DEALING WITH THE LIMITATIONS OF THE SHARPE RATIO FOR PORTFOLIO EVALUATION

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Abstract *Portfolio performance evaluation is an important criterion for selecting investment instruments. Traditionally Sharpe, Treynor, and Jensen's Ratios are used to measure the performance of various portfolios, and for comparisons and ranking, Sharpe ratio being the most prominent performance measure. Owing to the limitation of the unrealistic assumption of Sharpe ratio that returns are normally distributed, many exponents have criticized its use as a performance measure. So a need arose to develop alternatives to Sharpe ratio or to put it in other words, overcoming the limitations of Sharpe ratio.*

More than 100 alternative risk-adjusted performance measures can be identified in literature, most of them attempting to remedy the shortcomings of the Sharpe ratio which relies on normally distributed returns. However, there is a fervent discussion in literature whether the choice of risk-adjusted performance measure actually matters or not.

This paper focuses on the risk-adjusted performance measures which are applied to the return distribution of a portfolio of 6 mutual funds. The funds were first evaluated as per the Sharpe ratio and after it was found that the returns are not normally distributed, the portfolios were evaluated using the Adjusted Sharpe ratio and the Modified Sharpe ratio. It was found from the analysis that in many cases, the adjusted Sharpe ratio and the modified Sharpe ratio provided ranking results which were different from the traditional Sharpe ratio. In certain instances, the rankings were highly correlated to the Sharpe ratio as well as to each other.

Keyword: *Sharpe Ratio, Normal Distribution, Adjusted Sharpe Ratio, Modified Sharpe Ratio, Ranks, Skewness, Kurtosis.*

INTRODUCTION

In 1966, W. F. Sharpe developed what is now known as the Sharpe ratio. Sharpe originally called it the "reward-to-variability" ratio before academics and financial operators began referring to it as the Sharpe ratio. Sharpe ratio is defined as:

$$SR_i = \frac{r_i - r_f}{\sigma_i} \quad \text{(i)}$$

Practical Limitations of Sharpe Ratio

Valid only for normally distributed returns

The Sharpe ratio is a commonly used measure of portfolio performance. However, because it is based on the mean-variance theory, it is valid only for either normally distributed returns or quadratic preferences. In other words, the Sharpe ratio is a meaningful measure of portfolio performance when the risk can be adequately measured by standard deviation. The Sharpe ratio can lead to misleading conclusions when return distributions are skewed. It is well known that the distribution of hedge fund returns as well as short term portfolios deviate significantly from normality.

Abnormalities like kurtosis, fatter tails and higher peaks, or skewness on the distribution can be problematic for the ratio, as standard deviation doesn't have the same effectiveness when these problems exist.

Prone to Manipulations

Evaluation of the performances of hedge funds using the SR[1] seems to be dubious. It has been observed that the SR is prone to manipulations by the hedge funds and mutual funds manager. Even if the NAV[2] doesn't suggest positive returns, the SR can be shown positive by manipulating the returns on portfolio and showing it positive and at times higher than the risk free rate of return even though the NAVs do not suggest so. The manipulation of the SR consists largely in selling the upside return potential, thus creating a distribution with high left-tail risk. Hence, SRs tend to be overstated in the case of hedge funds with short track records.

1 SR-Sharpe Ratio
2 NAV-Net asset value

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Manipulating Ratios in order to increase the performance linked bonuses and remunerations

Studies have shown that the Sharpe ratio is prone to be manipulated through so-called information-free trading strategies. With these strategies a fund manager increases the fund's performance by manipulative actions without actually adding value. This is especially appealing for managers whose bonuses are correlated to the Sharpe ratio of the assets they manage. In order to increase the Sharpe ratio, they realize a gain in an early stage of the evaluation period and then invest the entire funds in a risk-free asset for the rest of the period. As the risk-free asset has a volatility of zero, SR converges towards infinity and so does the bonus of the manager.

Difficulty in interpreting the results of Sharpe Ratio when comparing Sharpe ratio of different portfolios

Because it is a dimensionless ratio, people find it difficult to interpret SRs of different investments. For e.g. how much better is an investment with a SR of .5 than one with a SR of-0.2?

