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Mutual Fund Performance in Pakistan, 1995-2004

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MANAGEMENT SCIENCES

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1. Introduction

Mutual funds performance is one of the most frequently studied topics in investments area in most countries. The reason for this popularity is availability of data and the importance of mutual funds as vehicles for investment in the stock market for both individuals and institutions. Mutual funds generally provide three benefits to their investors. First, they reduce the risk of investing in the stock market by diversification. Second, they provide professional management by experts in the stock market. And third, by pooling of investment funds, they allow small investors to hold a diversified portfolio.

While the first and third benefits of mutual funds have been generally accepted as real benefits, the second benefit of having access to financial expertise has been questioned extensively in finance literature. A vast amount of literature exists in finance on the topic of market efficiency that recommends passive investment and suggests that paying money to so-called investment professionals is a fool's game. As evidence they have tested again and again the performance of these professionals, such as mutual funds, and found evidence to support their hypotheses of market efficiency.

Despite the tremendous interest in mutual funds worldwide, mutual funds did not catch the fancy of Pakistani investors until recently (on the academic side there are two recent papers on the role of corporate governance and mutual funds in Pakistan by Cheema and Shah (2006) and Saeed and Syed (2005). For a long time two government-controlled organizations: Investment Corporation of Pakistan (ICP), which provided several closed-end mutual funds, and the National Investment Trust (NIT), which was an open-end mutual fund, were the only players in the game. However, by 2005 nearly 50 mutual funds were listed on the three stock exchanges of Pakistan. While many of them are new comers there are over thirty funds with at least ten years of price and dividend record and their performance can now be tested for market efficiency.

At first, evaluating the performance of various mutual funds seems to be a pretty straight-forward affair. All one has to do is determine the rate of return earned by investing in each mutual fund and then ranking the funds accordingly, the best fund being the one that provides the highest return. A quick look at the returns tells us that there is great variability in returns over time for any fund. A fund may do well in one year but not so in another, so how can one make a general statement that fund *A* is superior to fund *B*? Obviously one cannot make such a statement categorically unless one fund dominates another fund in every year of analysis. Such dominance is rare, if not non-existent. So in defining performance one has to be explicit about the period of analysis. For example, in this paper we would look at the performance of mutual funds over the last five years and over the last ten years. Actually, the analysis was done for the last year and on three-year basis in addition to five year and ten year basis. However, since the results were similar for all periods therefore, to economize on the presentation, results are presented for only five and ten year periods.

Though comparison of performance on the basis of returns is the simplest, it is also wrong. The missing ingredient is risk. It is now considered a generally accepted fact

in finance that there is a direct relationship between risk and return: the higher the risk, the higher is the expected return. It would make no sense to compare, for example, two funds where one fund only invests in government bonds while the other invests in a portfolio of stocks. Over a long period of time the stock fund would outperform the government bond fund because it is taking on more risk, and unless there is a higher expected return associated with it there would be no point in investing in that fund. Of course, there is no guarantee that the stock fund would outperform the bond fund in every time period, and that is what is meant by risk of that fund.

There are two things that are clear from the preceding analysis: firstly that the analysis should be done over a long period of time to be of significance, and secondly that risk has to be incorporated in the analysis. It is the second requirement, the inclusion of risk that is the problem. There is no universally acceptable definition of risk. Nonetheless, there are two popular ways of defining risk in finance - standard deviation of returns and beta - that we would employ in our analysis. Standard deviation captures the overall variability of returns. A fundamental result of investments is that diversification reduces risk of a portfolio. That is, as we increase the number of securities in a portfolio the variability of the portfolio's returns declines. This decline has to do with the covariance of one security with another. That is, when the securities have less than +1 correlation the ups and downs of the securities are not matched and thus in a portfolio some of the up and down movements of one security are cancelled by the up and down movements of the other securities. As the number of securities are increased the decline in the standard deviation of the portfolio's return tapers off due to diversification, and after a while adding more securities to the portfolio leads to no further reduction in risk. Beta captures that component of the risk that cannot be diversified away. Alternatively, beta is defined as the risk that a security brings to a well-diversified portfolio. Sharpe's (1964) Capital Asset Pricing Model (CAPM), perhaps the most famous model in finance, posits that in equilibrium the prices are determined according to a risk premium paid based on only the non-diversifiable, or beta risk. Thus, according to CAPM, beta is the only relevant measure of risk. When it comes to evaluating the performance of a mutual fund it is not clear whether standard deviation or beta is the relevant measure of risk. If the investors invest only in a mutual fund then the relevant measure of risk is the standard deviation of the returns of the mutual fund. However, if the fund were to be a part of a well-diversified portfolio then the relevant measure of risk would be the beta.

