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The effect of performance of the Tehran Stock Exchange and Iran FaraBourse Sukuk Index on the risk-adjusted returns of mutual funds: Fama and French three-factor model

Milad Badiei *, Mohammad Hassan Ebrahimi Sarve Oliya **, Mostafa Sargolzaei***

** M.Sc. in Financial Engineering and Risk Management, Department of Finance and Banking, Faculty of Management and Accounting, Allameh Tabataba'i University, Tehran, Iran (Corresponding Author)*
Email: *m_badiei@atu.ac.ir*

: 0000-0003-1066-6941

Postal address*: Allameh Tabataba'i University, Varzesh Sq., Dehkadeh Olympic, Tehran, Iran.*

*** Associate Prof, Department of Finance and Banking, Faculty of Management and Accounting, Allameh Tabataba'i University, Tehran, Iran*
Email: *mh.ebraheimi@atu.ac.ir*

**** Assistant Prof, Department of Finance and Banking, Faculty of Management and Accounting, Allameh Tabataba'i University, Tehran, Iran*
Email: *mostafa.sargolzaei@atu.ac.ir*

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EXTENDED ABSTRACT

INTRODUCTION

Performance review Mutual funds have a wide range of capital market audiences including retail investors, pension funds, and institutional investors with various goals such as Receiving cash returns, diversifying the portfolio, and managing the risk of investing in them is one of the most challenging issues in the finance field. The current research aims to investigate the performance of mutual funds using the Fama and French three-factor model and considering the diversity of the mutual funds' portfolios. Factor pricing models provide a basic framework for understanding the performance of various asset classes, including mutual funds. Function Compared to the performance of the stock market, mutual funds show less sensitivity to investors' sentiments, and as a result, returns are likely to be more reasonably commensurate with their accepted risk. These funds operate based on the investment goals reflected in their prospectus and as a result, their performance is less subject to upward biases. These factors cause a better

reflection of the net value of assets under the management of mutual investment funds and increase the explanatory power of factor models for them compared to stocks. Despite numerous pieces of research about the risk-adjusted performance of equity funds, few pieces of research have been conducted about the factors explaining the returns of bond funds. Due to the unique characteristics of fixed-income investments such as maturity and credit rating, the necessity of using the appropriate index in evaluating the performance of bond funds is felt. Also, legal quotas limit the investment of bond funds and balanced funds in variable-income securities. They also make it necessary to use the appropriate benchmark rate to measure market risk. Therefore, to measure the performance of equity funds, the return of the stock exchange index[1] has been used, and to measure the performance of bond funds, the return of the Sukuk index[2] has been used as a general index of fixed-income securities, which while strengthening the explanatory power of model three Fama and French factor shows more agreement with performance evaluation theory. To measure the performance of mixed funds, a combination of the return of the stock exchange index and the return of the sukuk index has been used.

METHODOLOGY

The current research is applied in terms of purpose and terms of method, research using regression analysis multivariable which uses the generalized least squares(GLS) model. The statistical population of the research includes those mutual funds under the supervision of the Securities and Exchange Organization of Iran (SEO), that collect, form and manage a portfolio consisting of money and capital market instruments. Also, the time domain of the research includes the monthly periods from the beginning of April 2012 to November 2022. Sampling is based on the methodical elimination of the funds that make up the statistical population, and after removing the funds with a shorter life span than the time domain of the research and removing the samples without sufficient published information, 59 mutual funds form the sample of the research. Data related to the performance of mutual funds through reports published by the Securities and Exchange Organization of

[1] Tehran Stock Exchange Index (TEDPIX)
[2] Iran Fara Bourse Sukuk Index (Sindex)

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Iran, information related to the risk-free rate of return through information published in the Economic Trends of The Central Bank of Iran (CBI) and the IRAN FARA BOURSE (IFB) Data center, The book value data and the number of outstanding shares of the sample companies, which are required to form the size portfolio and the value portfolio in the Fama and French three-factor model, have been extracted from the annual financial reports of the companies published on the publishers' information database (Codal). And all the price data needed for the research has been extracted through the TSEclient software. Excel software was used to classify the data and calculate the research variables, and to analyze the data, Eviews (13 edition) and Stata (17 edition) software were used.

The specified model in the current research is as follows:

$$R_{it} - RFR_t = \alpha_i + \beta_1 MktExcess_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{it}$$

In this model: R is the Return of fund I in period t, REF t Risk-free rate of return, MktExcess t is the Excess of market return, SMBt is the size portfolio performance and HMLt is the value portfolio performance in period t. The excess market return based on Hebb's research (2020) and the fit between benchmark rates ($R_{Bench,t}$) and the type of fund has been calculated. Based on this, the benchmark rate for equity funds is the return of the TEDPIX, for bond funds, is the return of the Sindex, and for balanced funds is equal to the weighted average of these two indices with a weight of 70% of the TEDPIX and 30% is the Sindex. Excess return or MktExcess in each monthly period is obtained from the difference between the benchmark rate of the period and the monthly risk-free rate of return.

$$MktExcess_t = R_{Bench,t} - RFR_t$$

To ensure the stability of the model variables, their mean, variance, and covariance are stable over time, we are tested by Im, Pesaran, and Shin W-stat and ADF – Fisher Chi-square, To ensure the long-term relationship of the variables, we are tested by Individual Johnson Cointegration test.