ASR[3] and MSR[4] as Tools to Overcome the Limitations of Sharpe Ratio

Adjusted Sharpe Ratio (ASR)

The Adjusted Sharpe Ratio (ASR) belongs to the group of measures in which skewness and kurtosis are explicitly included. Its creators Pezier and White were motivated by the drawbacks of the Sharpe ratio; especially those caused by the assumption of normally distributed returns, and therefore suggested an ASR to overcome this deficiency. It preserves the standard Sharpe ratio for zero skewness. Depending on the value and the sign of skewness, ASR increases when skewness is positive. On the contrary, ASR decreases when skewness is negative and increases in absolute terms. ASR is derived from a Taylor series expansion of expected utility with an exponential utility function. Keeping the first 4 terms of the expansion leads to the formula of the ASR as:

$$ASR_i = SR_i\left[1 + \left(\frac{S}{6}\right)SR_i - \left(\frac{E}{24}\right)SR_i^2\right] \quad \text{(ii)}$$

where SR stands for the Sharpe Ratio, S for skewness and E for excess kurtosis. ASR accounts for the fact that investors prefer positive skewness and negative excess kurtosis, as it contains a penalty factor for negative skewness and positive excess kurtosis. If S is negative and E is positive, the ASR gets smaller compared to the traditional SR. If the returns are normally distributed, S and E are equal to 0 and the formula for the ASR yields the same values as the traditional SR.

3 ASR-Adjusted Sharpe Ratio
4 MSR-Modified Sharpe Ratio

Modified Sharpe Ratio (MSR)

If Excess Return on Value at Risk and Conditional Return on Value at Risk are computed with the parametrical method, normally distributed returns are assumed even if returns deviate from the normal distribution in reality. Only when these measures are calculated empirically, deviations from the normal distribution are taken into account. This can only be done if empirical information on the return distribution is available. MSR however, accounts for the higher moments of distributions, by directly modifying a parameter of the normal distribution. Therefore no empirical data is necessary. The performance measure is based on Modified Value-at-Risk (MVaR) which adjusts VaR for skewness and kurtosis. In particular, this is done by modifying the quantile of the standard normal distribution. The modified quantile, Z_{CF} is calculated. The formula is

$$Z_{CF} = Z_a + \frac{1}{6}(Z_a^2 - 1)S + \frac{1}{24}(Z_a^3 - 3Z_a)E - \frac{1}{36}(2Z_a^3 - 5Z_a)S^2. \quad \text{(iii)}$$

The modified quantile is then used to calculate Modified Value at Risk denoted by equation:). MVaR is used to measure risk adjusted performance measure- Modified Sharpe Ratio which has the equation:

$$MSR = \frac{r_i^4 - r_f}{MVaR_i} \quad \text{(iv)}$$

REVIEW OF LITERATURE

Due to the limitations of Sharpe ratio, it became necessary to come up with alternatives which could help overcome these limitations. It had been observed that many times the returns were not normally distributed and hence it became impossible to use the traditional Sharpe ratio for evaluating the portfolio performance. More than 100 alternative risk-adjusted performance measures can be identified in literature, most of them attempting to remedy against the shortcoming of the Sharpe ratio which relies on normally distributed returns.

Alexandra Wiesinger (2010) conducted a study in order to overcome the limitations of Sharpe ratio with the help modern complex statistical tools like adjusted Sharpe ratio, modified Sharpe ratio, omega, kappa, sortino and others. The analysis of the results has shown that both traditional and alternative performance ratios produce highly correlated rankings. Steen Koekebakker and Valeri Zakamouline (2007) tried using the expected utility theory and the approximation analysis and derived a formula for the most natural extension of the Sharpe ratio which takes into account the skewness of distribution. The results of the study implied that the correction for skewness in a performance measure is much more important than the correction for excess kurtosis and other higher moments of distribution. Jacques

Pezier and Anthony White (2006) attempted to measure the performance of various hedge funds and portfolios through the use of various performance measures like adjusted Sharpe ratio, modified Sharpe ratio, omega and others. Martin Eling and Frank Schumacher tried to measure the performance of German hedge funds using tools other than the Sharpe ratio like omega, burke, kappa, conditional Sharpe ratio and others. Then the extent of rank correlation between results of these tools was found where except for Treynor ratio all the ratios exhibited a very high rank correlation. The main result of this empirical investigation was that the choice of performance measurement does not affect the ranking of hedge funds.