In this paper we would employ measures that would use both the above definitions of risk. These measures are the Sharpe (1966), Treynor (1966), and Jensen (1968) measures of portfolio performance evaluation. These measures are the ones that every investment text carries in its chapter on portfolio performance evaluation.

The Sharpe measure is defined as:

$$\frac{R_p - R_f}{\sigma_p}$$

Where R_p is the annualised geometric return of the portfolio, R_f is the annualised risk free rate and σ_p is the standard deviation of the portfolio returns.

The Treynor measure is similar to the Sharpe ratio in that it is a ratio of excess return per unit of risk except that in this case the risk is defined as the non-diversifiable risk. Thus Treynor measure is:

$$\frac{R_p - R_f}{\beta P}$$

Where βP is the non-diversifiable risk of the portfolio, defined as the covariance of the portfolio with the market portfolio divided by the variance of the market rate of return.

Jensen's measure, called Jensen's alpha, is the difference of the portfolio return from the return predicted by the CAPM.

Where R_m is the return on KSE 100 index, which is the market portfolio in our analysis. The terms within the square brackets equal the expected return for the portfolio being considered according to CAPM.

$$\alpha = R_p - [R_f + \beta (R_m - R_f)]$$

For each of these measures, the larger the value of the index the better the performance. While this may be sufficient for relative performance of the mutual funds it does not answer the question whether the performance is really good. For example, if fund A earns a return of 20 percent and fund B earns a return of 18 percent over some time period of interest then we can say that fund A outperformed fund B, but we cannot say that investing in fund A was the best an investor could have done. To answer this question we need a benchmark of good performance. Then by comparing the performance of each fund relative to this benchmark we can say in absolute terms whether the performance of a fund was good or not. In finance, typically the benchmark portfolio is either the market portfolio or a combination of market portfolio and the risk free asset, which has the same degree of risk as the fund whose performance is being judged.

Data

For this paper end of month closing prices reported in the *Business Recorder*¹ and dividend data were collected for the period January 1995 to December 2004 for 33 mutual funds. The corresponding values for the KSE 100 index were also recorded. Risk free (government bond) rates were collected from the *Economic Survey* [Government of Pakistan (2005)] and the *Statistical Bulletin of Pakistan* [Federal Bureau of Statistics (2005)] for 1995-2004. While there are nearly 50 funds listed on the market these days not all of them have a track record of ten years. Also some funds that were there in 1995 do not exist any more because they have either been merged with other funds or have died. Ordinarily, looking at the performance of only the funds that survive the period of study creates a survivorship bias in the study but in our case there were only

¹Pakistan's financial daily newspaper published simultaneously from Karachi, Lahore and Islamabad.

three such funds so we do not think that this bias is significant. From these prices and dividend data, annualised monthly returns were calculated for the funds and the KSE 100 index. The standard deviation of these returns for the period 1995-2004 and 2000-2004 was calculated and the annualised monthly returns were regressed against the KSE 100 index (market portfolio) for the five and ten year periods to determine the five and ten year betas.

Results

Table 1 gives the returns, standard deviation of returns and betas for the funds in our study for the five and ten year periods. One of the interesting things to note is the low correlation between the funds and the market portfolio, especially for the full ten-year period. In US studies the correlation between the market and mutual funds is often 0.9 or above. A high correlation with the market is an indication of a high degree of diversification. The low correlation in the Pakistani case suggests that the mutual funds are not doing a very good job of diversification. The low correlation and also the low betas are probably due to inclusion of fixed income securities such as the Term Finance Certificates (TFCs) in the portfolios of these funds. Since the composition of the funds is not publicly known therefore it is not possible to analyse this issue any further.

