

Performance evaluation of Pakistan's mutual fund industry

Ayesha Iraj

Syed Mohsin Ali

Abdul Wali Khan University, Mardan, Pakistan

Abstract

In order to evaluate the performance of mutual fund industry in various financial markets a wide variety of researches have been conducted, which lead to different results. As Pakistani mutual fund industry is much younger as compared to the US and UK fund industries and thus limited work has been done to evaluate Pakistani mutual fund industry. Over the past few years the industry had showed a phenomenal growth and it makes it worthwhile to study the performance of mutual funds. The aim of this research study is to validate the Fama French 3-Factor Model and Carhart 4-Factor Model. Also this research attempts to test that which one of the included model performs better than the other so as to check their preferred suitability in measuring and evaluating the mutual fund performance in Pakistan. The monthly data of 323 open ended mutual funds for the period of 2008 to 2018 is analyzed. The GRS model validation test was applied, the results of the test found that the Carhart 4-Factor Model performed much better than the Fama French 3-Factor Model and from the CAPM as well. This research contributes to the body of knowledge by providing academicians and practitioners more knowledge regarding multifactor asset pricing model so as to make better investment decisions.

Keywords: Mutual funds, performance evaluation, CAPM, Fama-French 3- factor model, Carhart 4-factor model

There are a lot of investment avenues available in today's financial market, out of which the mutual funds are considered to be the key instrument by the investors, because this instrument has been acknowledged as the best profitable investment for the small investors across the globe, especially those who don't possess professional knowledge of portfolio management. In Pakistan the first mutual fund was introduced by Investment Corporation of Pakistan (ICP) in 1962. The industry showed the phenomenal growth and today there are 323 open ended mutual funds listed on Mutual Fund Association of Pakistan (MUFAP). This tremendous growth of the industry is in itself a proof of investors' trust in this instrument, as it is considered safer and less risky investment instrument. It is witnessed that over the years, different tools and measures have been used to evaluate the performance of mutual funds. Previous studies showed that the traditional ratio analysis has been used for the said purpose. After the introduction of Sharpe ratio, Sharpe (1964) along with Lintner (1965), and Mossin (1966) formally developed the Capital Asset Pricing Model (CAPM) for the performance evaluation of stocks. This model describes the relationship between the risk and expected return of the securities. This single factor model was extended by Fama and French (1993) with two more factors of size and value. Furthermore this three factor model was extended by Carhart (1997) by adding another factor of momentum. Yi and He (2016) found that the value factor of Carhart four factors model can explain variation of returns of the Chinese mutual funds. Sundqvist (2017) used CAPM and Fama French five factor model and found that the size, value and investment factor explain average returns of the Nordic stock market. Rehman and Baloch (2016) size factor and value factor is insignificant in explaining the returns of Pakistani mutual funds. Farooq (2018) used CAPM to evaluate performance of Pakistan mutual funds and concluded that these funds have higher risk. Urooj (2017) found that the value factor and market factor are significant in explaining the returns of Pakistan stock market. Roy and Shinjin (2018) found that the Fama French five factors model along with the sixth human factor can explain returns of US stock. Though these single factor and multi factor models have been widely used for the performance evaluation of stocks and funds across the globe but very rarely used to evaluate the performance of Pakistan's mutual fund industry enabling the researcher to cover this gap. As the literature is scarce on the studies that use multifactor model especially four factor model to evaluate the mutual funds of Pakistan, on this ground and references there is a clear research gap which impelled the researcher to conduct the research on Pakistan mutual fund market. Therefore

this study attempts to evaluate the performance of Pakistan mutual funds using the multifactor asset pricing model.

This study contributes to the body of knowledge as it takes the multifactor models that are Fama French three factors model and Carhart four factors model as the parameters and dimensions to measure the performance of mutual funds. This study provides more knowledge to the academicians by enriching the literature in the context of developing country mutual fund market, as the previous researches are mostly conducted on the developed countries or on the equity markets of the developing markets. This study will not only enrich the literature but will also help fund managers in better evaluation of mutual funds of Pakistan. This study has the significance for both the scholars and the practitioners, particularly those who are engaged in the mutual funds of Pakistan. This study would be important to those who conduct research studies on practicing investment strategies and techniques with the objective of obtaining an optimal return, which is the emerging domain of the research in the business management. The results of this study are beneficial for the decision making. This study aims to examine and evaluate the mutual fund performance of Pakistan by using this modern method of competing models. This research intends to determine which of the included factor of the Fama French three factors model and Carhart four factors model are significant for the performance evaluation of mutual funds. This research has the following research objectives;

- i. To measure and evaluate the competing model i.e., CAPM, Fama French three factor model and Carhart four factor model.
- ii. To determine which of the used model better explains variation in the return of the mutual funds.

