Mutual Fund Growth
Analysis And Risk Minimization

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Abstract

Mutual fund is the most popular mode of investment at the stock market and its performance evaluation is a topic of immense interest for both investors and academics. This paper provides an overview of the Pakistani Mutual Fund industry and investigates the mutual funds risk adjusted performance using pertinent performance evaluation models. The focus of the study is on open end mutual funds consisting of equity, income, balanced, Islamic equity, asset allocation and money market funds.

Mutual fund industry in Pakistan is still in developing phase. The investors adopt a conservative approach as is evident from the beta derived in the research paper. This paper examines the performance of mutual funds over the span of five years using Sharpe and Treynor models to analyze portfolio performance and investigates the relationship between the mutual funds and market portfolio (KSE 100 Index). The paper further focuses on the critical ratios relevant to mutual funds namely net asset value, number of shares outstanding, return per unit of risk, standard deviation and beta as risks measure.

The paper proceeds as follows: Section 1 gives Introduction, Section 2 indicates the Objective, Section 3 provides Theoretical background information. Section 4 presents Literature review on empirical studies, Section 5 contains Research Statement, Section 6 states the Research Methodology used in the analysis while Section 7 pertains to computational Analysis of the Models. Section 8 summarizes the Result, Section 9 contains Limitation of the study and Section 10 concludes the research.

On an overall basis funds industry has outperformed the market proxy by 0.86 percent, indicating defensive investment by the investors. Pakistan's Mutual Fund industry has a Sharpe ratio of 0.475 as compared to market risk premium of 0.27 per one percent of standard deviation and Treynor ratio is 0.471. The result also identifies some of the funds that have underperformed.

Hence overall results suggest that mutual funds industry has growth potentials even though some of the funds have underperformed due to inherent problem of non-diversification.

__Key words:__ Sharpe ratio, Treynor ratio, Risk measurement, Bench mark, Beta.

__Field of Research:__ Finance - Mutual Fund

1. INTRODUCTION

The paper provides an overview of the Pakistan mutual fund industry and examines risk adjusted performance of mutual funds using Sharpe & Treynor models. Pakistan was pioneer in the field of Mutual Funds in the South Asian Region, when it launched National Investment Trust (NIT), an open-end mutual fund in 1962, followed by Investment Corporation of Pakistan (ICP) in 1966, which offered a series of close-end mutual funds. Both NIT and ICP were established in the public sector.

The reforms and restructuring of the financial system in mid 1990s, paved way for the private sector to enter this industry. The first mutual fund was launched by the private sector in 1997. The industry could not make substantial progress due to the long and deep recession during the late 1990s and lack of investment philosophy and prudent decision - making. Net Asset Values (NAVs) dropped and growth potentials became static. However, from the year 2002 onwards mutual fund industry witnessed an unprecedented growth spurned by many factors namely segregated divesture of ICP mutual funds to private sector, remarkable improvements in country's economic and financial indicators, global trends and favorable regulatory environment.

When compared with the growth in global mutual fund industry Pakistan's funds industry is in nascent stage as such there is ample potentials for growth as mutual is one of the best, safest and convenient avenue of investment.

1.1   SCOPE

The research study covers the performance of different categories of open - end mutual funds.

2. OBJECTIVE

To analyze mutual funds growth and risk minimization using Sharpe and Treynor model.

3. THEORETICAL BACKGROUND

3.1 Current Status

In Pakistan the mutual funds industry has shown unprecedented growth since the year 2005. There has been an upsurge in the number of asset management companies, number of funds, categories of funds and the aggregate size of mutual funds (Graph 1). It has also made strides in product diversification and market penetration.

Presently, there are thirty asset management companies in Pakistan. The member companies (30) of MUFAP are managing eighty one (81) funds. Out of this, twenty two (22) are close end and fifty nine (59) are open end having total net assets worth Rs.47.263 billion and Rs.120.666 billion respectively. Aggregate net assets amounts to Rs.167.929 billion as of 31-12-2007- (MUFAP).

Innovative products under mutual funds are being devised and offered in the market for both corporate and individual investors. The new products to be offered in the near future include Pension Funds, Real Estate Funds, and Infrastructure Funds etc. they are designed to be sharia based to suit investors' risk and return profile, their cash flow needs etc.

