International Journal of Applied Business and Economic Research
Volume 16, Number 3, 2018, ISSN : 0972-7302
available at http://www.serialsjournals.com

TESTING ABNORMAL FLUCTUATIONS AND STOCK RETURNS WITHIN THE FRAMEWORK OF FAMA AND FRENCH THREE-FACTOR MODEL

Farshad Farshi Jalali[1]

[1]*M.Sc. Degree in Accounting, Semnan Branch of Islamic Azad University, Semnan, Iran*

Abstract: In the process of investment, the return acts as an actuator which provides the investors with motivation and reward. Investment-derived return is of importance for investors, because the investment game is all about extracting some return. A return on investment (ROI) assessment is the only rational approach (prior to risk assessment) via which investors can compare different investment alternatives. In order to better understand the investment performance, it is necessary to measure actual return (related to the past), given in particular that an analysis of the return in the past plays a great role in the prediction and estimation of ROI in future. The main purpose of the current contribution is to investigate the relationship between abnormal fluctuations and stock returns among the firms listed on Tehran Stock Exchange (TSE). Statistical population of the study is composed of all of the firms listed on TSE during a six-year period (2009 – 2014). Results of the present research indicated a significant relationship between abnormal fluctuations and market stock value as variables and stock return among the listed firms on TSE. The results further revealed that, there is no significant relationship between the ratio of book to market value and stock return among the listed firms on TSE.

Keywords: Abnormal fluctuations, stock return, Fama and French three-factor model.

1. INTRODUCTION

Capital market represents one of the most important economic and capital-related fields which importance is obvious. The capital market (headed by stock exchange) is closely related to economic structures of the country. A hot topic regarding the capital markets is the way those interact with and mutually affect other elements of an economic system, which are usually known as minor and major economic variables. In the process of investment, the return acts as an actuator which provides the investors with motivation and reward. A return on investment (ROI) assessment is the only rational approach via which investors can compare different investment alternatives. In order to better understand the investment performance, it is necessary to measure actual return. In general, the return is composed of two parts, namely cash profit and capital profit (loss) which is generated upon an increase (decrease) in the value of an asset. Such investment-derived profit (loss) is generated from the difference between the purchase price and the sales price when the holder of securities is willing to sell the goods (Frank Key *et. al.*, 2005).

2. PROBLEM DESCRIPTION

Capital market serves as a key driver of economy, and ROI in the process of investment acts as an actuator which provides the investors with motivation and reward. ROI assessment is the only rational approach via which investors can compare different investment alternatives. In order to better understand the investment performance, it is necessary to measure actual return. In general, the return is composed of two parts, namely

cash profit and capital profit (loss) which is generated upon an increase (decrease) in the value of an asset. Such investment-derived profit (loss) is generated from the difference between the purchase price and the sales price when the holder of securities is willing to sell the goods (Faranak-Key *et. al.*, 2005).

One of the most important and extensive scopes of research on financial markets refers to the explanation of the behavior of stock return. The models presented in previous research works have been criticized and/ or supported frequently. A well-known instant of such models is the capital asset pricing model (CAPM). Results of studies performed in United States, Japan and other developed countries during the past two decades indicate the model is not adequate for predicting the stock return. Findings of the mentioned studies show that, such factors as size, price-earnings ratio, price-to-cash-flow ratio, and the ratio of book price to market price of equity can predict the stock return better than the CAPM model (Saghafi and Salimi, 2005).

Volatility of stock return is a challenging financial topic which has recently gained attention from researchers of capital market in emerging markets. Such an attention is because of the relationship between price volatility and stock return, and the effect of such relationship on financial performance of the firms and the economy as a whole. On the other hand, another advantage of studying volatility of stock return for investors is that, the investors tend to see the stock return volatility as a risk criterion, and policy-setters for the capital market can use this criterion as a tool for measuring vulnerability of the stock market (Zafar *et. al.*, 2008). According to York (2004), efficient markets hate the volatility and unexpected events. In presence of volatility, markets tend to respond to the high risk level. Regardless of the source of volatility, managers can adopt either of the two general strategies to deal with that: (1) trying to address root causes and using managerial control for attenuating or eliminating the causes, through which actual risk is lowered, thereby lowering the cost of capital; (2) concealing the fluctuations using various accounting methods. This approach ends up with a solely apparent stability rather than changing actual risk of operation. Indeed, this approach adds to total risk, because the capital market does not acquire the needed information from financial statements. As such, cost of capital follows an increasing trend while the securities prices decrease. In an efficient market, one can distinguish between the mentioned two approaches to volatility and response to that. Therefore, investigation of the factors affecting volatility of stock return can contribute to many of the decisions to be made in capital market, with its result being applicable for practitioners in stock exchange, including financial authorities, firm managers, observers of economic systems, and ordinary investors.

