

Efficiency of the Mutual Funds in Pakistan

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Abstract: The study has applied non-parametric Data Envelopment Analysis (DEA) to estimate the cost efficiency of 100 mutual funds operating in Pakistan over the period of 2005 to 2010. The value added approach is followed for the selection of input and output variables. The current study has used investments and returns as output variables whereas; management fee, business services and equity are chosen as input variables. The mutual funds of Pakistan are found to be 92 percent technical efficient, 97 percent allocative efficient and 89 percent cost efficient over the study period. Moreover, the study also tried to study the impact of stock market crisis on the efficiency trend of the mutual funds in Pakistan. The results showed an improvement in the efficiency scores from 2005 to 2008 and then noticed a significant fall in the mean efficiency scores of mutual funds in the financial year 2009 due to stock market crisis.

Key words: Cost Efficiency • Data Envelopment Analysis • Mutual Funds • Pakistan

INTRODUCTION

The structure of financial institution has dynamically changed over the years. The prototype investment alternatives for financially rational investors have transformed from savings and fixed bank deposits to mutual funds which hold professionally managed and diversified basket of securities. The main purpose of the mutual funds is to collect and optimally utilize the savings of the pooled small investors into a highly diversified managed large portfolio. The mutual funds are operated by asset management companies which invest in various money and capital market securities. They maintain these portfolios and provide an opportunity for small individual investors to diversify their risk instead of putting all eggs in one basket. Therefore, mutual funds need to perform efficiently to compete successfully in today's dynamic financial and economic environment. There are several efficiency concepts which explain various aspects of mutual funds in regard of their performance. For instance; technical efficiency determines a firm's ability to maximize its output with the given level of input whereas, allocative efficiency considers the input prices to produce optimum outputs and the combination of both technical and

allocative efficiency measures the cost efficiency of firm which indicates that how close a firm's cost to a optimum performer's cost.

Although, Pakistan is amongst the initiators of mutual funds in the South Asia since the National Investment Trust (NIT) and the Investment Corporation of Pakistan (ICP) were established in 1960's [1]. But the mutual fund sector of Pakistan have shown significant growth in recent years as the numbers of mutual funds were just 38 in 2001 which rose to 126 in 2010. Amongst these mutual funds 105 are open ended and 21 are closed ended mutual funds. Moreover, the total net assets are also improved from 21 billion rupees in 2001 to 200 billion rupees in 2010 (Mutual Funds Association of Pakistan - MUFAP, 2010).

In recent years, mutual funds are dealing with various financial uncertainties such as; the numbers of mutual funds are dramatically increased which eventually raised the competition within the industry. Moreover, the financial uncertainties in financial year 2009 have also negatively affected the operations of mutual funds in Pakistan. In the year 2009, the Assets Under Management (AUM) fall from 379.49 billion rupees in March 2008 to 195.79 billion rupees in March 2009 (MUFAP, 2010). In

addition, most of the funds conceded losses in the same financial year. Furthermore, the devaluation of Pakistani rupee had also affected the stock market prices which eventually affected the mutual fund industry in Pakistan. Consequently, there is much empirical attention is needed to evaluate the efficiency of the mutual fund industry in Pakistan. The objective of present study is to analyze the efficiency of mutual funds over the period of 2005 to 2010. In addition, this study has also investigated the effect of financial crisis in the financial year 2009 on the general level of efficiency of mutual funds in Pakistan. The efficiency analysis of the mutual funds is of significant importance since it will help regulators, managers, investors and customers to understand strengths and weaknesses of each financial institution. The regulators can realize the overall impact of their past time to time implemented financial reforms. Managers of the mutual funds can identify cause of their inefficiencies. Moreover, it will also provide an estimate to optimally utilize their inputs. For the investors and customers, these efficiency scores are also beneficial since they can rank firms based on their efficiency scores. Nevertheless, investors can get more secured earnings from their investments while customers can obtain maximum utility of their money.

The remaining paper is organized as follows; section II will briefly discuss some of the empirical studies on the efficiency of mutual funds. Section III and section IV will provide the methodology and the empirical results of the current study, respectively. The study will end up with some brief concluding remarks in section V.