The performance of the mutual funds industry has generally kept pace with the performance of the stock market. The effective monitoring of operations of mutual funds and other non-banking Finance companies (NBFCs) by SECP have improved the confidence of investors in Pakistan to a great extent.

According to Khorana, Servaes and Tufano (2005), as of end 2001 approximately 55,000 mutual funds around the world held assets worth $11.7 trillion representing 13.8% of 'primary securities' including 'sovereign debt, corporate equity, private sector bond/notes, or commercial loans. When compared to the global mutual fund industry Pakistan's mutual fund industry is miniscule in size.

3.2 Risk Management

Security exchange commission of Pakistan (SECP) has stipulated conditions for different categories of mutual fund to ensure sufficient risk management. For example, a fund management company is restricted to invest in listed securities or up to twenty percent (20%) in government securities or investment grade debt securities. Its exposure in any security cannot exceed 10% of its paid-up capital or ten percent (10%) of the listed securities of that company, whichever is lower. The management company is also not allowed to invest more than twenty-

five percent (25%) of its net asset value in any one sector.

Equity open-end funds are required to invest at least fifty percent (50%) of their assets in listed securities. The SECP relaxes these conditions if it deems appropriate.

3.3 Benchmark

To understand and interpret the computation of Sharpe and Treynor ratios the results are compared with the benchmark market index for the respective categories of fund. The models are meaningless in the absence of benchmark because on the basis of benchmark funds are stated to have outperformed, underperformed or equally performed the market index.

Benchmarks used are:

Equity Fund	KSE 100 index
Income Fund	T-Bills 1 year
Balance Fund	50% of above benchmarks

4. LITERATURE REVIEW

Otten and Bams (2004) in the article "How to measure mutual fund performance: economic versus statistical relevance" expressed majority of studies in USA conclude that actively managed portfolios, on an average, underperform the market indices. He argued mutual funds underperform the market because of the amount of expenses they charge the investors.

Bauer, Otten & Koedijk, (2002) carried a research on European mutual funds. Results suggest that Europeans mutual funds especially small capitalization funds are able to add value. If the management fee is added back, some exhibits significant out performance. The author also pointed out that European mutual funds industry is still lagging behind the US industry both in total assets size and market capitalization.

For the majority of investors, investment performance of funds is ultimately the most important factor considered in the selection of fund. A mutual fund's performance can be measured in several different ways, depending on its investment objectives. Whether a fund aims for long - term growth, current income, or a combination of the two, investors can track a fund's performance and judge

profitability by following the changes in share price or net asset value (Marketocracy 2004).

According to CAPM, ?eta is the only relevant measure of risk. While, evaluating the performance of mutual funds investors consider Standard deviation as the relevant measure of total risk, investors of a well diversified portfolio regard ?eta as the relevant measure of systematic risk (Cheema & Shah, 2006).

βeta offers a clear, quantifiable measure, which makes it easy to work with, hence it is a convenient measure of a fund's volatility in relation to the market (McClure, B. 2004).

Malkiel and Radisich (2001) finds that index funds have regularly produced rates of return exceeding those of active funds by 100 to 200 basis points per annum. During the 1990s in USA the two reasons resulted in excess performance by passive funds were management fee and trading costs.

Wermers (2000) carried out a research on mutual funds performance in America and found that funds hold stocks that outperform by market 1.3 percent per year, their net results underperform by one percent. Of this 1.6 percent is due to expense and transaction costs.

Blake and Timmermann carried out a research in 1998 on performance evaluation of UK mutual funds and found that the average UK equity fund appears to underperform by around 1.8 percent per annum on a risk-adjusted basis. They have come to conclusion that there is also some evidence of persistence of performance, on an average, a portfolio composed of the historically best performing quartile of mutual funds performs better in the subsequent period than a portfolio composed of the historically worst-performing quartile of funds.

Elton, Gruber and Blake (1996) in the article based on USA data, claims it most of the older studies are subject to survivorship bias. When this effect is adjusted, is argued that mutual funds on average under-perform the market proxy by the amount of expenses they charge the investors.

