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- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill
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- Kumar S. (2006): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University.

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PERFORMANCE MEASUREMENT OF MUTUAL FUNDS IN INDIA IN THE POST LIBERALIASATION ERA – AN ECONOMIC REVIEW
(A STUDY BASED ON SAMPLE OF 100 ACTIVELY TRADED OPEN ENDED FUNDS WITH GROWTH OPTION)

DR.BIMAL JAISWAL
DIRECTOR BBA (INTERNATIONAL BUSINESS)
DIRECTOR BACHELOR OF MANAGEMENT SCIENCES (BMS)
DEPARTMENT OF APPLIED ECONOMICS
FACULTY OF COMMERCE
UNIVERSITYOF LUCKNOW
LUCKNOW

NAMITA NIGAM
CO-ORDINATOR, M.B.A. PROGRAMME & CONTROLLER OF EXAMINATIONS
INSTITUTE OF ENVIRONMENT AND MANAGEMENT
(U. P. TECHNICAL UNIVERSITY, LUCKNOW)
JANKIPURAM, KURSI ROAD
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ABSTRACT

Mutual fund came out to a good investment option to medium and small investors who do not excel at stock market due to lack of professional knowledge, limited resources and failure to diversify. Though the industry has been operational so long, it still not able to win the trust of investors. The figure shows that in the year 2008, out of total financial savings of household sector only 7.7% goes to mutual fund industry as compare to 56.5% to bank deposit and 17.5% to insurance sector. As on march 2009, the industry was comprising of 39 asset management companies, managing financial assets of over 493,285 crs contributed by more than 4.76 crs investors spread all over the country. The performance evaluation of mutual funds is an important area for financial economists. The assessment of fund manager's performance influences the investors to allocate their resources into different mutual funds. The present study is an attempt to analyze the performance of Indian mutual fund industry since the liberalization of economy till now. (i.e. form the year1993 to the year2009).

KEYWORDS
Mutual Funds, Investment, finance, fund management & performance.

INTRODUCTION
The economic development of a nation is reflected by the progress of the various economic units, broadly classified into corporate sector, government and household sector.

A financial system facilitates the transformation of savings of individuals, government as well as business in to investment and consumption. A vibrant and competitive financial system is necessary to sustain reforms in the structural aspect of the economy. Financial system in India has made commendable progress in extending its geographical spread and functional reach during last two decades. The Indian financial sector in general and the mutual fund industry in particular continue to take turnaround from early 1990s when government has opened the economy for private and foreign players. The reform process has sent signal to the waves of changes in saving and investment behavior adding a new dimension to the growth of financial sector. Mutual fund came out to a good investment option to medium and small investors who do not excel at stock market due to lack of professional knowledge, limited resources and failure to diversify.

Indian mutual fund industry is as old as four decades but its growth, performance and awareness has reached to the present level only since last few years. SEBI as regulator issued the first set of regulations governing the transparency of operations, investor's protection and disclosure standard of mutual fund industry in 1993.

Though the industry has been operational so long, it still not able to win the trust of investors. The figure shows that in the year 2008, out of total financial savings of household sector only 7.7% goes to mutual fund industry as compare to 56.5% to bank deposit and 17.5% to insurance sector. As on march 2009, the industry was comprising of 39 asset management companies managing financial asset of over 493,285 crs contributed by more than 4.76 crs investors spread all over the country. The assets have grown at a compounded annualized growth rate of 48 percent over a period of four decades, which is an evidence of growing popularity of mutual funds in the country (as per figure made available by Association of Mutual funds in India). The impressive growth can be attributed to entry of private players in the industry coupled with rapid growth of capital market after economic liberalization and globalization

 The performance evaluation of mutual funds is an important area for financial economists. The assessment of fund manager's performance influences the investors to allocate their resources into different mutual funds. After reviewing the various work on performance evaluation a need of the study on performance measurement of Indian mutual fund industry covering the entire period since liberalization was felt and it was realized under this perspective that there are potential areas in which research can be attempted. The present study is an attempt to analyze the performance of mutual fund industry in India since the liberalization of economy till now (i.e.1993-2009).

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OBJECTIVES OF THE STUDY

1. To assess the financial performance of Indian mutual funds in terms of risk & return in a post liberalization period.
2. To compare the performance of funds with a bench mark portfolio (market index) and risk free return.
3. To develop the relationship between fund return and market return.

SCOPE OF THE STUDY

1. The time span of study is post liberalization period i.e. beginning from year 1993 and ends with year 2009.
2. The study is limited to open ended mutual fund scheme with growth option in India.
3. The time span is very long period about seventeen years & therefore is quite sufficient to study the performance of the mutual fund industry in India.

REVIEW OF LITERATURE

Several researchers have undertaken lots of study on mutual funds and its performance evaluation from many years .Brief of few of them is given below-

Benchmark comparison is important performance measure as it indicates to what extent the fund managers were able to produce better performance of managed portfolio compared to the market or index portfolios. Haslem, J.A., (1988) in his paper evaluated fund performance by comparing the fund return with the return on market portfolio with the comparable risk. Portfolio performance without reckoning the risk exposure do not provide fair & true picture. Various studies in the past have not only examined performance in terms of rate of return but also evaluated portfolio performance in terms of risk-adjusted rate of return (Treynor & Sharpe's indices).

Equity mutual funds assume higher risks compared to gilts, bonds or other government securities. Hence, they are expected to produce returns not only higher than the returns offered by gilts, bonds or other government securities but also high enough to match the risk level of a given equity fund .The McDonald. J.G., (1974), had measure performance in terms of Shape & Treynor's index as also in terms of Jensen's alpha. The study revealed that 54 percent of the funds had positive alphas. Mean alpha for the sample was found to be 0.052. Statically significance was not reported in his study.

Kon, S.F., (1983), in his paper evaluated performance in terms of selectivity & timing parameters over a period, January 1960 to June 1976. The sample was 37 funds. The study concluded that individually few funds have shown positive selectivity & timing skills but collectively mutual funds failed to perform satisfactorily.

Sarkar, J. & Majumdar S., (1995) evaluated financial performance of five close-ended growth funds for the period February1991 to August 1993, concluded that the performance was below average in terms of alpha values (all negative & statistically not significant) & funds possessed high risk. No reference was provided about the timing parameters in their study.

Jaydev. M., (1996) evaluated performance of two schemes during the period, June 1992 to March 1994 in terms of returns/benchmark comparison, diversification, selectivity & market timing skills. He concluded that the schemes failed to perform better than the market portfolio (ET's ordinary share price index). Diversification was unsatisfactory. The performance did not show any signs of selectivity & timings skills of the fund managers.

Gupta, O.P. & Sehgal, S., (1997) evaluated mutual fund performance over a four year period, 1992-96. The sample consisted of 80 mutual fund schemes. They concluded that mutual fund industry performed well during the period of study. The performance was evaluated in terms of benchmark comparison, performance from one period to the next & their risk-return Characteristics. Gupta & Sehgal in another paper "Investment Performance of Mutual Funds: The Indian Experience," "presented at UTI-ICM Second Capital Market Conference, Dec" has reported that Mutual Fund Industry had performed reasonably well during their period of study.

RESEARCH METHODLOGY

The data used in the study is secondary data. On 31 march 2009 there were1001 mutual funds schemes floated by various mutual funds companies with total of 417300 crs asset under management,in which 293 schemes are equity mutual funds schemes, 509 schemes are income schemes and 35 schemes are balanced schemes. Out of these available schemes 100 actively traded open ended schemes with growth option are selected for study. The study period is post liberalisation period which start from 1993. Thus the study period is 17 years beginning from December 1993 to June 2009.(The list of 100 sample mutual funds selected for the study is given in the annexure in table A.)