Sharpe ranking

Table 2 shows the Sharpe index values for the 33 mutual funds and the market portfolio. We notice that only one fund beats the market portfolio during the last five years but that over the full ten years no fund shows a performance superior to the market portfolio. We also note a very low correlation between the five and ten year rankings. This means that funds that did well according to this measure of performance in the last five years did not do so well in the first five years or the overall ten-year period.

Treynor and Jensen ranking

Table 3 shows the Treynor and Jensen index values for the 33 funds and the market portfolio. We notice that funds 1,2,3,5,6,7,10,11,15,17,18,19,26,28,31,and 32 beat the market index according to the Treynor index over the period 2000-04, while, over the period 1995-04, funds 1,2,10,11,12,13,16,17,22,28,29,30,and 32 beat the market. Over both the periods, funds 1, 2, 10, 11, 17, 19, 28 and 32 outperformed the market. This is a much more respectable performance for the mutual funds than under the Sharpe measure. However, we will have more to say about it a little later. The correlation between the five year and ten year rankings is -0.08, which indicates that funds that do well in one five year period do poorly in the next five-year period.

According to the Jensen measure over the period 2000-04 funds 1, 2, 3, 5, 6, 7, 10, 11, 13, 15, 17, 18, 19, 26, 28, 31 and 32 beat the performance of the market portfolio, while over the period 1995-04 only funds 19, 25, and 32 outperformed the market. The negative correlation of -0.12 between the five year and ten year rankings indicates that good performance in one period is generally followed by poor performance in the other.

Over the last five-year period Jensen measure shows considerable ability on the part of the funds to beat the market. Over this period, 2000-04, we see that quite a few of the same funds beat the market according to this measure as did according to the Treynor measure. This overlap is not very surprising because both measures are using beta as their measure of relevant risk. But there is a problem in using beta as the relevant measure of risk. It presupposes that the mutual fund is going to be a part of a well-diversified portfolio. Usually, a mutual fund is the entire portfolio for an investor and in this case the amount of risk that one is assuming by investing in the fund is the total risk of the fund and not just the non-diversifiable component of risk. This problem is especially important for the funds studied by us because as Table 1 shows the funds are not very well diversified. If one still wishes to use CAPM as the benchmark of performance then, according to Fama (1972), the appropriate comparison is between the performance of the fund and a portfolio of risk free asset and the market portfolio, which has a beta equal to the risk of the fund. This calls for replacing the beta in Jensen's alpha equation by $\sigma p / \sigma m$. Recall that an equivalent way of representing the CAPM equation is:

$$R_p = a + \beta_p R_m + \varepsilon_p$$

From which for a well-diversified portfolio, that is one with $\sigma_{\varepsilon p} = 0$, we get:

$$\sigma_p^2 = \beta_p^2 \sigma_m^2$$

Therefore,

$$\beta_p = \sigma_p / \sigma_m$$

Substituting the above definition of beta in Jensen's alpha equation we get the modified alpha as given in Table 4. We notice that with this modified definition of beta only fund 32 beat the market portfolio in the last five years and none of the funds beat the market over the full ten-year period.

Conclusion

Ten years is too short a period to make any definitive conclusions about the performance of mutual funds in Pakistan. Nevertheless, the performance of these funds cannot be considered to be very good relative to the market portfolio. These results are however, not different from results of studies conducted over much longer periods in US and Europe. There also a small proportion of funds (approximately 30 percent) beat the market in a given period, but the compositions of these market beaters kept on changing from period to period, thus suggesting no special competency on the part of the mutual funds to consistently beat the market. This result is consistent with the semi-strong form of market efficiency, which claims that it is not possible to earn abnormal returns consistently with publicly available information. The result from Pakistan is even stronger in favour of this kind of market efficiency.

One of the consequences of mutual fund performance studies is the emergence of index funds in the West, which passively mimic the market index and provide excellent results to their investors. Even actively managed funds now carry a substantial proportion of their funds in such indexed funds. This move to the index funds took almost twenty years of resistance and denial from the mutual fund industry. We hope that it will not take this long in Pakistan for index funds to materialize.

