Managing Performance of Mutual Funds During Different Phases of a Business Cycle in India

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Abstract

The present study evaluated the performance of mutual funds (sector wise) in India over a period of 11 years (2003 to 2014) using performance indicators such as Sharpe ratio, Jensen alpha, and Treynor's ratio. The analysis consisted of 54 schemes out of which 27 schemes are offered by nine private sector mutual fund companies; 12 schemes are offered by four public sector companies ; and 15 schemes are offered by five foreign sector mutual fund companies. The entire study period is classified into three sub-periods based upon the movement of the Sensex named as pre-period, inter- period, and post-period. Effect of different economic situations during these time periods with reference to selected mutual fund schemes of public, private, and foreign sectors has been studied on the basis of risk and returns parameters. The study evidenced that the private sector performed well as compared to the public and foreign sector in the pre and post period. Among the schemes, equity performed better as compared to balanced and tax saving schemes and during the inter period, public, private, and foreign sector AMCs moved according to the market against the expectations of the investors.

Key words : **mutual fund, AMCs, Sharpe ratio, Treynor's ratio, Jensen alpha**

JEL Classification : G11, G12, G23

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Mutual Funds are the most suitable investment for retail investors as they offer an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost. In the past few years, there has been a dramatic growth of the Indian mutual fund industry with many private and foreign players bringing global expertise to the industry. The Indian mutual fund industry consists of various portfolio mix, expertise of professional management, and various investment objectives. The present study evaluates the performance of selected mutual fund schemes (sector wise) during different phases of a business cycle in India. The growth and performance of mutual funds has become more complex in context to accommodate both returns and risk measurement.

Review of Literature

A number of research studies have been conducted by various researchers on mutual funds. However, some of the relevant and important studies have been reviewed here, which are discussed in the following paragraphs.

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Roy and Ghosh (2013) examined the NAV performance of the selected open-ended mutual fund schemes in India. With a view to examine the consistency in return performance of the selected mutual fund schemes, auto-regressive model was applied, and the authors observed that only 34 schemes out of 56 open-ended income schemes consistently influenced the returns performance.

Ferson and Mo (2016) examined the performance measurement of selected mutual funds. Performance of a portfolio manager, who may engage in market timing behaviour, depends on market level and timing as well as security selection. This study indicated versions of the new model (that focused on asset allocation) to be consistent with previous studies, finding weak negative market.

Cuthbertson and Nitzsche (2013) investigated the performance of the German equity mutual fund industry for the time period of 20 years (monthly data 1990-2009) using the false discovery rate (FDR) to examine both model selection and performance measurement using the Fama French model. These results were largely invariant to different sample periods, alternative factor models to the performance of the funds investing in German and non - German funds.

Objectives of the Study

Performance evaluation of different types of schemes like equity, balanced, and tax saving schemes has been an issue of discussion for investors. Also, asset management companies' performance in terms of public, private, and foreign players has been calculated for different phases of a trade cycle. The main objective of the study is to find out whether the mutual funds were performing well and fulfilling the purpose of having good returns by using a number of performance indicators. The study also attempts to evaluate the performance of selected equity, balanced, and equity linked saving mutual fund schemes of public, private, and foreign sectors during different phases of a trade cycle in India during 2003 - 2014.

Research Methodology

(1) Time Period : The time period taken for the study is from April 1, 2003 to March 31, 2014. During this tenure, different phases of a trade cycle like boom and recession affected the Indian financial market.

(2) Universe : On 1st April, 2003 there were 33 AMCs, out of which nine were from the public sector including UTI, 13 from the private sector, and 11 were from the foreign sector. On March 31, 2014, there were 46 AMCs, out of which eight belonged to the public sector including UTI, 27 belonged to the private sector, and 11 belonged to the foreign sector.