The rest of the paper is structured as follows; literature review of the study, followed by the methodology which discusses competing models and data formation, then the data analysis is discussed and lastly the conclusion is drawn from the analysis.

Literature Review

Capital Asset pricing theory known as CAPM, was established by Sharpe (1964), Lintner (1965) and Mossin (1966). Miller and Nicholas (1980) applied regression analysis to test the CAPM and found inconsistent relationship between the risk and return. Carleson (1970) found that the funds outperform the market return. Murthi, Choi and Desia (1997) investigated the efficiency of the investment funds through Data Envelopment Analysis (DEA) and found that all the mutual funds were approximately mean variance efficient and performing quite efficiently. Fama and French (1993) developed three factor model for evaluating the mutual fund performance and found that the size and value factor of the model explains more variation in the return than the market factor. Cai, Chan and Yamada (1997) used the same model and found contradicting results than that of Fama and French (1993) results and concluded that the market factor of the model better explains the mutual fund returns than the value and size factor. Carhart (1997) extended the Fama French three factors model with the momentum factor and applied four factors model for the evaluation of funds and stock portfolios. The researcher found similar results as that of the three factor model. The fourth factor of momentum also affected the fund returns. He concluded that the funds outperform the market in terms of all four factors. Otten and Dennis (1999) used Carhart four factors model and found that the small cap funds were able to add value and there is a positive relationship between the und size and the returns of the fund. Otten and Bams (2002) used the same model and found that three factor of market, size and value results were consistent with the Carhart four factors model but found contrasting results for the momentum factor and concluded poor performance by the funds. Kothari and Warner (2001) applied Fama French three factor model as well as the Carhart four factors model and found that the three factor model performs better than the CAPM and four factors model does not affect the returns of the funds. Sap and Tiwari (2004) applied Fama and French three factors model and Carhart four factors model and concluded that momentum factor has significant results and the investors only respond to the large recent returns. Luckoff (2011) evaluated the mutual fund performance using Fama French three factors model and Carhart four factors model and concluded that the past performance is merely an indicator of how the fund will perform in the future. As in Pakistan mutual fund industry is still in its growing phase most of the researches have been done using the traditional ratio analysis for performance evaluation and very few researches have been done where the researcher have applied CAPM or multi-factor model. Sipra (2006) found that the mutual funds outperform the market. The same results were found by Nazir and Nawaz (2010). Whereas Saeed (2004) had found that mutual funds underperform than the market. Bhatti, Tanveer and Sial (2015) applied CAPM and found that low return portfolios capture more market variation than the high performing portfolios. Yi and He (2016) found insignificant results for the factors of size and

momentum factors whereas the results were significant for the value factor. Rehman and Baloch (2016) applied CAPM and Fama French three factor model and concluded that the CAPM model is more preferred model for the evaluation of mutual funds of Pakistan, whereas, Kampman (2011) in his research study supported the notion that Fama French three factor model better explains the return variations than that of CAPM. Sundqvist (2017) used CAPM and Fama and French five factor model to evaluate the Nordic Funds and that the size, value and investment factors explain the average returns of the Nordic funds whereas the profitability factor does not explain the average returns of the mutual funds. Urooj (2017) used the three factor model and found that market factor and value factor showed the significant results whereas the results for the size factor are insignificant. The literature reveals that the anomalies of size, value and momentum factor are widely used across the globe (Luckoff 2011, Ye & He 2016, Roy & Shijin 2018). These price anomalies are being used by researchers to evaluate the performance of stock/equity market of Pakistan (Rehman & Baloch, 2015, Urooj, 2017, Farooq, 2018, Rasheed, Saood, Allam & Ullah, 2019). The literature also reveals that there is a need to use more competing methods for the performance evaluation of the mutual funds of Pakistan. However there is no evidence that these multi factors model especially Carhart four factors model is being used to evaluate the performance of mutual funds of Pakistan and it is needed to check that whether these price anomalies have significant effect on the return of mutual funds of Pakistan or not. Therefore this research aims to investigate the four factors model along with the three factors model to evaluate the mutual fund performance. This study includes the market, size, value and momentum factor to check which of these included factors have the explanatory power for the variation in the returns of Pakistan mutual funds. This research has the following set of research hypothesis;

H₀1: Fama French three factors model does not evaluate mutual fund performance better than the CAPM.