The research performed by Campble *et. al.*, (2001), Brandt *et. al.*, (2010), and Fink *et. al.*, (2010) on abnormal fluctuations of return indicated that, such fluctuations exhibit variable behaviors rather than following a consistent trend. Given that abnormal fluctuations of return are of priority for such applications as diversification and portfolio management, risk-award relationship, and appraisal, and investors utilize it as a criterion for risk assessment while capital market policy-setters use that as a measure of vulnerability of the stock market, and also knowing that the strategies adopted by the Securities and Exchange Organization in recent years have targeted the attenuation and control of market fluctuations, then it can be important to undertake research works to study abnormal trend of stock return and its fluctuations in TSE. Should the research ends up concluding a reduction in abnormal stock return and abnormal fluctuations of stock return, this will imply that the policies adopted by the Securities and Exchange Organization toward reducing the fluctuations across the market have been successful.

In the process of investment, the return acts as an actuator which provides the investors with motivation and reward. Investment-derived return is of importance for investors, because the investment game is all about extracting some return. ROI assessment is the only rational approach (prior to risk assessment) via which investors can compare different investment alternatives. In order to better understand the investment performance, it is necessary to measure actual return (related to the past), given in particular that an analysis of the return in the past plays a great role in the prediction and estimation of ROI in future. Normal stock return refers to the sum of earnings entitled to the shareholder during a given financial period, as follows:

- *Price change:* Change in stock price during a given period is a key factor contributing to the stock return, and is commonly referred to as "capital gain".
- *Cash earnings per share:* This is paid to the shareholders after tax, and is known as dividends.
- *Priority right-derived benefits:* Shareholders of public corporations are deemed as of priority when it comes to a capital increase; those can take advantage of their right within a predetermined period deadline. This right is of commercial value and can be traded.
- *Dividend-derived benefits or bonus shares:* Some firms prefer to pay the dividends in the form of bonus shares. Accordingly, the shareholders are granted a number of shares rather than the dividend in cash (Kamali, 2008).

3. NECESSITY AND SIGNIFICANCE OF THE RESEARCH

As of current, rate of stock return is the most important criterion for performance evaluation of different institutes. This criterion alone contains some information for the investors who use it for performance evaluation. A decrease in the value of this criterion shall be seen as an alarm, indicating inappropriate performance of the company. This criterion contains a great deal of information, because performance evaluation based on market value reflects the investors' information very well. Volatility of stock return is a challenging financial topic which has recently gained attention from researchers of capital market in emerging markets. Such an attention is because of the relationship between price volatility and stock return, and the effect of such relationship on financial performance of the firms and the economy as a whole. On the other hand, another advantage of studying volatility of stock return for investors is that, the investors tend to see the stock return volatility as a risk criterion, and policy-setters for the capital market can use this criterion as a tool for measuring vulnerability of the stock market. In most of research works, abnormal stock return has been defined as the difference between predicted and actual stock returns (Zafar *et. al.*, 2008).

Since Adam Smith, the dominant viewpoint regarding organizations implies that, the entities are powered by their investors, employees, and vendors to produce some goods or services for their customers. According to this viewpoint, organizational performance is the financial return attained by shareholders. During his/her life, each of us makes decisions regarding investment on different thinks, including real estate, gold, stocks, etc. In a scientific decision-making, the choice of each investment alternative shall be directly dependent on its associated risk and return, as compared to other investment alternatives. In other words, the point is to identify the investment alternative which, at the end of the day, can provide us with the highest possible return at the same or even lower level of risk under similar conditions. Therefore, the importance of stock return prediction motivated researchers toward seeking for variables and criteria which exhibit significant relationships with stock return, and also those affecting such relationships. They have been consistently looking for variables affecting the stock return, so as to base their decision on such variables (Mansoori, 2008).

