six years
- Annual turnover ratio less than or equal to 60 percent

Analysis shows the top 25 no-load funds (on the basis of five-year return as of 12/31/96) that met each of the above criteria, and the top 25 load funds that met all but the "no-fload" criteria. True to the generalized conclusions of this study, the top 25 no-load funds produced an average annual return over the five-year period of 16.38
percent, compared with a 14.69 percent load-adjusted return for the load funds. This difference in return is statistically significant at the 99 percent confidence level. This study does not "prove" that no-load funds are superior to load funds during all time periods and in all events. However, it does support the argument that in recent years true no-load funds have, on average, produced returns that exceed those of comparable load funds.

Farrell James L. Jr., in his book on Portfolio Performance Analysis (15), has described the objective of portfolio performance analysis as to assess 'how well the investment plan is meeting its goal as well as the degree to which investment managers are adding value in carrying out the investment plan'. A measure that is basic to the performance appraisal process is the rate of return earned on the assets employed over a period of time. This return should be time-weighted to adjust for any cash flow in or out of the plan over the period. This calculation becomes complex and tedious where there are significant flows of cash. Though managers can be evaluated by comparing rates of return earned over a period, risk should be considered too. There is a risk return relationship that is basic to capital market. In assessing whether a manager is adding value, we need to determine to what extent returns were more or less than commensurate with risk. Capital market theory provides an explicit framework—Security Market Line and measure beta and standard deviation for making such risk adjustments to return. Because of the complexity of multi manager programs and the wide variety of special styles purchased by managers, there is a growing awareness of the need to evaluate more aspects of the investment plan and process. Furthermore, there is a growing awareness that factor beyond market risk can have a significant impact on the performance of a plan and its managers. Return attribution provides the framework for considering how various factors interact to generate the performance of a plan over time and how those factors now being used extensively by major plan sponsors and their consultants.

Indro Daniel C., et al, in their research article on 'Mutual Fund Performance: Does Fund Size Matter?' (20) have concluded that Fund size (net assets under management) affects mutual fund performance. Mutual funds must attain a minimum fund size in order to achieve sufficient returns to justify their costs of acquiring and trading on
information. Furthermore, there are diminishing marginal returns to information acquisition and trading, and the marginal returns become negative when the mutual fund exceeds its optimal fund size. In a sample of 683 non-indexed U.S. equity funds over the 1993–95 periods, they found that 20 percent of the mutual funds were smaller than the breakeven-cost fund size and 10 percent of the largest funds over invested in information acquisition and trading. In addition, we found that value funds and blend (value-and-growth) funds have more to gain than growth funds from these information activities.

Muralidhar Arun. S, in his research paper on ‘Risk-Adjusted Performance: The Correlation Correction’ (31) has expressed that current measures of risk-adjusted performance, such as the Sharpe ratio, the information ratio, and the M-2 measure, are insufficient for making best decisions on how to rank mutual funds or structure portfolios. In his paper, he has proposed a new measure, called the M-3, which is a more comprehensive alternative to these measures, that accounts for differences in (1) standard deviations between a portfolio and a benchmark and (2) the correlations of mutual fund portfolios and their benchmarks for an investor’s relative-risk target. This technique facilitates portfolio construction to optimally achieve investors’ objectives by combining the risk-free asset, the benchmark, and mutual funds.

It takes into consideration differences in correlation and the fact that investors have relative-risk targets. Correlations are important for two reasons—as a measure of covariance with other assets for optimal portfolio selection and as a forward-looking risk measure. By exploiting its role as a forward-looking measure of risk, the M-3 measure, which adjusts for standard deviations and correlations, provides rankings of portfolios that are different from the rankings provided by other techniques. Furthermore, M-3 facilitates portfolio construction to achieve investor objectives by combining an optimal fraction of the risk-free asset, the benchmark, and risky mutual funds. Not only is this paradigm different and a form of three-fund separation, but it also gives investors optimal mixes of active and passive management based not on the investor’s views on market efficiency but on the investor’s target tracking error and market information. A form of three-fund separation, this paradigm provides optimal mixes of active and passive management based on the ability of fund managers rather
than on individual biases about market inefficiency. This article provides support for the claim that leverage may not be bad if it is used to structure portfolios to achieve the highest risk-adjusted performance.

**Wermers Russ**, in his research article on 'Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses' (47) creates a new database and provides evidence showing that over the 1975–94 periods, stocks held by mutual funds outperformed the market. This superior performance can be attributed to the characteristics of the stocks held by the funds as well as the stock-picking skills of fund managers. But because of funds' high transaction costs and expense ratios and their lower-performing non-equity holdings, the funds underperformed. The author finds that high-turnover funds exhibit stock-picking and timing skills and that they provide higher returns than low-turnover funds, even after accounting for higher transaction costs and expense ratios.

**Williams Charles M**, in his research paper on Measuring Mutual Fund Performance (48) examines various methods of measuring mutual fund performance. He specifically outlines two types of approaches: one that is based on a fund's exposure to broad market risk factors and one that is based on its overall level of risk. He discusses computation of total return, arithmetic versus geometric averaging, Sharpe ratio and The Risk Adjusted Performance (RAP) Measure.