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Table 1
Risk and return

	Returns		Standard deviation		Betas		Corr. with market	
	00-04	95-04	00-04	95-04	00-04	95-04	00-04	95-04
0 KSE 100 Index	0.291	0.133	1.041	3.664	1	1	1	1
1 1st ICP	0.250	-0.279	2.289	2.892	0.399	-0.013	0.182	-0.017
2 2nd ICP	0.248	-0.257	1.944	2.608	0.624	-0.030	0.334	-0.042
3 3rd ICP	0.281	-0.217	1.715	3.022	0.638	0.016	0.387	0.019
4 4th ICP	0.131	-0.224	2.039	3.210	0.745	0.026	0.380	0.030
5 5th ICP	0.234	-0.043	2.302	2.161	0.378	0.010	0.171	0.017
6 6th ICP	0.299	0.032	1.573	1.727	0.587	0.018	0.388	0.037
7 7th ICP	0.283	-0.051	1.433	1.646	0.525	0.017	0.382	0.039
8 8th ICP	0.114	-0.044	1.782	2.084	0.348	-0.017	0.204	-0.031
9 9th ICP	0.142	0.037	1.862	2.088	0.577	0.027	0.323	0.047
10 10th ICP	0.338	-0.029	2.022	2.021	0.686	-0.015	0.353	-0.026
11 11th ICP	0.279	-0.039	2.068	2.031	0.798	-0.015	0.402	-0.028
12 12th ICP	0.175	-0.077	2.579	2.483	0.760	-0.077	0.307	-0.113
13 13th ICP	0.272	-0.016	1.517	1.890	-0.613	-0.005	-0.421	-0.009
14 14th ICP	0.170	-0.004	2.226	2.852	1.405	0.022	0.658	0.028
15 15th ICP	0.268	-0.029	2.035	2.016	0.807	0.038	0.413	0.068
16 16th ICP	0.149	0.021	2.144	2.296	0.739	-0.023	0.359	-0.037
17 17th ICP	0.204	0.000	1.612	1.909	0.500	-0.008	0.323	-0.015
18 18th ICP	0.228	0.008	2.178	1.771	0.712	0.013	0.341	0.026
19 19th ICP	0.291	0.092	2.187	1.871	0.217	0.044	0.103	0.086
20 20th ICP	0.268	0.067	4.831	3.411	2.857	0.023	0.616	0.024
21 21st ICP	0.365	-0.002	3.044	3.057	1.455	0.044	0.498	0.052
22 22nd ICP	0.337	0.012	2.499	2.380	1.634	-0.006	0.681	-0.009
23 23rd ICP	0.338	-0.007	2.941	2.680	2.074	0.032	0.735	0.044
24 24th ICP	0.419	0.044	2.762	2.627	2.161	0.052	0.815	0.073
25 25th ICP	0.367	0.112	2.666	2.319	1.785	-0.028	0.697	-0.045
26 Asian Stock Fund	0.448	0.048	3.056	2.746	0.978	0.018	0.333	0.024
27 Dominion MF	0.170	-0.105	3.464	2.625	0.674	0.011	0.203	0.016
28 First Capital MF	0.221	-0.023	2.405	3.051	0.430	-0.065	0.186	-0.078
29 Golden Arrow	0.165	0.022	11.309	8.230	5.728	-0.003	0.527	-0.001
30 ICP (State Enterprise) A	0.272	0.042	2.062	1.968	1.423	-0.013	0.719	-0.025
31 Prudential Stocks	0.258	-0.006	3.836	3.140	0.595	0.014	0.162	0.016
32 Safeway MF Ltd	0.783	0.102	2.579	2.446	0.373	0.003	0.151	0.005
33 Tri-Star MF Ltd	0.228	-0.086	3.944	3.667	0.859	0.024	0.227	0.024
Risk free rate	2000-04	6.60%	1995-04	8.20%				

