“Risk Adjusted Performance of Pakistani Mutual Funds”

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Abstract

This research aims to analyze the risk adjusted performance of Pakistani open-end mutual funds during the time period July 2008 to July 2013 using the most important and widely used risk adjusted performance measures. A sample of 73 open-end funds is used for this purpose. The analysis is free from the limitation of unequal sample observations and non-identical time periods. Findings suggest that in Pakistan the open-end mutual funds do not have superior risk adjusted performance.

Key Words: Mutual funds, Risk adjusted performance, Risk management.

JEL Classification: G11, G12, G32.

1. Introduction:

Mutual funds have become one of the most famous tools of investment for common people because they provide opportunity of diversified investment for small investors. Assets under management are increasing and mutual funds are getting diversified as their demand is growing (Zhao, Wang, & Lai, 2011). Consequently, performance assessment of mutual funds has become an attractive area for academic researchers and an area of vital interest for investors and mutual funds managers (Simons, 1998), because the historical performance of mutual funds is usually a highly significant determinant of the investment decision (Brown, Goetzmann, Ibbotson, & Ross, 1992).

The essence of evaluating performance of mutual funds is to measure the value of mutual funds management industry services (if any). The fund manager offers no service if he provides a portfolio that may also be achieved by the investing public (Chen & Knez, 1996). Put differently, an actively managed fund has superior performance if it provides higher average return than a passively managed portfolio with the same amount of risk (Lehmann & Modest, 1987). Therefore, performance of mutual funds needs not to be evaluated on the basis of return alone; the different levels of risk associated to the funds also need to be taken into consideration. The comparative strength of mutual funds with respect to one another can better be assessed using the risk return relationship. Several well-known authors have been working since 1960s

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for developing composite performance indices for risk adjusted performance evaluation of investment portfolios. Since the important work of Markowitz (1952), Sharpe (1964, 1966), Treynor (1965), and Jensen (1968, 1969) who provided a basis for risk adjusted performance evaluation, numerous studies on performance evaluation of mutual funds have been conducted, mainly based on the risk and return framework.

A limited number of studies have been conducted to evaluate risk adjusted performance of Pakistani mutual funds. These studies have many limitations, for example many of these have either a small or/and non-representative sample, unequal sample observations, or non-identical time periods. That is why these studies have contradictory results even though these employ same performance measures. Thus the existing literature has failed to depict the actual picture of Pakistani mutual fund industry. The present study aims to investigate the risk adjusted performance Pakistani open-ended mutual funds. We have used a sample that is a fair representative of the population. Moreover, our results are free from the limitations of unequal sample observations, and non-identical time periods.

2. Literature Review

Past performance of mutual funds is usually a highly significant determinant of the investment decision (Brown et al., 1992). Small investors face information and searching costs while selecting mutual funds. That is why such investors make selection of funds on the basis of historical performance even though past performance may not predict future performance accurately (See for example Chevalier & Ellison, 1997; Goetzmann & Peles, 1997; Sirri & Tufano, 1998). On the other hand large private investors and institutional investors are generally assumed to have better information than the small investors. Such investors reflect economies of scale in the production of information, therefore lower cost should lead institutional investors to more sophisticated and better criteria of investment selection (James & Karceski, 2006). However, as pointed out by Lakonishok, Shleifer, and Vishny (1992), many layers of agency conflicts influence the investment decisions of some institutional investors. Specifically, trustees, corporate treasurers and pension fund sponsors may delegate funds management to outside managers so that they are longer responsible for poor performance (See Devenow & Welch, 1996). This may lead to selection of funds managers on the basis of past performance-similar to the mutual funds selection by small investors (James & Karceski, 2006).

The literature on performance evaluation of mutual funds dates back to the beginning of assets pricing theory in the mid-1960s (Chen & Knez, 1996). The development of Capital Asset Pricing Model (CAPM) provided a bases for adjusting returns for risk (Grinblatt & Titman, 1994). It's important application, implemented by Treynor

(1965) and Jensen (1968, 1969), is the performance evaluation of managed portfolios. Since 1960s several measures have been proposed for performance evaluation of mutual funds. Among these the most popular and the best-known measures include the Treynor ratio, the Sharpe ratio, and Jensen's alpha (Jordan & Miller, 2009).