Net Asset Value (NAV)

The average logerithemic return on mutual fund.is calculated by taking month end NAVs.The sourse of the data is webside of ascociation of mutual fund of India (AMFI). The net asset value is the mirror image depicting the worth of the investment per unit. It is an indicator of the capital appreciation of the funds under the schemes as on date of NAV. NAV represented funds per share market value. The NAV is calculated by dividing the aggregate value of the net assets of a scheme by the number of outstanding units under the scheme.

Benchmark portfolio-

Mumbai stock exchange index (BSE-100) index is used as a bench mark in present study and is considered as market portfolio .The average logrithem return is used as a return from market portfolio.

Risk-Free asset

A risk free asset is that asset which has zero verability of return. Investor buys an asset at the begining of the holding period with the none terminal value, such type of asset can be considered as risk free asset. Government sequirities and nationalized bank deposits fall under this category as the Government sequirities are not easely avilable to the commen man, Nationalized bank diposits are considered as risk free asset and interest rate on such diposit are considerd as risk free return. The interest rate on bank deposits is collected from the webside of RBI and logerithemic returns are calculated to find mean return.

Performance evaluation-

Following tools are used for Performance evaluation—

For each mutual fund scheme in the sample, return have been calculated by taking month end NAVs .The return for the sample schemes are calculated by using the following equation--.

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Rpt = Log (NAVt/NAVt-1)

Where Rpt is the annual return on mutual fund portfolio for the period t.

NAVt = net asset value for the (t) Period.

NAVt-1= net asset value for the (t-1) Period

The returns on the fund portfolio are averaged as follows

$$Rp = {}^{n}\sum_{t-1} Rpt/n$$

Rp is average return on the mutual fund portfolio.

Standard Daviation of fund return is used to calculate total risk of mutual fund portfolio.

Unique risk (unsystematic risk) –

The unsystematic risk is one which can be eliminated by diversification. This risk represents the fluctuation in return of security due to factors specific to the particular firm only and the market as a whole. These factor may be such as strike, worker unrest, change in market demand etc. The unique risk of a security is computed as follows—

$$\text{Unique risk} = \text{variance} (R_p) - \beta^2 * \text{variance}(R_m)$$
$$= \sigma_p{}^2 - \beta^2 * (\sigma m)^2$$

Measurement of BETA- Beta calculation requires covariance of the scheme returns & market returns..

$$\text{Beta} = Cov(R_p, R_m)/Var(R_m)$$

Where, $Cov(R_p, R_m)$ = Covariance between the index's return & the mutual fund scheme's return. $Var(R_m)$ = Variance in the index return.

Coefficient of determination-measure of diversification- The potential advantage of mutual fund investment is the diversification of portfolio. Diversification reduces the unique or unsystematic risk and thus improves the return and performance of funds.

The diversification extent can be measured by the value of coefficient of determination (r^2). A low coefficient of determination indicates that portfolio of mutual fund is not properly diversified and fund has large scope for diversification. For such portfolio, fund manager need to take effort for proper diversification and minimizing the unique risk.

Coefficient of variation- A measure of variability or consistency in performance (C.V.)-

The standard deviation is absolute measure of variation and the corresponding relative measure is known as the coefficient of variation. It is very useful tool for measuring the variability in more then one series. A series in which coefficient of variation is higher have greater variation then the one in which it is lower. That is the series for which coefficient of variation is high is more variable, less consistent, less uniform, less stable and less homogeneous. The coefficient of variation is denoted by C.V. and calculated as follows—

$$\text{C.V.} = (\text{standard deviation}/\text{mean})*100$$

In the current research study coefficient of variation is used to find the variability in return or consistency in performance of various mutual fund schemes.

Sharpe Ratio: - This ratio given by William Sharpe in 1996 & is one of the most usefultool for determining a fund's performance. It is a ratio indicating the relationship between the portfolio additional return over risk free return & total risk of the portfolio measured in terms of standard deviation. As the standard represents the total risk experienced by a fund, the sharpe ratio reflects the returns generated by undertaking all possible risk.

Sharpe ratio for mutual fund portfolio-

Sharpe Ratio = R_p-R_f / σ_p

         = Risk Premium / Total Risk

Where: R_p= Average Return of the fund , R_f = Average Risk Free Return

         σ_p= Standard Deviation i.e. total risk of the portfolio

& Benchmark Comparison = R_m-R_f / σ_m

Where R_m= Average Return of the benchmark portfolio & σ_m= Standard Deviation of Market Portfolio.

A fund with the higher Sharpe ratio in relation to another fund or market portfolio is preferable as it indicates that the fund has higher risk premium for every unit of total risk. The major limitation of Sharpe ratio is that it is based on the capital market line.

Treynor's Ratio: - Jack Treynor in 1965 conceived an Index of portfolio measure called as reward to volatility ratio. He assumes that the investor can eliminate unsystematic risk by holding a diversified portfolio. Hence this performance measure adjusts excess return over the risk free return for systematic risk. The Treynor ratios for the sample schemes have been computed by using the following formula:

Treynor Ratio = **Risk Premium / Systematic Risk**

         = R_p-R_f / β_p

Where, R_p = Return of Portfolio, R_f = Risk Free Return, β_p = Systematic Risk of Portfolio.

As the β of the market portfolio is equal to 1.

Treynor Ratio for Benchmark Portfolio = (R_m-R_f)

Where R_m = Return on Market Portfolio.

If Treynor ratio of the mutual fund schemes is greater than (R_m-R_f), then scheme has outperformed the market.

Jensen Measure- Sharpe & Treynor ratio rely mainly on ranking of portfolio in comparison to the market portfolio but they are unable to evaluate that whether the fund has given return more/less than expected return. Hence there is a need for a better performance measure. Michael Jensen has developed another method for evaluate of performance of a portfolio. This measure is based on differential return & is known as Jensen's Ratio, the Jensen's Ratio measures the differences between the actual return of a portfolio & expected result of a portfolio in view of the risk of the portfolio. The model based on Capital Asset Pricing Model (CAPM), where expected return of the portfolio is measured as:-

R_s= R_f + β_p ($R_m - R_f$)

Where R_f = risk free return, β_p = beta coefficient of the portfolio, R_m = return from benchmark portfolio.

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The differential return gives an indication, how well portfolio has performed. The performance measure or differential return is measured by the factor J_p & is defined by the equation.

J_p = Portfolio return- expected return of the portfolio

   = R_p – { R_f + $β_p$ (R_m – R_f)}

If **Jp** is positive, it shows that the portfolio has performed better & it has outperformed the market & lies above the security market line.

If **Jp** is negative, it means that the portfolio has under performed as compared to the market & lies below the security market line.

If **Jp** is zero, it indicates that the portfolio has just performed what it's expected to & expected return & actual return of the portfolio both would be on the Security Market Line (SML).

Sharpe differential measure — Sharpe differential return measure is used to known the ability of the fund manager in both security selection and diversifying the portfolio.

The equilibrium return is given by capital market line (CML) as the risk premium expected to be earned by the portfolio is in relation to the total risk of the portfolio rather than the systematic risk. Differential returns are computed by the following formula-

$$R_p = R_f + (R_p – R_m) σ_{p/} σ_m$$

If a portfolio well diversified, the two measures (Jensen and Share) should indicate same quantum of differential return. In case the portfolio is not fully diversified, the Sharpe differential return would be small in magnitude. The difference can be interpreted as decline in performance resulting from lack of diversification

Fema Measure- Fema's Model attempts to measure the performance in terms of the components of risk of portfolio. In view of Capital Asset Pricing Model, the return of a portfolio is consisting of risk free returns & risk premium.

$$R_p = R_f + \text{risk premium}.$$

 Whereas, Risk Premium = Reward for Risk + Rewards for Selection.