Literature Review: During the last two decades, the efficiency analysis of the Mutual Funds has captured a great deal of attention and a number of empirical studies have investigated the general level of efficiency in the mutual funds. For instance; Weibin [2] applied DEA to measure the efficiency of 20 Chinese close end mutual funds over the period from 2000 to 2002. Results indicated that cost is one of the major variables in determining the efficiency of Chinese funds. Moreover, the results indicated that mutual fund “Yulong” is the worst inefficient whereas the mutual fund “Ahshun” is the most efficient. Another study, Alexakis and Tsolas [3] examined the efficiency of Greek domestic mutual funds over the period of 2001 to 2004. The study applied DEA techniques to compute the efficiency scores and the results indicated that on average technical efficiency in the mutual funds was 77% over the study period with a standard deviation of 0.07. Moreover, the study also found increase in the efficiency of mutual funds from 73% to 84% over the study period of 2001 to 2004.

Some studies have also examined the impact of the recent financial crisis on the efficiency trend of the mutual funds around the world. Recently, Babalos *et al* [4] analyzed 31 Greek mutual funds for the year 2003-09 with the help of DEA technique. The result revealed that the mean efficiency scores ranged between 90% and 96% in the mutual funds of Greece. The study also indicates a quick fall in the efficiency scores due to financial crisis. Another study by Hu *et al* [5] studied the efficiency of 300 mutual funds operating in Taiwan over the period of 2006 to 2010 with the help of DEA. The average efficiency was found 59.2% with the highest efficiency in 2009 and lowest efficiency in the year 2008 due to financial crisis. The study also found that size has positive association on the performance of the mutual funds in Taiwan.

In Pakistan, there are some studies which have analyzed the performance of mutual funds with the traditional methods. For instance; some studies have investigated the determinants of growth in mutual funds [6-9], there are studies which analyzed the corporate governance issues [10] and some others have evaluated the performance of mutual funds using various traditional ratios such as; Sharpe, Treynor and Jensen [1, 11, 12]. To the best of author’s knowledge, there is no empirical study which has analyzed the cost efficiency of mutual funds in Pakistan with the help of frontier methods. Therefore, presents study will investigate the level of cost efficiency in the open ended and close ended mutual funds over the period of 2005 to 2010.

MATERIALS AND METHODS

There are various empirical studies which have investigated the efficiency of financial institutions with frontier techniques. These techniques are preferred by researchers over fundamental accounting ratio analysis since it provides a helpful numeric value which also reflects additional information [13]. These frontier efficiency measurement techniques are primarily distributed into parametric and non-parametric approaches [14-15]. Stochastic Frontier Approach (SFA), Distribution Free Approach (DFA) and Thick Frontier Approach (TFA) are the parametric approaches whereas; Data Envelopment Analysis (DEA) and Free Disposal Hull (FDH) are the non-parametric approaches.

This study will apply DEA amongst the non-parametric approaches to evaluate the efficiency of mutual funds in Pakistan. On one hand, the parametric approaches DFA and TFA failed to meet our analysis requirements as the former fail to made constant the inefficiency component of the error term for a period of six

year and the later do not provide efficiency scores of each individual firm [16-17]. The remaining parametric approach SFA do not allow zero in the output vector. On the other hand, the non-parametric approach FDH has the disadvantage of upward biasness of efficiency scores due to relaxation of convexity assumption. One of the other reasons behind the selection of DEA technique is its high correlation with the traditional performance measure [18]. Moreover, DEA is also convenient method as it divides the cost efficiency into pure technical efficiency and allocative efficiency. Furthermore, DEA is most frequently used for estimation of efficiency scores over time [15, 19]. Non parametric DEA approach is applied to compute the efficiency of firms with the relationship of outputs to inputs but within the limits of mathematical programming. It is based on optimization problem; therefore, it does not require to make assumptions on the specification of the efficient frontier. The estimation of cost, allocative and efficiency from DEA approach consists of three steps. Firstly, compute the technical efficiency of each Decision making Unit (DMU) by following Banker *et al* [20] the model is presented in Figure 1.

In Figure (1 & 2), y_{rj} and x_{i0} are the output and input of the n th DMU whereas, λ is the weight. 0 is the DMU which is to be measured and by solving the non-parametric model, we can get the minimum θ_0 which is the efficiency score of that DMU₀. The index j specifies DMUs for $j=1, \dots, N$. y_{rj} is the r th output of the j th firm for $r=1, \dots, R$. x_{ij} indicates the i th input of the j th DMU for $i=1, \dots, I$ [15]. w_i is a vector of input prices for i th DMU and x_i is the vector of cost minimization for input quantities for the i th DMU given the price of the input vector w_i and the y_i is the output vector. The third constraint introduces Variable Return to Scale (VRS) into the model. Moreover, if $(\sum \lambda_j \leq 1)$ is applied instead of third constraint, the new model can even determine the reason of scale inefficiency that could be increasing return to scale (IRS) or decreasing return to scale (DRS). In the final step we can compute the allocative efficiency by dividing the cost efficiency scores with the technical efficiency scores. In the same way, we can get the efficiency scores of all DMUs.

