

Mutual Fund Performance: An Analysis of Monthly Returns

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ABSTRACT

In this paper an attempt is made to evaluate the performance of two growth oriented mutual funds (Mastergain and Magnum Express) on the basis of monthly returns compared to benchmark returns. For this purpose, risk adjusted performance measures suggested by Jenson, Treynor and Sharpe are employed. It is found that, Mastergain has performed better according to Jenson and Treynor measures and on the basis of Sharpe ratio it's performance is not upto the benchmark. The performance of Magnum Express is poor on the basis of all these three measures. However, Magnum Express is well diversified and has reduced it's unique risk where as Mastergain did not. These two funds are found to be poor in earning better returns either adopting marketing or in selecting under priced securities. It can be concluded that, the two growth oriented funds have not performed better in terms of total risk and the funds are not offering advantages of diversification and professionalism to the investors.

THE CONSIDERATIONS UNDERLYING the performance evaluation of mutual funds is a matter of concern to the fund managers, investors and researchers alike. The present paper attempts to answer two questions relating to mutual fund performance;

1. Whether the growth oriented Mutual Fund are earning higher returns than the benchmark returns (or market Portfolio/Index returns) in terms of risk.
2. Whether the growth oriented mutual funds are offering the advantages of Diversification, Market timing and Selectivity of Securities to their investors.

This paper attempts to answer the questions raised, by initially describing some basic concepts and later by employing a methodology which was used by Jenson (1968), Treynor (1965), and Sharpe (1966) and finally drawing appropriate conclusions.

Two growth oriented mutual funds selected for the purpose of this study are 'Capital Growth Unit Scheme' or popularly 'Mastergain 1991' of UTI and 'Magnum Express' of SBI Mutual Fund. The study period is 21 months (June 1992 to March 1994). The data source is monthly Net Asset Values

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(NAVs) published in 'The Economic Times'. 'The Economic Times Ordinary Share Price Index' (ETOSHPI) is assumed as Market Index or the Benchmark.

The Basic Concepts

- a. *Return Portfolio Returns.* Fundamentally, return on a portfolio or a fund* is :

$$r_p = \frac{NAV_{(t)} - NAV_{(t-1)}}{NAV_{(t-1)}} \times 100$$

where,

r_p is return on portfolio
 NAV is the Net Assest Value of the Fund
 't' is the time period.

Monthly returns based on the NAVs of the two funds for the period are taken and simple averages of such returns (AR_p) are calculated.

Market Return; Similarly, returns on the market index (r_m) are taken to arrive at the average market return (AR_m)

$$r_m = \frac{\text{Market Index}_{(t)} - \text{Market Index}_{(t-1)}}{\text{Market Index}_{(t-1)}} \times 100$$

where, r_m is return on market

Risk Free Return; Further it is assumed that, the monthly risk free return (r_f) is one percent. The reason for this is Post Office Monthly Income Deposits Offer an annual return of 13 per cent. Thus, although the average monthly risk free return (AR_f) works out to more than one per cent, it is rounded upto one percent.

- b. *Risk* Risk is the variability of returns. Total risk is measured with the help of standard deviation of returns for both the portfolio \bar{O}_p and the market (\bar{O}_m)

$$\bar{O}_p = \sqrt{\frac{\sum [(r_p - r_f) - (\bar{r}_p - r_f)]^2}{N-1}}$$

where,

\bar{O} is total risk of the Portfolio

$(\bar{r}_p - r_f)$ Average excess return of Portfolio over risk free return.

N = Number of observations

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* Return on a portfolio is computed after adjusting the NAVs to dividends, Capital gains, Right and Bonus issues. But in the study the two funds do not have any of these four elements.

$$\bar{\sigma}_m = \sqrt{\frac{\sum [(r_m - r_f) - (\bar{r}_m - \bar{r}_f)]^2}{N-1}}$$

where,

$\bar{\sigma}_m$ is total risk of the Market Index.

$(\bar{r}_m - \bar{r}_f)$ Average excess return of Market over risk free return.