The Sharpe ratio is a basic measure for the risk adjusted performance, which was proposed by William F. Sharpe in 1966. The Sharpe ratio is computed as the ratio of the portfolio risk premium over standard deviation of the portfolio return (Sharpe, 1966). This ratio measures the performance of a portfolio with respect to the risk premium per unit of total risk. If the Sharpe ratio is high and positive, it signifies the favorable risk adjusted performance of a mutual fund scheme. On the other hand, the low or negative Sharpe ratio indicates an unfavorable performance of a fund. The negative Sharpe ratio indicates that the risk-free asset has over performed the mutual fund under consideration (Investopedia). Thus, among two or more managed portfolios, an investor will prefer that portfolio which has the positive and the greater Sharpe ratio. If a mutual fund's Sharpe ratio is higher than the Sharpe ratio of the market portfolio, it means that the mutual fund scheme has outperformed the market.

Similarly, the Treynor Ratio, originally proposed by Jack L. Treynor in 1965 is an index of the portfolio risk adjusted performance computed as the ratio of a portfolio risk premium over the portfolio systematic risk measured by beta coefficient of the portfolio. A high and positive Treynor ratio indicates favorable risk adjusted performance of a mutual fund scheme. On the other hand, if the Treynor ratio of a fund is low or negative, it indicates an unfavorable performance (Simons, 1998). Thus, among two or more mutual funds schemes, an investor will prefer that scheme which has the positive and the greater Treynor ratio (Treynor, 1965). If the Treynor ratio of a mutual fund is greater than that of the market portfolio, it gives the indication that the mutual fund scheme has outperformed the market.

The Treynor and Sharpe ratios are similar in the sense that both of these divide the risk premium of a fund by a numerical measure of its risk. The small investors, who invest in one or few funds, have no or little chance of diversifying the unsystematic risk. Therefore, for the small investors Sharpe ratio is more relevant as it considers the total risk of the portfolio (Mutualfundsindia). The large investors, on the other hand, hold a large portfolio containing many securities; therefore, a fund's unsystematic risk does not matter for them because when the fund is included in their total portfolio, its systematic risk will be diversified away. For such investors, the systematic risk is more relevant that is non diversifiable. Therefore, for large investors the Treynor ratio is more appropriate, indicating that a mutual fund has significantly outperformed the market and is very attractive (Barua, Varma, & Raghunathan, 2001, p. 207).

On the other hand, the Jensen model also called the Differential Return Method was developed by Michael C. Jensen in 1968. This measure calculates the difference between the returns actually earned by the fund and the expected returns of the fund predicted by the Capital asset pricing model (CAPM) (Jensen, 1968). The difference between the actual and the expected returns of the fund is called Alpha, widely known as Jensen Alpha (Jordan & Miller, 2009, p. 416). The positive Jensen's alpha indicates that the fund has provided higher than the expected return and thus lies above the Security Market Line (SML) and vice versa. Thus, the positive and higher Jensen's alpha indicates favorable performance of the mutual fund scheme.

Recent studies have gone beyond the measures based on CAPM. These studies consider the non-market factors (such as book-to-market, size and momentum etc) in the cross section of expected returns (Kothari & Warner, 2001). Since the early measures of Treynor (1965), Sharpe (1966) and Jensen (1968), several new measures have been proposed for performance evaluation of mutual funds. These measures include Assets Pricing Theory based measures of Connor and Korajczyk (1986) and Lehmann and Modest (1987), the period weighting measures proposed by Grinblatt and Titman (1989), and the measures of Glosten and Jagannathan (1994) based on inter-temporal marginal rates of substitution, to list just a few. The huge variety of measures offers a rich choice set to those interested in performance evaluation, but at same time makes it difficult to select a method (Chen & Knez, 1996).

Few studies have been conducted in Pakistan on mutual funds performance evaluation using conventional measures. Among these Sipra (2006), Ali and Qudous (2012), Abbasi and Shah (2012), and Khalid, Abbas, and Shah (Unknown) suggest that Pakistani mutual funds do not reveal superior risk adjusted performance, while Shah and Hijazi (2005), Khan (2010), Nafees, Shah, and Khan (2011), Iqbal and Qadeer (2012), and Razzaq, Gul, Sajid, Khan, and Razzaq (2012) have contradictory results.