Risk-Adjusted Performance (RAP) measure was suggested by Modigliani and Modigliani. Similar to the Sharpe Ratio, the RAP is based on the fund's return, the standard deviation of the returns, and the risk-free rate of return. The RAP adjusts the fund's returns to capture the return an investor would have earned in a particular period if the fund's returns had been diluted or leveraged to match a benchmark level of volatility. This is accomplished by hypothetically blending shares of the fund with lending or borrowing at the risk-free rate to achieve a benchmark level of risk such as that of the S&P 500 index. Under this process, funds with greater volatility than the benchmark are combined with cash, while funds with less volatility are leveraged. The RAP measure can be stated mathematically as follows:
Risk Adjusted Performance Fund = \left( \frac{\sigma_{Benchmark}}{\sigma_{Fund}} \right) + \left( 1 - \frac{\sigma_{Benchmark}}{\sigma_{Fund}} \right)

Return_{Risk-free}

**Luck Christopher G.,** in his research paper on *The Importance of Index Selection* (27) has expressed that although the most commonly used indexes in the United States share some similarities, their differences have recently sharpened, primarily because of the technology boom. No longer can one assume that the standard industry benchmarks serve as good substitutes for each other. Standard & Poor's and Frank Russell Company indexes (the focus of the presentation) differ markedly in their construction parameters: weighting, rebalancing, and reinvestment procedures. Close examination of these parameters reveals that choosing indexes wisely will likely become even more complicated, and more important, in the future. In portfolio management, the choice of the benchmark index is surprisingly important and will become even more important as the economy and market structure evolve. Some of S&P's biases, for example, reflect that it is more conservative than Russell, and if that trend continues, the S&P and Russell indexes will differ more in the future than they will converge. The philosophical differences between the two sets of indexes have begun to accentuate the significant differences in performance between the two. Sponsors should be cognizant that the index they have chosen may encourage manager behavior that differs from that which caused them to hire the manager in the first place. Sponsors must choose the index that maximizes manager allocation, asset allocation, and performance-measurement decisions.

**Ryan Timothy P.,** in his research paper on *Separating the Impact of Portfolio Management Decisions* (38) proposes the use of a set of measurement tools for analyzing return attribution. He suggests using return-neutralized weight analysis to determine return attribution. This approach helps to explain the environment in which the portfolio manager made his or her decisions. By understanding how one decision affects another, the investor can gain a better understanding of the portfolio manager's decisions and their impact on portfolio returns.

**Bailey Jeffery V.,** in his research paper on *Benchmarks and Attribution Analysis for the Total Fund* (3) Total fund benchmarks and performance evaluation play crucial
roles in setting and monitoring investment policy. According him, Performance evaluation is a broad concept that involves measuring, dissecting, and critiquing the performance of an investment portfolio. It takes an informed look at the past in an attempt to understand the quality of investment results. Performance evaluation comprises three elements: performance measurement, performance attribution, and performance appraisal.

Performance measurement, according to him involves calculating account and benchmark returns, seeks to answer the simple question: What was the account’s performance? The concept of calculating time-weighted returns on benchmarks and accounts has been around for a long time. Only recently, however, have account owners attempted to gain a broader understanding of how and why an account achieved a certain level of performance relative to an assigned benchmark. He further elaborate that Performance attribution tries to answer the question: Why did the account produce the observed performance? The sponsor seeks to explain the causes of differences between the account’s return and the return of the benchmark. Performance attribution extends the results of performance measurement to investigate both the sources of the account’s relative performance and the relative contributions of those sources.

In his opinion, Performance appraisal, the most complex of the three elements of performance evaluation, attempts to answer the question: Was the account’s performance caused by luck or skill? Attribution analysis might explain that the account’s results were caused by superior stock selection, but that answer is incomplete. The plan sponsor wants to assess the likelihood that the account’s superior performance was caused by sustainable management skill rather than the manager’s good fortune. Keep in mind that the odds of a truly superior manager underperforming his or her benchmark for a sustained period of time (e.g., three to five years) are surprisingly high. Past performance does not say anything definitive about future performance. If a plan sponsor believes a manager to be skillful, then the sponsor should retain that manager regardless of past performance. But to make this determination, the sponsor has to devise a way to distinguish between manager skill and luck—a difficult challenge but one that sponsors constantly face.
Lo Andrew W., in his study on 'The Statistics of Sharpe Ratios' (26) has opined that the building blocks of the Sharpe ratio—expected returns and volatilities—are unknown quantities that must be estimated statistically and are, therefore, subject to estimation error. This raises the natural question: How accurately are Sharpe ratios measured? To address this question, he derives explicit expressions for the statistical distribution of the Sharpe ratio using standard asymptotic theory under several sets of assumptions for the return-generating process—individually and identically distributed returns, stationary returns, and with time aggregation. He shows that monthly Sharpe ratios cannot be annualized by multiplying by except under very special circumstances, and he derive the correct method of conversion in the general case of stationary returns. In an illustrative empirical example of mutual funds and hedge funds, he finds that the annual Sharpe ratio for a hedge fund can be overstated by as much as 65 percent because of the presence of serial correlation in monthly returns, and once this serial correlation is properly taken into account, the rankings of hedge funds based on Sharpe ratios can change dramatically.

Although the Sharpe ratio has become part of the canon of modern financial analysis, its applications typically do not account for the fact that it is an estimated quantity, subject to estimation errors that can be substantial in some cases. The results presented in this article provide one way to gauge the accuracy of these estimators, and it should come as no surprise that the statistical properties of Sharpe ratios depend intimately on the statistical properties of the return series on which they are based. This suggests that a more sophisticated approach to interpreting Sharpe ratios is called for, one that incorporates information about the investment style that generates the returns and the market environment in which those returns are generated. For example, hedge funds have very different return characteristics from the characteristics of mutual funds; hence, the comparison of Sharpe ratios between these two investment vehicles cannot be performed naively. In light of the recent interest in alternative investments by institutional investors—investors that are accustomed to standardized performance attribution measures such as the annualized Sharpe ratio—there is an even greater need to develop statistics that are consistent with a portfolio's investment style.
The empirical example underscores the practical relevance of proper statistical inference for Sharpe ratio estimators. Ignoring the impact of serial correlation in hedge fund returns can yield annualized Sharpe ratios that are overstated by more than 65 percent, understated Sharpe ratios in the case of negatively serially correlated returns, and inconsistent rankings across hedge funds of different styles and objectives. By using the appropriate statistical distribution for quantifying the performance of each return history, the Sharpe ratio can provide a more complete understanding of the risks and rewards of a broad array of investment opportunities.