4. RESEARCH BACKGROUND

Babalooyan and Mozafari (2016) compared predictive power of the so-called Fama and French five-factor model to Carhart four-factor models and HXZ *q*-factor models when it came to explanation of stock return. The present research is aimed at investigating explanation powers of the Fama and French five-factor model, Carhart four-factor model and HXZ (Hu, Xue, and Zhang) *q*-factor model to explain stock return. Results of the research based on monthly data of the firms listed on TSE during 2010-2014 indicates that, the stock return could be better explained using the Fama and French five-factor model rather than Carhart and HXZ models. In contrast to the findings of Fama and French on United States stock exchange (USSE), the value factor (HML) is significant in TSE rather than being deemed as excessive. Research results indicate that, among beta factors, size, value, tendency toward previous performance (momentum), profitability, and investment, the momentum and investment on TSE impose no impact on the stock return.

Chai *et. al.*, (2015) used an extensive sample during 1982 – 2013 to investigate performance of the Fama and

French five-factor model in pricing the Australian banks. Their results indicated better explanatory power of the five-factor model for pricing anomalies, as compared to the Fama and French three-factor model.

In a research entitled as abnormal fluctuations of return and information quality under managerial opinions, Chen *et. al.*, (2012) studied abnormal fluctuations of return during 1978-2009 and conclude that, such fluctuations were a result of fluctuations in optional accruals and the correlation between earnings before application of managerial opinions and optional accruals, which is an indication of the quality of the information published by companies.

In 2016, Hezbi and Salehi compared explanatory power of the Carhart four-factor model with that of Fama and French five-factor model in predicting expected stock return. This research was aimed at comparing explanatory power of the Carhart four-factor model with that of Fama and French five-factor model in predicting expected stock return among listed companies on TSE. For this purpose, a sample of 142 companies were selected for the 2009-2013 period. The research hypotheses were tested using multi-variate regression and panel data. Results of the research showed that, the Fama and French five-factor model were of higher explanatory power than the Carhart four-factor model when it comes to the expression of return on the companies' stocks. The results further revealed that, one can enhance the model's ability to explain stock value by adding profitability and investment factors to the three-factor model.

Rajgopal and Venkatachalam (2013) studied the quality of financial reporting and abnormal fluctuations in stock prices during 1969 – 2008. In this study, the quality of financial reporting was evaluated based on two criteria, namely Dechow and Dichev criterion and accruals squared criterion. Results of the research indicated that, management of the earnings obtained with these two criteria is positively associated with increased abnormal fluctuations in stock price.

Zanali and Mohammad-Shilan (2011) performed a research to "investigate the impact of capital structures on size, rate of return on investment, and per share earnings in the companies listed on TSE (case study: pharmaceutical industry)". Findings of the research showed that, the companies grouped into pharmaceutical group during the considered period (2007-2009) were of identical financial structure. A significant relationship was identified between financial structure of these companies and their size, but no such significant relationship was identified between the financial structure and ROI or per share earnings.

Saeidi (2013) analyzed the quality of financial reporting in relation to abnormal fluctuations in stock return using a cross-sectional regression-time series hybrid model. The results showed that, a decrease in the quality of reporting, as per the Dechow and Dichev criterion, brings about abnormal fluctuations in stock return; however, decreasing financial reporting quality based on abnormal accruals squared exhibited no significant relationship with increasing abnormal fluctuations in stock return with time. Furthermore, fluctuations in operational cash flows was found to be significantly related to abnormal fluctuations in stock return. Operational performance, growth opportunity, firm size, and financial leverage exhibited no significant association with fluctuations in stock return. According to the results, in contrast to predictions, the relationship between stock return efficiency and fluctuations in stock return was positive.