3. Methodology

3.1 Population and Sample

At present there are 25 Asset Management Companies (AMCs) in Pakistan managing over 160 open/closed end funds. The sampling frame consists of the open end funds that were incepted before 31st July 2008 and have survived till 31st July 2013. Moreover, those funds were also dropped whose data was not available during the mentioned period. So, we were left with 66 funds to be included in the sample. The sample also contains 7 such funds which were incepted 1 to 3 months after July 2008. For such funds the month-end Net Asset Value (NAV) of the initial missing months was estimated using average of the subsequent five months' NAVs. Thus our sample

consists of 73 open end funds. The time period July 2008 to June 2013 was selected to get returns of the past 60 months, as 60 observations of historical monthly returns (i.e., returns of the past 60 months) are commonly used for estimating beta (Simons, 1998). Thus our analysis is free from the limitation of unequal sample observations and non-identical time periods.

3.2 Data sources

For calculating the mutual funds' returns, the dividend payout and month-end Net Asset Value (NAV) were obtained from the Mutual funds association of Pakistan (MUFAP) official website. For market returns the KSE 100 index is used as a benchmark. While, for the risk-free rate, six months treasury bills yield is used as a proxy. The historical monthly data of KSE 100 index was downloaded from Yahoo finance website while, the historical T-bills rates were collected from the Statistical Bulletins issued by the State Bank of Pakistan.

3.3 Return

The mutual fund return is calculated net of expenses charged to the fund including management fees. The monthly returns for each mutual fund scheme are calculated as follows as suggested by Simons (1998):

$$R_p = \frac{NAV_t + DIST_t - NAV_{t-1}}{NAV_{t-1}}(1)$$

Where, R_p is the fund's return in the month t , NAV_t is the fund's closing NAV on the month's last trading day, NAV_{t-1} is the NAV of the fund on the previous month's last trading day, and $DIST_t$ is the capital gains and income distributions in the form of cash dividend and the bonus issue taken during the month. Since data on the bonus issue was not accessible, therefore the distributions in the form of cash dividend are considered only.

The monthly returns on the market portfolio are computed using KSE 100 index as benchmark. The market portfolio returns are computed as:

$$R_m = \frac{KSE\ 100\ index_t - KSE\ 100\ index_{t-1}}{KSE\ 100\ index_{t-1}} \quad (2)$$

Where, R_m shows return on the market portfolio in the month t , $KSE\ 100\ index_t$ is the closing value of KSE 100 index on the month last trading day, while $KSE\ 100\ index_{t-1}$ is the value of KSE index on the previous month's last trading day.

3.4 Measures of Risk

In finance, the standard deviation and variance of returns are used as surrogate

for the total risk. Both standard deviation and variance are equally accepted measures of total risk of an asset (Rao and Ravindran, 2004).

Variance of the returns, denoted as $\text{Var}(R)$ is computed as:

$$\text{Var}(R) = \frac{1}{n} \sum_{t=1}^n (R - R_{am})^2 \quad (3)$$

Where R = Return on the fund (or market portfolio in case of variance of market)

R_{am} = Mean rate of return on fund (or market portfolio in case of variance of market).

Standard deviation is the square root of the variance, denoted as σ :

$$\sigma = \sqrt{\text{Var}(R)} \quad (4)$$

On the other hand Beta is widely used as a measure of systematic risk. Beta can be estimated from the historical returns on an investment and the market portfolio. 60 observations of historical monthly returns (i.e., returns of the past 60 months) are commonly used for estimating beta (Simons, 1998).

In this study beta of a mutual fund is estimated using the Sharpe-Lintner CAPM regression of the excess return on the mutual fund against the excess return on the market portfolio. The equation of the regression can be represented as follows:

$$R_p - R_f = \alpha + \beta(R_m - R_f) + \epsilon_p \quad (5)$$

Where, beta represents the slope, while alpha is the intercept of the regression line. Beta is interpreted as the systematic risk of the given portfolio. Whereas, alpha shows the extra return for the fund's given level of systematic risk and thus represents the value added by the manager of the fund (Jensen, 1968).

3.5 Mutual Funds Performance Measures

In this study we have employed the most popular and the best-known measures of risk adjusted performance: the Treynor ratio, the Sharpe ratio, and Jensen's alpha.

The Sharpe ratio is computed as the ratio of the portfolio risk premium over standard deviation of the portfolio return:

$$\text{Sharperatio} = \frac{R_p - R_f}{\sigma_p} \quad (6)$$

Where, the portfolio's risk premium is computed as the difference between the

return on the portfolio and return on risk-free security, i.e., $R_p - R_f$, which is the reward for bearing risk. The standard deviation of the return, σ_p , is the measure of total risk of a portfolio.