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Cheema & Shah (2006) expressed it is not easy to gauge the performance of any mutual funds in absolute terms.

4.1 Variables
Variables identified for the performance evaluation and risk management of mutual funds are:

- Net income after taxes of funds.
- Number of certificates/ shares outstanding.
- Earning per certificate.
- Six-month Treasury bills rate for Risk free rate.
- Return of fund (calculated by dividing return per certificate of opening net asset value per certificate).
- Return per certificate (calculated by dividing fund income after taxes by total number of certificates outstanding for the year).
- Net asset value per certificate (calculated by deducting total liabilities from total assets of the year or by taking shareholders equity.
- Return of a fund may also be calculated dividing net income after taxes of a fund by opening net assets of the fund for that year).

5. STATEMENT OF THE PROBLEM
To investigate the performance of open end mutual funds under total risk as well as under systematic/ non-diversifiable risk.

6. RESEARCH METHODOLOGY

6.1 Research Design
The study is both exploratory and descriptive. The exploratory approach supports the application of models for testing the hypothesis. The descriptive approach provides all background / theoretical information. To analyze the research issue Sharpe and Treynor models are used for which the data has been collected and compiled accordingly.

6.2 Sampling Technique
Stratified random sampling technique has been used to draw open-end mutual funds from an array of funds being managed by the AMCs.

6.2.1 Sample
The sample size of the study comprises 30 mutual funds.

6.3 Sources of Data

6.3.1 Secondary
Secondary data has been collected from following sources:

- Annual reports of Asset Management Companies.
- Stock Exchange.
- SECP.
- Web sites.
- MUFAP (Mutual Funds Association of Pakistan).

7. COMPUTATIONAL ANALYSIS
Exploratory aspect of research involves application of renowned models for the performance evaluation of mutual funds.

7.1 Sharpe model
The model is used to measure the performance of a managed portfolio in respect of return per unit of risk. Through this model an investor can know what should be the required rate of return for a risky asset.

$$\text{Sharpe Ratio} = \underline{\quad\quad} \frac{R_p - R_f}{\sigma}$$

R_p = the observed average fund return.
R_f = the average risk free return.
σ_p = the standard deviation of fund returns.

The research study computes the ratio using the historical and average returns, risk-free rate, the standard deviation of the portfolio returns of the funds for the period from 2006 to 2007. Six months Treasury bill is used as a risk free rate. Sharpe ratio of funds is 0.4751 as compared to market risk premium of 0.27 per one percent of standard deviation, which shows higher and better performance as compared to market.

7.2 Treynor Model
It is the ratio of reward or risk premium to the volatility of return as measured by the ?eta (Kevin, 2007). Treynor Ratio indicates that the fund offering the highest risk will be providing the highest return per unit of risk and investors prefer risky funds to those providing low return per unit of risk.

Treynor ratio on an overall basis is 0.471, per one percent of systemic risk. Our sample funds are facing diversification problem that is why the results of both ratios are not the same. Alternatively, had the risk been fully diversifiable the results of both the ratios would have been the same.

Treynor Ratio = $\dfrac{R_p - R_f}{ß}$

Rp = the observed average fund return.
Rf = the average risk free return.
ß = coefficient as a measure of systematic risk.

$$\text{Beta} = \frac{\sum(r_m-r_f)^*(r_i-r_f)-n^* \sum(r_m-r_f)/n^* \sum(r_i-r_f)/n}{\sum(r_m-r_f)2 - n^* \sum((r_m-r_f)/n)2}$$

rm = market return.
ri = portfolio return.
rf = risk free return.
n = number of observations.

Treynor Ratio indicates that the portfolio offering the highest reward/ risk will be the only risky portfolio in which investors will choose to invest. The assumption is that the portfolio manager has diversified away the diversifiable risk (unsystematic risk), as such the focus of the investor should be only on the systematic risk (non-diversifiable/market risk) and not total risk. Here the historical returns, in excess of the risk-free rate (T-Bill rate) to be the systemic risk of the portfolio returns of the Pakistani funds for the period from 2006 to 2007. Results show (Table 2) that all funds have beta less than 1, in some cases significantly less than 1, regarding systemic risk we can conclude that all mutual funds are defensive in their returns as compared to the market returns (KSE 100 index). Treynor ratio on overall basis is 0.4711, risk premium per one percent of systemic risk. If the diversifiable risk is fully diversified away by the portfolio manager, the results of Sharpe ratio and Treynor ratio will be exactly same.