In a research entitled as "A five-factor asset pricing model", Fama and French (2015) investigated the effects of introducing profitability and investment as two new factors to the Fama and French three-factor model. They results were indicative positive associations between the return, in one hand, and profitability and investment, on the other hand; the relationship was attributed to redemption of the stocks with small fluctuations in return and beta values, which were released by profitable firms which make investment following a conservative approach. On the other hand, a negative association was identified between return and profitability and investment related to the release of stocks with large beta values and volatile return which were attributable to non-profitable companies adopting aggressive investment schemes.

In a study on new factors contributing to asset pricing and expected return on bonds, Frank *et. al.*, (2015) analyzed the approach to pricing the effects of two new factors, namely profitability and investment, on

stock return in corporation bonds. In their research, they investigated the extent to which systematic risk premiums are related to operational profitability and investment, as defined by Fama and French. The research result indicated a negative association between profitability and risk premium, while the association between investment and risk components was not adequately robust. In general, their results indicated an inconsistency between the two factors and return.

In a research, Kashanipoor and Rezaei (2011) "investigated the impact of changes in free float on stock return of the companies listed on TSE" where the effect of "changes in free float" on "stock return" among firms listed on TSE is studied. Results of this research indicated that, such changes contain some information, significantly affect stock return of companies, and tend to reduce the return. The findings also indicated that, a change of free float results in different effects in different industries.

Kalimipali and Nayak (2012) performed a research on abnormal fluctuations in return and liquidity to find the range wherein investors are worried about the impact of volatility and liquidity on the issuance of firms bonds. Results of this research revealed that, the volatility and liquidity impose significant impacts on the issuance of bonds by companies.

Studying Bucharest stock exchange (BSE) during 2006-2013, Maxim (2016) compared predictive power of six models (CAPM, DCAPM, two-factor model, APT, and Fama and French three- and five-factor models). The results indicated that the Fama and French five-factor model was of superior explanatory power, as compared to other models. Accordingly, the lowest and highest values of coefficient of determination (R^2) were those of DCAPM and Fama and French five-factor model, respectively.

In their research entitled as "investigation of the factors affecting profit volatility", Mashayekhi and Menati (2013) showed that, accounting and economic factors (except for operational cycle of the company) impose significant impacts on the development of fluctuations in earnings. In this contribution, they investigated some accounting parameters such as weak compliance, quality of accruals, and profit normalization, and also economic parameters such as loss, firm size, growth criterion, type of industry, fluctuations in revenues and cash flows, and operational cycle of companies.

Nademi *et. al.*, (2015) performed studies to present a model for predicting sever fluctuations in TSE via the Markov-switching GARCH model. Evaluating this model, transition probabilities matrix was calculated for two cases: high-fluctuation and low-fluctuation returns in TSE. Using this matrix, one could predict the probability of facing severe fluctuations in the stock market in the proceeding period, and develop an appropriate model for predicting severe fluctuations. Considering the criteria for choosing AIC and BIC models, the Markov switching regime-based model with GAD distribution is the optimal model for predicting sever fluctuations in TSE. Using this model, one can formulate strategies for preventing such fluctuations and enhance investment security in TSE.

Nosrat Kakissi (2015) tested Fama and French five- and three-factor models in 23 stock markets in developed countries during 1992-2015, and found strong evidences in North American, European, and international markets – similar to those of American markets. However, impacts of profitability and investment were very weak in Japanese and Asian-Pacific portfolios. Upon introducing profitability and investment, the value was not significant in North American, European, and international markets (in agreement with Fama and French's (2015) findings), but it was significant in Japanese and Asian-Pacific markets.

5. RESEARCH OBJECTIVES

The main objective of this research is to investigate the relationship between abnormal fluctuations and stock return in the firms listed on TSE.

The followings are secondary objectives of this research:

- Determining abnormal fluctuations in the firms listed on TSE.
- Investigation of stock return in in the firms listed on TSE.
- Investigation of the relationship between market value and stock return.
- Investigation of the relationship between book to market ratio and stock return.

6. RESEARCH HYPOTHESES

The present research considers the following primary and secondary hypotheses:

The main research hypothesis:

- There is a significant relationship between abnormal fluctuations and stock return in the firms listed on TSE.

Secondary research hypotheses:

- There is a significant relationship between market value of stock and stock return in the firms listed on TSE.
- There is a significant relationship between book to market ratio and stock return and stock return in the firms listed on TSE.