(3) Data Collection : This study is entirely based on secondary data. Secondary data were mainly taken from the AMFI website. NAVs (net asset values) for selected time were mainly taken from AMFI website supplemented by The Economic Times. Annual NAVs for selected schemes for the time period of 11 years were collected and respective benchmarks of all the selected schemes were also taken for calculation.

(4) Tools Used for Analysis : Depending upon the objectives of the study, various statistical and financial techniques are used for measurement of performance. Financial tools used for measuring performance are beta, risk adjusted performance measures like Sharpe ratio, Treynor's ratio, Jensen's ratio, and coefficient of determination.

(i) Systematic Risk – β (Beta) : Beta measures the risk or volatility of mutual fund schemes relative to market

portfolio. Beta describes the volatility of mutual funds over the market. The CAPM describes the relationship between risk and expected returns and is used for pricing risky securities :

$$R_{PT} = \alpha_p + \beta_p R_{mt} + €_p$$

where,

R_{PT} = Returns of M.F schemes for time period,
R_{mt} = Returns on market index for time period,
α_p = Intercept term,
$€_p$ = Error term,
β_p = Measure of sensitivity or slope coefficient.

(ii) Sharpe Ratio (1966) : This ratio simply indicates the ratio of reward defined as the realized portfolio returns in excess of the risk free rates to the variability of returns as measured by standard deviation.

$$S_p = (R_p - R_f)/\sigma_p$$

where,

R_p = Avg. returns on portfolio,
R_f = Average risk free rate of returns (91 days treasury bill),
σ_p = Total risk or S.D.

For Sharpe Ratio Benchmark : The benchmark for comparison of performance with Sharpe index is :

$$\frac{(R_m - R_f)}{\sigma m}$$

where,

R_m = Avg. risk of market,
σm = Total risk of market.

(iii) Treynor's Ratio (1965) : Treynor developed a measure based on the systematic risk. It shows the relationship between funds - additional returns over risk free returns wherein the market risk is (β), also called reward to volatility measure :

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

R_p = Avg. returns on portfolio,
R_f = Avg. risk free returns (91-days treasury bill),
β_p = Sensitivity of fund returns to market.

Treynor's Ratio Benchmark Comparison is given as :

$$T_m = (R_m - R_f)/\beta_m$$

R_m = Avg. returns on market,
R_f = Avg. risk free returns,

β_m = Market beta (Benchmark).

If Treynor Ratio > Benchmark comparison, then the portfolio outperforms. Higher value of Treynor ratio indicates better performance of a portfolio. Treynor measure of portfolio performance is a relative measure that ranks the funds in terms of risk and returns.

(iv) Jensen's Alpha or Jensen's Performance Index : This is risk adjusted measure that takes into account the relative riskiness of the portfolio. Portfolio is having positive alpha or abnormal returns if it is having higher returns than the risk adjusted returns. This measure represents the average returns of a portfolio over and above as predicted by the capital asset pricing model.

Jenson (α) is given as :

$$\alpha_p = R_p - [R_f + \beta_p(R_m - R_f)]$$

where,

R_p = Avg. returns on portfolio,
R_f = Avg. returns of the risk free proxy,
R_m = Avg. returns of benchmark proxy ,
R_f = Beta of the portfolio .

(v) Coefficient of Determination (R^2) : Coefficient of determination is the square of the correlation co-efficient and indicates the degree of diversification. It gives the percentage variation in the scheme's returns as explained by the variation in the market returns. Low coefficient of determination (R^2) indicates that a scheme has further scope for diversification and a high coefficient of determination (R^2) indicates that a scheme is well diversified.

Analysis and Results

In this study, consolidated figures of public, private, and foreign sector mutual fund schemes for different time periods - pre, inter, and post were used for calculating the various performance indicators.

(1) Performance of Equity Schemes : Equity schemes of public, private, and foreign sector mutual fund companies showing beta, coefficient of determination, Sharpe ratio of schemes and benchmark, Treynor's ratio of schemes and benchmark, and Jensen's ratio of schemes in pre, intermediate, and post time periods were analyzed.