The reward for stock selection is for the better selection of stock for the portfolio. It's the return earned on a portfolio over & above the return. As Fama's measure is based on total risk,, so the reward for risk can be decomposed into reward for systematic risk & reward for unsystematic risk. Thus the Fema component breakdown the risk as follow-

Thus, Fama breakdowns the observed return in to four components.

1- Risk free return **(R_f)**

2- Reward for Systematic Risk **($R_β$)**-- $β$ (R_m – R_f)

3- Reward for unsystematic Risk **(Rid)** --(R_m – R_f) – {($σ_p$/$σ_m$) – ($β$)}

4- Reward for Stock Selection- **(R_p-R_f)** - ($σ_p$/$σ_m$) (R_m – R_f)

Fema says that the portfolio performance can be judged by the net superior returns due to selectivity. His performance measure denoted by F_p is defined by equation,

F_p= Portfolio return- risk free – returns due to all risk

= (R_p-R_f) – {($σ_p$/$σ_m$) (R_m – R_f)}

Where F_p = Fama's measure for portfolio, R_p = portfolio return ,R_f = risk free return

$σ_p$ = standard deviation of portfolio return, $σ_m$ = standard deviation of the market return

A positive value of F_p indicates that the fund earned return higher than expected returns & lies above Capital Market Line, & a negative value indicates that the fund earned returns less than expected returns & lies below Capital Market Line.

DATA ANALYSIS AND INTERPRETATION

Performance Evaluation On The Basis Of Risk And Return

Table 1: Statistical measures of risk and return of sample mutual fund schemes

Particulars	Maximum value	Value in %	Minimum value	Value in %	Mean value	Value in %
Risk free rate of return (Rf)	0.05135	5.13	-0.0102	-1.02	0.004130	0.41
Return on mutual fund portfolio (Rp)	0.20463	20.46	-0.02069	-2.06	0.052277	5.23
Return on market portfolio(Rm)	0.51682	51.62	0.04017	4.01	0.063420	6.34
Total risk on mutual fund portfolio (σp)	0.43216	43.16	0.006779	0.67	0.152147	15.24
Total risk on market portfolio (σm)	0.208485	20.84	0.001322	0.13	0.187420	18.74
Systematic risk of mutual fund portfolio βp	1.5569	-	-0.18776	-	0.615194	-
Coefficient of variation	27.82	-	-24.64	-	5.05	-

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Table B (Annexure) presents the risk and return statistics for sample funds and benchmark portfolio .The compiled results of table B is presented in table 1 .Table 1 show that the average return of the 100 selected funds is 0.054523 i.e 5.4% and the average total risk of portfolio is 15.21 %. As many as 35 schemes have above average return. Out of 100 selected schemes 29 schemes are in conformity with the linear relationship of above average return with above average and vice versa. Six schemes have above average return with a risk less than average and 23 schemes have less return than the average with higher risk.

On comparing the average minimum and maximum return of funds with market portfolio from the above table, it is clear that variation in return of the mutual fund portfolio is lesser as compare to stock market fluctuations, but they are not able to perform as per market portfolio or benchmark portfolio.

The mean total risk of portfolio is 15.21 %, lesser than market portfolio which is containing average total risk of 18.74% ,where as average market risk of fund portfolio is 0.6151 which is lesser then the market risk of benchmark portfolio which is always one. Out of 100 schemes only 10 schemes have beta more than 1, indicating that mutual fund portfolio are less risky than market portfolio.

Thus it is observed form the above analysis that average return (Rp), total risk (σp) and market risk (**βp**) on sample mutual fund port folio is lower as compare to risk & return of bench mark port folio. This concluded that mutual fund investment are subject to lower risk as compare to investment in stock market through equity shares because diversification in investment helps in reducing the risk of the portfolio but at the same time portfolio managers are not able to manage their port folio efficiently so as to provide better return than shares. There are only 35 mutual fund schemes which are showing higher return than average return of funds. The reason may be that in the sample funds there are only fifty equity schemes & 9 tax planning funds. The other are balance, Debt & Gilt funds.

Coefficient of variation- The average coefficient of variation of the sample mutual fund schemes is 5.05 varying between the ranges of 27.82 to -24.64. This shows that consistency in return of some schemes is very low.

Table 2: **Number of mutual funds showing higher / lower rate of return than risk free rate of return during the period of study 1993 to 2009**

Particular	No. of Funds	% of Funds
$R_p > R_f$	93	93
$R_p < R_f$	7	7

Table 2 (compiled from table B of annexure) shows that out of 100 selected fund, 93 schemes (93%) have earned higher return than risk free rate of return (R_f.) , 7 schemes have shown return (Rp) lower than risk free rate & they are Baroda Pioneer ELSS fund, Canara Robeco tax saver fund , Kotek income plus fund, Baroda Pioneer income fund , J.M. MIP fund , LIC MF balance fund and Sahara income fund i.e. 4 funds are income fund, 2 schemes are tax planning & one is balance schemes.

Table 3: **Number of mutual funds showing higher/lower rate of return than market rate of return (R_m) during the period of study 1993 – 2009**

Particular	No. of Funds	% of Funds
$R_p > R_m$	32	32
$R_p < R_m$	68	68

Out of 100 sample fund, 33% (33 funds) have shown return (Rp) higher than return on market port folio (Rm) and 67% funds have shown lesser return than market port folio. That is only 33 funds have outperformed the market which is even less than half of the fund selected. (The above results are drawn from table B which is shown in annexure)

Relationship between fund return, risk and market return is evaluated and is given below-
Correlation between fund total risk and fund return-

Correlations

		fund_ return	fund_ risk
fund_ return	Pearson Correlation	1	.148
	Sig. (2-tailed)		.141
	N	100	100
fund_ risk	Pearson Correlation	.148	1
	Sig. (2-tailed)	.141	
	N	100	100

The Correlation between Fund Return and Fund Risk as per table shown above is 0.148, which shows that they have positive association with each other. In other words, higher the risk better is the return of investment scheme. Again, since the degree of relationship is 0.148, which shows that the relationship is not of much significance, which in turn concludes that investor should take into consideration the factors other than risk while investing in Mutual fund schemes

Correlation between market return and fund return-

Correlations

		Fund return	Market return

fund_return	Pearson Correlation	1	.108
	Sig. (2-tailed)		.281
	N	101	101
market_return	Pearson Correlation	.108	1
	Sig. (2-tailed)	.281	
	N	101	101

On the basis of above table the correlation between fund return and Market return is calculated as 0.108. The positive relationship means that higher the market return more will be the return of the mutual fund portfolio. However, as the magnitude of the correlation is very low this simply means that relationship is not of much significance, which in turn means that fund return is more influenced by factors other than Market return.

Unique Risk and Diversification
Risk and return are the two basic factors for construction of a portfolio is to maximize the return and to minimize the risk. The risk can be reduced by diversification. Therefore the present research work tries to examine that as to what extent Indian mutual fund managers have been able to diversify their portfolio. It has been observed, through table B (annexure) that average unique risk of sample mutual fund schemes is 61.38% p.m. while the average diversification comes to 60.33%. Of the 100 schemes 85 schemes show less than average unique risk. However 7 schemes have lower unique risk than the average unique risk but have a higher degree of diversification, as it was higher than average, 6 schemes have higher than average unique risk, but have lower degree of diversification. However 35 schemes reflect less than the average degree of diversification.