H1: Fama French three factors model does evaluate mutual fund performance better than the CAPM

H₀2: Carhart four factors model does not evaluate mutual fund performance better than the CAPM

H2: Carhart four factors model does evaluate mutual fund performance better than the CAPM

Research Methodology

This study falls under the quantitative paradigm. The time series data for all 323 open ended mutual funds has been collected from the MUFAP for the time period of 2008 to 2018. The monthly data of 323 open ended mutual funds have been collected from the MUFAP data base for the said time period. The T-bills 12 month rate collected for the said time period and merged with the mutual funds data. The data of PSE100 Index is calculated for the said time period for calculating the size, value and momentum. Six portfolio returns were generated in each month i.e., BL, BM, BH, SL, SM, SH where B stands for big, S stands for small and L, M, H are for low, medium and high respectively. After that ten portfolio of mutual funds are created on the basis of their cumulative last one year return, where lowest return mutual funds are placed in portfolio one (P1) and highest return mutual funds are placed in portfolio 10 (P10). Time series regression has been applied.

Research Models

The models used for the analysis are CAPM, Fama French three factors and Carhart four factors model. These models are discussed as follows;

CAPM can be stated as;

$$R_i - R_f = \alpha + \beta(R_m - R_f) + \epsilon \dots \dots \dots (1)$$

$R_i - R_f$ represents the actual risk premium on the given stock or fund.

$\beta(R_m - R_f)$ represents the expected risk premium,

Whereas, α is the intercept.

Fama French three Factor model can be stated as;

$$R_i - R_f = \alpha + \beta_1(R_m - R_f) + \beta_2(SMB) + \beta_3(HML) + \epsilon \dots \dots \dots (2)$$

$R_i - R_f$ represents the actual risk premium on the given stock or fund,

$\beta(R_m - R_f)$ represents the expected risk premium,

$\beta_2(SMB)$ represents the size factor; it is the difference between the return on a portfolio that consist of small cap funds and those that contain large cap funds.

$\beta_3(HML)$ represents the value factor, it is calculated as the difference in the return of a portfolio of high book to market fund and a portfolio of a low book to market fund.

Whereas, α is the intercept.

Carhart Four Factor model can be stated as;

$$R_i - R_f = \alpha + \beta_1(R_m - R_f) + \beta_2(SMB) + \beta_3(HML) + \beta_4(WML) + \epsilon \dots \dots \dots (3)$$

$R_i - R_f$ represents the actual risk premium on the given stock or fund,

$\beta(R_m - R_f)$ represents the expected risk premium,

β_2 (SMB) represents the size factor, it is the difference between the return on a portfolio that consist of small cap funds and those that contain large cap funds.

β_3 (HML) represents the value factor, it is calculated as the difference in the return of a portfolio of high book to market fund and a portfolio of a low book to market fund.

β_4 (WML) represents the momentum factor and it is calculated as the difference between the a portfolio of a past year winner and a portfolio of a past year loser.

Whereas, α is the intercept.

Data Analysis and Results

This study attempts to evaluate the performance of mutual funds using single factor and multifactor asset pricing models. Table 1 shows the result of CAPM. The results indicate that the portfolio having least return and portfolio having moderate to higher returns are significantly related to the market factor. Almost all of the portfolios i.e., P1 and P5 to P10 have significant coefficients. All the portfolios have significant intercept value thus indicating that CAPM perform poorly in explaining the returns of portfolio those who have lower returns but it can explain the returns not completely but for portfolio which have higher returns as the intercept value tends to become closer to zero. As the intercept if zero or close to zero means that the return of that portfolio is explained by the market factor (Rehman, 2016). The market factor of the CAPM for the portfolios having higher return have significant values suggesting that the market factor do capture the returns of mutual funds