The two components of total risk are systematic risk and unique risk. Systematic risk is measured as follows:

where,

$$\beta_p = \frac{(N \sum_{t=1}^N er_{mt} er_{pt}) - (\sum_{t=1}^N er_{pt} \sum_{t=1}^N er_{mt})}{(N \sum_{t=1}^N er_{mt}^2) - (\sum_{t=1}^N er_{mt})^2}$$

where, β_p is Beta, systematic risk of the portfolio

$$er_{mt} = r_{mt} - r_{ft}$$

$$er_{pt} = r_{pt} - r_{ft}$$

t is time period 1,2,.....N

N is Total number of observations

Systematic risk includes all types of factors which influence all securities available in the market. Thus, systematic risk of the market is always one, systematic risk of risk free investment is zero, and portfolio or fund systematic risk can be greater than or less than one.

Unique risk is the risk of the portfolio in particular. It is measured with the help of Standard Deviation of Error term (SDEt). Unique risk can be altered by better portfolio management.

$$SDEP_t = \sqrt{\frac{\sum (E_{pt} - \bar{E}_{pt})^2}{N-1}}$$

where,

$SDEP_t$ = Unique risk of the portfolio.

E_{pt} = Error terms of the portfolio for period 't'

\bar{E}_{pt} = Average of error terms.

The Methodology

The two questions raised in the beginning are answered with the following Methodology.

1. In order to answer the first question the following measures are adopted. These measures are introduced and tested by Jensen (1968), Treynor (1965) and Sharpe (1966). Basically, these measures are developed on the assumptions of 'The Capital Asset Pricing Model' (CAPM) profounded by Sharpe, Lintner and others.

The CAPM specifies that in equilibrium the return and risk are in linear relationship called as Security Market Line (SML)¹.

$$r_p = r_f + \beta (r_m - r_f)$$

where,

r_p is expected return on security portfolio P

r_m is expected market return

r_f is risk free return

β is the measure of systematic risk of the security or portfolio.

For a well diversified portfolio, the above relationship can be specified in terms of the total risk ($\bar{\sigma}_p$) of portfolio return, called as Capital Market Line (CML).

$$r_p = r_f + \bar{\sigma}_p (r_m - r_f) / \bar{\sigma}_m$$

where,

$\bar{\sigma}_m$ is the total risk of Market Index

Though, SML and CML are for the purpose of security return, every security of the portfolio must be plotted on SML and CML. However, well diversified portfolios plot on both the CML and SML, undiversified portfolios plot only on the SML².

The following first two measures are based on the SML, where as the third one is based on the CML.

a. Jensen Measure

According to Jensen (1968), equilibrium average return on a portfolio would be a benchmark. Equilibrium average return is the return of the portfolio by the market with respect to systematic risk (volatility) of the portfolio. This is a return the portfolio should earn with the given systematic risk.

$$EAR_p = AR_f + (AR_m - AR_f) B_p$$

where,

EAR_p is Equilibrium average return.

Difference between equilibrium average return and average return of the portfolio indicates superior performance of the fund. This is called as alpha (α)

$$\alpha = AR_p - EAR_p$$

If the alpha is positive, the portfolio has performed better and if alpha is negative it has not shown performance upto the bench mark, i.e., the market index.

b. *Reward to Volatility Ratio*

This is introduced by Treynor (1965) and similar to the above discussed Jensen measure. Here, additional returns of the portfolio over the risk free return is expressed in relation to portfolio's systematic risk;

$$RVOL_p = \frac{AR_p - AR_f}{B_p}$$

where,

$RVOL_p$ is reward to volatility of the portfolio.

Here, additional returns of market over risk free return ($AR_m - AR_f$) is the benchmark. Greater value of the portfolio over the market, indicates a superior performance of the fund.

The analysis on the basis of above two measures may lead to the same conclusion. This is so because both the measures are based on only systematic risk and exclude unique risk of the portfolio. Hence, it is necessary to evaluate the performance of the fund in terms of its total risk. The following measure is used for the purpose.

c. *Reward to Variability*

It was developed by William F. Sharpe (1966). Here, additional portfolio return over risk free return is related with the total risk of the portfolio.

$$RVAR_p = \frac{AR_p - AR_f}{\overline{O}_p}$$

The bench mark is additional return of market over risk free return related with market portfolio's total risk.

$$RVAR_m = \frac{AR_m - AR_f}{\overline{O}_m}$$

A fund which performed better according to first two measures namely Jensen and Treynor measures and not according to the third measures indicates the direction in which fund manager has to change the portfolio structure.