Performance evaluation using Sharpe and Treynor ratio-

Table 4: Compiled results of Sharpe ratio

Particulars	No. of funds	Particulars	No. of funds
Sp>Sm	61	Tp>Tm	48
Sp<Sm	39	Tp<Tm	52
Total	100	Total	100

On evaluating the performance of sample mutual funds by Sharpe measure (as per table C of annexure) it is found that out of 100 mutual funds 61 funds outperform the market in terms of total risk and shows that have shown better excess return per unit of risk over benchmark portfolio, where as 39 funds have shown poor performance as compare to benchmark portfolio. Top five performers are Baroda Pioneer income fund, Reliance income fund, Tata Income fund, LIC MF MIP, Tata monthly income fund.
The Treynor ratio measures the excess return per unit of market risk. In terms of Treynor ratio only 48 schemes have superior return per unit of market risk as compare to benchmark portfolio.
Relationship between fund ranking as given by Sharpe measure and Treynor ratio
Correlation analysis refers to the degree of relationship between two or more variables.

Correlations

		rank_treynor	rank_sharpe
Rank_treynor	Pearson Correlation	1	.260[**]
	Sig. (2-tailed)		.009
	N	100	100
Rank_sharpe	Pearson Correlation	.260[**]	1
	Sig. (2-tailed)	.009	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

The above table shows the correlation between Rank1 and Rank2. Rank 1 is calculated on the basis of Treynor ratio whereas Rank 2 is calculated on the basis of Sharpe ratio. Both the ratios, however, incorporates fund return and fund risk despite the fact that they use different mechanisms to arrive at absolute figure.
The correlation between rank 1 and rank 2 on the basis of table shown above is 0.26, which implies these two ranks are highly associated and for an investor, more or less, both give same message regarding concern mutual fund scheme that is higher the rank, better the scheme.

Performance evaluation Using Jenson and Sharpe differential return measure-
Results of Jensen differential return measure are given in table D (Annexure).
The compiled results of table D are presented below in the table 5.

Table 5:Compiled results of Jensen and Sharpe differential measure for funds

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Particulars	No. of funds	Particulars	No. of funds
Jp positive	71	Positive Sharpe differential return	58
Jp negative	29	Negative Sharpe differential return	42
Total	100	Total	100

Table 5 indicates that out of sample of 100 funds 71 funds haves positive Jensen Performance measure showing superior performance. Hence 71% of the funds are giving higher return then the equilibrium return. 29% funds are not able to give the return which is at least required at a level of systematic risk they possess.

Of the 100 sample schemes, 58 schemes (50%) reflect positive differential returns, thereby indicating superior performance , 42 schemes (42%) shows negative differential returns indicating that they could not commensurate with the level of risk they posses. The top five performers are ICICI prudential growth fund, Franklin Templeton India tax shield fund, SBI magnum equity fund, LIC MF index fund & Birla Sun Life Basic industries fund. Average differential return is – 0.95% per annum. This indicate that on an average no mutual fund is earning more than expected return which they are expected to give at a given level of total risk. Out of 100 sample schemes 59 schemes have more than the average differential returns. These are the schemes which are giving positive differential return & earning more than they should have earned at a given level of total risk.

PERFORMANCE EVALUATION BY FEMA MEASURE

Sharpe, Treynor and Jensen measures evaluate the overall performance of the portfolio. Fema's model attempt is to measure the performance in terms of components of a risk of portfolio. The analysis of Fema components of performance (as per table D in the annexure) is as follows –

(1)   Risk free rate of Return

Since mutual fund investment is subject to risk, both systematic and unsystematic risk thus mutual fund schemes must give return more than risk free return in order to compensate the risk they assume. It is observed through analysis that 93% of the funds are giving return more than risk free return. Only 7% schemes are giving such a poor performance that they are not able to give return even higher than risk free return. The average risk free return is 0.42% for the study period where as, average return of the fund portfolio is 5%. Thus on an average mutual fund schemes are giving risk premium.

(2)   Reward for systematic risk -

The performance on risk assesses return being generated by fund managers due to their decision to take risk. They assume risk in the hope of generating extra returns on their portfolio. Table D shows that only 83 schemes out of 100 sample schemes have positive performance on account of risk bearing activity of their fund managers. Only 17 mutual fund schemes suffered from negative performance on account of risk assumed by fund manager in order to generate extra return.

(3)   Reward for diversification

The performance attributed to selectivity can be attributed to diversification and net selectivity. Diversification measures additional return that compensate the fund manager for bearing diversifiable or unsystematic risk. Therefore an attempt has been made to examine fund managers performance on diversification, and it is found through Fema measure that except 6 schemes ICICI prudential child care, ICICI Prudential FMCG, SBI magnum equity, JM MIP, LIC MF balance Taurus discovery fund all the other mutual fund schemes have positive diversification and justify the fund managers ability to generate additional return for bearing diversifiable return.

(4)   Return due to selectivity

The reward for stock selection is for the better selection of stock for the portfolio. It is the return earned on a portfolio over and above the return in view of the risk of the portfolio. If net selectivity is positive it indicates superior performance and return from portfolio is more than what is warranted by the risk level of the portfolio. However in case net selectivity is negative then it means that fund managers have taken diversifiable risk that has not been compensated by extra returns. This shows that return is not sufficient because of poor selection of stock by fund manager.

Table D (Annexure) indicates that 58 schemes out of a sample of 100 mutual fund schemes have positive net selectivity indicate superior stock selection ability of their fund managers, this reflect that for 58% mutual fund schemes, the diversifiable risk assumed by fund managers is compensated by extra return earn by their superior stock selection ability.

42% mutual fund schemes have negative net selectivity & indicate the poor stock selection ability of their fund managers. Top five performers with regard to selectivity are ICICI prudential growth funds, Franklin Templeton India blue chip fund, SBI magnum equity fund, LIC MF index senses fund and Birla Sun Life basic industries fund.

CONCLUSION

The study reported the following results- Sample Mutual Fund's are able to provide better return than any return on risk free securities but unable to outperform the benchmark portfolio in terms of average return. The correlation between fund return and fund risk justify the fact that higher the returns, high the risk. There is also positive association between fund return and market return. The sample funds are not adequately diversified with a diversification of about 60.3%. Due to inadequate diversification, a substantial part of the variation in fund return is not explained by market and the fund is exposed to large diversification risk.

In terms of Sharpe ratio, 61 funds outperformed the relevant benchmark while 48 funds out performed the relevant benchmark portfolio in case of Treynor ratio. In terms of Jensen differentiation measure 71 funds reflected superior performance. For Sharpe differential ratio 58 funds had shown superior performance. The high difference between these two ratios indicates that mutual funds are able to earn higher return due to selectivity but proper balance is not maintained between selectivity and diversification.

In terms of Fema Company of investment performance, only 17 mutual fund schemes suffered negative performance on account of risk assumed by fund manager in order to generate extra return. Except 6 schemes all the other sample schemes have positive diversification and justify the fund managers' ability to generate additional return for bearing diversifiable risk. Thus on the whole it can be concluded that, there is

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no conclusive evidence that indicates that performance of mutual fund industry in India is superior to the market portfolio during the study period.