Table 1. *Portfolio Regressions using CAPM*

| <i>Vars</i> | <i>rm_rf</i> | <i>_cons</i> | <i>R²</i> |
|-------------|---------------------|----------------------|----------------------|
| rpi1 | 0.032*** (2.500) | 0.011*** (11.790) | 0.047 |
| rpi2 | 0.022 (0.681) | 0.010*** (4.364) | 0.004 |
| rpi3 | 0.010 (0.938) | 0.009*** (11.901) | 0.007 |
| rpi4 | 0.018 (0.902) | 0.013*** (9.531) | 0.006 |
| rpi5 | 0.049*** (2.041) | 0.020*** (11.288) | 0.032 |
| rpi6 | 0.171*** (3.045) | 0.039*** (9.776) | 0.068 |
| rpi7 | 0.188*** (5.026) | 0.040*** (14.985) | 0.166 |
| rpi8 | 0.176*** (3.415) | 0.055*** (14.813) | 0.084 |
| rpi9 | 0.169*** (3.365) | 0.057*** (15.823) | 0.082 |
| rpi10 | 0.176*** (3.291) | 0.065*** (17.176) | 0.079 |

t-statistics are in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 2 shows the result of 10 decile portfolios defined and explained by Fama - French five three factor model. The table indicates the significant results for the portfolio P1 which is the lowest return and for the portfolio P6 to P10 that is portfolios having higher returns as the coefficient of the market factor shows significant value. However the coefficient of SMB i.e., the size factor can explain the returns of portfolio having lower and higher returns but fails to explain the returns of the portfolios which have moderate returns i.e., P2 to P5. Whereas the HML factor i.e., the value factor has insignificant coefficient value for almost all portfolios except P2 and P10 thus indicating that HML factor fails to explain the returns of portfolios but from the results of portfolios P2 and P10 we can say that this factor may have some explanatory power. The intercept has significant value for all the portfolios except P2. The results also indicate significant values for the market factor and size factor for the portfolios having higher returns thus suggesting that the

Fama and French three factor model does have some explaining power for the variation in the returns of the mutual fund industry of Pakistan especially for those which have higher returns than those having lower returns.

Table 2. *Portfolio Regressions using Fama & French Three – Factor Model*

| <i>Vars</i> | <i>rm_rf</i> | <i>SMB</i> | <i>HML</i> | <i>_cons</i> | <i>R²</i> |
|-------------|---------------------|-----------------------|-----------------------|----------------------|----------------------|
| rpi1 | 0.028*** (2.164) | -0.055*** (-2.447) | 0.001 (0.038) | 0.010*** (8.940) | 0.089 |
| rpi2 | 0.041 (1.222) | -0.164*** (-2.842) | -0.232*** (-3.046) | 0.005* (1.770) | 0.124 |
| rpi3 | 0.011 (0.948) | -0.038* (-1.965) | -0.009 (-0.352) | 0.008*** (9.077) | 0.040 |
| rpi4 | -0.002 (-0.208) | -0.015 (-0.814) | -0.020 (-0.818) | 0.009*** (10.489) | 0.011 |
| rpi5 | 0.035 (1.631) | -0.063* (-1.686) | -0.041 (-0.836) | 0.016*** (8.861) | 0.047 |
| rpi6 | 0.178*** (2.955) | -0.153 (-1.464) | -0.180 (-1.307) | 0.033*** (6.653) | 0.090 |
| rpi7 | 0.183*** (4.702) | -0.155*** (-2.293) | -0.038 (-0.428) | 0.037*** (11.328) | 0.196 |
| rpi8 | 0.177*** (3.322) | -0.211*** (-2.293) | -0.203* (-1.666) | 0.047*** (10.599) | 0.130 |
| rpi9 | 0.173*** (3.225) | -0.198*** (-2.132) | -0.019 (-0.155) | 0.055*** (12.285) | 0.119 |
| rpi10 | 0.194*** (3.429) | -0.209*** (-2.131) | -0.290*** (-2.239) | 0.059*** (12.432) | 0.138 |