Murphy Robert J, in his article on ‘Omega: A More Complete Picture of Investment Performance’ (32) has expressed that traditional measures of investment performance typically assume that investment returns are normally distributed. As such, they incorporate the mean and standard deviation of historical returns but ignore higher moments of the distribution (e.g., skewness and kurtosis). Distributions with different skew (i.e., lack of symmetry) and kurtosis (i.e., tendency to have fat tails) can have similar means and standard deviations and produce similar Sharpe ratios, even though the distributions may have different risk–return implications.

The author reviews a new statistic, called omega that incorporates information in a distribution’s higher moments. It is particularly useful for those investors who are interested in absolute returns and for those who have a defined return threshold they desire. Omega is calculated by using historical data to divide the cumulative probability of acceptable outcomes (area under the curve to the right of the threshold return) by the cumulative probability of unacceptable outcomes (area under the curve to the left of the threshold return). The resulting omega statistic can then be used to rank alternative investment opportunities and measure performance against a benchmark. It suffers from the same drawbacks as other performance measures that rely on historical information but incorporates more information from the distribution of returns. It is also useful to investors concerned about realizing absolute return objectives rather than objectives relative to a benchmark.

Shadwick William F. and Keating Con, in their study on ‘A Universal Performance Measure’ (39) has opined that Performance measurement and attribution suffer from
two oversimplifications. First, the probability distribution of returns is assumed to be fully described only by mean and variance, and second, the mean return is the reference point that characterizes the risk-reward properties of a portfolio.

The authors describe a performance evaluation measure, omega that incorporates all of the higher moments of a return distribution, not just the mean and variance. Omega is easily calculated, is not dependent on an assumed utility function, and incorporates the impact of gains and losses relative to any specified return threshold. The authors compare omega with the Sharpe ratio in ranking the performance of hedge fund–style indexes and find differences in rankings, which they attribute to the additional higher moment information that omega captures and the Sharpe ratio does not. Traditional portfolio performance measures, such as the Sharpe ratio, implicitly assume that the return distribution is specified by only two parameters—the mean and variance of returns. Empirical evidence, however, shows that this assumption is not accurate; higher moments are present in stock return distributions. In addition, traditional measures describe performance in reference to the mean return, but many managers are measured against a threshold return that differs from the mean. Both of these attributes of traditional performance measures can produce misleading performance measurement. The authors present a new approach to measuring performance, the omega function that captures all of the higher moments in return distributions and accounts for sensitivity to return levels.

The omega function is used to measure portfolio performance relative to a benchmark index and to consider some threshold return level. (The threshold level is the return above which the manager is producing “gains” and below which he or she is producing “losses.”) Distribution of returns is transformed and expressed relative to the benchmark index, and from this step, the cumulative distribution function (CDF) can be constructed. Using the CDF and integral calculus, the authors define omega as the ratio of the probability weighted returns (gains) above the threshold level to the probability weighted returns (losses) below the threshold level.

As defined, omega is a function of the return level (or threshold return level) and has a value of 1 at the distribution’s mean value, independent of the return distribution.
Omega contains all information present in the return distribution, including higher moments, and does not depend on any parametric assumptions or utility function specification. The omega function allows users to compare returns among different assets and to rank them on the basis of the magnitude of omega, with higher values preferred to lower values. The authors compare the performance rankings provided by omega with the Sharpe ratio using a sample of monthly returns for 16 hedge fund–style indexes, the MSCI equity index, and the Salomon World Government Bond Index. The descriptive statistics show that the returns are not normally distributed, with both skewness and kurtosis present.

As per his research, using a threshold return level of zero, the rankings of the 16 funds and of the equity and bond indexes show only five points of agreement, indicating the importance of higher moment effects. The Kendall and Spearman rank correlations are 0.89 and 0.97, respectively. The omega function and Sharpe ratio are also calculated for a range of threshold returns and show changes in rankings as threshold returns vary, again illustrating the impact of including higher moments. Tracking error is also compared with omega and the Sharpe ratio and shows only two points of agreement, with low correlation between it and the other two measures, leading the authors to conclude that tracking error is a poor performance measure.

Strong Robert A., in research article on 'Performance Measurement in Practice' (45) has concluded that a controversy is growing in academia about the value of the traditional portfolio measures. No one questions the need to view asset returns in a risk-adjusted framework. The issue is that there use relies on the Capital Asset Pricing Model as the correct view of the world, yet evidence continues to accumulate that may ultimately lead to displacement of the CAPM paradigm. Efforts to develop the arbitrage pricing model, multi factor CAPM, and an inflation-adjusted CAPM have implications for proper performance evaluation. Until someone discovers a better technique, however, the Sharpe and Treynor measures are likely to continue as popular methods in academic research.