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ANNEXURE

Table A: LIST OF SAMPLE MUTUAL FUND SCHEMES

S.no.	Name of the funds	S.no.	Name of the funds
1	Baroda Pioneer ELSS	51	Kotak gilt investment regular - G
2	Birla Sun Life – 95	52	Kotak Bond Deposits - G
3	Birla Sun Life Front Line equity fund -G	53	Kotak income plus - G
4	Birla Sun Life advantage fund - G	54	Canara robeco income - G
5	Birla Sun Life freedom fund - G	55	Canara robeco gilt - PGS – G
6	Birla Sun Life Buy india fund - G	56	Baroda Pioneer income - G
7	Canana Robeco balance fund - G	57	JM balanced - G
8	Canara.Robeco. equity diversified - G	58	JM equity - G
9	Canara.Robeco. equity diversified tax saver	59	JM MIP - G
10	D.B.S. chola grawth fund - G	60	JM G- sec regular - G
11	D.B.S. chola triple ace - G	61	LIC MF balance – G
12	DSP black rock - G	62	LIC MF equity - G
13	DSP black rock top 100 equity reg - G	63	LIC MF govt sec - G
14	Escort growth - G	64	LIC MF growth - G
15	Escort balanced - G	65	LIC MF MIP - G
16	Franklin tempelton india balance	66	LIC MF tax plan – G
17	Franklin tempelton india blue chip - G	67	LIC MF index sensex - G
18	Franklin tempelton India prima - G	68	UTI MNC - G
19	Franklin tempelton india Taxshield - G	69	UTI balance - G
20	Franklin pharma - G	70	UTI equity - G
21	HDFC equity - G	71	UTI equity tax saving plan - G
22	HDFC capital builder - G	72	UTI mastar index - G
23	HDFC LT advantage – G	73	UTI master plus (91) - G
24	HDFC tax saver - G	74	UTI master value - G
25	HDFC income fund-G	75	UTI service industry - G
26	HDFC growth - G	76	UTI nifty index fund - G
27	HSBS equity - G	77	UTI master share - G
28	ICICI prudential child care – G	78	Morgan stanley growth - G
29	ICICI prudential FMCG - G	79	Reliance growth - G
30	ICICI prudential growth - G	80	Reliance income
31	ICICI prudential balanced - G	81	Reliance vision- G
32	ICICI prudential income - G	82	Sahara tax gain - G
33	SBI magnum balanced - G	83	Sahara income - G
34	SBI magnum contra fund - G	84	Sahara growth - G
35	SBI magnum equity - G	85	Tata balanced fund –G
36	SBI magnum FMCG	86	Tata growth - G
37	SBI magnum global - G	87	Tata income fund - G
38	SBI magnum income - G	88	Tata monthly income fund - G
39	SBI magnum MIP - G	89	Taurus bonanza - G
40	SBI magnum index - G	90	Taurus discovery - G

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41	SBI magnum multiplier plus - G	91	Taurus tax shield – G
42	SBI magnum taxgain - G	92	Taurus income-G
43	SBI magnum pharma - G	93	ING care equity - G
44	Sundaram BNP paribas balanced	94	ING income - G
45	Principal balanced - G	95	Nifty benchmark ETS –G
46	Principal child benefit carrer builder	96	UTI CCP balanced – G
47	Principal growth - G	97	UTI pharma health care - G
48	Principal index - G	98	Birla Sun Life Basic Industries - G
49	Principal income - G	99	Canara robeco MIP – G
50	Kotak - 30 - G	100	DBS chola gilt investment - G

Table- B: RISK AND RETURN STATISTICS FOR MUTUAL FUND VS MARKET PORTFOLIO

S. No.	Rf	Rm	σm	Rp	Σp	βp	Cov	unique risk	R2
1	0.00119	0.046007	0.18834	0.001153	0.1819714	0.8274	157.82	0.8274	67.46%
2	-0.00807	0.051682	0.174092	0.097593	0.159868	0.740695	1.64	0.740695	65.06%
3	0.03514	0.093169	0.20499	0.110571	0.185626	0.77441	1.68	0.77441	73.13%
4	-0.0078	0.05162	0.174092	0.078432	0.244861	1.1606	3.12	1.1606	68.11%
5	0.00119	0.46007	0.18834	0.034637	0.119289	0.532029	3.44	0.532029	70.60%
6	0.001322	0.063461	0.190994	0.114165	0.179631	0.78807	1.57	0.78807	71.69%
7	-0.00212	0.041957	0.167399	0.036136	0.115336	0.58703	3.19	0.58703	72.64%
8	0.051355	0.065215	0.208485	0.066752	0.189964	0.75709	2.85	0.75709	69.04%
9	0.00119	0.046007	0.18834	-0.02069	0.179462	0.83095	-8.67	0.83095	76.09%
10	0.007881	0.085846	0.191144	0.055684	0.228367	0.662978	4.1	0.662978	62.74%
11	-0.0102	0.056554	0.18787	0.02557	0.026921	-0.026066	1.05	-0.026066	3.32%
12	0.00119	0.046007	0.18834	0.082054	0.13799	0.6497	1.68	0.6497	78.68%
13	0.051355	0.065215	0.208485	0.085996	0.175707	0.69782	2.04	0.69782	68.56%
14	0.007881	0.08584	0.191144	0.086203	0.20452	0.91263	2.37	0.91263	72.76%
15	0.007881	0.085946	0.19114	0.084584	0.161592	0.719056	1.91	0.719056	72.37%
16	0.00119	0.046007	0.18834	0.058456	0.128861	0.607369	2.2	0.607369	78.86%
17	-0.00502	0.040582	0.173181	0.057661	0.215864	1.029	3.74	1.029	68.19%
18	-0.00502	0.04058	0.173181	0.062078	0.241817	1.1546	3.9	1.1546	68.39%
19	0.00119	0.046007	0.18834	0.075539	0.164876	0.76513	2.18	0.76513	76.40%
20	0.00119	0.046007	0.18834	0.032558	0.131742	0.53064	4.05	0.53064	57.56%
21	-0.00502	0.040582	0.173181	0.084156	0.196342	0.836684	2.33	0.836684	54.46%
22	-0.00502	0.040582	0.173181	0.048237	0.18817	0.922	3.9	0.922	72.03%
23	0.007881	0.063461	0.190994	0.105434	0.190396	0.81522	1.81	0.81522	68.00%
24	-0.00727	0.057269	0.17989	0.093685	0.20742	0.961341	2.21	0.961341	69.52%
25	0.001322	0.063461	0.190994	0.033194	0.028411	-0.083063	0.86	-0.083063	31.18%
26	0.001322	0.063461	0.190994	0.086794	0.185767	0.84722	2.14	0.84722	75.87%
27	0.03514	0.093969	0.204962	0.127797	0.207831	0.82321	1.63	0.82321	65.90%
28	0.007881	0.08584	0.191144	0.069337	0.20044	0.90921	2.89	0.90921	75.18%
29	0.00119	0.046007	0.18834	0.048894	0.159776	0.95036	3.27	0.95036	65%
30	-0.00308	0.07808	0.192751	0.089982	0.21239	0.94272	2.36	0.94272	73.22%
31	0.00119	0.046007	0.18834	0.041197	0.144668	0.6667	3.51	0.6667	75.35%
32	-0.00308	0.067808	0.192751	0.040186	0.030576	-0.090706	0.76	-0.090706	32.73%
33	-0.00807	0.051682	0.174092	0.043059	0.209325	0.9675	4.86	0.9675	64.75%
34	0.00119	0.046007	0.18834	0.05374	0.185688	0.805192	3.46	0.805192	66.97%
35	-0.00212	0.041957	0.167399	0.0095	0.22857	1.5569	24.06	1.5569	71.66%