Note. t-statistics are in parenthesis; *** p<0.01, ** p<0.05, * p<0.1

Table 3 shows the result of 10 decile portfolios defined and explained by the Carhart four factors model. The result indicates mostly insignificant result for the market factor and only shows significant results for P4, P7 and P10. Thus indicating that the market factor can some time explains the returns of the portfolios having moderate to higher returns. For the size factor the table indicates significant result only for the portfolios of P1, P2, P7 and P10. Just like the market factor the size factor also can not sufficiently explains the returns of Mutual Funds of Pakistan due to the mixed results of the model for the size factor. For the value factor which is HML only the result of Portfolio P2 is significant and it is insignificant for the rest of the portfolios thus indicating that the value factor of the Carhart four factors model cannot explain the variation in the returns of the mutual funds. For the momentum factor the table shows significant results mostly for all the portfolios excluding portfolio P2 and P3, thus indicating that the momentum factor verily explains the returns of the mutual funds of the Pakistan. Also by looking at the intercept values which are very much closer to zero and some of these are even insignificant (that is for Portfolio P2, P5 and for P8) it can be concluded that the Carhart four factors model explains the variation in the returns of the Pakistani mutual fund industry.

Table 3. *Portfolio Regressions using Carhart - Four Factor Model*

| <i>Vars</i> | <i>rm_rf</i> | <i>SMB</i> | <i>HML</i> | <i>MOM</i> | <i>_cons</i> | <i>R²</i> |
|-------------|------------------|-----------------------|-----------------------|---------------------|---------------------|----------------------|
| rpi1 | 0.016 (1.198) | -0.052*** (-2.310) | 0.020 (0.658) | 0.069*** (3.207) | 0.006*** (3.843) | 0.179 |
| rpi2 | 0.028 (0.782) | -0.161*** (-2.629) | -0.233*** (-2.873) | 0.078 (1.335) | 0.001 (0.129) | 0.144 |
| rpi3 | 0.006 (0.498) | -0.040* (-1.971) | -0.002 (-0.084) | 0.019 (1.002) | 0.007*** (5.165) | 0.055 |
| rpi4 | -0.021*** | 0.002 | -0.004 | 0.105*** | 0.004*** | 0.310 |

| | | | | | | |
|-------|----------|-----------|----------|----------|-----------|-------|
| | (-2.168) | (0.119) | (-0.187) | (6.735) | (3.391) | |
| rpi5 | -0.011 | -0.029 | -0.005 | 0.268*** | 0.002 | 0.499 |
| | (-0.641) | (-1.012) | (-0.119) | (9.778) | (0.966) | |
| rpi6 | 0.046 | -0.047 | -0.069 | 0.842*** | -0.011*** | 0.628 |
| | (1.107) | (-0.656) | (-0.730) | (12.362) | (-2.282) | |
| rpi7 | 0.106*** | -0.110*** | 0.028 | 0.472*** | 0.011*** | 0.576 |
| | (3.535) | (-2.160) | (0.414) | (9.691) | (3.065) | |
| rpi8 | 0.067* | -0.123* | -0.081 | 0.723*** | 0.009* | 0.615 |
| | (1.735) | (-1.883) | (-0.931) | (11.559) | (1.947) | |
| rpi9 | 0.073* | -0.122* | 0.105 | 0.674*** | 0.019*** | 0.543 |
| | (1.733) | (-1.698) | (1.106) | (9.837) | (3.837) | |
| rpi10 | 0.075*** | -0.128*** | -0.133 | 0.796*** | 0.016*** | 0.678 |
| | (2.015) | (-2.035) | (-1.603) | (13.220) | (3.564) | |

Note. t-statistics are in parenthesis; *** p<0.01, ** p<0.05, * p<0.1

Table 4 is showing the results of GRS test. This test has been applied to find out which of the competing models better explain the variation of returns of the Pakistan mutual fund industry. If the intercepts are close to zero then the model is considered a good model (Rehman & Baloch, 2016). The GRS test results reveal the Fama and French three factor model performs a little better than the CAPM in explaining the variation of returns of Pakistan mutual fund industry thus rejecting null hypothesis one and accepting alternate hypothesis one. Whereas the GRS result of the Carhart four factor model reveal that this model better explain the variation of return of the Pakistan mutual fund industry than the CAPM as the average adjusted R² value is higher than the 0.389 (38.9%), also the mean absolute value of four factor model is much closer to zero than the CAPM's mean absolute value thus rejecting the null Hypothesis two and accepting alternating hypothesis two.