(i) Beta : As depicted in the Table 1, beta values range from 0.42967 to 0.78347 in all three time periods - pre, intermediate, and post for all sectors. For all combinations, pre-private (0.703), inter-private (0.506), post-private (0.784), pre- public (0.552) , post-public (0.604), pre-foreign (0.429), inter-foreign (0.497), and post-foreign (0.681), all the values of beta are positive and less than 1, indicating that the scheme performance is in the same direction as that of market index, and scheme portfolio is defensive in nature. Beta values are on a higher side in the private sector as compared to public and foreign sector AMCs. Also, it is observed that beta values are comparatively more in pre and post as compared to inter time period in both public as well as private sector. The results are similar for the pre period as observed by Parmar (2010). Conservative investors should invest in schemes having beta less than 1, and aggressive investors should invest in schemes having higher beta values for higher returns by taking more risks.

(ii) Coefficient of Determination (R^2) : From the Table 1, it can be inferred that the value of R^2 is maximum in case

Table 1. Performance Indicators of Equity Schemes (Growth)

Time Period & Sector	Beta	Coefficient of Determination	Sharpe Ratio of Scheme	Sharpe Ratio of benchmark	Treynor's Ratio of Scheme	Treynor's Ratio of benchmark	Jensens Alpha
Pre – Private	0.703	0.524	1.196	0.998	-0.432	-0.286	0.331
Inter – Private	0.506	0.956	-0.526	-0.526	0.321	-0.277	-0.197
Post – Private	0.783	0.098	0.403	-0.324	0.246	-0.075	0.141
Pre – Public	0.552	0.6	0.678	0.587	0.125	0.253	0.317
Inter – Public	0.52	0.924	-0.59	0.218	0.106	-0.018	0.004
Post – Public	0.604	0.233	0.17	-0.219	0.265	-0.951	0.075
Pre – Foreign	0.429	0.425	0.971	0.944	0.86	0.481	0.241
Inter – Foreign	0.497	0.924	-0.366	0.131	0.257	-0.147	-0.135
Post – Foreign	0.681	0.066	0.351	-0.277	-0.277	-0.087	0.113

of inter private (0.956), inter public (0.924), and inter foreign (0.924) time periods, depicting high correlation between the schemes' portfolio returns and their benchmark returns. Minimum value of R^2 is predicted during post time periods in private (0.098) and foreign sector (0.066) AMCs (Table 1), depicting low correlation between schemes' portfolio returns and their benchmark returns. These results are on the same lines as obtained by Narayanasamy and Rathnamani (2013) for public and private sector mutual fund equity schemes' coefficient of determination. Also, the average value of R^2 (Table 1) during pre-private (0.524), pre-public (0.600), and pre-foreign (0.425) shows moderate correlation between the equity schemes' portfolio returns and their benchmark returns.

(iii) Sharpe Ratio : As can be inferred from the Table 1, the Sharpe ratio exhibits negative values during the intermediate period for all three types of mutual fund AMCs namely public (-0.590), private (-0.526), and foreign (-0.366) sectors, which implies that none of sectors performed well. The maximum positive value of Sharpe ratio is seen in public (0.678), private (1.196), and foreign (0.971) sectors during the pre time periods, indicating that equity schemes generated higher returns. During post periods, the maximum Sharpe ratio is seen in private sector (0.403) as compared to public (0.170) and foreign sectors (0.351), indicating best risk adjusted performance. These results are on the same lines as obtained by Narayanasamy and Rathnamani (2013) for public and private sector mutual fund equity schemes.

(iv) Comparison of Sharpe Ratio of Schemes and Benchmark : The Table 1 exhibits that in case of the private sector, the Sharpe ratio of equity schemes is greater than the Sharpe ratio of benchmark during all time periods, indicating that the private sector outperformed the market. During the recession, in all three sectors, the Sharpe ratio of market is greater than Sharpe ratio of schemes, indicating underperformance of the schemes. Hence, investors should prefer private sector equity schemes to get risk adjusted returns during the pre period.