Virtually everyone who ever studied investment theory in a university classroom has read about the merits of the traditional performance measures. The sobering fact is
that the investment industry has never really adopted them. A 1987 survey of three thousand investment practitioners found that more than 80 percent agreed with the following statement: "portfolio managers are hired and fired largely on the basis of realized investment returns with little regard to risk taken in achieving the returns." In actual practice, formal performance measurement usually involves (among other things) a comparison of the fund's performance with that of some benchmark. In considering investment performance, it can be instructive to see why an investment performed better or worse than expected. One method for doing so is "Fama's decomposition," named for Eugene Fama, a finance professor at the University of Chicago. He shows how to segregate realized investment performance into several components that give more information on what the manager actually did.

**Fischer Donald.E & Jordan Ronald**, in their book on security Analysis and Portfolio Management (16) have expressed that if the management of a mutual fund is performing well; that is, has management done better through its selective buying and selling of securities than would have been achieved through merely "buying the market"-picking a large number of securities randomly and holding them throughout the period?

One of the most popular ways of measuring management's performance is by comparing the yields of the managed portfolio with the market or with a random portfolio. The portfolio-yield formula parallels the holding-period-yield formula for stocks.

\[
\text{Portfolio Yield} = \frac{\text{NAV}_t + \text{Dt} - 1}{\text{NAV}_{t-1}}
\]

The portfolio with the highest one-year holding-period-yield is deemed the better portfolio. If the managed portfolio did better than the unmanaged portfolio, the investor in the mutual fund should not rejoice too soon. He had to pay a management fee as well as suffer a reduction in equity equal to the loading charge (in case of a load fund). So he must determine if the excess return is sufficient to cover these added expenses he has incurred by purchasing a mutual fund rather than purchasing a
diversified portfolio on his own and paying the commissions (assuming he has this option). The investor must determine the relative riskiness of the portfolio under analysis. The managed portfolio could have achieved higher returns than the market or the unmanaged portfolio by taking on considerably more risky investments. It is not surprising under such circumstances for higher return to occur, for higher returns should go along with higher risks. Only after the relative risks of the portfolios have been considered is a comparison of returns meaningful.

Grinold Richard C. & Kahn Ronald N., in their research paper on Performance Analysis (18) analyzed the questions like: Are you winning or losing? Why? Performance measurement will answer the first question and can help to answer the second. A sophisticated performance analysis system can provide valuable feedback for an active manager. The goal of performance analysis is to distinguish skilled from unskilled managers. Simple cross sectional comparisons of returns can distinguish winners from losers. Time series analysis of the return can start to separate skill from luck, by measuring return and risk.

Performance analysis is useful not only for fund owners, but also for investment managers, who can use performance analysis to monitor and improve the investment process. The manager can make sure that the active positions in the portfolio are compensated, and that there has been no unnecessary risk in the portfolio. Performance analysis can ex post; help the manager avoid two major pitfalls in implementing an active strategy. The first is incidental risk: managers may like growth stocks, for example, without being aware that growth stocks are concentrated in certain industry groups and concentrated in the group of stocks with higher volatility. The second pitfall is incremental decision making. A portfolio based on a sequence of individual asset decisions, each of them wise on the surface, can soon become much more risky than the portfolio manager intended. Risk analysis can diagnose these problems ex ante. Performance analysis can identify them ex post.

Kishore N K, in his article on ‘Mutual Fund Investments are Subject to Market Risks’ (24) commented on the following statement:
He said that the above statements are inevitable found in every disclaimer clause of the mutual funds.

A disclaimer is a statement that denies responsibility or affiliation and is an act of disclaiming, repudiating and renouncing a claim. By making a disclaimer statement, mutual fund reserve the right not to be held responsible for the topicality, correctness, and completeness or quality of the information provided. Liability claims regarding the damage caused by the use of any information that is incorrect or incomplete, may, therefore, be rejected.

It may be interpreted that unless there is a greater amount of risk involved in the subject matter, disclaimer statement(s) may not be lengthier. In fact, these disclaimers, directly or indirectly, give a clear message that investors should be informed, take adequate care and beware of the inherent risk before investing in the mutual funds.

Dutta Dibyendu & Sengupta Souvick, in their research article on ‘ELSS Growing Strong’ (13) concluded that the all round growth in the economy advocates investors to look for more favorable investment avenues. The economic growth rate of 8.1% as given by the RBI review gives a break to invest in strong portfolios that have bargaining power in the market. But the traditional thinking to save more comes to the mind. This indulge the investor for a tax saving investment with a base in equity, what else but Equity Linked Saving Scheme (ELSS). ELSS is an equity-diversified fund with its mass corpus invested in equities. Today the stock market is unpredictable hence it is better to go for long term investment to obtain higher returns, and that’s the positive aspect where the lock in period of three years in ELSS comes favorable. The
main advantage of ELSS lies in tax savings. It gives one the benefit of Sec 80C with an investment of Rs 1, 00,000. These funds are, however, subject to certain risk that is being minimized with setting prescribed measure. The concentration risk factor is one of them. Talking about the liquidity risk, which is a common phenomenon for any investment, the scheme takes into consideration the time required for liquidation of the stocks. The primary disadvantage of ELSS is its lock in period. The lock in period of three years does not allow a short-term gain from these investments. There is also a restriction of exiting earlier.

Raju ISSN, in his research article on ‘Mutual Fund Investments: Preferred or Induced?’ (35) has opined that booming stock markets and innovative marketing strategies of mutual fund companies in India are influencing the retail investors to invest their surplus funds with different schemes of mutual fund companies with or without complete understanding of Mutual Funds (MF). Though mutual fund investment gave good returns in the recent past, it may not be consistent for all the times. The retail investors are hardly conscious of MF investments leaving the scope to conclude that to some extent a good number of retail investors have not preferred, but rather were induced to invest in MFs. If at all the investors’ decision was a preferred choice it was without complete awareness to the investor about the MF as an investment instrument and its relative features like risk, return, and load. Important inducing factors are aggressive marketing of AMCs, abnormal returns in the recent times, misperception of MF as an equal substitute with more returns, tax benefits, and liquidity of the investment.