7. RESEARCH METHODOLOGY

In terms of nature, this is a quantitative research, while in terms of objectives, it is an applied one as it attempts to attain principles and rules which are applied in actual and practical situations to improve executive methods. Working with facts and data processing, this research is performed via a descriptive-survey-based approach.

Statistical population of the present research is composed of all firms listed on TSE during a six year period (2009 – 2014). Herein the sample was selected via elimination sampling while respecting the following general rules:

1. Not an insurance or investment firm, bank, or leasing institute
2. No change of financial year during the considered interval
3. Listed on TSE during the considered interval
4. Had financial year ending at March 20th
5. Incomplete firm information

Considering the studied six-year period, a total of 103 firms were selected.

In the present research, statistical analysis of the collected data is performed in two stages, as follows: (1) statistical data analysis, and (2) analysis of the research hypothesis based on the results of the first stage.

Stage 1: In this stage, using MS Excel, the collected data was subjected to statistical analysis and plot of trend of each variable was prepared.

Stage 2: In this investigation, EViews software was utilized to analyze the research hypotheses and perform econometric methods. Considering characteristics of the model, panel data was used to evaluate coefficient of variables of different models. In the panel data-based technique, F-Limer and Hussmann tests were used to determine whether to use pooling data or panel data for estimating the model, and whether to undertake estimation with fixed effect or random effect.

In this study, stock return of the firms listed on TSE was taken as dependent variable, while abnormal fluctuations of stock return, market value of stock, and book to market values ratio were considered as independent variables. Furthermore, financial leverage and firm size were controlling variables in this research.

The considered model is as follows:

$$SR = \beta_0 + \beta_1 IRV_{i,t} + \beta_2 SMV_{i,t} + \beta_3 RBM_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} + \varepsilon_{i,t}$$

where, SR: stock return

IRV: abnormal fluctuation of stock return

SMV: stock market value

RBM: ratio of book to market value

LEV: financial leverage

SIZE: firm size

Stock Return: Stock return refers to the rate of return obtained during a given period of investment on stocks; the values used in this research are retrieved from the specific software for TSE (Rahavard Novin) (Baavar Nahandi *et. al.*, 2013).

Abnormal fluctuation of stock return: In the present study, the Fama and French three-factor model (1993) was used to measure this variable, as follows:

$$R_t - Rf_t = \alpha_i + b_i(Rm_t - Rf_t) + s_i Rsmb_t + h_i Rhml_t + e_t$$

where:

$R_t - Rf_t$: stock risk premium

$Rm_t - Rf_t$: market risk premium

$Rsmb_t$: firm size factor

$Rsmb_t$: ratio of book to market value

Stock market value: Equals the price of the stock in the market at the end of each year.

Ratio of book to market value: This ratio is obtained upon dividing book value of equity by market value of the equity.

Financial leverage: The ratio of liabilities to assets of a company.

Firm size: This is natural logarithm of the company's assets.

8. RESULTS AND DISCUSSION

In this section, the data collected for the 103 selected companies during 2009 – 2014 period are analyzed. The required calculations were performed in MS Excel, while the results were analyzed in EViews. For this purpose, we begin with presenting descriptive statistics of the collected data. Accordingly, the data is descriptively analyzed by calculating central statistics including mean and median as well as scattering indicators such as standard deviation and minimum and maximum values of the variables. The research hypotheses are then tested in the proceeding subsection.

A. Descriptive Statistics

The first step toward statistically analyzing the data is to determine summarized characteristics of the data and calculate descriptive indices. Herein the aim is to recognize internal relationships between different variables and to demonstrate the behavior of subjects, so as to provide a foundation for statistical analyses and reveal the descriptive characteristics for further analysis. In this section, data analysis was performed by calculating central statistics including mean and median as well as scattering indicators such as standard deviation and minimum and maximum values of the variables.