Input and Output Variables: Selection of input and output variables is never been easy task in case of financial institutions since there are three different approaches for the selection of input and output variable which are followed in the empirical literature; intermediation approach, user cost approach and value added approach which are followed by various studies. These empirical

$$\begin{array}{llll}
 \text{Min} & \lambda_0 \theta_0 & & \\
 \text{s.t.} & \sum \lambda_j y_{rj} & \geq & y_{r0} \quad (r = 1, \dots, s) \quad (1) \\
 & \theta_0 x_{i0} & \geq & \sum_{j=1}^n \lambda_j x_{ij} \quad (i = 1, \dots, n) \quad (2) \\
 & \sum \lambda_j & = & 1 \quad (3) \\
 & \lambda_j \geq 0 & & 0 \quad (j = 1, \dots, n)
 \end{array}$$

1) $\sum \lambda_j y_{rj} \geq y_{r0}$ (1) is the output constraint.
 2) $\theta_0 x_{i0} \geq \sum \lambda_j x_{ij}$ is the input constraint.

Technical Efficiency (Model)

Fig. 1:

$$\begin{array}{llll}
 \text{Min} & w_i' x_i & & \\
 \text{s.t.} & \sum \lambda_j y_{rj} & \geq & y_{r0} \quad (r = 1, \dots, s) \quad (1) \\
 & \theta_0 x_{i0} & \geq & \sum_{j=1}^n \lambda_j x_{ij} \quad (i = 1, \dots, n) \quad (2) \\
 & \sum \lambda_j & = & 1 \quad (3) \\
 & \lambda_j \geq 0 & & 0 \quad (j = 1, \dots, n)
 \end{array}$$

Cost Efficiency (Model)

Fig. 2:

studies argue for and against a particular approach. However, researchers failed to reach any consensus to state which approach is the best one [15].

Present study has followed the value added approach for the selection of input and output variables to compute the efficiency scores of mutual funds instead of intermediation or user cost approach. The intermediation approach considers the financial institutions as the intermediaries whereas, the user cost approach is based on the revenue generation which considers revenues as outputs and expenses are inputs. In contrast to both these methods, the value added approach considers all categories of financial statements to have some output characteristics instead of distinguishing inputs from outputs in a mutually exclusive way. If a financial variable contributes significantly as an output based on operating cost allocation only then it will be considered as output variable [21]. This method is also attractive since it allows in differentiating various functions of financial institutions based on their output.

This study has selected two outputs for the computation of efficiency scores in Pakistan; investments and returns. Investments are the most important output of the mutual funds as their prime motive is to invest their funds to earn higher returns. Mutual funds put their more than 90 percent of funds in investments. This study is also considering investments as output since the mutual funds invests to diversity their risks. Investments are measured as the total investments including the funds deposited into the saving accounts of commercial banks. Unit holders (in case of open ended mutual funds) and Shareholders (in case of close ended mutual funds) invest in a particular mutual fund in expectation of earning better returns. Schaefer & Raimond [22] and Barrientos & Boussofiane [23] also selected returns as one of output for the mutual funds. We have measured the return of the

mutual funds as total income (TI) to total assets (TA) plus 1 ($TI/TA + 1$) which is also term as “Relative Returns”. The reason behind this transmission is the negative profits earned by the mutual funds especially in the year 2009 as more than 80% of the funds earned negative returns due to stock market crisis. The negative values are not allowed to compute the efficiency scores with the DEA technique.

We have selected three inputs which are; management fee, business services and equity. Management fee is one of the important costs paid by the mutual funds to their management company. In Pakistan, according to Non Banking Finance Companies (NBFC) rules, “*The management company is entitled to a remuneration of an amount not exceeding three percent of the average annual net assets of the fund during the first five years of the fund’s existence and thereafter, of an amount equal to two percent of such assets of the fund*”. Therefore, it is important to include management fee as an input. Business services are measured as total operating expenses excluding management fee. The operating expenses are also selected as input by various studies such as; Barrientos and Boussofiane [23] and Barros *et al* [24]. The equity is measured as the total unit holder’s fund in case of open ended mutual funds and total shareholder’s equity in case of closed ended mutual funds.