RESEARCH METHODOLOGY

Problem Statement

This study explores the limitations of the Sharpe ratio and the use of adjusted Sharpe ratio and modified Sharpe ratio which to a large extent can help to overcome shortcomings of Sharpe ratio.

Research Objectives

The primary objectives of this research project are:

- To apply the SR, ASR and MSR and study the effectiveness of the results of such tools.
- To determine whether alternative tools yield effective results compared to traditional Sharpe ratio and check the extent of correlation and degree of agreement among these tools.
- To understand the limitations of traditional Sharpe ratio.

Data

Secondary data of the returns of mutual funds were collected from the fact sheets and websites of the concerned funds. The sampling was done by judgmental method as only those mutual funds which had a five star rating from any one credit rating agency were selected. Only small cap, mid cap and large cap equity mutual funds were selected for the study however, this study can be extrapolated for all types of funds and could be very aptly applied to hedge funds whose returns very rarely confirm to normality.

Period: The daily data of NAVs of selected MFs for a period of 1 year from January 2011 to December 2011 were analysed.

Abnormal returns of each fund were calculated and the risk of each scheme was taken into account. The returns data were checked for normality and presence of skewness and kurtosis. Portfolio evaluation measures namely the Sharpe ratio, modified Sharpe ratio and adjusted Sharpe ratio were calculated and ranks were given to each mutual fund on the bases of all the three measures.

It was deemed fit to understand whether these ranks were similar or not. Hence, two statistical measures appropriate for finding the correlation and degree of agreement between the three evaluation methods were used to analyse the data. Kendall's Tau-b was used to analyse the degree of correlation between the ranks given by the different methods and Kappa Statistic has been used to find out the degree of agreement between the methods.

LIMITATIONS OF THE STUDY

- The paper focuses on results of few mutual funds selected through judgmental sampling and so chances of sample being a representative of population are rare.
- There are several limitations of the Sharpe ratio and not all of them can be rectified using ASR or MSR.

DATA ANALYSIS AND INTERPRETATIONS

Though the traditional Sharpe ratio is one of the best performance measurement tools, it can provide misleading conclusions especially when it relies on the assumptions that the returns are normally distributed, but the reality may be different thus breaching one of its most important assumptions. In order to overcome such limitation of SR, the modified versions of Sharpe ratio, i.e. ASR and MSR were applied, which account for higher moments of mean like skewness and kurtosis. These are the alternative portfolio performance measurement tools. The results achieved by these tools are given below.

Except for the Franklin Blue-chip Fund, the skewness and kurtosis of all the funds lie within the range of normality. In case of skewness and kurtosis any value other than 0 is termed as abnormal or non-normal distribution. But to take a confidence interval and for easing the process of assessment, the range of 0-1 was customized and defined as a range of normality for both skewness and kurtosis. In case of Franklin Blue-chip Fund the values of kurtosis are above 1 for all the cases. Except SBI MF, all the funds to some or greater extent, exhibit instances of combination of positive skewness and negative excess kurtosis, the investors' preferred combination.

Return and risk data of mutual funds were taken from the factsheets and the official internet websites of the funds and the abnormal returns were calculated, abnormal returns being R_i-R_m. The three evaluation measures namely, the

Sharpe ratio, adjusted Sharpe ratio and modified Sharpe ratio were applied to the data. There were three mutual funds in each category and ranks were given to these three funds on the basis of the ratios. (The rank tables are provided in the appendices.) It was found that the ranks given by all the three methods were somewhat different. To understand the degree of correlation between the ranks, the statistical measure of Kendall's Tau-b was used. One of the main objectives of this study was to understand the degree of agreement between the different methods used. A high correlation or degree of agreement would suggest that for the given sample, the different methods do not yield very different ranks. In that case, the Sharpe ratio can be considered to be optimal. But if there is low significant correlation and low degree of association, it would mean that ranks given by other methods are better indicators of fund performance as they would incorporate higher moments of data.

RESULTS

Checking of Normality

The Kolmogorov-Smirnov test for normality indicates that except for IDFC and SBI, all the other returns were not normally distributed. Hence, it was found appropriate to use the adjusted Sharpe and the modified Sharpe ratio for the ranking process of the funds.

Two categories of mutual funds were under study and there were three funds under each category.