2.2 The second question of the paper can be answered with the help of three measures which indicate Diversification, Market timing and Selectivity.

a. *Diversification*

One of the important advantages of mutual funds is that a small investor can also enjoy benefits of diversification of portfolio. Further, well diversified portfolio reduces the risk of the portfolio. Diversification can be measured with the help of coefficient of determination (R^2). This can be obtained by regressing the portfolio's additional return ($r_p - r_f$) against the market additional returns ($r_m - r_f$). A high value indicates greater diversification of fund and vice-versa³.

b. *Market Timing*

It is a form of active fund management. A fund manager who would like to prefer market timing, structures the portfolio to have a relatively high beta during a market rise and relatively low beta during market decline. Because of this investors will benefit out of both the market rise and market fall situations.

A scatter diagram is to be presented to know whether the fund returns and market returns are linear. If it is found that, they are not linear, a parabolic relationship can be anticipated and measured with the help of quadratic regression equation (Treynor 1966).

$$r_{pt} - r_{ft} = a + b (r_{mt} - r_{ft}) + c (r_{mt} - r_{ft})^2 + E_{pt}$$

If the estimated value of 'C' is positive, the curve would become less steep and moves to the left⁴. This would indicate successful market timing of fund manager.

c. *Selectivity*

It is the ability (Professional acumen) of the fund manager to select under valued securities (priced lower than their true value at a point of time) in order to earn higher returns. It can be known with the help of Fama's (1972) decomposition measure.

$$(AR_p - AR_f) - \bar{O}_p / \bar{O}_m (AR_m - AR_f)$$

A positive high value indicates that the fund has achieved superior returns and investor's are benefited out of the selectivity exercised by the Fund Manager.

However, this paper is not exempted from one major limitation. That is, the ETOSHPI consist of 72 actively traded securities, only in Bombay Stock Exchange alone more than 8000 companies scripts are listed hence ETOSHPI may not be a effective Index as benchmark.

Analysis of Results

Performance Evaluation Against Benchmarks

Table 1: Presents return and risk of the two funds along with market return and risk. From the table it is evident that, Mastergain has earned an average return of 2.89 percent as against the market earning of 2.84 percent, Magnum Express has not earned higher return than the Market portfolio.

However, high volatility of Magnum Express indicates that, one percent increase in market portfolio resulted 0.83 percent increase in the fund. In case of Mastergain the Volatility is only 0.68. From the volatility point of view Magnum Express investors might have benefitted and Master gain investors have not.

Further, the Magnum Express has a low risk compared to market and Master gain has taken a high risk. In terms of risk both systematic and total, which fund has performed better in comparison to market is a question to be answered.

Table 2: Presents risk adjusted performance measures. These measures are calculated on the basis of rules discussed in the Methodology Section.

Alpha value of Mastergain is positive, indicating its superior performance and Magnum express has a negative value of alpha which indicates inferior performance of the fund in comparison to market. Further, reward to volatility ratio is higher than the benchmark for Mastergain where as it is low for Magnum Express. From these two measures it can be concluded that Mastergain has a superior performance over its benchmark and Magnum Express is not upto the mark.

Mastergain has earned superior returns by taking greater risk than the market (Table: 1). Here, an issue is, the extent to which investors have been compensated for additional risk. This can be measured with reward to variability ratio. The reward to variability ratio of Mastergain is lower than its benchmark and indicates inferior performance. In the case of Magnum Express, the result is consistent with the earlier two measures. Thus, in terms of total risk both the funds are inferior to their benchmark returns. Magnum Express fund manager can diversify the portfolio and can reduce the unique risk of portfolio.

Diversification, Market Timing and Selectivity

The low R^2 value of Master Gain indicates less diversification of the portfolio (Table: 3). As the portfolio is less diversified, its unique risk is very high (9.77). In the case of Magnum Express the portfolio is well diversified with high R^2 value. Further, unique risk of the portfolio is low (5.70). Thus the Magnum Express is offering the advantage of diversification which resulted into reduction of total risk ($10.142 < 10.265$) also. Unless portfolio is diversified Master gain has less scope to earn better returns.