The input prices are also important to compute the cost efficiency. Therefore, management fee is divided by total investments, business services are divided by total assets whereas; the cost of equity is measured as 5 year average KSE rate of return [25-26]. The input, output and input prices which are given in the Table 1.

This study has computed pure technical efficiency, technical efficiency, scale efficiency, allocative efficiency and cost efficiency of mutual funds for a more comprehensive efficiency analysis since each kind of efficiency demonstrates different information regarding the mutual funds. Moreover, current study has also estimated the efficiency scores based on Variable Return to Scale (VRS) instead of Constant Return to Scale (CRS) since the mutual funds in Pakistan are highly fragmented

Finally, the study has examined the return to scale in the mutual funds of Pakistan over the study period of 2005 to 2010.

Data: The financial data is obtained from the published annual reports of mutual funds over the period of 2005 to 2010. The descriptive statistics of outputs, inputs and input prices which are used to estimate the efficiency of 100 mutual funds are provided in the Table 2. The total numbers of mutual funds are increased from 25 to 94 over the study period which indicates that the mutual fund industry has shown significant progress over the recent years. Although, there are 100 mutual funds which are include in the analysis but the number of mutual funds in 2010 are 94. The reason behind it is the change of accounting year by 5 of the mutual funds in 2010 and the remaining 1 mutual fund not further exists.

Relative return implies that the mutual funds have earned positive relative return over the study period except in the year 2009. This was the main reason behind the use of relative returns instead of total revenue since DEA is sensitive to negative values. As like the relative returns, investments also dropped in the financial year 2009. The reason behind the negative returns and significant fall of investments is the stock market crash in the financial year of 2009.

As discussed in the methodology, this study has selected three input variables; remuneration to management company, business services and equity. On the one hand, remuneration to management company increased from 63 million in 2005 to 74 million rupees in 2008 and then suddenly decreased in the year 2009. This may be due to the stock market crash in the financial year of 2009. Business services cost is fall from 27.21 million to 15.15 million rupees but the price of business services is raised from 0.978 to 2.008. It suggest that although the mutual funds able to decrease their operational cost but still fail to decrease the input price over the study period due to various financial uncertainties. Equity capital and equity capital price dropped over the study period.

Table 1: Variables for Data Envelopment Analysis

Outputs	Inputs	Input Prices
Relative returns	Management Fee	Total management fee / Total Investments (%)
(Total Income / Total Assets) + 1	Business Services	Total operating expenses excluding Management fee /Total Assets (%)
Investments	Equity	5-Year-Average KSE rate of return (%)

Table 2: Descriptive Statistics of Mutual Funds (Outputs, Inputs, Input Prices) Over the period of 2005 to 2010

			Outputs		Inputs & Input Prices								
			Relative Returns	Investments	Remuneration to Mgmt Co	Price of Remuneration to Mgmt Co	Business Services	Price of Bus. Serv	Equity	Price of Equity			
Year	Obs		2005	25	Mean	1.174	4655.188	63.16	1.779	27.21	0.978	4522.15	34.67
		SD				0.113	12667.64	118.67	0.814	38.87	0.606	11121.91	0.00
			2006	30	Mean	1.236	5050.795	76.37	2.135	33.91	1.03	4689.95	35.295
		SD				0.099	13251.05	132.18	0.879	46.79	0.47	11500.34	0.00
			2007	42	Mean	1.199	5876.546	65.99	1.955	27.84	0.87	5868.77	43.093
		SD				0.092	15996.94	120.52	1.333	42.91	0.843	15541.35	0.00
			2008	59	Mean	1.073	4650.725	74.3	2.211	24.06	0.79	4689.37	43.831
		SD				0.098	11856.47	121.41	0.921	34.04	0.419	11376.55	0.00
			2009	79	Mean	0.82	1836.008	35.33	2.313	19.15	1.125	1937.89	28.794
		SD				0.341	3624.032	45.8	0.932	49.24	1.015	3673.05	0.00
			2010	94	Mean	1.193	2000.74	33.62	2.399	16.15	2.008	2053.03	11.147
		SD				0.226	4295.523	46.56	1.215	23.78	3.188	4239.69	0.00
Mean	329	Mean				1.085	3411.019	51.6	2.217	22.24	1.265	3413.35	29.313
		SD				0.267	9749.523	91.94	1.072	38.83	1.878	9191.83	12.741
Total Mutual Funds			100										
Relative Returns			(Total Income / Total Assets) + 1										
Investments			Investments including Bank PLS deposits										
Remuneration to Mgmt Co			Total management fee										
Price of Rem to Mgmt Co			Total management fee / Total Investments (%)										
Business Services			Total operating expenses excluding Management fee										
Price of Bus. Serv			Total operating expenses excluding Management fee /Total Assets (%)										
Equity			Total Equity										
Price of Equity			5-Year-Average KSE rate of return (%)										