Category 1: (Mid-Cap and Small Cap equity funds)

Interpretation

The Kendall's Tau-b which is a measure to find the degree of rank correlation between samples, gives an output value of positive 0.454. This correlation coefficient is significant. Hence, it can be said that there is low positive significant correlation between the ranks given by Sharpe ratio and modified Sharpe ratio.

Table 1: Tests of Normality

	Kolmogorov-Smirnov(a)		
	Statistic	**df**	**Sig.**
Abnormal returns Franklin India	.087	246	.000
Abnormal returns ICICI	.085	246	.000
Abnormal returns UTI	.073	246	.003
Abnormal returns IDFC	.039	246	.200(*)
Abnormal returns SBI	.040	246	.200(*)
Abnormal returns Rel	.059	246	.039

* This is a lower bound of the true significance.
a Lilliefors Significance Correction

The Kappa statistic is a measure of agreement between the two methods. In the above case, the Kappa statistic is 0.375. It means that 37.5 percent of the time, the ranks given by Sharpe measure and modified Sharpe measure are same. The Kappa statistic is also significant at the confidence interval of 99 percentage. Hence, it can be interpreted that for the sample under study, the ranks would differ 62.5 percent of the time. Hence, use of the modified Sharpe ratio becomes significant whenever the data does not conform to the assumptions of the Sharpe ratio.

Table 2: Symmetric Measures (Sharpe-Modified Sharpe)

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Ordinal by Ordinal	Kendall's Tau-b	.454	.136	3.344	.001
Measure of Agreement	Kappa	.375	.123	3.182	.001
N of Valid Cases		36			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.

Table 3: Symmetric Measures (ASR-MSR)

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Ordinal by Ordinal	Kendall's Tau-b	.421	.148	2.846	.004
Measure of Agreement	Kappa	.417	.122	3.536	.000
N of Valid Cases		36			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.

Interpretation:

When the ranks given by adjusted Sharpe ratio and modified Sharpe ratio were correlated, a positive significant correlation to the tune of 0.421 was found. It can be said that there is low correlation between the ranks of ASR and MSR.

The Kappa statistic has a value of 0.417 which indicates that the ranks given by the two methods exhibited an agreement of 41.7 percentage and 58.3 percentage times the ranks differed.

Interpretation:

Sharpe ratio and adjusted Sharpe ratio have a correlation coefficient of .944. Hence, it can be inferred that there is a high degree of positive correlation between the results of the two evaluation systems. This correlation is also significant at the confidence interval of 99 percentage. The Kappa statistic indicates an agreement of 91.7 percentage between the ranks given by the two methods and this agreement is also significant. This indicates that there is a high degree of similarity between the ranks given by both the methods.

Category II: (Large Cap Equity Mutual Funds)

Interpretation:

The Correlation given by Kendall's Tau-b between Sharpe ratio and modified Sharpe ratio is 0.382. At a confidence interval of 99 percent, it indicates a significantly low positive correlation between the ranks given by the two methods. The Kappa statistic is 0.333 which shows that 33.3 percent of the times the ranks given by the two methods were congruous or in agreement. The remaining times, they were different. Hence, it can be said that the use of the modified Sharpe ratio becomes imminent when the data so requires.

Interpretation:

Here there is significantly high positive correlation between sharpe ratio and adjusted Sharpe ratio. The Kappa statistic also indicates that about 83.3 percentage times the ranks given by the adjusted Sharpe ratio are same as those given by the Sharpe ratio.

Interpretation:

The correlation between ranks given by ASR and MSR is 0.375 and is significantly low. The agreement measure Kappa is also only20.8 percent. It indicates that the ranks given by these two methods are significantly different from each other.

CONCLUSION

There came up the necessity to overcome the limitations of the Sharpe ratio. Many researchers have tried to develop

Table 4: Symmetric Measures (SR-ASR)

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Ordinal by Ordinal	Kendall's Tau-b	.944	.040	23.715	.000
Measure of Agreement	Kappa	.917	.057	7.778	.000
N of Valid Cases		36			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.

Table 5: Symmetric Measures (SR-MSR)

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Ordinal by Ordinal	Kendall's Tau-b	.382	.142	2.693	.007
Measure of Agreement	Kappa	.333	.124	2.832	.005
N of Valid Cases		36			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.