Table 2
Sharpe ranking

		Sharpe Index		Sharpe Ranking	
		00-04	95-04	00-04	95-04
0	KSE 100 Index	0.279	0.036	1	0
1	1st ICP	0.109	-0.096	19	32
2	2nd ICP	0.128	-0.099	16	33
3	3rd ICP	0.164	-0.072	7	31
4	4th ICP	0.064	-0.070	30	30
5	5th ICP	0.102	-0.020	21	24
6	6th ICP	0.190	0.018	3	13
7	7th ICP	0.197	-0.031	2	29
8	8th ICP	0.064	-0.021	32	26
9	9th ICP	0.076	0.018	28	9
10	10th ICP	0.167	-0.014	5	22
11	11th ICP	0.135	-0.019	11	25
12	12th ICP	0.068	-0.031	25	27
13	13th ICP	0.180	-0.008	4	21
14	14th ICP	0.077	-0.001	24	15
15	15th ICP	0.132	-0.014	14	23
16	16th ICP	0.069	0.009	29	10
17	17th ICP	0.126	0.000	18	19
18	18th ICP	0.104	0.005	20	18
19	19th ICP	0.133	0.049	12	3
20	20th ICP	0.055	0.020	26	4
21	21st ICP	0.120	-0.001	15	11
22	22nd ICP	0.135	0.005	10	14
23	23rd ICP	0.115	-0.003	17	16
24	24th ICP	0.152	0.017	6	7
25	25th ICP	0.138	0.048	9	1
26	Asian Stock Fund	0.147	0.018	8	6
27	Dominion MF	0.049	-0.040	31	28
28	First Capital MF	0.092	-0.007	22	17
29	Golden Arrow	0.015	0.003	33	5
30	ICP (State Enterprise) A	0.132	0.022	13	8
31	Prudential Stocks	0.067	-0.002	23	12
32	Safeway MF Ltd	0.304	0.042	0	2
33	Tri-Star MF Ltd	0.058	-0.023	27	20
correlation between 5 and 10 year rankings		0.196333			

Table 3
Treynor and Jensen Rankings

	Treynor index		Treynor ranking		Jensen Index		Jensen ranking	
	00-04	95-04	00-04	95-04	00-04	95-04	00-04	95-04
0 KSE 100 Index	0.225	0.051	16	15	0	0	17	3
1 1st ICP	0.463	26.946	2	0	0.095	-0.360	7	33
2 2nd ICP	0.293	11.310	11	4	0.042	-0.338	12	32
3 3rd ICP	0.338	-19.192	9	33	0.072	-0.300	9	30
4 4th ICP	0.088	-11.583	29	30	-0.102	-0.308	27	31
5 5th ICP	0.446	-12.855	3	31	0.083	-0.126	8	25
6 6th ICP	0.398	-2.867	5	23	0.101	-0.052	5	9
7 7th ICP	0.413	-7.676	4	29	0.099	-0.134	6	26
8 8th ICP	0.138	7.249	25	8	-0.030	-0.125	19	24
9 9th ICP	0.133	-1.691	26	19	-0.053	-0.046	22	8
10 10th ICP	0.397	7.603	6	7	0.118	-0.110	4	21
11 11th ICP	0.268	7.921	13	6	0.034	-0.120	13	23
12 12th ICP	0.144	2.084	24	12	-0.062	-0.156	23	27
13 13th ICP	-0.338	21.146	33	2	0.345	-0.098	1	19
14 14th ICP	0.074	-3.986	30	25	-0.212	-0.087	31	16
15 15th ICP	0.251	-2.952	14	24	0.021	-0.113	15	22
16 16th ICP	0.112	2.655	28	11	-0.083	-0.060	24	10
17 17th ICP	0.276	10.364	12	5	0.026	-0.082	14	14
18 18th ICP	0.227	-5.819	15	26	0.002	-0.074	16	13
19 19th ICP	1.040	0.233	1	14	0.176	0.008	2	2
20 20th ICP	0.071	-0.683	31	16	-0.441	-0.017	32	4
21 21st ICP	0.206	-1.939	17	21	-0.028	-0.087	18	15
22 22nd ICP	0.166	11.936	20	3	-0.097	-0.070	25	12
23 23rd ICP	0.131	-2.795	27	22	-0.195	-0.091	30	18
24 24th ICP	0.164	-0.742	21	17	-0.133	-0.041	29	7
25 25th ICP	0.169	-1.055	19	18	-0.100	0.031	26	0
26 Asian Stock Fund	0.391	-1.897	7	20	0.162	-0.035	3	5
27 Dominion MF	0.155	-16.374	22	32	-0.047	-0.188	21	29
28 First Capital MF	0.361	1.625	8	13	0.058	-0.102	11	20
29 Golden Arrow	0.017	22.152	32	1	-1.190	-0.060	33	11
30 ICP (State Enterprise) A	0.145	3.004	23	10	-0.114	-0.039	28	6
31 Prudential Stocks	0.324	-6.473	10	27	0.059	-0.089	10	17
32 Safeway MF Ltd	1.921	5.811	0	9	0.633	0.020	0	1
33 Tri-Star MF Ltd	0.189	-6.944	18	28	-0.031	-0.169	20	28
Correlation between 5 and 10 year rankings-0.08113						-0.12452		