(v) Treynor's Ratio : The negative value of Treynor's ratio (Table 1) reveals that equity schemes do not provide sufficient returns to cover risk free returns and market returns of the schemes in case of pre-private (-0.435) and post-foreign (-0.277). All others exhibit positive values for Treynor's ratio indicating that the schemes provide better (adequate) returns to cover risk free returns and the market risk during the respective time periods. Treynor's ratio for schemes being more than the Treynor's ratio for market (benchmark) indicates superior performance of the scheme based on beta risk during the periods.

(vi) Jensen's Ratio : Negative alpha values during inter (recession) in both private (-0.197) and foreign sector

Table 2. Balanced Schemes' Performance in Public, Private, & Foreign Sectors

Time Period and sector	Beta	Coefficient of Determination	Sharpe Ratio of Scheme	Sharpe Ratio of benchmark	Treynor's Ratio of Scheme	Treynor's Ratio of benchmark	Jensen's Ratio of Scheme
Pre – Private	0.6668	0.6271	1.334	1.0846	-0.0815	-0.2549	0.3809
Inter – Private	1.0590	1.0590	-0.385	-0.5364	-0.1034	-0.0400	-0.1664
Post – Private	2.0131	0.9795	0.3454	0.4791	0.0451	0.0357	0.2734
Pre - Public	0.3667	0.4532	0.9032	0.4892	0.1868	0.1248	0.3144
Inter - Public	1.2513	0.9850	0.1204	-0.1193	-0.006	0.0033	-0.0463
Post - Public	1.1470	0.6317	0.3045	0.2308	0.0342	0.0725	0.2085
Pre – Foreign	0.9496	0.502	1.0626	0.7205	0.2312	0.5678	0.2123
Inter – Foreign	0.9442	0.9844	-0.269	0.306	-0.250	-0.1096	0.093
Post – Foreign	1.6220	0.8705	0.354	0.4517	-0.082	-0.362	0.2092

(-0.135) AMCs from Table 1 indicate underperformance of equity schemes over their benchmark indices. All other schemes having positive values of Jensen's alpha indicate that the scheme has outperformed its benchmark index. During pre (boom) period, all three sector schemes outperformed their benchmark index. These values for Jensen's alpha are similar to the values obtained by Kundu (2009) for the pre period.

(2) Performance of Balanced Schemes

(i) Beta : As depicted in the Table 2, the beta values range widely from 0.36676 to 2.01312 in all three time periods - pre, intermediate, and post for all types of mutual fund AMCs namely public, private, and foreign sector. For all combinations, the beta values are positive, indicating that the scheme performance was in the same direction as that of the market index. The Beta values are on a higher side in private, public, and foreign sectors during recession, which means fund managers had to increase beta to improve returns. Dharamraj and Santosh (2010) observed that for both public and private sectors, balanced schemes possessed lower risk than market during pre and inter periods. Also, it is observed that beta values are comparatively much more in post as compared to inter and pre periods across all sectors.

(ii) Coefficient of Determination (R^2) : The value of R^2 is maximum (Table 2) in case of inter private, inter public, and inter foreign time periods, depicting high correlation between the schemes' portfolio returns and their benchmark returns. Maximum value of R^2 is predicted during pre, inter, and post time periods in private sector AMCs depicting high correlation between schemes' portfolio returns and their benchmark returns. Minimum value of R^2 is depicted during pre, inter, and post public, indicating low correlation between the balanced schemes' portfolio returns and their benchmark returns. Hence, it can be inferred that the mutual fund managers exhibit high value of coefficient of determination during the recession period.