Bank deposit could not equate the pace of increase in demand for credit as the retail investor’s savings are attracted by MFs. With this transformation, the MF industry is growing steadily and reaching new heights from year to year. Though an increase in AUM is a good sign, the retail investors have to be very cautious, as most of the AMCs are not transparent. Before investing in MFs, which is a non-conventional investment source, the retail investor should invest in himself by putting efforts on educating himself making his investments translucent and more productive, following the prerequisites and investment principles before investing in MFs thereby making qualitative investment leading to wealth accumulation.
Nigam Divya, in her article on ‘Mutual Fund Performance Measurement: A closer Look’ (33) expressed that it can be said that a true measure of fund performance should lead us to future returns of the fund. The methodology adopted in measuring fund performance is always a crucial decision. Generally, past records are used to measure fund performance. It is always the meaningful analysis of past performance, which facilitates to undertake a decision in the future. So, the performance measurement of fund managers is also done in retrospect. The fund managers’ performance can not be measured on the basis of the rate of return generated during past periods. Because performance based on the rate of return is more likely to depend on the target risk level of the portfolio and the performance of the market than the skill level of the fund manager. So a performance measure is needed that is insensitive to relative risk and strength of the market. Such risk adjusted measures, irrespective of the performance of the market, are not sensitive to its level of risk maintained in the portfolio.

While constructing a risk adjusted performance measure, one has to make assumptions about the nature of risk and the relationship between return and risk. Popular asset pricing models like Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) are the backbone of traditional performance measure. These theories are derived by examining the behavior of investors in a hypothetical model economy for one period. This makes the model static. But, the real world is essentially dynamic. So, performance measures based on these static models would fundamentally be biased. Investors’ behavior would keep changing in the light of new information in the market. Therefore, an information efficient asset pricing model would be appropriate in measuring the performance of active fund managers.

Banerjee Arindam, in his article on ‘Wealth Creation through Systematic Investment Plans’ (4) has opined that a systematic investment plan (SIP) is a regular investment plan enabling an investor to purchase units of a mutual fund scheme. While an investor goes for investing in mutual funds, he generally identifies the scheme as per his risk profile and invests a predetermined amount in the asset class at the fund’s prevailing Net Asset Value (NAV). If the investor invests a sum of Rs 1,000 at a NAV of Rs 10, then he receives 100 units if the fund. The timing of the investment in
such a case may turn out to be favorable or unfavorable. Unlike the investments generally made in mutual funds whereby the investor invests all his money at one goes, SIP allows the investors to invest a specified amount at predetermined specific intervals. The number of unit accruing in periodic investment is dependent on the NAV of the scheme that is prevailing at the time of the purchase of the fund. Thus, with the help of SIP one can do away with the need of timing the market. SIPs bring in the much needed disciplined approach towards investment habits. An investor opting for SIP should have a clear defined investment objective. Though this principle is fundamental to all kinds of investments, it becomes all the more important in case of an SIP that involves investment over a longer tenure of time. A well defined objective provides an indicative time frame to the investment and gives the investor a better understanding on the periodic investment that one has to make.

Style Analysis

Bartolomeo Dandi and Witkowski Erik, in their research article on ‘Mutual Fund Misclassification: Evidence Based on Style Analysis’ (5) find misclassification of Mutual Fund. This conclusion has been drawn based on the study of style analysis of mutual funds. According to them, the mutual fund industry has experienced tremendous growth in recent years. Assets managed by equity funds grew from $245.8 million at the end of 1990 to $1.3 trillion at the end of 1995, and the number of equity funds in existence more than quadrupled, to 5,761, during the same period (Investment Company Institute 1996). Mutual funds have become the primary vehicle through which individuals and most institutions invest in capital markets (New York Times, January 26, 1996). Faced with the large and growing number of mutual funds available in the financial marketplace; investors need a way to select funds that will best accommodate their own financial situations. Mutual fund classes are one way for investors searching for the “right” fund to simplify their decision-making. In addition to allowing investors to tailor their choice of mutual funds to their own risk acceptance levels and income needs, the classification system also allows financial institutions, mutual fund data vendors, and individual investors to rate objectively the performance of mutual funds within their respective categories, thus avoiding
comparisons between apples and oranges. The topic of mutual fund classification, ignored for many years, has received considerable attention from both the financial press and securities regulators, who have only recently begun to establish a risk-measurement scale for funds.

Under the present classification system, many equity funds exhibit behavior that is inconsistent with that of their class. If mutual funds are widely misclassified, is their classification random or explainable? And is misclassification a meaningful hindrance to investors’ fulfilling their investment objectives? The misclassification of mutual funds is a real phenomenon. The empirical results of our investigation support the anecdotal evidence. About 40 percent of the funds examined displayed return patterns that more closely resembled another category than the one listed in their prospectuses; of those, 9 percent were seriously misclassified two or more risk tiers away from their declared categories.

Kim, Shukla and Tomas obtained similar results using discriminant analysis, a statistical technique very different from the one normally used. They found that nearly half of the 591 funds they studied, in practice, disagreed with their classified objectives. International funds had the cleanest classification, and the small-cap and aggressive growth categories are so similar that their labels provide little information. Perhaps small/value and small/growth would be better descriptions of the underlying investment strategies. “Purifying” fund classifications using style analysis improves the risk–reward characteristics of fund portfolios.