Our sample funds are facing diversification problem as

such the results of both ratios are not identical.

8. SUMMARIZED RESULT
Computation details pertaining to the performance measurement of mutual funds is enclosed as Table 1 and Table 2.

Sharpe ratio of the overall funds is 0.475 as compared to market index of 0.33.
Treynor ratio of the overall funds is computed to be 0.471 as compared to market index of 0.18.

During the year 2006 and 2007 mutual funds have earned an average return of 26 percent with a standard deviation of 38 percent, ?eta (?) coefficient and expected return on the funds are 0.51 and 18 percent respectively. Result indicates some of the funds have underperformed, due to inherent problem of non – diversification.

9. LIMITATIONS OF RESEARCH
1. The focus of the study has been on open - end mutual fund belonging to different categories Equity, Income, Balance fund etc.
2. Mutual funds industry revived in the early 2000s and performance became apparent since 2005. Data collection has been initiated from 2003 wherein discrepancies were observed in the funds age variation.
3. To avoid distortions and biases funds analysis is on the basis of performance and availability of data for 2006 and 2007.
4. Most of the Asset Managers have organized the entire set up on professional lines but due to lack of qualified personnel, systems is deficient in generating data for the purpose of research analysis. AMCs are using Sharpe and Treynor models in their fund manager's report.

10. CONCLUSION
Overall result shows that funds industry has outperformed the market proxy by 0.86 percent. The asset management companies are investing in the market very defensively as is evident from their beta. Mutual Fund industry's Sharpe ratio is 0.47 as compared to market risk premium of 0.27

per one percent of standard deviation. Hence overall results suggest that mutual funds in Pakistan are able to add value to market index for mobilization of investment. Results also show some of the funds have underperformed, due to diversification problem.

The need of the hour is to attract individual investors by offering an array of funds having different investment objectives. Innovative products under mutual funds are in the offing for both corporate and individual investors. The new products to be offered in the near future include Pension Funds, Real Estate Funds, and Infrastructure Funds etc. they are designed to be sharia based to suit investors' risk and return profile, their cash flow needs etc.

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Graph 1
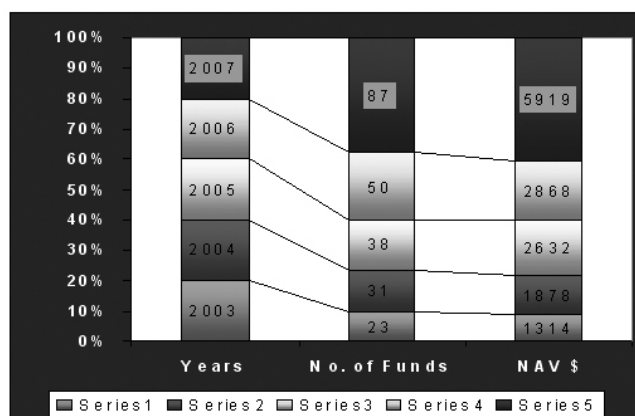## Growth of Mutual Funds in Pakistan