(iii) Sharpe Ratio : Sharpe ratio exhibits negative values as depicted in the Table 2 during the intermediate period for all three sectors - public, private, and foreign sectors, which implies that none of the sectors performed well. Maximum positive value of Sharpe ratio is depicted in all sectors during pre time periods indicating that balanced schemes generated higher returns for every unit of risk that was undertaken. During post periods, the maximum Sharpe ratio is seen in private sector as compared to public and foreign sectors, indicating best risk adjusted performance. Chauhan and Gautam (2014) found in their study that the Sharpe ratio for public sector was more than what it was for the private sector during the post recession period.

(iv) Comparison of Sharpe Ratio of Schemes and Market : As inferred from the Table 2, private sector Sharpe ratio of balanced schemes is greater than Sharpe ratio of market (benchmark) during pre, inter, and post periods, indicating that the private sector outperformed the market. During the recession period in all three sectors, the Sharpe ratio of market is greater than the Sharpe ratio of schemes, indicating underperformance of the schemes. Hence, investors should prefer private sector balanced schemes to get risk adjusted returns. This is in line with the results obtained by Kundu (2009) regarding public and private sector mutual fund schemes during the boom period.

(v) Treynor's Ratio : The negative value of Treynor's ratio reveals (Table 2) that balanced schemes did not provide sufficient returns to cover risk free returns and market returns of the schemes in pre-private and post-foreign. All others exhibit positive values for Treynor's ratio, indicating that the schemes provided better (adequate) returns to cover risk free returns and the market risk during the respective time periods. Treynor's ratio for schemes being more than the Treynor's ratio for market (benchmark) indicates superior performance of the schemes based on beta risk during the periods.

(vi) Jensen's Ratio : Negative alpha values during inter (recession) in both private and foreign sector AMCs indicates (as per Table 2) underperformance of balanced schemes over their benchmark indices. All other schemes having positive values of Jensen's alpha indicate that the schemes outperformed their benchmark index. During the pre (boom) period, all three sector schemes outperformed their benchmark indices. Similar results for pre recession period were found by Mehta (2010) for the public sector.

Table 3. Tax Saving Schemes' Performance in Public, Private, & Foreign Sector AMCs

Time period & sectors	Beta	Coeffici-ent of Determination	Sharpe Ratio of Scheme	Sharpe Ratio of benchm-ark	Treynor's Ratio of Scheme	Treynor's Ratio of benchm-ark	Jensen's Ratio of Scheme
Pre – Private	0.45	0.4082	1.3281	1.6698	-0.1015	0.1395	0.1395
Inter – Private	0.278	0.943	-0.542	0.2216	0.2638	-0.1342	-0.17
Post – Private	0.603	0.6254	0.1761	0.1761	-0.0698	-0.4587	0.0119
Pre – Public	0.429	0.427	0.3493	1.4054	-0.4644	-1.0734	0.3905
Inter – Public	0.288	0.982	-0.703	0.21875	0.1622	0.0548	-0.055
Post – Public	0.46	0.2448	-0.025	-0.4072	0.1206	-0.1211	-0.018
Pre – Foreign	0.171	0.4283	0.8049	0.9512	0.228	0.6264	0.2067
Inter – Foreign	0.189	0.929	-0.1216	0.1832	0.1666	-0.1133	-0.1006
Post – Foreign	0.384	0.2927	0.2564	-0.1626	0.0622	-0.0222	0.0937

(3) Performance of Tax Saving Schemes /ELSS

(i) Beta : As depicted in the Table 3, the beta values for tax saving schemes range widely from 0.18912 to 0.60371 across three time periods for all sectors. For all combinations used in analysis, all the values of beta are positive, indicating that scheme performance is in the same direction as that of market index. All the funds exhibit beta less than 1 in boom period, indicating that the funds react less than the market reaction. The same was evident for the pre - recession period from the study conducted by Parmar (2009). Also, it is observed that beta values are comparatively much more in post as compared to inter and pre periods across all sectors. Balanced mutual funds exhibit low beta in pre, inter, and post periods. Kaur (2004) concluded that tax saving schemes exhibited systematic (beta) risk less than 1 and it was positive for selected schemes during 2005 - 2010.