Data indicate that the observed misclassifications were not the result of random noise. First, although misclassification appears to take place in both directions (into more and less aggressive categories), among seriously misclassified funds, the ratio of funds misclassified in the expected direction was nearly 2 to 1 (42 to 23), with a z-score of 2.46. The result allows us to reject, at the 2 percent level, the null hypothesis that an equal number of funds are seriously misclassified upward and downward. Second, profit analysis reveals that misclassification is not random but is related to fund size and assets under management to a statistically significant degree. Third, a Monte Carlo simulation indicates that the level of noise inherent in the data is too low
to seriously affect our results. In addition, the fact that 40 percent of the funds we studied showed some degree of misclassification is extremely unlikely to be the result of random forces, given the number of funds analyzed and the length of the period studied. Analysis of the data appears to confirm both reasons put forward for why misclassification occurs. The ambiguity of the taxonomic system and the lack of specific guidelines play a role, according to people familiar with the industry. The observed patterns of misclassification are consistent with adverse economic incentives, to which management companies respond by trying to obtain a superior ranking within a category with the aim of attracting new investments. Data indicate that aggressive funds do rank better in their categories than do funds that are much less aggressive than they purport to be. A third, unanticipated phenomenon was the misclassification of funds into more aggressive categories, which was often accompanied by higher average bond and cash holdings.

Authors conclude that misclassification is an important problem and that an improved classification mechanism is badly needed. The methodology they present is one way of achieving more-accurate peer groupings. The out-of-sample simulations indicate that the approach discussed offers a meaningful benefit to investors trying to build diversified portfolios of funds. In addition, the purified fund class indexes that arise from as appropriate benchmarks for more accurately measuring fund performance.

Sortino Fran. A. et al, in their research article on Short-Term Risk-Adjusted Performance: A Style-Based Analysis (42) were of the opinion that comparing the highest and lowest deciles of return distributions for mutual funds implies that some styles should perform better than other styles, but it does not mean that a manager could earn higher returns without taking additional risk. The authors propose a “style beta” ratio that can be used to evaluate whether managers take more or less risk than is inherent in their styles. Style betas are calculated over an entire cycle to capture the relationship of the manager’s risk relative to the style.

Because most investors tend to agree that risk relates to returns below a minimum acceptable level, the style-beta ratio focuses on downside risk. The authors develop a framework for style-adjusted downside risk, which is calculated as downside style
beta times the downside style variance. Return-based style analysis using BARRA data classifies, for example, the T. Rowe Price New Horizons Fund as a medium growth style fund, even though it is considered a small-cap fund. The downside beta indicates that the fund took only 80 percent of the risk associated with this style. Similar results are presented for more than 60 mutual funds.

**Mutual Fund Rating Methodologies**

**Morningstar Equity Research Methodology (29)**

The Morningstar Rating for stocks identifies stocks trading at a discount or premium to their intrinsic worth—or fair value, in Morningstar’s terminology. Five-star stocks are trading at the most attractive prices relative to their fair values, whereas 1-star stocks are trading at premiums to fair value. There are three key components to the Morningstar Rating for stocks: stock’s fair value, assessment of the firm’s business risk, and the stock’s current market price. Fair value estimates are based on projection of a company’s future cash flows and our estimate of the appropriate discount rate to apply to those cash flows. Calculation of fair value of the common stock consists of the following:

A detailed forecasts of each company’s performance over the next five years, including revenue growth, profit margins, tax rates, changes in working-capital accounts, and capital spending.

Second stage will take for the company’s marginal ROIC—the return on capital for the last dollar invested—to decline (or rise) to its cost of capital. Once a company’s marginal ROICs hit its cost of capital, we assume it remains in this “perpetuity” state forever. At perpetuity, the return on new investment is set equal to the firm’s weighted average cost of capital (WACC), which is our discount rate minus inflation. In deciding the rate to discount future cash flows, stock-price’s volatility are ignored (which drives most estimates of beta) because volatility is welcome if it offers opportunities to buy a stock at a discount to its fair value. In arriving at fair value estimate, any hidden assets and subtract out hidden liabilities also add backed.
The Morningstar Rating for Funds (30)

The following items are needed to calculate the Morningstar Rating for funds:

- A list of fund categories and rules for assigning funds to these categories
- A triangular matrix with the categories as labels for both the rows and columns. Each element of the matrix contains a measure of the similarity of the two categories between zero (highly dissimilar) and one (identical).
- A database of funds. For each fund, the database should contain:
  - The front load, back load, and redemption fee
  - A monthly time-series record containing:
    1. Category
    2. NAV per share
    3. Total return

Each fund is placed in the category indicated in the most recent monthly record. For each category, Morningstar calculates a three-year star rating for all member funds that have at least 36 continuous months of total return data, up to and including the evaluation month. In extreme cases where the funds in a category vary widely in their risk factor exposures (i.e., it is a “convenience category”) a star rating would have little value and is not assigned. For this reason, ratings are not assigned to funds in the Bear Market category.

To assign three-year ratings to funds in a given category, Morningstar calculates the load-adjusted MRAR(2) of total returns for the 36 months ending in the evaluation month. The funds are ranked using MRAR(2), and the funds with the highest scores receive the most stars.

To accommodate fractional fund counts, star ratings are assigned as follows:

1) Sort all funds, including fractional funds, in the category by MRAR in descending order.

2) Count off funds until n5 is either reached or just exceeded. These funds receive five stars.

3) Continue counting off funds until the total number either reaches or just exceeds
n5+n4. The additional funds receive four stars.