Table 1
Sharpe Ratio and Standard Deviation Analysis

Name of Funds	Rp Return of Fund	Standard Deviation	Sharpe Ratio
AMZ Plus Stock Fund	0.243697784	0.2899	0.55087197
Askari Income Fund	0.25	0.3663	0.55087197
AKD Income Fund	0.130998293	0.3119	0.453180453
AKD Opportunity Fund	0.233868379	0.3851	0.150683849
Atlas Income Fund	0.113998136	0.2831	0.389167434
Atlas Islamic Fund	0.141998601	0.1849	0.105963038
Dawood Money Mkt. Fund	0.278996698	0.2195	0.313675506
Dawood Islamic Fund	0.271987096	0.2918	0.888367644
Faysal Bal. Growth Fund	0.267999906	0.7837	0.644232681
Faysal Income & Growth Fund	0.203963358	0.3105	0.234783598
Faysal Savings Growth Fund	0.290971168	0.2147	0.386355419
First Habib Income Fund	0.113967438	0.1757	0.964001716
HBL Income Fund	0.337973115	0.87	0.170560261
HBL Multi Asset Fund	0.174975657	0.1384	0.29192312
IGI Income Fund	0.169978528	0.289	0.657338564
KASB Stock Market Fund	0.148820327	0.944	0.037561611
National Investment Trust	0.586749027	0.715	0.033343789
NAFA Cash Fund	0.267618198	0.039	0.293148121
NAFA Stock Fund	0.336935392	0.302	0.090053064
NAFA Multi Asset Fund	0.418964736	0.573	0.109876365
NAFA Islamic Income Fund	0.438793221	0.433	0.212946431
MCB Dynamic Cash Fund	0.220910024	0.782	0.247587733
MCB Dynamic Stock Fund	0.27196402	0.862	0.076829418
Meezan Islamic Fund	0.782997972	0.022	0.100947379
Pakistan Stock Market Fund	0.113999324	0.068	0.345696327
Pakistan Cap Market Fund	0.337925326	0.579	0.014506443
United Stock Advantage Fund	0.174995366	0.517	0.098458831
United Composite Islamic Fund	0.170813357	0.226	0.059983761
Unit Trust of Pakistan	0.148983753	0.035	0.038999711
UTP - Islamic Fund	0.227989383	0.144	0.031933048
UTP – Agg. Asset Allocation	0.267983491	0.612	0.067159227
Overall position/Industry.	0.26	0.38	0.4750665

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Table 2
Beta and Treynor Ratio Analysis

Name of Funds	Rp Return of Fund	BETA	TREYNOR RATIO
AMZ Plus Stock Fund	0.243697784	0.75	0.212930379
Askari Income Fund	0.25	0.83	0.2
AKD Income Fund 1	0.130998293	0.63	0.074600464
AKD Opportunity Fund 2	0.233868379	0.93	0.161148794
Atlas Income Fund	0.113998136	0.71	0.042250896
Atlas Islamic Fund 3	0.141998601	0.41	0.141460003
Dawood Money Mkt. Fund	0.278996698	0.54	0.361104996
Dawood Islamic Fund	0.271987096	0.62	0.303204994
Faysal Bal. Growth Fund	0.267999906	0.28	0.657142521
Faysal Income & Growth Fund	0.203963358	0.38	0.315693046
Faysal Savings Growth Fund	0.290971168	0.15	0.37980779
First Habib Income Fund	0.113967438	0.64	0.046824122
HBL Income Fund	0.337973115	0.17	0.493959498
HBL Multi Asset Fund	0.174975657	0.5	0.181951315
IGI Income Fund	0.169978528	0.65	0.132274658
KASB Stock Market Fund	0.148820327	0.3	0.216067756
National Investment Trust	0.586749027	0.28	0.795532239
NAFA Cash Fund	0.267618198	0.96	0.191268956
NAFA Stock Fund	0.336935392	0.52	0.486414215
NAFA Multi Asset Fund	0.418964736	0.87	0.385016938
NAFA Islamic Income Fund	0.438793221	0.35	0.013694918
MCB Dynamic Cash Fund	0.220910024	0.69	0.198420324
MCB Dynamic Stock Fund	0.27196402	0.85	0.221134141
Meezan Islamic Fund	0.782997972	0.34	0.055876389
Pakistan Stock Market Fund	0.113999324	0.21	0.142853925
Pakistan Cap Market Fund	0.337925326	0.26	0.976635868
United Stock Advantage Fund	0.174995366	0.29	0.313777124
United Composite Islamic Fund	0.170813357	0.38	0.228456202
Unit Trust of Pakistan 9	0.148983753	0.54	0.120340284
UTP - Islamic Fund	0.227989383	0.67	0.214909527
UTP – Agg. Asset Allocation	0.267983491	0.32	0.574948408
Overall/industry position.	0.26402	0.51	0.471134141

Mutual Fund Return

Risk Analysis of five years (2003-2007)

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