(ii) Coefficient of Determination (R^2) : The value of R^2 is maximum in case of inter private, inter public, and inter foreign time periods depicting high correlation (Table 3) between the schemes' portfolio returns and their benchmark returns. Maximum value of R^2 is predicted during pre, inter, and post time periods in private sector AMCs depicting high correlation between schemes' portfolio returns and their benchmark returns. Minimum value of R^2 is depicted during inter and post public indicating low correlation between the tax schemes saving portfolio returns and their benchmark returns. Hence, the mutual fund managers exhibit high value of coefficient of determination during recession period to be on a safer side.

(iii) Sharpe Ratio : Sharpe ratio exhibits negative values as depicted from the Table 3 during the intermediate period for all sectors, which implies that none of the sectors performed well. Maximum positive value of Sharpe ratio is depicted in public, private, and foreign sectors during pre time periods, indicating that tax saving schemes generated higher returns. During post periods, maximum Sharpe ratio is shown in the private sector as compared to public and foreign sectors, indicating best risk adjusted performance. Kaur (2012) concluded that tax saving schemes' Sharpe ratio provided better returns for selected schemes during 2005 to 2010. During recession, all three sectors exhibited negative value of Sharpe ratio, indicating low returns as compared to pre and post periods.

(iv) Comparison of Sharpe Ratio of Schemes and Market : In case of the private and public sector, Sharpe ratio of tax saving schemes is lower than Sharpe ratio of market (benchmark) during all time periods, indicating that private and public sector underperformed than the market. During the recession period in all three sectors, Sharpe ratio of market is greater than Sharpe ratio of schemes, indicating underperformance of the schemes. This ratio helps an investor to know that it is safe to invest in private sector tax saving schemes during a boom period by taking the risk-adjusted returns.

(v) Treynor's Ratio : The negative value of Treynor's ratio (as per Table 3) reveals that tax saving schemes do not provide sufficient returns to cover risk free returns and market returns of the schemes in pre-private, pre-public, and post-private. All others exhibit positive values for Treynor's ratio, indicating that the schemes provide better (adequate) returns to cover risk free returns and the market risk during the respective time periods. Treynor's ratio for the schemes being more than the Treynor's ratio for market (benchmark) for public and private sector indicates superior performance of the schemes based on beta risk during these periods.

(vi) Jensen's Ratio : Negative alpha values (Table 3) during inter (recession) across all three public, private, and foreign sector AMCs indicates underperformance of tax saving schemes over the benchmark index. All other schemes having positive values of Jensen's alpha indicate that the schemes outperformed their benchmark indices. During pre (boom) period, all three sector schemes outperformed their benchmark indices.

Findings

(1) Performance of Equity Schemes :

✧ Beta values range from 0.42967 to 0.78347 in all three time periods - pre, intermediate, and post for all types of mutual fund AMCs namely public, private, and foreign sectors. For all combinations, all the values of beta are positive and less than 1, indicating that scheme performance was in same direction as that of market index.

✧ Maximum positive value of Sharpe ratio is depicted in public, private, and foreign sectors during pre time period, indicating that equity schemes generated higher returns. Sharpe ratio exhibits negative values during the inter period for all three types of mutual fund AMCs namely public, private, and foreign sectors, indicating that

none of the sectors performed well. During post periods, the maximum Sharpe ratio is shown in private sector as compared to public and foreign sectors, indicating best risk adjusted performance.

✧ In case of the private sector, the Sharpe ratio of equity schemes is greater than the Sharpe ratio of benchmark during pre, inter, and post time periods, indicating that the private sector outperformed the market. During the recession period, in all three sectors, the Sharpe ratio of benchmark is greater than the Sharpe ratio of schemes, indicating underperformance of the schemes.