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36	0.00119	0.046007	0.18834	0.006434	0.151804	0.58468	23.59	0.58468	52.62%
37	-0.00807	0.051682	0.174092	0.049759	0.237163	1.2207	4.77	1.2207	80.29%
38	-0.00308	0.067808	0.192751	0.030423	0.027207	-0.029608	0.89	-0.029608	4.40%
39	0.007881	0.085846	0.191144	0.02937	0.022131	0.08342	0.75	0.08342	50.24%
40	0.03574	0.093969	0.20496	0.08088	0.19088	0.797	2.36	0.797	73.25%
41	-0.00212	0.040582	0.173181	0.034329	0.240781	1.2309	7.01	1.2309	78.42%
42	-0.00502	0.040582	0.173181	0.029039	0.247929	1.19129	8.54	1.19129	10.29%
43	0.00119	0.046007	0.18834	0.027057	0.16766	0.73505	6.2	0.73505	68.20%
44	0.001322	0.063461	0.190994	0.06433	0.13259	0.60924	2.06	0.60924	77.04%
45	0.00119	0.046007	0.18824	0.039146	0.144942	0.68045	3.7	0.68045	79.32%
46	0.007881	0.085846	0.191144	0.082451	0.145336	0.65371	1.76	0.65371	73.91%
47	0.001322	0.063461	0.190994	0.06734	0.211987	0.95866	3.15	0.95866	74.62%
48	0.00119	0.046007	0.18834	0.041138	0.16383	0.60927	3.98	0.60927	49.07%
49	0.001322	0.063461	0.190994	0.010166	0.079389	-0.18547	7.81	-0.18547	18.33%
50	-0.00308	0.067808	0.192751	0.080141	0.209683	0.96197	2.62	0.96197	78.32%
51	-0.00308	0.067808	0.19275	0.04328	0.43216	-0.12946	9.99	-0.12946	33.35%
52	0.00119	0.046007	0.18834	0.036907	0.02922	-0.103182	0.79	-0.103182	44.28%
53	0.05135	0.06521	0.20848	0.020155	0.039675	0.14554	1.97	0.14554	58.51%
54	0.03574	0.09396	0.20496	0.036801	0.03523	-0.13092	0.96	-0.13092	58.02%
55	0.00119	0.046007	0.18834	0.039898	0.046618	-0.17676	1.17	-0.17676	50.99%
56	0.03514	0.09396	0.20496	0.017257	0.006779	-0.00833	0.39	-0.00833	6.43%
57	-0.00807	0.05168	0.17409	0.0219	0.15085	0.58588	6.89	0.58588	45.72%
58	-0.00807	0.05768	0.17409	0.038696	0.2014	1.0601	5.2	1.0601	83.98%
59	0.05135	0.065215	0.20848	0.02025	0.03337	0.12635	1.65	0.12635	60.92%
60	0.00119	0.046007	0.18834	0.04412	0.04683	-0.187759	1.06	-0.187759	57.01%
61	0.05135	0.065215	0.20848	0.04655	0.170158	0.66446	3.66	0.66446	81.42%
62	0.00119	0.046007	0.18834	0.030588	0.19514	0.92686	6.38	0.92686	89.46%
63	0.00119	0.046007	0.18834	0.033698	0.042813	-0.13588	1.27	-0.13588	35.76%
64	0.00119	0.046007	0.18834	0.03077	0.21507	0.99495	6.99	0.99495	75.93%
65	-0.00308	0.0678	0.19275	0.04263	0.030128	0.112564	0.71	0.112564	58.26%
66	-0.0102	0.05655	0.18787	0.03185	0.189674	0.78776	5.96	0.78776	60.99%
67	0.03574	0.09396	0.20496	0.06167	0.18225	0.74272	2.96	0.74272	69.76%
68	-0.00308	0.0678	0.19275	0.04343	0.14584	0.65774	3.36	0.65774	75.57%
69	-0.00807	0.051682	0.174092	0.05434	0.108104	0.51989	1.99	0.51989	83.72%
70	-0.00212	0.04957	0.167399	0.018664	0.14675	0.791866	7.86	0.791866	81.84%
71	0.00119	0.046007	0.18834	0.04708	0.17499	0.76789	3.72	0.76789	68.33%
72	-0.00308	0.0678	0.19275	0.060704	0.17284	0.80698	2.85	0.80698	81.01%
73	-0.00212	0.04195	0.16739	0.023	0.15315	0.821461	6.66	0.821461	80.60%
74	-0.00308	0.0678	0.192751	0.040021	0.19893	0.8305	4.97	0.8305	64.77%
75	0.00119	0.046007	0.18834	0.030472	0.20986	0.88142	6.89	0.88142	62.58%
76	0.001322	0.06346	0.19099	0.06054	0.17196	0.79834	2.84	0.79834	78.83%
77	-0.00212	0.04195	0.16739	-0.0106	0.261218	0.50628	-24.64	0.50628	10.52%
78	-0.00502	0.04058	0.17318	0.04323	0.18444	0.96235	4.27	0.96235	81.65%
79	-0.00807	0.05768	0.17409	0.106603	0.2224	1.1307	2.09	1.1307	78.38%

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80	-0.0102	0.05655	0.18787	0.039929	0.026073	-0.0729	0.65	-0.0729	31.62%
81	-0.00807	0.05168	0.17409	0.09053	0.19275	0.9701	2.13	0.9701	76.81%
82	-0.0102	0.056554	0.18787	0.03544	0.34576	0.8002	9.76	0.8002	18.89%
83	0.03514	0.09396	0.20496	0.02764	0.03134	-0.1002	1.13	-0.1002	43%
84	0.03514	0.09396	0.20496	0.111759	0.171919	0.71003	1.54	0.71003	71.68%
85	-0.00807	0.05168	0.17409	0.05502	0.14454	0.74907	2.63	0.74907	81.42%
86	-0.00807	0.05168	0.17409	0.035329	0.17925	0.77207	5.07	0.77207	56.25%
87	-0.0102	0.05655	0.18787	0.034361	0.02586	-0.03881	0.75	-0.03881	7.95%
88	-0.0102	0.056554	0.18787	0.01872	0.019079	0.05048	1.02	0.05048	24.72%
89	-0.00807	0.051682	0.17409	0.03846	0.181035	0.885178	4.71	0.885178	72.46%
90	-0.00502	0.04017	0.17283	0.00907	0.24905	1.24884	27.46	1.24884	73.75%
91	-0.00727	0.05726	0.17989	0.03219	0.21564	0.97784	6.7	0.97784	66.54%
92	0.007881	0.08584	0.19114	0.02004	0.01972	-0.02955	0.98	-0.02955	8.25%
93	0.00119	0.046007	0.18834	0.012957	0.0206679	0.93789	1.6	0.93789	73.05%
94	0.00119	0.046007	0.18834	0.034601	0.027322	-0.0974	0.79	-0.0974	45.22%
95	0.007881	0.08584	0.191144	0.204632	0.38067	0.593	1.86	0.593	8.86%
96	0.00119	0.046007	0.18834	0.003892	0.048386	0.17605	12.43	0.17605	46.96%
97	0.00119	0.046007	0.18834	0.023392	0.094886	0.41715	4.06	0.41715	68.56%
98	0.001322	0.063461	0.190994	0.114754	0.22261	0.9822	1.94	0.9822	71.03%
99	0.007881	0.085846	0.191144	0.047106	0.049299	0.2068	0.1	0.2068	64.35%
100	0.001322	0.063461	0.190994	0.03205	0.047714	-0.1406	1.49	-0.1406	31.68%