4) Continue counting off funds until the total number either reaches or just exceeds n5+n4+n3. The additional funds receive three stars.

5) Continue counting off funds until the total number either reaches or just exceeds n5+n4+n3+n2. The additional funds receive two stars.

6) The remaining funds receive one star.

**Morningstar Style Score (12)**

Stocks are given a value score based on five fundamental measures and a growth score based on five growth rates. Stocks are scored against their style zone and size peers (e.g. Latin America large-caps). The difference between the stock’s growth and value scores is the net style score. If the result is strongly negative, the stock’s style is value. If the result is strongly positive, the stock is classified as growth. If the scores for value and growth are similar in strength, the stock is classified as “core.” On average, value, core, and growth stocks each account for approximately one-third of the total capitalization in a given scoring group.

**Sharpe William F.,** in his research paper on Morningstar’s Risk-Adjusted Ratings (39), has analysed the characteristics of the “risk-adjusted rating” (RAR) on which Morningstar bases its “star ratings” and “category ratings” and the comparison of RAR with more traditional mean-variance measures. The RAR measure has characteristics similar to those of an expected utility function based on an underlying bilinear utility function. These characteristics are of some concern because strict adherence to maximizing expected utility with such a function could lead to extreme investment strategies.

This study finds that Morningstar varies one of the parameters of this function in a manner that frequently produces results similar to the results of using the excess-return Sharpe ratio. Finally, the argument is presented that neither Morningstar’s measure nor the excess-return Sharpe ratio is an efficient tool for choosing mutual funds within peer groups for a multi fund portfolio. Morningstar’s RAR measure has a number of drawbacks. It is complex, and it has poor statistical qualities. More importantly, it fails to capture an important aspect of investor preferences, the desire
for portfolios that are neither the least nor most risky available. Fortunately, the inherent disadvantages are considerably mitigated by Morningstar's practice of adjusting the risk aversion implicit in the measure to equal the ratio of return to risk for each peer group over the specific period covered, although this adjustment is made only if the peer group performance has been modest or poor. This adjustment increases the time and sample dependency of the measure, but it has the advantage of aligning the Morningstar rankings well with rankings that would be obtained by using the more familiar, less complex, and statistically more straightforward excess-return Sharpe ratio.

If the only choice for a measure by which to select funds is between Morningstar's RAR measure and the excess-return Sharpe ratio, the evidence favors selecting the Sharpe ratio. A more appropriate choice, however, is to use either a different performance measure or none at all. If the investor can separate fund selection from asset allocation without cost by taking long and short positions as needed in index funds representing "pure asset plays," the investor can usefully evaluate funds on the basis of their projected selection Sharpe ratios. Such measures take into account only a fund's non-asset-related expected return and risk. Typically, rankings based on selection Sharpe ratios will differ considerably from rankings based on Morningstar's measures or excess return Sharpe ratios, and of course, the preferred portfolios that result will also differ. Although it is tempting to conclude that investors constructing multi fund portfolios should shift their focus from performance measures based on total or excess return to measures such as the selection Sharpe ratio that are based on differential correlative-to-benchmark return, the conclusions of this study do not lead to such counsel.

The conditions under which the selection Sharpe ratio is appropriate are stringent and unlikely to hold for many investors. Rather than continue the search for the ideal universal performance measure, the preferable approach is to return to basics. Markowitz taught that portfolio construction should take into account the best possible estimates of all relevant future risks and returns. This principle is as true for portfolios of mutual funds as it is for portfolios of individual securities. Asset allocation exercises, followed by selection of funds within peer groups based on
simple rankings, are easy, but they may lead to inefficient overall portfolios. A better approach—one based on first principles—takes into account the complexity involved in portfolio decisions. The key information an investor needs to evaluate a mutual fund is

1. the fund’s likely future exposures to movements in major asset classes,
2. the likely added (or subtracted) return over and above a benchmark with similar exposures, a
3. the likely risk vis-à-vis the benchmark.

Investors should devote their efforts to obtaining the best possible estimates for future values of these key ingredients and to using the estimates optimally to determine efficient portfolios.

**Blume Marshall E.,** in his article on *An Anatomy of Morningstar Ratings* (7) has expressed that Chicago-based Morningstar Inc. rates the investment performance of mutual funds using a rating system of one to five stars. This article first documents the method Morningstar uses in assigning these widely circulated ratings. It then establishes that (1) a fund with a long history is less likely to receive the top rating of five stars than a fund with a short history and (2) nearly half of the no-load, diversified, domestic equity funds receive an overall Morningstar rating of four or five stars whereas slightly more than a quarter of these funds receive one or two stars. The disproportionate number of high ratings for these funds is a result of the interaction between the broad comparison group Morningstar uses in its rankings and the handicaps it gives to load and specialized equity funds. Morningstar ratings are extremely sensitive to the definition of the investment class in which funds are compared. To examine this sensitivity, this article concentrated on the ratings for Morningstar’s domestic equity funds, a classification that includes a diverse group of funds.

Along one dimension, Morningstar includes both load and no-load funds in the investment class it calls domestic equities. In determining its ratings, Morningstar handicaps load funds by the amount of their load. This handicap drives down the number of stars assigned to load funds and drives up the number of stars assigned to
no-load funds. Along another dimension, Morningstar includes a wide range of equity fund types in the class of domestic equity funds—diversified domestic equity funds, sector funds, and a miscellaneous category containing convertible bonds and hybrid funds. Probably because of the poor diversification of sector funds and Morningstar’s emphasis in its ratings on the total volatility of a fund, Morningstar tends to assign low ratings to the sector funds, which increases the number of stars assigned to other funds in the investment class. In addition, as of June 1997, Morningstar assigned an average rating of three stars to a disproportionate number of funds in the miscellaneous category, which also distorts the ratings of other funds in the investment class. In using such a broad investment class, Morningstar winds up with nearly 50 percent of the 772 no-load, diversified, domestic equity funds that it has evaluated as of June 1997 in its top two categories.