↳ **Other Measures of Returns :** The negative value of Treynor's ratio reveals that equity schemes did not provide sufficient returns to cover risk free returns and market returns of the schemes in pre-private and post-foreign. All others exhibit positive values for Treynor's ratio, indicating that the schemes provided better returns during the respective time periods.

Treynor's ratio for schemes being more than the Treynor's ratio for benchmark indicates superior performance of the schemes based on beta risk during the periods. Negative alpha values during inter (recession) in both private and foreign sector indicates underperformance of equity schemes over their benchmark indices. All other schemes having positive values of Jensen's alpha indicate that the schemes outperformed their benchmark indices. During the pre (boom) period, all three sector schemes outperformed their benchmark indices.

(2) Performance of Balanced Schemes

✧ Beta (measure of risk) values range widely from 0.366 to 2.013 in all three time periods - pre, intermediate, and post for all sectors. For all combinations, all the values of beta are positive, indicating that scheme performance was in the same direction as that of the market index. Furthermore, it is observed that beta values are comparatively much more in post as compared to inter and pre periods across all sectors. Mutual fund managers maximize risk to compensate returns, but in the same direction as of the market. Balanced mutual fund managers exhibit beta greater than 1 in post and inter periods.

✧ Value of R^2 is maximum in case of inter private, inter public, and inter foreign time periods, depicting high correlation between the schemes' portfolio returns and their benchmark returns. AMCs depict high correlation between schemes' portfolio returns and their benchmark returns. Minimum value of R^2 is depicted during pre, inter, and post public, indicating low correlation between the balanced schemes' portfolio returns and their benchmark returns. Mutual fund managers exhibit high value of R^2 during the recession period.

✧ Sharpe ratio exhibits negative values during the intermediate period for all sectors, which implies that none of the sectors performed well. Maximum positive value of Sharpe ratio is depicted in all sectors during the pre time periods indicating that balanced schemes generated higher returns. During post periods, maximum Sharpe ratio is seen in the private sector as compared to public and foreign sectors, indicating best risk adjusted performance.

✧ In case of the private sector, the Sharpe ratio of balanced schemes is greater than Sharpe ratio of market benchmark during all time periods, indicating that the private sector outperformed the market. During the recession period, the Sharpe ratio of market is greater than the Sharpe ratio of schemes indicating underperformance of the schemes in all three sectors. Hence, investors should prefer private sector balanced schemes to get risk adjusted returns.

✧ The negative value of Treynor's ratio reveals that balanced schemes did not provide sufficient returns to cover risk free returns and market returns of the schemes in pre-private and post-foreign. Treynor's ratio for schemes being more than the Treynor's ratio for benchmark indicates superior performance of the schemes based on beta risk during the periods.

✧ Negative Jensen's alpha values during inter (recession) in both private and foreign sector AMCs indicates underperformance of balanced schemes over their benchmark indices. All other schemes having positive values of Jensen's alpha indicate that the schemes outperformed their benchmark indices. During pre (boom) period, all three sector schemes outperformed their benchmark indices.

(3) Performance of ELSS

✧ For all combinations, all the pre values of beta are positive, indicating that scheme performance was in same direction as that of the market index. Beta values are on a lower side in all sectors during recession, which means fund managers do not take more risk. Furthermore, it is observed that beta values are comparatively much more in post as compared to inter and pre periods across all sectors. Balanced mutual fund managers exhibit low beta in inter and post periods.

✧ Value of R^2 is maximum in case of inter private, inter public, and inter foreign time periods, depicting high correlation between the schemes' portfolio returns and their benchmark returns. Maximum value of R^2 is predicted during pre, inter, and post time periods in private sector AMCs depicting high correlation between schemes' portfolio returns and their benchmark returns. Minimum value of R^2 is depicted during inter and post public, indicating low correlation between the tax schemes' saving portfolio returns and their benchmark returns. Mutual fund managers exhibit high value of coefficient of determination during recession period to be on a safer side.