Table 6: Symmetric Measures (SR-ASR)

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Ordinal by Ordinal	Kendall's Tau-b	.889	.057	15.573	.000
Measure of Agreement	Kappa	.833	.079	7.071	.000
N of Valid Cases		36			

a Not assuming the null hypothesis.
b Using the asymptotic standard error assuming the null hypothesis.

Table 7: Symmetric Measures (ASR-MSR)

		Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Ordinal by Ordinal	Kendall's tau-b	.375	.127	2.952	.003
Measure of Agreement	Kappa	.208	.125	1.770	.077
N of Valid Cases		36			

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

alternatives to traditional Sharpe ratio. The selection of the tools in the scientific literature most frequently applied and discussed risk-adjusted performance measures i.e. ASR and MSR. The Sharpe ratio in its parametric form assumes normally distributed returns. ASR and MSR try to overcome the strong limitation of such assumption by explicitly or implicitly considering the information contained in the higher moments of distributions, i.e. skewness and excess kurtosis.

To verify whether ASR and MSR leads to significantly different investment decisions than the Sharpe ratio which assumes normally distributed returns, the ASR and MSR have been applied to a portfolio of mutual funds of 6 companies having a 5 star rating.

The findings lead us to believe that the Sharpe ratio can give the investors completely faulty rankings if the data is not normal. It can be seen that in both the categories of mutual funds, the degree of correlation between the Sharpe ratio and the modified Sharpe ratio is quite low and the Kappa agreement measure also is low. Hence, it can be said that whenever the data is skewed or shows excess kurtosis, it is not advisable to use the Sharpe ratio for evaluation of the portfolios or assets.

The findings support the conclusion that risk-adjusted performance measurement based on the Sharpe ratio only is not sufficient and that alternative performance measures like ASR, MSR and others deliver additional, important information for investment decisions. ASR and MSR included in this work were based on a rather small selection of performance measures and asset classes. This is why the conclusions derived so far might only be of limited general validity. Yet, it seems to be the only way to bring more transparency into the existing discussion concerning traditional Sharpe ratio and alternative risk-adjusted performance measures.

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APPENDICES

Calculation of Sharpe Ratio, Adjusted Sharpe and Modified Sharpe Ratios

The three ratios have been calculated from the data of the monthly returns of the mutual funds under study. The returns data were obtained from daily NAV data of the mutual funds. The data was extracted from *http://www.personalfn.com/tools-and-resources/mutual-funds/nav-history.aspx.*

APPENDIX 1

Category I	Sharpe Ratio Based on Abnormal Returns			Adjusted Sharpe Ratio Based On Abnormal Returns			MSR		
Jan	-0.3254	-0.3783	-0.3025	-0.3279	-0.3736	-0.3016	-0.3214	-0.3343	-0.3257
Feb	-0.1962	-0.0873	-0.3287	-0.1931	-0.0861	-0.3220	-0.0671	-0.0171	-0.1689
Mar	-0.3753	-0.3515	-0.4103	-0.3626	-0.3567	-0.4095	0.4475	0.3018	0.2329
Apr	0.1202	0.1491	0.1311	0.1213	0.1535	0.1322	-0.2554	-0.0669	-0.0045
May	-0.3461	-0.2528	-0.4157	-0.3546	-0.2572	-0.4067	0.0088	0.0554	-0.1349
Jun	-0.3835	-0.1180	-0.4355	-0.3955	-0.1196	-0.4455	0.0780	0.1418	-0.0459
Jul	0.0994	0.1910	0.1191	0.0994	0.1870	0.1204	-0.2009	-0.0121	0.0971
Aug	-0.0275	-0.0994	-0.2360	-0.0275	-0.0979	-0.2320	-0.0312	-0.0657	-0.1845
Sep	-0.3337	-0.1951	-0.2465	-0.3458	-0.1987	-0.2529	-0.1042	-0.0886	-0.1252
Oct	-0.5918	-0.5728	-0.7584	-0.5777	-0.5965	-0.7120	-0.2354	-0.0820	0.1168
Nov	-0.3333	-0.1447	-0.3166	-0.3324	-0.1451	-0.3206	-0.1533	-0.2306	-0.2131
Dec	-0.3775	-0.2916	-0.4957	-0.3781	-0.2973	-0.4990	-0.1067	-0.0074	-0.2477