Table C: SHERPE AND TREYNOR RATIO FOR SELECTED FUNDS AND THEIR RANK SPONSOR WISE

S.N0.	Sp	Sm	Rank	Tp	Tm	Rank
1	-0.00019	0.23795	92	-0.000044	0.044817	80
2	0.66093	0.34322	17	0.142653	0.059487	12
3	0.40636	0.28698	40	0.097404	0.058829	26
4	0.352184	0.341696	44	0.006548	0.059487	79
5	0.28038	0.237957	54	0.062866	0.044817	43
6	0.628186	0.54623	19	0.143189	0.104314	11
7	0.331691	0.263305	46	0.065168	0.044077	42
8	0.081052	0.06647	86	0.06789	0.01386	38
9	-0.121919	0.237957	96	-0.026331	0.044817	83
10	0.209325	0.40788	71	0.0721034	0.077965	35
11	1.3287	0.843955	7	-1.37228	0.158554	100
12	0.586004	0.23795	21	0.124463	0.044817	13
13	0.191752	0.066479	73	0.67453	0.01386	2
14	0.382949	0.407886	42	0.08582	0.077965	30
15	0.47467	0.40878	32	0.107947	0.078136	18
16	0.4444	0.237957	37	0.094285	0.044817	28
17	0.29037	0.26331	51	0.06091	0.045602	44
18	0.277474	0.263319	55	0.058113	0.045602	47
19	0.45093	0.23795	35	0.097171	0.044817	27
20	0.228263	0.237957	68	0.59112	0.044817	3
21	0.454187	0.2633198	34	0.097719	0.045602	25
22	0.28302	0.263319	52	0.057762	0.045602	48
23	0.51236	0.291	27	0.007881	0.05558	76
24	0.486717	0.358769	30	0.105014	0.064539	19
25	1.121819	0.325345	10	-0.41004	0.062139	95
26	0.4601	0.325345	33	0.10088	0.062139	23
27	0.44582	0.28702	36	0.11255	0.058829	17
28	0.306602	0.407886	49	0.06759	0.077965	39
29	0.298567	0.237957	50	0.0501957	0.044817	59

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30	0.438165	0.36776	38	0.098716	0.68118	24
31	0.27654	0.244217	56	0.06007	0.045417	45
32	1.41503	0.36776	6	0.476991	0.07088	5
33	0.24425	0.34322	61	0.052848	0.059752	56
34	0.28302	0.23795	53	0.06527	0.044817	41
35	0.05083	0.263305	89	0.00746	0.044077	77
36	0.034544	0.23795	91	0.008968	0.044817	75
37	0.243836	0.34322	62	0.04737	0.059752	61
38	1.231411	0.35749	8	-1.1315	0.35749	98
39	0.97099	0.407886	11	0.257587	0.077965	8
40	0.23963	0.287023	65	0.05738	0.058829	49
41	0.151378	0.24657	77	0.0296116	0.042702	69
42	0.137374	0.263319	82	0.02859	0.045602	70
43	0.154282	0.23795	76	0.03519	0.044817	64
44	0.4752	0.325345	31	0.103425	0.062139	20
45	0.26187	0.23795	58	0.05578	0.044817	53
46	0.51308	0.407886	26	0.11407	0.077965	16
47	0.31143	0.32534	48	0.06886	0.062139	37
48	0.24383	0.23795	63	0.06556	0.044817	40
49	0.1114	0.32534	84	-0.047684	0.062139	84
50	0.39688	0.36776	41	0.086509	0.07088	29
51	0.107279	0.36776	85	-0.35809	0.070888	94
52	0.85561	0.23795	13	-0.24235	0.044817	91
53	-0.78638	0.066479	99	-0.214371	0.01386	86
54	0.04714	0.28702	90	-0.012686	0.058829	81
55	0.83032	0.23795	14	-0.21898	0.044817	88
56	2.6379	0.28702	1	2.14656	0.058829	1
57	0.19866	0.34322	72	0.057153	0.059752	50
58	0.2322	0.34322	67	0.044115	0.059752	62
59	-0.931691	0.06647	100	-0.246118	0.01386	92
60	0.91664	0.23795	12	-0.22866	0.044817	89
61	-0.02823	0.06647	93	0.007229	0.01386	78
62	0.15064	0.23795	78	0.031717	0.044817	66
63	0.7593	0.23795	16	-0.239181	0.044817	90
64	0.13755	0.23795	81	0.02973	0.044817	68
65	1.5172	0.051158	4	0.406088	0.00986	6
66	0.22169	0.3553	69	0.053379	0.066754	54
67	0.80719	0.28702	15	0.198075	0.05882	9
68	0.3189	0.36776	47	0.070711	0.07088	36
69	0.57739	0.34322	22	0.12006	0.05975	14
70	0.14162	0.30878	79	0.026246	0.05769	71
71	0.26226	0.23795	57	0.059767	0.044817	46
72	0.369017	0.36776	43	0.07904	0.070888	32
73	0.16406	0.2633	75	0.030586	0.044077	67
74	0.21665	0.36776	70	0.051893	0.07088	58
75	0.13952	0.23795	80	0.033221	0.044817	65
76	0.34434	0.32534	45	0.074178	0.06213	34
77	-0.04869	0.2633	95	-0.025724	0.04407	82
78	0.26163	0.26331	59	0.050143	0.045602	60
79	0.5156	0.34322	25	0.101417	0.05975	22
80	1.9226	0.35532	2	-0.64345	0.06675	97
81	0.51153	1.0463	28	0.10163	0.18216	21
82	0.13201	0.35532	83	0.05704	0.06675	51
83	-0.23912	0.287	98	0.0748	0.05882	33
84	-0.1998	0.28702	97	-0.04842	0.05882	85
85	0.43648	0.34322	39	0.084229	0.05975	31
86	0.2421	0.34322	64	0.056211	0.05975	52
87	1.723	0.35532	3	-1.14818	0.066754	99
88	1.5158	0.35532	5	0.57282	0.044561	4
89	0.251027	0.33005	60	0.052566	0.05975	57
90	0.056574	0.261508	87	0.011286	0.045798	74
91	0.18298	0.35876	74	0.040354	0.06453	63
92	0.616914	0.40788	20	-0.411177	0.077965	96

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93	0.56933	0.23795	23	0.012546	0.044817	73
94	1.2228	0.23795	9	-0.34285	0.044817	93
95	0.51684	0.40788	24	0.331786	0.077965	7
96	0.05584	0.23795	88	0.015344	0.044817	72
97	0.23398	0.23795	66	0.053222	0.0422817	55
98	0.50955	0.325345	29	0.11548	62139	15
99	-0.04309	0.0368	94	0.15325	0.007036	10
100	0.644	0.32534	18	-0.2185	0.062139	87

Table D: JENSON, SHARPE DIFFERENTIAL AND FEMA MEASURES FOR SAMPLE SCHEMES

S.no.	Rp	SML	Jp	Rp-Fp	Rβ	Rid	Fp
1	0.001153	0.38263	-0.03711	0.04633	0.03708	0.00806	-0.04578
2	0.097593	0.036189	0.061404	0.0468	0.044258	0.010612	0.050793
3	0.110571	0.08071	0.029861	0.088411	0.045557	0.007714	0.02216
4	0.078432	0.06124	0.017192	0.07586	0.06904	0.014628	0.002564
5	0.034637	0.3367669	0.0096031	0.029575	0.023843	0.004542	0.005062
6	0.114165	0.083528	0.030637	0.099443	0.082206	0.015915	0.014722
7	0.036136	0.023754	0.0123814	0.028249	0.025874	0.004494	0.007887
8	0.066752	0.059295	0.007457	0.056041	0.00794	0.004688	0.010711
9	-0.02069	-0.079811	-0.059121	0.131336	0.037241	0.005463	-0.064584
10	0.055684	0.051798	0.003886	0.01034	0.051689	0.041458	0.045344
11	0.02557	-0.01433	0.0399	0.01252	-0.00413	0.02685	0.01305
12	0.082054	0.030308	0.051746	0.034027	0.029117	0.003719	0.048027
13	0.085996	0.83499	0.02497	0.063035	0.009671	0.002009	0.022961
14	0.086203	0.079034	0.007169	0.091303	0.071153	0.012269	-0.0051
15	0.084584	0.301816	-0.217232	0.073937	0.056184	0.00987	0.010647
16	0.058456	0.02841	-30046	0.031853	0.02722	0.003443	0.026603
17	0.057661	0.041905	0.015756	-0.177619	0.046924	0.009917	0.23528
18	0.062078	0.047632	0.014446	0.05865	0.058113	0.045602	0.003423
19	0.075539	0.03548	0.040059	0.040399	0.03429	0.00494	0.03514
20	0.032558	0.67953	0.007586	0.030227	0.0237819	0.007561	0.002331
21	0.084156	0.033135	0.051021	0.046681	0.03815	0.013571	0.037475
22	0.048237	0.037025	0.0112119	0.049549	0.04204	0.007509	-0.001312
23	0.105434	0.053194	0.05224	0.063281	0.045309	0.010096	0.042153
24	0.093685	-0.058965	0.15265	0.067146	0.06204	0.012375	0.026539
25	0.033194	-0.003836	0.037033	0.009376	0.0051614	0.014404	0.023818
26	0.086794	0.05397	0.03282	0.061729	0.052645	0.007761	0.025065
27	0.127797	0.083568	0.044229	0.094789	0.048428	0.011224	0.033005
28	0.069337	0.051933	0.017404	0.072321	0.070886	-0.00644	-0.002984
29	0.048894	0.043783	0.005111	0.03921	0.04259	-0.00457	0.009684
30	0.089982	0.639082	-0.5491	-0.498136	0.64216	0.10841	0.588118
31	0.041197	0.031867	0.00933	0.036487	0.030672	0.004667	0.00471
32	0.040186	0.352165	0.049695	0.008165	-0.006429	0.017673	0.032021
33	0.043059	0.050271	-0.006681	0.06109	0.05781	0.01403	-0.018031
34	0.05374	0.037272	0.016468	0.045371	0.036086	0.008099	0.008369
35	0.0095	0.0665	-0.057	0.05806	0.068623	-0.008436	-0.04856
36	0.006434	0.02739	-0.020959	0.037312	0.0262	0.00992	-0.030878