✧ Sharpe ratio exhibits negative values during the intermediate period for all three sectors, which implies that none of the sectors performed well. Maximum positive value of Sharpe ratio is depicted in all sectors during pre time periods indicating that tax-saving schemes generated higher returns for every unit of risk that was undertaken. During post periods, maximum Sharpe ratio is shown in private sector as compared to public and foreign sectors, indicating best risk adjusted performance.

✧ In case of private and public sectors, Sharpe ratio of tax saving schemes is lower than Sharpe ratio of benchmark during pre, inter, and post time periods, indicating that private and public sectors under performed. During the recession period in all three sectors, the Sharpe ratio of the market is greater than the Sharpe ratio of schemes, indicating underperformance of the schemes.

✧ The negative value of Treynor's ratio reveals that tax saving schemes did not provide sufficient returns to cover risk free returns and market returns of the schemes in pre-private, pre-public, and post-private. All others exhibit positive values for Treynor's ratio, indicating that the schemes provide better (adequate) returns to cover risk free returns during the respective time periods. Treynor's ratio for schemes being more than the Treynor's ratio for benchmark for public and private sector indicates superior performance of the schemes.

✧ Negative alpha values during inter (recession) across all three sectors indicate underperformance of tax saving schemes over their benchmark indices. All other schemes having positive values of Jensen's alpha indicate that the schemes outperformed their benchmark indices. During pre (boom) period, all three sector schemes outperformed their respective benchmark indices.

Conclusion

On the basis of returns, equity and balanced schemes performed better in pre and post periods. This is due to portfolio of higher risk attached to equity, balanced, and ELSS schemes. On the basis of Sharpe's ratio, equity, balanced, and ELSS outperformed the benchmark portfolio with positive values. These schemes show high coefficient of determination values, indicating better diversification in inter period during recession.

Treynor measure related to selected schemes has similarity with Sharpe ratio as these exhibit positive values and outperformed. Jensen's alpha measure is better and significant in pre and post period in private sector followed by public and foreign sectors. Equity schemes evidenced high values of Jensen's alpha, indicating these schemes as high performers during pre and post periods. The broad implications of the findings are that equity based mutual funds schemes in pre and post period provided superior returns to investors. The small investors should analyze the return and risk parameters over a longer period of time before taking any investment decision. By considering the coefficient of determination, diversification of mutual funds can be visible for making a prudent choice.

Implications

This study is of immense importance to investors as there are a plethora of schemes made available to them by public, private, and foreign sectors, and these sectors provide different returns during different phases of a trade cycle like boom, recession, and recovery. Equity schemes exhibit more beta values and returns as compared to other schemes, creating a challenge for equity fund managers. During the transition of a period, more variation is observed in equity schemes as compared to balanced schemes. So, there is a challenge for equity fund managers to maintain returns for investors. Risk evader investors should invest in balance schemes, and risk taking investors should invest in equity schemes. Also, it can be concluded that other factors contribute more as compared to the coefficient of determination for maximizing returns, so fund managers should try to control all the factors. Equity and ELSS mutual fund schemes in the private sector offer diversification to improve the returns to the investors by increasing risk of portfolio.

Limitations of the Study and Scope for Further Research

The following are the limitations of the study : The study is sample based and complete enumeration of the mutual fund industry is not feasible. The study mainly depends on secondary data (NAVs of different schemes). The weaknesses inherent in the secondary data could not be avoided. Brokerage commission, entry load, exit load, and taxes were not taken into account.

Some of the important issues like performance, comparing mutual funds with other investment options and comparing Indian mutual fund industry with other developed countries like USA and UK, market timing and stock selection ability of mutual fund managers, performance persistence, and regulatory framework are significant for mutual fund companies, managers, governing bodies, and investors. These areas can be explored by researchers in the future.

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