In this study the ex-post returns, computed from the NAVs of mutual fund schemes, are used for computing Sharpe ratio for each fund. The Sharpe ratio of the market portfolio is computed using the historical returns on the KSE 100 index.

The Treynor Ratio is computed as the ratio of a portfolio risk premium over the beta coefficient of the portfolio:

$$Treynor\ ratio = \frac{R_p - R_f}{\beta_p} \quad (7)$$

Where, the portfolio's risk premium is computed as the difference between return on the portfolio and return on risk-free security, i.e., $R_p - R_f$, which is the reward for bearing the risk. The beta coefficient of the portfolio, β_p , is the measure of portfolio systematic risk.

This ratio measures the performance of a portfolio with respect to the risk premium per unit of systematic risk. Since beta for the market portfolio is always equal to 1, therefore its Treynor ratio is equal to the risk premium, $R_m - R_f$.

The Jensen Alpha has been computed as the difference between the actual and the expected returns of the fund predicted by the Capital asset pricing model (CAPM).

According to the CAPM, the expected return of a portfolio can be predicted as:

$$E(R_p) = R_f + \beta_p(R_m - R_f) \quad (8)$$

The actual return is then compared to the predicted return to calculate Jensen's Alpha, denoted by

$$\begin{aligned} \alpha_p : \\ \alpha_p &= R_p - E(R_p) \\ &= R_p - \{R_f + \beta_p * (R_M - R_f)\} \end{aligned} \quad (9)$$

4. Results And Discussions

The Table 1 reports average excess return, standard deviation, and beta of different categories of mutual funds. Most of the categories have been able to beat the risk free rate except few but none of these except Islamic Equity funds could beat the market portfolio. Almost all the categories have low risk represented by their low

average beta and standard deviation. Among these funds the Aggressive fixed income and Islamic aggressive fixed income schemes have the lowest average returns and have the highest total risk.

Table 1: The Average Risk and Return-Mutual Fund's Type Wise (July 2008 to July 2013).

Category	No. of Funds	Excess return Over Bench-mark (%)	Excess return Over Risk Free (%)	σ	Coeff. of Variation (%)	β
Aggressive Fixed Income	11	-1.720	-0.859	0.030	21.019	0.108
Asset Allocation	8	-0.849	0.014	0.066	6.493	0.196
Balanced	5	-0.856	0.004	0.045	4.470	0.270
Equity	15	-0.189	0.673	0.068	4.089	0.317
Fund of Funds	1	-0.650	0.210	0.043	3.542	0.096
Income	13	-1.213	-0.353	0.018	1.809	0.068
Index Tracker	2	-0.805	0.065	0.079	7.498	0.325
Islamic Aggressive Fixed Income	4	-1.568	-0.708	0.031	10.535	0.172
Islamic Asset Allocation	3	-0.620	0.243	0.037	3.014	0.154
Islamic Balanced Fund	1	-0.330	0.530	0.051	3.304	0.311
Islamic Equity	5	0.030	0.892	0.071	3.751	0.316
Islamic Income	4	-1.298	-0.438	0.014	2.538	0.042
Money Market	1	-0.990	-0.130	0.0034	0.391	-0.003
Total	73	-0.851	0.011	0.0423	5.5732	0.1824

The table 2 reveals that a large number of funds (i.e., 54) have low systematic risk, 17 funds have below the average risk, and only two funds have average systematic risk. While none of the funds have above average or high risk. Six funds gave negative return while the remaining 67 funds gave positive returns. 14 funds have low returns, 47 funds have average returns, and 4 funds have high returns, while 2 funds have above high returns. Thus, it can be concluded that most of the funds have average returns and low systematic risk.

The table 3 reveals that most of the funds (i.e., 63 funds) have low total risk, 6 funds have below average risk, 1 fund lies in the average risk and above average risk class respectively, while 2 funds have high risk. Most of the funds have low total risk with average returns. Those funds that have average, above average, or high risk gave either negative or low positive returns thus indicating a poor performance.