To determine the model and integrated diagnosis Panel Model or Pooled Model from Chow's test has been used. For the autocorrelation test which examines the zero covariance between error components and their non-dependence on each other over time or cross-sectionally, from the Wooldridge test and to check the stability of the error variance From the Breusch-Pagan test In Stata software has been used

Due to cross-sectional dependence, which causes the efficiency of the ordinary least squares method to disappear Ordinary least squares (OLS), the model using Estimated from the generalized least squares method in Eviews software And to eliminate the problem of heterogeneity of variance as well, from White correction (Period Cluster) has been used.

FINDINGS

The results of the stability test show that all research variables are stable at the significance level of 5% without the need for differentiation. Also, the results of Johanson's Cointegration test show that the probability of the Dickey-Fuller test statistic is equal to 0.0000, and therefore by rejecting the null hypothesis of the test, the Cointegration of the research variables at a significance level of 5% is confirmed and the ambiguity surrounding the creation of spurious regression is resolved. to be Due to the high correlation between the excess return of mutual funds and the excess return of the market, the variance inflation factor (VIF) test was used to ensure non-collinearity in the model, and the results of the test show that the variance inflation factor for all research variables is very close to 1, and as a result, there is no collinearity between explanatory variables.

According to the results of the Chow test, which shows the probability of the F statistic of the test equal to 0.7052, the research model is of Pooled type.

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The results of the Breusch-Pagan test to check the conditions of variance heterogeneity show that the probability of the test statistic is equal to 0.0000 and therefore, by rejecting the null hypothesis of the test, the existence of variance heterogeneity conditions is confirmed. According to the cross-sectional dependence identified in the model, the final estimation of the research model has been done using the generalized least squares(GLS) method and using White's correction to solve the heterogeneity of variance. The results of the model estimation show that the F statistic of the model (333/7567) and the probability related to it (0.0000) indicate the significance of the model. Among the explanatory variables of the research, the variables of excess market return and size portfolio performance are significant, and value portfolio performance has no significant effect on the risk-adjusted performance of mutual funds. The coefficient of determination of the model is also equal to 76.84% and it shows that a significant part of the changes of the dependent variable is explained by the independent variables of the research. The following table shows the results of the model estimation.

Table 1. Results of Estimating the model using the Generalized least squares(GLS) method

Source: Research calculations

Variables	Coefficient	Std. Error	t-Statistic	Prob.
MktExcess	0.9863	0.0065	150.8464	0.0000
SMB	0.072	0.0067	10.6472	0.0000
HML	0.0048	0.007	0.68	0.0000
alpha	0.0033	0.0004	7.7331	0.0000
R-squared	0.7685			
Adjusted R-squared	0.7684			
F-statistic	7567.333			
Prob(F-statistic)	0.0000			
S.E. of regression	0.9995			
Mean dependent var	0.1293			
S.D. dependent var	2.093			
Sum squared resid	6833.192			
Durbin-Watson stat	1.94			

The results of the Wooldridge test also show that according to the test statistic (0.010) and its related probability (0.9199), the null hypothesis of the test is not rejected and the research model has no autocorrelation.

CONCLUSION

The purpose of this research is to investigate the explanatory power of the risk-adjusted performance of mutual funds, using the three-factor model of Fama and French, and redefining the benchmark rate in the calculation of excess market returns. The results of the research show that the explanatory power of the Fama and French three-factor model has increased significantly by adjusting the benchmark rate to the type of mutual fund. Also, the research findings indicate the significance and positive effect of excess market return and size portfolio performance. This means that one unit change in the market's excess return factor causes a change of 0.99 units in the excess return of mutual funds, which indicates the diversity of the mutual fund's portfolio and the preservation of the investors' money value in the long term. Also, a change of one unit in the size portfolio performance causes a change of 0.07 units in the excess return of mutual funds. Therefore, investing funds in the stocks of big companies can have a positive effect on their excess returns. The positive effect of the value portfolio performance on the excess return of mutual funds is not statistically significant, and therefore the fund's investment in the shares of companies with a high ratio of book value to market value does not affect their excess return. This shows that although the expectations of investors due to future developments, regarding the growth of stock returns with a high ratio of book value to market value, will increase the return of this type of stock in the medium term, in the long term, it is an influencing factor on stock returns and in The result of excess return of mutual funds is not considered. The significance and positivity of the alpha coefficient, which shows the effect of active management of mutual funds on their risk-adjusted returns, indicate that the studied funds have performed better than the market performance in the research period. However, the coefficient of determination of the research model, which shows the high explanatory power of the market, shows that the contribution of active

management to the performance of mutual funds is not impressive. The reason for this is not considering net transaction costs in factor models.

Considering the interesting results of using a proportional benchmark rate, it is suggested to the researchers investigate the risk-adjusted performance of mutual funds using other factor models and proportional rates. Also, examining the predictive power of factor models about the performance of mutual funds in short and long-term horizons can be the subject of future research.

According to the availability of data related to the Sindex Since March 2011, researchers have been deprived of the possibility of expanding the time scope of the research, which is considered a limitation of the research.

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