Scatter diagrams of the funds indicate the relationship between fund excess return ($r_p - r_f$) and the market excess return ($r_m - r_f$). These are not linear for both the funds. This may suggest that, the portfolio consisted of high beta securities during periods when the market return was high and low beta securities when the market return was low. (Graph 1 and 2)

Further the ability of market timing can be known with the help of following equations:

Mastergain:

$$-1.41 + 0.6 (r_{mt} - r_{ft}) + 0.02 (r_{mt} - r_{ft})^2 + E_t$$

(t = 19)

Magnum Express:

$$-0.95 + 0.79 (r_{mt} - r_{ft}) + 0.005 (r_{mt} - r_{ft})^2 + E_t$$

(t = 15)

Table 4 : Presents break up of portfolio returns with the help of Fama's decomposition measures. Both the funds have not earned any superior returns because of the lack of selectivity on the part of the Fund Manager. Thus it indicates that the funds have not offered the advantages of professionalism to the investors.

Conclusions

From the above analysis, it can be noted that the two growth oriented mutual funds have not performed better than their benchmark indicators. Though Master Gain has performed better than the benchmark of its systematic risk (volatility) but with respect to total risk the fund has not outperformed the Market Index.

Growth oriented mutual funds are expected to offer the advantages of Diversification, Market timing and Selectivity. In the sample, Magnum Express is found to be highly diversified fund and because of high diversification it has reduced total risk of the portfolio. Whereas, Master gain is low diversified and because of low diversification its total risk is found to be very high. Further, the fund managers of two funds are found to be poor in terms of their ability of market timing and selectivity.

The fund manager of Mastergain can improve the returns to the investors by increasing the systematic risk of the portfolio, which in turn can be done by identifying highly volatile shares. Alternatively, Mastergain can take advantage by diversification, which goes to reduce the risk if the same return is given to the investor at a reduced risk level, the compensation for risk might seem adequate. The fund manager of Magnum Express can earn better returns by adopting the marketing timing strategy and selecting the under priced securities.

Notes

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Table 1
Return and Risk on Portfolios

(Figures in %)

	Master Gain	Magnum Express
1. Average Monthly Return on Fund (AR_p)	2.89	2.52
2. Average Monthly Risk Free Return (AR_r)	1.00	1.00
3. Average Monthly Market Return (AR_m)	2.84	3.41
4. Risk (\bar{O}_p)	11.82	10.142
5. Risk of Market Portfolio (\bar{O}_m)	10.342	10.265
6. Volatility (β)	0.68	0.83

Table 2
Risk Adjusted Performance Measure

	Master Gain	SBI Magnum Express
1. Equilibrium Average Monthly Return on Fund (A bench mark) (%)	2.25	3.00
2. Average Monthly Return on Fund (%)	2.89	2.52
3. Excess of Average Return of Fund over Equilibrium Return (2-1) (%) (Alpha)	0.54	-0.48
4. Market Index Reward to Volatility (Benchmark)	1.84	2.41
5. Fund Reward to Volatility	2.78	1.83
6. Market Index Reward to Variability	0.178	0.235
7. Fund Reward to Variability	0.159	0.149

Table 3
Risk and Diversification

	Master Gain	Magnum Express
1. Total Risk (\bar{O}_p)	11.82	10.142
2. Systematic Risk (β)	0.68	0.83
3. Unsystematic Risk ($\bar{O}_{E_{pt}}$)	9.77	5.70
4. Diversification (R^2)	0.35	0.71

Table 4
Break Up of Portfolio Returns

(Figures in Percentage)

	Master Gain	Magnum Express
1. Risk Free Return (AR_p)	1.00	1.00
2. Impact of Systematic Risk [$\beta_p AR_m - AR_p$]	1.25	2.00
3. Impact of Imperfect Diversification [[$\bar{O}_p / m - \bar{O}_p$] ($AR_m - AR_p$)]	0.85	0.381
4. Net Superior Returns due to Selectivity [($AR_p - AR_p$)-(\bar{O}_p / \bar{O}_m) ($AR_m - AR_p$)]	-0.213	-0.86
5. Portfolio Return (%)	2.89	2.52

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