RESULT

The efficiency results are given in Table 3. The results reveal that the cost efficiency of mutual funds in Pakistan is 89.3% which indicates that the mutual funds need to improve their cost efficiency by 10.3% to optimally perform. As the cost efficiency under VRS assumption is the blend of pure technical efficiency (managerial efficiency) and allocative efficiency (price efficiency). Therefore, the reason of their lower cost efficiency is the managerial efficiency instead of price efficiency as the pure technical efficiency is 92.1% whereas; allocative efficiency is 97%. Therefore, the mutual funds need to improve their managerial skills to optimally utilize their inputs to get higher output.

Technical efficiency (Operational efficiency) is the mixture of pure technical efficiency and scale efficiency (Size efficiency). Here, the results indicate that the reason behind their lower technical efficiency is also the pure technical efficiency (92.1%) as like the cost efficiency.

The scale efficiency was found 97.7% in the mutual funds of Pakistan. It suggests that the mutual funds can improve their cost efficiency and operational efficiency if they want to improve their managerial efficiency by rationally minimizing the inputs to produce the outputs.

Efficiency scores in current study are very high, Babalos *et al* (2012) also found higher efficiency scores in the mutual funds of Greece.

Close ended mutual funds (90.7%) are found more cost efficient as compared to open ended mutual funds (88.9%). Although, there is minor difference between the efficiency scores of both type of mutual funds but it is also important to note that the efficiency scores of close ended mutual funds in respect of all kind of DEA efficiencies are higher than open ended mutual funds. Alpha fund, National Investment Trust unit fund (NIT) and NIT CRS National Investment Trust (NIT) remain on the frontier but NIT unit is the only firm which remains on the efficient frontier over the whole study period of 2005 to 2010. It indicates that the fund is optimally utilizing its resources to produce its outputs. NIT unit fund is enjoying various advantages as it is the largest and oldest mutual fund of Pakistan. Alfalah GHP Alpha fund was established in 2008 (two years observations) whereas NIT CRS fund was established in 2009 (one year observation). Therefore, we cannot compare their results with NIT unit fund.

Alfalah GHP Alpha fund, Pakistan Cash management fund, Askari Islamic fund, KSB cash fund, MCB dynamic cash fund and NIT CRS fund are found as the most

Table 3: Efficiency of Mutual Funds (Mean)