Table 4
Modified Jensen Ranking Using Fama's Net Selectivity

	Modified betas		Modified alpha		Modified Jensen rank	
	00-04	95-04	00-04	95-04	00-04	95-04
0 KSE 100 Index	1	1	0	0	1	0
1 1st ICP	2.198	0.789	-0.310	-0.401	18	33
2 2nd ICP	1.867	0.712	-0.238	-0.375	10	32
3 3rd ICP	1.646	0.825	-0.155	-0.342	5	30
4 4th ICP	1.958	0.876	-0.375	-0.351	25	31
5 5th ICP	2.211	0.590	-0.329	-0.155	20	24
6 6th ICP	1.511	0.471	-0.107	-0.075	3	8
7 7th ICP	1.376	0.449	-0.093	-0.156	2	25
8 8th ICP	1.711	0.569	-0.337	-0.155	21	23
9 9th ICP	1.788	0.570	-0.326	-0.074	19	7
10 10th ICP	1.942	0.551	-0.165	-0.139	6	19
11 11th ICP	1.985	0.554	-0.234	-0.149	8	22
12 12th ICP	2.476	0.678	-0.448	-0.194	28	27
13 13th ICP	1.456	0.516	-0.121	-0.124	4	14
14 14th ICP	2.137	0.778	-0.377	-0.126	26	15
15 15th ICP	1.954	0.550	-0.237	-0.139	9	20
16 16th ICP	2.059	0.627	-0.381	-0.093	27	10
17 17th ICP	1.548	0.521	-0.210	-0.108	7	13
18 18th ICP	2.092	0.483	-0.309	-0.098	17	11
19 19th ICP	2.100	0.511	-0.248	-0.016	13	3
20 20th ICP	4.639	0.931	-0.842	-0.063	32	4
21 21st ICP	2.923	0.834	-0.359	-0.127	22	17
22 22nd ICP	2.400	0.650	-0.269	-0.103	14	12
23 23rd ICP	2.824	0.731	-0.363	-0.126	23	16
24 24th ICP	2.652	0.717	-0.244	-0.075	12	9
25 25th ICP	2.560	0.633	-0.275	-0.002	15	1
26 Asian Stock Fund	2.934	0.749	-0.278	-0.072	16	6
27 Dominion MF	3.326	0.716	-0.644	-0.224	30	29
28 First Capital MF	2.309	0.833	-0.365	-0.147	24	21
29 Golden Arrow	10.859	2.246	-2.346	-0.174	33	26
30 ICP (State Enterprise)	1.980	0.537	-0.239	-0.067	11	5
31 Prudential Stocks	3.683	0.857	-0.637	-0.132	29	18
32 Safeway MF Ltd	2.476	0.668	0.159	-0.014	0	2
33 Tri-Star MF Ltd	3.787	1.001	-0.690	-0.219	31	28

Correlation between 5 and 10 year rankings 0.288923

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Abstract

Mutual funds are the most popular vehicle of investing in the stock market and their performance evaluation is a topic dear to both investors and academics. Surprisingly, mutual funds have not played a very important role in the Pakistani stock market and perhaps consequently almost nothing has been written about their performance in any academic journal. This paper looks at the performance of Pakistani mutual funds over the last five and ten year periods using Sharpe, Jensen and Treynor measures of portfolio performance analysis. The performance is compared to that of the market portfolio defined as the KSE 100 index. Using the Sharpe measure the performance of virtually all the funds was found to be inferior to that of the market portfolio. The Jensen and Treynor measures showed about half the funds to be outperforming the market portfolio over the last five years, but when the risk measure was corrected using Fama's net selectivity measure the market portfolio outperformed all the funds except one. These results support the semi-strong form of market efficiency hypothesis even more strongly than it has been demonstrated in the developed markets.

Key words: Mutual fund performance; Sharpe Jensen and Treynor measures of portfolio performance; test of semi-strong form of market efficiency



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