APPENDIX 2

Category I	Sharpe Ratio Based On Normal Returns			Adjusted Sharpe Ratio Based On NormalReturns			MSR		
	IDFC	SBI	REL	IDFC	SBI	REL	IDFC	SBI	REL
Jan	2	3	1	2	3	1	1	3	2
Feb	2	1	3	2	1	3	2	1	3
Mar	2	1	3	2	1	3	1	2	3
Apr	3	1	2	3	1	2	3	2	1
May	2	1	3	2	1	3	2	1	3
Jun	2	1	3	2	1	3	2	1	3
Jul	3	1	2	3	1	2	3	2	1
Aug	1	2	3	1	2	3	1	2	3
Sep	3	1	2	3	1	2	2	1	3

Oct	2	1	3	1	2	3	3	2	1
Nov	3	1	2	3	1	2	1	3	2
Dec	2	1	3	2	1	3	2	1	3

APPENDIX 3

Category II	**Sharpe Ratio Based On Abnormal Returns**			**Adjusted Sharpe Ratio Based On Abnormal Returns**			**MSR**		
Jan	-0.1235	-0.0970	-0.0990	-0.1233	-0.0967	-0.0984	-0.2651	-0.2387	-0.2523
Feb	-0.1950	-0.1845	-0.2403	-0.1933	-0.1844	-0.2396	-0.0984	-0.0899	-0.1188
Mar	-0.2915	-0.1653	-0.3059	-0.2790	-0.1624	-0.2926	0.3304	0.1975	-0.2128
Apr	-0.2444	-0.1783	-0.0360	-0.2359	-0.1731	-0.0359	-0.0885	-0.1443	0.0523
May	-0.2416	-0.2594	-0.2618	-0.2432	-0.2642	-0.2624	-0.1453	-0.1453	-0.0400
Jun	-0.3867	-0.2776	-0.4662	-0.3618	-0.2713	-0.4803	0.0198	-0.0099	-0.0280
Jul	-0.2238	-0.1621	-0.0393	-0.2202	-0.1591	-0.0393	-0.1041	-0.1035	-0.1538
Aug	-0.1671	-0.2331	-0.1277	-0.1618	-0.2230	-0.1257	-0.2146	-0.1237	-0.0927
Sep	-0.1708	-0.1511	-0.2119	-0.1742	-0.1530	-0.2167	-0.0314	-0.0470	0.1931
Oct	-0.2979	-0.2383	-0.3518	-0.2978	-0.2383	-0.3458	0.1212	0.1447	-0.1272
Nov	-0.1887	-0.1880	-0.1094	-0.1846	-0.1864	-0.1080	-0.2377	-0.2260	-0.1566
Dec	-0.2229	-0.1805	-0.1652	-0.2168	-0.1770	-0.1634	-0.1376	-0.1153	-0.1153

APPENDIX 4

Category II	**Sharpe Ratio Based On Abnormal Returns**			**Adjusted Sharpe Ratio Based On Abnormal Returns**			**MSR**		
Jan	3	1	2	3	1	2	3	1	2
Feb	2	1	3	2	1	3	2	1	3
Mar	2	1	3	2	1	3	1	2	3
Apr	3	2	1	3	2	1	2	3	1
May	1	2	3	1	3	2	2	2	1
Jun	2	1	3	2	1	3	1	2	3
Jul	3	2	1	3	2	1	2	1	3
Aug	2	3	1	2	3	1	3	2	1
Sep	2	1	3	2	1	3	2	3	1
Oct	2	1	3	2	1	3	2	1	3
Nov	3	2	1	2	3	1	3	2	1
Dec	3	2	1	3	2	1	3	1	1

ANNEXURE-1: RATING OF MUTUAL FUNDS BY ICRA

1.	Franklin India Blue-chip Fund, Growth, Large Cap	5 Star
	ICICI Prudential Focused Blue-chip Fund, Growth, Large Cap	
	UTI Opportunities Fund, Large Cap	
2.	IDFC Premier Equity Fund, Growth, Small and Mid Cap	5 Star
	SBI Magnum Sector Funds, Emerging Business, Growth, Small and Mid Cap	
	Reliance Long Term Equity Fund, Growth, Small and Mid Cap	

(Source: http://www.mutualfundsindia.com/annual.pdf)
The above given mutual funds have been selected on the basis of the ratings and rankings given by the rating agency, ICRA.