Sr. No.	MUTUAL FUND	DEA					
		TYPE	TE	PTE	SE	AE	CE
1	ABL Income Fund	OPEN END	0.950	0.954	0.995	0.973	0.927
2	ABL Stock Fund	OPEN END	0.871	0.946	0.921	0.995	0.942
3	AKD Income Fund	OPEN END	0.621	0.622	0.999	0.946	0.587
4	AKD Index Tracker Fund	OPEN END	0.981	1.000	0.981	0.929	0.929
5	AKD Opportunity Fund	OPEN END	0.921	0.964	0.955	0.994	0.958
6	Meezan Islamic Fund	OPEN END	0.887	0.911	0.976	0.993	0.903
7	Meezan Islamic Income Fund	OPEN END	0.831	0.862	0.965	0.984	0.851
8	Meezan Cash Fund	OPEN END	0.939	0.972	0.967	0.996	0.969
9	Alfalah GHP Income Multiplier Fund	OPEN END	0.947	0.967	0.980	0.993	0.960
10	Alfalah GHP Islamic Fund	OPEN END	0.970	0.970	1.000	0.994	0.965
11	Alfalah GHP Principal Protected Fund	OPEN END	0.926	0.927	0.999	0.993	0.921
12	Alfalah GHP Value Fund	OPEN END	0.934	0.964	0.969	1.000	0.964
13	Alfalah GHP Alpha Fund	OPEN END	1.000	1.000	1.000	1.000	1.000
14	Pakistan Capital Market Fund	OPEN END	0.873	0.913	0.957	0.997	0.910
15	Pakistan Cash Management Fund	OPEN END	1.000	1.000	1.000	0.907	0.907
16	Pakistan Income Enhancement Fund	OPEN END	0.925	0.930	0.994	0.999	0.930
17	Pakistan Income Fund	OPEN END	0.797	0.800	0.996	0.992	0.794
18	Pakistan Int'l Element Islamic A A Fund	OPEN END	0.886	0.902	0.980	0.996	0.898
19	Pakistan Stock Market Fund	OPEN END	0.869	0.917	0.951	0.998	0.914
20	Askari Asset allocation Fund	OPEN END	0.874	0.883	0.990	0.994	0.878
21	Askari High Yield Scheme	OPEN END	0.819	0.843	0.967	0.974	0.819
22	Askari Sovereign Cash Fund	OPEN END	0.723	0.724	0.998	0.946	0.685
23	Askari Islamic Income Fund	OPEN END	1.000	1.000	1.000	0.821	0.821
24	Askari Islamic Asset allocation Fund	OPEN END	0.906	1.000	0.906	0.890	0.890
25	Atlas Income Fund	OPEN END	0.936	0.959	0.977	0.945	0.904
26	Atlas Islamic Income Fund	OPEN END	0.946	0.971	0.974	0.913	0.886
27	Atlas Islamic Stock Fund	OPEN END	0.890	0.922	0.965	0.981	0.904
28	Atlas Stock Market Fund	OPEN END	0.899	0.927	0.970	0.991	0.918
29	BMA Chandigarh Road Saving Fund	OPEN END	0.894	0.894	1.000	0.982	0.879
30	BMA Empress Cash Fund	OPEN END	0.982	1.000	0.982	0.926	0.926
31	Crosby Dragon Fund	OPEN END	0.914	0.958	0.955	0.999	0.957
32	Crosby Phoenix Fund	OPEN END	0.936	0.949	0.986	0.881	0.836
33	Dawood Income Fund	OPEN END	0.891	0.899	0.992	0.951	0.856
34	Dawood Islamic Fund	OPEN END	0.988	0.990	0.998	0.966	0.957
35	Faysal Balanced Growth Fund	OPEN END	0.892	0.904	0.987	0.998	0.902
36	Faysal Income & Growth Fund	OPEN END	0.945	0.948	0.997	0.968	0.916
37	Faysal Savings Growth Fund	OPEN END	0.972	0.987	0.985	0.949	0.935
38	First Habib Income Fund	OPEN END	0.914	0.945	0.968	0.997	0.943
39	HBL Income Fund	OPEN END	0.900	0.925	0.973	0.994	0.919
40	HBL Multi Asset Fund	OPEN END	0.935	0.940	0.996	0.969	0.910
41	HBL Stock Fund	OPEN END	0.921	0.945	0.976	0.991	0.936
42	IGI Aggressive Income Fund	OPEN END	0.827	0.828	1.000	0.990	0.819
43	IGI Income Fund	OPEN END	0.854	0.871	0.979	0.997	0.868
44	IGI Stock Fund	OPEN END	0.910	0.944	0.962	0.979	0.923
45	JS Aggressive Asset allocation	OPEN END	0.927	0.957	0.969	0.995	0.953
46	JS Aggressive Income Fund	OPEN END	0.906	0.959	0.946	0.686	0.657
47	JS Fund of Funds	OPEN END	0.988	0.988	1.000	0.976	0.964
48	JS Income Fund	OPEN END	0.882	0.916	0.964	0.958	0.877
49	JS Islamic Fund	OPEN END	0.874	0.886	0.987	0.997	0.882
50	JS KSE 30 Index Fund	OPEN END	0.985	0.989	0.995	1.000	0.989
51	JS Capital Protected Fund II	OPEN END	0.954	0.959	0.994	0.999	0.958
52	JS Principal Secure Fund I	OPEN END	0.676	0.710	0.952	0.998	0.708
53	JS Unit trust of Pakistan	OPEN END	0.910	0.929	0.979	0.990	0.919
54	KASB Asset allocation Fund	OPEN END	0.847	0.861	0.981	0.958	0.821
55	KASB Cash Fund	OPEN END	1.000	1.000	1.000	0.908	0.908