These rankings would be useful to an investor who was considering any fund in this broad class, but an investor who has already decided to invest in a no-load, diversified, domestic equity fund would find a ranking of these funds within their own universe more valuable. When the universe is limited to no-load, diversified, domestic equity funds, nearly 50 percent of the funds to which Morningstar has assigned four or five stars lose a star.

Blake Christopher R. and Morey Matthew R, in their study on Morningstar Ratings and Mutual Fund Performance (6) observes as under: The Morningstar five-star rating system (five stars is the highest rating, and one star, the lowest) is a tool investor’s use in deciding which mutual funds to purchase. The system is also heavily used in many mutual fund advertisements oriented toward individual investors. The importance of the system is demonstrated by previous studies that have shown that the vast majority of money flowing into no-load mutual funds was invested in funds that were rated four or five stars, but funds rated below three stars experienced net outflows during the same period. The focus on Morningstar ratings may be misplaced, however, if the ratings do not have predictive capability. To address this issue, the authors examine the predictability of Morningstar ratings for two groups of funds. The first group contains virtually all funds rated by Morningstar in January 1993, and the second group contains seasoned funds in the 1992–97 periods (those with at least
10 years of returns at the time rated by Morningstar). Two major results emerge from the examination—First, Morningstar is able to identify low-performing funds, because funds with less than three-star ratings generally have worse future performance than other groups. This result is robust across different samples, fund ages, fund styles, and whether load or no-load returns are used.

Second, there is little statistical evidence to show that five-star-rated funds outperform funds rated four or three stars. These results are consistent with other mutual fund performance research showing that predicting poor performance is relatively easy compared with trying to predict superior performance. Also, Morningstar ratings are only slightly better than alternative predictors of future performance, such as the Jensen measure and Sharpe ratio.

Morey Matthew R., in his article on ‘Mutual Fund Age and Morningstar Ratings’ (28) has identified an age bias in the Morningstar mutual fund ratings. He found that the average overall star ratings of seasoned funds are consistently—and in many cases, significantly—higher than the average overall star ratings of younger funds. This bias is not the result of a survivorship bias but of the methodology Morningstar uses to calculate the ratings. If star ratings affect fund flows, then this age bias in the Morningstar ratings is of significance to the mutual fund industry and to investors. Specifically, he found that the weighting and rounding systems used by Morningstar make a decline in overall ratings relatively more difficult for seasoned funds. These results have two implications—

First, if investors care about the ratings and great amount of anecdotal evidence says that they do then these results imply that investors should be careful in interpreting the overall ratings as signals of past performance, much less future performance. My findings, together with those of Blake and Morey (2000), which documented that overall star rating does not have much ability to predict winning funds, provide investors with ample evidence that they need to look beyond the ratings when deciding which fund(s) to invest in.
Second, mutual fund rating services may want to use a single consistent time horizon to evaluate funds. Systems that weight time horizons by the age of the fund, such as those used in the Morningstar overall star ratings, can lead to biases that render the ratings more subjective than objective.

Morningstar, to its credit, has tried to address this issue in several ways. It has emphasized the time specific ratings, which compare all funds with the same time horizon. Indeed, these ratings are now available on Morningstar data products, whereas before the fall of 1996, the time-specific ratings were not normally made available. In addition, Morningstar has developed a “category rating” that uses a slightly different methodology from that used for the overall rating and, most importantly, bases all ratings on three-year historical returns.

Adkisson J.A. and Fraser Don R., in their research article on ‘Reading the Stars: Age Bias in Morningstar Ratings’ (1) concluded that the Morningstar ratings have always been a useful signal of a fund’s quality and are helpful to both professional and household investors. The new rating methodology substantially strengthens the ratings by establishing more narrowly defined benchmark groups. This change will reveal the value added by the fund manager better than the old system did and will allow investors to make stronger conclusions about a fund’s relative merits. The new ratings still, however, contain an age bias. As a result, the overall star ratings among fund age groups are not directly comparable. Investors should keep three important considerations in mind when making comparisons. First, a fund’s overall star rating is heavily influenced by its most recent 36 monthly returns but the weight of these returns depends on the fund’s age. The older the fund, the lower the weight. Second, because funds’ relative performances may vary according to market cycles, comparisons of star ratings earned over the same time period are more meaningful than comparisons based on different periods. Finally, an interaction occurs between fund size and fund age: Younger funds also tend to be smaller, so their returns are more susceptible to manipulation. We offer the following guidelines for using the Morningstar ratings:
• Compare a fund’s overall star rating with that of funds within the same age group and measured over the same time period. For example, if a fund on the June 2002 Principia disc has a 10-year time-specific rating; its overall rating should be compared with those of other seasoned funds from the same Principia disc.

• Valid comparisons may be made between the time-specific ratings of funds when both the length and the dates of the measurement period are identical. For example, the three-year time-specific ratings of two seasoned funds from the same Principia disc may be compared without reserve. Both ratings are based on the same number of returns and are measured under identical market conditions.

• Comparisons between the overall star ratings of funds in the same age group but estimated over different time periods should be used with caution.

• Investors should be aware that mutual fund management companies could exploit the age bias by continually bringing out new funds.