Table 4. GRS tests Mean Absolute Intercepts and Returns Dispersions

| Factors | GRS_ F-test | P- value | Mean Abs. Alpha | Avg. Adj R ² |
|-------------------|----------------|-------------|--------------------|----------------------------|
| rm_rf | 37.536 | 0.000 | 0.031 | 0.047 |
| rm_rf SMB HML | 21.377 | 0.000 | 0.028 | 0.074 |
| rm_rf SMB HML MOM | 5.135 | 0.000 | 0.009 | 0.389 |

Discussion and Implications

Multifactor asset pricing models are widely used across the globe for the performance evaluation of stock markets as well as the mutual fund industry. In western countries the three factors model and four factors model are used by most of the researchers to check whether the factors included in these models have significant results or not. However in Pakistan the CAPM has been repeatedly used for the performance evaluation of mutual funds. This study uses the Fama French three factors model and Carhart four factors model to check whether or not the market factor, size factor, value factor and momentum factor have the ability to predict the mutual funds returns. So for this purpose this research used the last decade time series data for July 2008 to July 2018 with the help of stata coding. This study used the Carhart (1997) methodology and created ten portfolios of mutual funds on the basis of their cumulative last one year return, where lowest return mutual funds are placed in portfolio one (P1) and highest return mutual funds are placed in portfolio 10 (P10). The results of Fama French three factor model revealed that the size factor have some explaining power in terms of variation of the returns of mutual funds whereas the value factor i.e., HML fails to capture mutual fund returns. Thus concluding that Fama French three factor model does not significantly explains the returns of the mutual funds of Pakistan especially those that have higher returns but performs somewhat better than the CAPM as the adjusted R² value is .074 (7.4%) which is slightly more than .047 (4.7%). The finding of this study negates the previous studies, which evidenced that the return variation is concerned with the market factor (Huiji & Verbeek, 2006, Afza & Rauf, 2009, Nazir & Nawaz, 2010, Alam & Qadar, 2015, Sundquist, 2017). Also this study shows contradicting results that of Huiji and Verbeek (2006), Kothari and Warner (2001) who found that the variation of return is well captured by size and value factor. The results of four factors model of this study showed that the momentum factor can predict returns of the

mutual fund industry. The results are consistent with the previous studies of Jagdeesh and Titman (1993), Anjun, Ijaz and Ahmed (2016), Khan (2016) and Rasheed, Saood, Alam (2019). This study also shows consistent results with that of Detzel and Weigand (1998), Otten and Dennis (1999), Kothari and Warner (2001), Wermers (2003) which suggested momentum factor explains the variation of the returns of the mutual funds whereas the results of this study negates the results of Yi and He (2016) that suggest that momentum factor does not capture the fund returns. The results of the GRS test reveal that the four factor model better explains the mutual fund performance than the CAPM as well as from the Fama French three factors model as the adjusted R^2 value is 0.389 (38.9%) which is a lot more than the adjusted R^2 value of the CAPM and that of three factors model.

Conclusion and Further Research Directions

Mutual fund is an important investment instrument which is trusted across the globe. This research study attempted to evaluate the Pakistan's mutual fund performance by applying the modern method of three competing models i.e., CAPM, Fama French three factor model and Carhart four factor model. Also this study aims to determine which of the applied models better explain the variation in return of mutual funds industry of Pakistan. The monthly data of 323 open ended mutual funds for the time period of 2008 to 2018 was collected. The CAPM results showed that all the intercepts have significant results thus indicating that CAPM performs poorly in explaining the variations of the returns of the mutual funds of Pakistan. The results of Fama French three factor model shows that the size factor have some explain power in terms of variation of the returns of mutual funds whereas the value factor i.e., HML fails to capture mutual fund returns. Thus concluding that Fama French three factor model does not significantly explains the returns of the mutual funds of Pakistan especially those that have higher returns. The results of Carhart four factors model suggest that the market and size factor may sometime explain the return variation of the portfolio whereas the value factor fails to explain the return variation. The momentum for of this model verily explains the returns of the mutual funds of Pakistan. The GRS test was applied to find out which of the competing model is the best for explaining the returns of the mutual funds of Pakistan. The GRS test results reveal that the Carhart four factor model better captures the return variation of the Pakistan mutual fund industry, as its mean absolute value is closer to zero. In future along with these factors the investment and profitability factor may also be included to evaluate the performance of mutual funds. Also the factors of trading volume and transaction cost along with the human factor may also be included in this model for future research to get the broader picture of mutual fund industry of Pakistan.

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