Table 3: Continue

Sr. No.	MUTUAL FUND	DEA					
		TYPE	TE	PTE	SE	AE	CE
56	KASB Income Opportunity Fund	OPEN END	0.809	0.860	0.941	0.970	0.834
57	KASB Islamic Income Opportunity Fund	OPEN END	0.873	0.880	0.992	0.953	0.839
58	KASB Stock Market Fund	OPEN END	0.907	0.909	0.997	0.997	0.906
59	MCB Dynamic Allocation Fund	OPEN END	0.694	0.753	0.921	0.994	0.749
60	MCB Dynamic Cash Fund	OPEN END	1.000	1.000	1.000	0.828	0.828
61	MCB Dynamic Stock Fund	OPEN END	0.805	0.909	0.885	0.997	0.906
62	Metro Bank Pakistan Solv. Fund Perp.	OPEN END	0.989	0.989	1.000	0.952	0.940
63	NAFA Government Sec Liquid Fund	OPEN END	0.869	0.870	0.999	1.000	0.870
64	NAFA Income Fund	OPEN END	0.903	0.903	0.999	0.984	0.889
65	NAFA Income Opportunity Fund	OPEN END	0.915	0.922	0.993	0.991	0.913
66	NAFA Islamic Aggressive Income Fund	OPEN END	0.892	0.918	0.972	0.945	0.867
67	NAFA Islamic Multi Asset Fund	OPEN END	0.868	0.912	0.952	0.994	0.907
68	NAFA Multi Asset Fund	OPEN END	0.885	0.926	0.955	0.994	0.920
69	NAFA Stock Fund	OPEN END	0.892	0.933	0.957	0.993	0.927
70	National Investment Unit Trust	OPEN END	0.991	1.000	0.991	1.000	1.000
71	NIT CRS SEF	OPEN END	1.000	1.000	1.000	1.000	1.000
72	Pak Oman Advantage Stock Fund	OPEN END	0.934	0.953	0.980	0.983	0.936
73	Pak Oman Islamic Asset allocation Fund	OPEN END	0.947	0.982	0.964	0.991	0.974
74	Pak Oman Advantage Isl. Inc Fund	OPEN END	0.830	0.850	0.977	0.909	0.773
75	UBL Liquidity Plus Fund	OPEN END	0.710	0.711	0.999	1.000	0.710
76	United Composite Islamic Fund	OPEN END	0.831	0.879	0.945	0.994	0.874
77	United Growth & Income Fund	OPEN END	0.877	0.966	0.910	0.895	0.862
78	United Islamic Income Fund	OPEN END	0.872	0.896	0.972	0.982	0.880
79	United Stock Advantage Fund	OPEN END	0.904	0.935	0.969	0.984	0.921
80	NAMCO CRS Income	OPEN END	0.924	0.939	0.984	0.914	0.859
81	Golden Arrow Selected Stock Fund	CLOSE END	0.922	0.960	0.961	0.989	0.949
82	Al Meezan Mutual Fund	CLOSE END	0.891	0.908	0.982	0.989	0.898
83	Meezan Balanced Fund	CLOSE END	0.863	0.873	0.990	0.996	0.869
84	Pakistan Premier Fund	CLOSE END	0.912	0.933	0.978	0.991	0.924
85	Pakistan Strategic Fund	CLOSE END	0.894	0.901	0.992	0.997	0.899
86	Atlas Fund of Funds	CLOSE END	0.837	0.846	0.989	0.866	0.734
87	First Dawood Mutual Fund	CLOSE END	0.803	0.809	0.993	0.991	0.802
88	First Capital Mutual Fund	CLOSE END	0.970	0.970	0.999	0.994	0.965
89	JS Growth Fund	CLOSE END	0.941	0.950	0.991	0.996	0.946
90	JS Value Fund Limited	CLOSE END	0.917	0.944	0.971	0.994	0.939
91	JS Large Cap Fund	CLOSE END	0.849	0.876	0.971	0.996	0.873
92	NAMCO Balanced Fund	CLOSE END	0.883	0.899	0.983	0.993	0.892
93	Pakistan Capital Protected Fund	CLOSE END	0.954	0.987	0.965	0.993	0.980
94	Pak Oman Advantage Fund	CLOSE END	0.923	0.932	0.990	0.991	0.923
95	PICIC Energy Fund	CLOSE END	0.925	0.949	0.974	0.996	0.945
96	PICIC Growth Fund	CLOSE END	0.939	0.969	0.970	0.969	0.938
97	PICIC Investment Fund	CLOSE END	0.920	0.936	0.985	0.995	0.931
98	Asian Stocks Fund	CLOSE END	0.900	0.913	0.986	0.984	0.898
99	Safeway Mutual Fund	CLOSE END	0.954	0.967	0.986	0.954	0.921
100	UBL Capital Protected	CLOSE END	0.923	0.925	0.998	0.985	0.911
	Mean		0.900	0.921	0.977	0.970	0.893
	Mean Open end		0.898	0.919	0.977	0.968	0.889
	Mean Close end		0.909	0.925	0.983	0.980	0.907
	Maximum		1.000	1.000	1.000	1.000	1.000
	Minimum		0.621	0.622	0.885	0.686	0.587
TE	Technical Efficiency computed with the DEA model						
PTE	Pure Technical Efficiency computed with the DEA model						
SE	Scale Efficiency computed with the DEA model						
AE	Allocative Efficiency computed with the DEA model						
CE	Cost Efficiency computed with the DEA model						