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37	0.049759	0.064869	-0.0151102	0.083788	0.07293	0.008469	-0.034029
38	0.030423	-0.108925	0.139348	0.04738	-0.105845	0.1563	-0.016957
39	0.02937	0.01437	0.015	0.016908	0.006489	0.002537	0.012462
40	0.08088	0.079731	0.001149	0.95479	0.04689	0.8844	-0.87391
41	0.034329	0.050441	-0.016112	0.011408	0.05256	0.00681	0.022921
42	0.029039	-0.001267	0.030306	0.060264	0.054325	0.010959	-0.031225
43	0.027057	0.019982	0.007075	0.041086	0.032942	0.00695	-0.014029
44	0.06433	0.039176	0.025154	0.044458	0.037857	0.005282	0.019872
45	0.039146	0.031686	0.00746	0.035681	0.030495	0.003995	0.003465
46	0.082451	0.058847	0.023604	0.068443	0.050966	0.009595	0.014008
47	0.06734	0.060829	0.006511	0.070287	0.05957	0.00945	-0.002947
48	0.041138	0.028496	0.012642	0.014556	0.0273	0.011684	0.026582
49	0.010166	-0.022554	0.033214	0.02715	-0.01152	0.03735	-0.016984
50	0.080141	0.65113	0.015028	0.074036	0.068192	0.00892	0.0061049
51	0.04328	-0.01225	0.05553	0.155853	-0.009177	0.168112	-0.112573
52	0.036907	-0.00343	0.04034	0.018854	-0.00462	0.011578	0.018053
53	0.020155	0.053372	-0.033217	0.053985	0.002017	0.00062	-0.03383
54	0.036801	0.027438	0.009363	0.028349	-0.007702	0.001324	0.008452
55	0.039898	-0.006732	0.04663	0.112118	-0.00792	0.019015	-0.07222
56	0.017257	-0.000135	0.017392	0.037085	-0.00049	0.00243	-0.019828
57	0.0219	0.016863	0.005037	-0.002378	0.035	0.01677	0.024278
58	0.038696	0.055266	-0.01657	0.016339	0.06334	0.00578	0.022357
59	0.02025	0.05527	-0.03502	0.053566	0.003929	-0.00171	-0.033316
60	0.04412	-0.007227	0.051347	0.012333	-0.008414	0.01955	0.031787
61	0.04655	0.18668	-0.014013	0.20771	0.009209	-2103	-0.016116
62	0.030588	0.042729	-0.0121414	0.047626	0.04153	0.0049	-0.017038
63	0.033698	-0.004899	0.038597	0.011388	-0.00608	0.016267	0.02231
64	0.03077	0.045775	-0.015005	0.052364	0.04255	0.00862	-0.021594
65	0.04263	-0.00197	0.044602	-0.00154	0.001109	0.000432	0.04417
66	0.03185	0.04223	-0.01039	0.057194	0.05244	0.014808	-0.025344
67	0.06167	0.078832	-0.017162	-0.08396	0.043693	0.008618	0.14563
68	0.04343	0.043545	-0.0001158	0.05055	0.04662	0.007015	-0.00712
69	0.05434	0.022985	0.031355	0.029025	0.031064	0.006039	0.025315
70	0.018664	0.038811	-0.020147	0.043194	0.04093	0.00438	-0.02453
71	0.04708	0.035599	0.011481	0.02895	0.034414	0.007226	0.018126
72	0.060704	0.05412	0.006584	0.044579	0.0572	0.050766	0.016125
73	0.023	0.01192	0.01108	0.038199	0.036207	0.004118	-0.015199
74	0.040021	-0.017729	0.015775	0.070082	0.05887	0.01428	-0.0300616
75	0.030472	0.040692	-0.01022	0.020042	0.039502	0.010437	0.01043
76	0.06054	0.050924	0.009616	0.057263	0.049604	0.006335	0.003277
77	-0.0106	0.04139	-0.03079	-0.0921	0.02231	0.04646	-0.0815
78	0.04323	0.038854	0.004371	0.044593	0.04388	0.005736	-0.001365
79	0.106603	0.059493	0.047112	0.068273	0.06756	0.00877	0.03833
80	0.039929	-0.055329	0.055329	-0.000931	-0.0052	0.01446	0.04086

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81	0.09053	0.01241	0.07812	1.09909	0.17672	0.93046	-1.00856
82	0.03544	0.02767	0.00777	0.11265	0.053417	0.06943	-0.07721
83	0.02764	0.08453	-0.05689	0.04413	-0.00589	0.01488	-0.016491
84	0.111759	0.187918	-0.076159	0.027952	0.04177	0.007649	0.083807
85	0.05502	0.036684	0.018336	0.04154	0.04475	0.00485	0.01348
86	0.035329	-0.038062	0.073391	0.053454	0.046132	0.015392	-0.018125
87	0.034361	0.296459	0.047157	-0.001009	-0.00259	0.011779	0.03537
88	0.01872	-0.00795	0.026672	-0.007264	0.002249	0.000688	0.025984
89	0.03846	0.04482	-0.00636	0.054063	0.05289	0.56845	-0.015603
90	0.00907	0.0514	-0.04233	0.0601	0.056424	-0.03612	-0.05103
91	0.03219	0.05583	-0.023649	0.07009	0.063109	0.014255	-0.0379
92	0.02004	0.01345	0.00659	0.015917	-0.002303	0.010347	0.004123
93	0.012957	0.04322	-0.030266	0.050367	0.042033	0.007147	-0.037413
94	0.034601	-0.003177	0.037778	0.007691	-0.004367	0.010868	0.02691
95	0.204632	0.054114	0.150518	0.399721	0.04623	0.09207	-0.195089
96	0.003892	0.009008	-0.005188	0.012702	0.00789	0.00362	-0.00881
97	0.023392	0.027275	-0.059493	0.082885	0.018695	0.003883	-0.000376
98	0.22261	0.062354	0.0524	0.147913	0.061032	0.011393	0.102039
99	0.049299	0.080265	-0.033159	0.080616	0.001455	0.0003596	-0.03351
100	0.047714	-0.00299	0.03504	0.016842	-0.00432	0.019843	0.015208

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