Table 2: Risk (β) and Return of Mutual Funds (No. of Schemes)

Risk→ Monthly Return (%)↓	Low Risk $\beta < 0.3$	Below Avg. Risk $0.3 > \beta < 0.5$	Average Risk $0.5 > \beta < 0.7$	Αβοωε Αωγ. Ριςκ $0.7 > \beta < 0.9$	High Risk $0.9 > \beta < 1.1$	Total
Less than 0	5	1	0	0	0	6
0-0.50	14	0	0	0	0	14
0.51-1.00	19	1	0	0	0	20
1.01-1.50	12	5	0	0	0	17
1.51-2.00	2	6	2	0	0	10
2.01-2.50	0	4	0	0	0	4
2.51-3.00	1	0	0	0	0	1
3.01-3.50	1	0	0	0	0	1
Total	54	17	2	0	0	73

Table 3: Risk (Coefficient of Variation) and return of Mutual Funds (No. of Schemes)

Risk→ Annual Return (%)↓	Low Risk CV < 20%	Below Avg. Risk 20% > CV < 40%	Average Risk 40% > CV < 60%	Αβοωε Αωγ. Ριςκ $60\% > X \leq 80\%$	High Risk $80\% > CV < 100\%$	Total
Less than 0	2	2	0	1	1	6
0-0.50	8	4	1	0	1	14
0.51-1.0	20	0	0	0	0	20
1.01-1.50	17	0	0	0	0	17
1.51-2.00	10	0	0	0	0	10
2.01-2.50	4	0	0	0	0	4
2.51-3.00	1	0	0	0	0	1
3.01-3.50	1	0	0	0	0	1
Total	63	6	1	1	2	73

Table 4 reports results of the one sample t test. This test has been conducted to test whether mutual funds have superior risk adjusted performance than the benchmark portfolio measured through Sharpe and Treynor ratios. The underlying null hypothesis is that the risk adjusted performance of actively managed portfolios is similar to that of the passively managed portfolio. Mathematically,

Table 4: Risk adjusted performance: Mutual funds vs. benchmark portfolio

		Mutual Funds values			
Measure	Test value	Mean	Standard Error	t ¹	Sig.
Sharpe Ratio	0.117	-0.104	0.025	-8.717	0.000*
Treynor Ratio	0.009	-0.032	0.024	-1.716	0.091**

1 One sample t test

* Significant at 5% level of confidence,

** Significant at 10% level of confidence

$$H_0: \mu = \mu_0$$

$$H_1: \mu \neq \mu_0$$

Results indicate that Sharpe and Treynor ratio of market portfolio (test value) is significantly higher than that of the mutual funds at 10% level of confidence. Therefore the null hypothesis cannot be accepted. Thus we can conclude that the benchmark portfolio has superior risk adjusted performance than the mutual funds.

Table 5 reports the average Jensen alpha for different categories of mutual funds and number of funds with positive and negative alpha in each category. The table reveals that out of 73 funds only 26 have superior performance. Among these the

Table 5: Average Jensen Alpha

Category	Average Jensen α	No. of funds having Negative α	No. of funds having Positive α
Aggressive Fixed Income	-0.0095	11	0
Asset Allocation	-0.0015	5	3
Balanced	-0.0023	4	1
Equity	0.0040	2	13
Fund of Funds	0.0013	0	1
Income	0.0041	13	0
Index Tracker	-0.0022	2	0
Islamic Aggressive Fixed Inc	-0.0086	4	0
Islamic Asset Allocation	0.0011	1	2
Islamic Balanced Fund	0.0026	0	1
Islamic Equity	0.0062	0	5
Islamic Income	-0.0047	4	0
Money Market	-0.0012	1	0
Total	-0.0012	47	26

equity funds (13 funds), Islamic equity funds and funds of funds have positive Jensen alpha thus indicating superior risk adjusted performance. While the other categories have failed to deliver an overall superior risk adjusted performance.

5. Conclusion

Risk and performance assessment is an attractive area for academic researchers and an area of vital interest for investors and mutual funds managers who want to take informed decisions. This research aims to analyze the risk adjusted performance of Pakistani open-end funds during the time period July 2008 to July 2013 using the most important and widely used risk adjusted performance measures including the Sharpe ratio, the Treynor ratio, Jensen Alpha, and Fama measure. Findings of the study suggest that only few funds have over performed the market proxy while the rest have underperformed during the study period. A large number of funds have even not been able to beat the risk-free rate, especially the Islamic Aggressive Fixed Income, Aggressive Fixed Income, Income, Islamic Income and Money Market Funds. Most of the funds have lower return than the return matching with the level of risk their managers have taken. Thus, the return of most of the fund is less than what it should have been. Thus we can conclude that in Pakistan the benchmark portfolio has superior risk adjusted performance than the open-ended mutual funds industry.

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