Table 4: Return to Scale in the Mutual Funds of Pakistan

	Over the Period of 2005 to 2010						
	2005	2006	2007	2008	2009	2010	Average
DRS	40.00	30.00	40.48	54.24	51.90	67.02	52.28 (%)
CRS	28.00	40.00	45.23	35.59	29.11	17.02	29.79 (%)
IRS	32.00	30.00	14.29	10.17	18.99	15.96	17.93 (%)
RTS: Return to Scale				DRS: Decreasing Return to Scale			
CRS: Constant Return to Scale				IRS: Increasing Return to Scale			

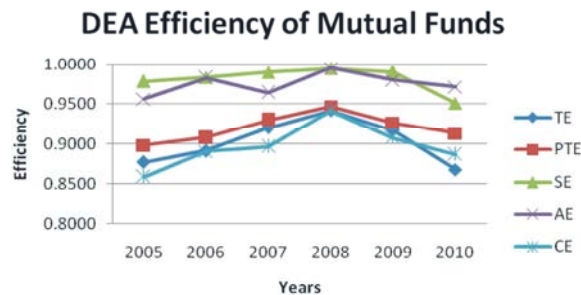


Fig. 3:

technical efficient funds since all of these funds remain on the frontier over the study period. It suggests that out of six efficient funds, there are three cash funds which implies that the cash funds are performing better as they mostly invest in government securities, bank deposits and money market.

AKD Income fund is found as the lowest cost efficient mutual fund in Pakistan since it is consuming higher cost to produce their outputs. The lowest technical efficiency is also found in AKD income fund (62.1%). This fund was established recently in 2008, therefore, we can relate it with the financial crisis in 2009 which adversely affected the mutual funds in Pakistan. Moreover, this may also be attributed to their lower expertise in managing these funds.

The efficiency trend of the mutual funds over the study period is given in Figure 3 which suggests that the DEA efficiencies of the mutual funds improved from 2005 to 2008 and then sharply fell in the year 2009. After the financial crisis in 2009, the profits and investments of mutual funds sharply dropped. This indicates that the financial crisis provoked a stock market crisis which adversely affected the efficiency of mutual funds in Pakistan. Babalos *et al.*, (2012) also found a sharp fall due to the financial crisis in the Greek mutual funds.

Return to scale analysis of mutual funds suggests that there are 52.28% Decreasing Return to Scale (DRS), 29.79% Constant Return to Scale (CRS) and 17.93% Increasing Return to Scale (IRS) (Table 4). Although, mutual funds have higher scale efficiency (97.7%) but still many of the mutual funds lose their way as they have wrong scale to meet the market demand. It is also evident

from raising the percentage of DRS from 40% to 67% from 2005 to 2010. It may be due to the high competition amongst the mutual funds. There is a small percentage of CRS which indicates that although the overall scale efficiency is very high in the mutual fund sector but still there are few mutual funds with the optimum size. IRS results suggest that only a few companies have the potential of optimum utilization of growth.

CONCLUSION

The efficient operations of the mutual funds are important since they not only try to optimally diversify the risk for their investors but also provide expertise at an affordable price. Mutual funds try to facilitate the investors who don't have the expertise to trade in the stock market. In the recent years, the achievement of higher efficiency levels has become challenging for the mutual funds of Pakistan due to financial uncertainties and intense competition. Therefore, it is important to analyze their efficiency.

Various conclusions can be derived from the present study. For instance, the mutual funds of Pakistan are working well since the cost efficiency score is very high. Moreover, it is also found that the cause of lower technical efficiency and cost efficiency is the pure technical efficiency instead of scale efficiency and allocative efficiency, respectively. Therefore, the management companies need to improve their managerial operations by optimally utilizing the investments of the company to produce higher profits. Furthermore, close-ended mutual funds are operating better than the open-ended mutual funds although the difference between their efficiency scores is minor. In addition, the study also found that amongst the highest efficient mutual funds mostly were the cash funds which can be attributed to their lower exposure to the stock market. Finally, the analysis of return to scale in the mutual funds indicates that the mutual funds in Pakistan need to be alert since the number of DRSs has been increased. The regulators need to monitor it since any careless growth can harm the overall health of the industry.

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