Table 1
Descriptive statistics of the research variables

	Abnormal fluctuations of stock return	*Market stock value*	*Ratio of book to market value*	*Financial leverage*	*Firm size*	*Stock return*
Mean	0.322954	0.783257	–263.7816	1.690289	12.91318	0.115786
Median	0.274958	0.380758	0.429579	0.669120	13.23512	0.021970
Maximum	1.800875	14.57100	4.624542	58.98935	16.43735	3.171650
Minimum	0.000002	0.008541	–17631.00	0.040548	7.754482	–0.815086
St. Deviation	0.341804	1.204678	1952.713	6.031181	1.641821	0.537518
Skewness	1.893973	4.422228	–7.855601	8.550361	–0.881056	2.042400
Kurtosis	7.689931	36.87585	65.92988	79.96175	3.795597	8.602013
Number of observations	721	721	721	721	721	721

Source: Research findings.

A comparison between standard deviations of the studied variables indicates that, as a variable, *abnormal fluctuations of stock return* exhibits the lowest standard deviation, which implies narrow distribution of this variable. At the other end of the spectrum, the *ratio of book to market value* exhibits the highest standard deviation, i.e. the variable is widely distributed, as indicated by the large gap between minimum and maximum values of this variable.

As far as the form of frequency distribution or probability distribution is concerned, skewness refers to asymmetry of distribution. Skewness is defined as normalized third momentum (a quantitative measure describing the form of a probability distribution). Indeed, skewness acts as a criterion indicating symmetric or asymmetric nature of the distribution function. For a perfectly symmetric distribution, the skewness is zero, and its value becomes negative as kurtosis moves toward smaller values. As can be observed, *ratio of book to market value* and *firm size* exhibit negative skewness values, while those of other variables are positive.

Kurtosis is an indication of how peaky is a distribution. The kurtosis has been quantified using normalized fourth momentum. In other words, kurtosis is a measure of sharpness of a curve at maxima. The value of kurtosis for a normal distribution is 3. Accordingly, positive kurtosis means that the peak of the considered distribution is higher than that of corresponding normal distribution, and negative kurtosis means that the peak of the considered distribution is lower than that of corresponding normal distribution. As is evident, all of the variables exhibited positive kurtosis values.

B. Inferential Statistics

Unit root test is one of the most popular test methods for identifying stationarity of variables. In the present contribution, the following tests were adopted to check for stationarity: Levene's test, Im test (Pesaran and Shin, 2003), and Fischer's ADF and PP tests. Table 2 presents the results of applying unit root test on panel data.

Table 2
Investigation of stationarity of the variables

Variable	*Levene*		*Im, Pesaran and Shin*		*Fischer's ADF*		*Fischer's PP*	
	Statistic	*Prob.*	*Statistic*	*Prob.*	*Statistic*	*Prob.*	*Statistic*	*Prob.*
Abnormal fluctuations of stock return	–10602.0	0.0000	–5461.9	0.0000	343.1	0.0000	411.84	0.0000
Market stock value	–43.9	0.0000	–10.5	0.0000	468.4	0.0000	597.9	0.0000
Ratio of book to market value	–45177.3	0.0000	–3591.6	0.0000	437.3	0.0000	522.2	0.0000
Firm size	–254.7	0.0000	–30.9	0.0000	446.1	0.0000	542.2	0.0000
Financial leverage	–40.2	0.0000	–12.1	0.0000	493.9	0.0000	676.6	0.0000
Stock return	–25.1	0.0000	–6.8	0.0000	-369.6	0.0000	464.8	0.0000

Source: Research findings.

Table 2 indicates the fact that, probabilities of all statistics were less than 5%, thus the test results confirmed stationarity of all variables.

Continuing with the analysis, the research model estimation is performed and the research hypotheses are tested.

In order to estimate the model related to the hypotheses, one should begin with specifying the estimation method. As such, we began with calculating the Limer's F-statistic to determine whether to use data pooling or panel data.

Table 3
Results of F-Limer test

Prob.	*d.f*	*Statistic*	*Test*
0.0000	(102,499)	4.411076	F
0.0000	102	390.136335	Chi-square

Source: Research findings.

Given that the *p*-value was obtained as 0.0000, the null hypothesis of the test (preference of data pooling over panel data) is hereby rejected, and it is concluded that estimation using panel data is preferred and one should proceed to consider an intercept for the equation.

Hussmann test was used to find whether to use estimation with fixed effects or that with random effects.

Table 4
Results of Hussmann test

Prob.	*Chi-sq. d.f*	*Chi-sq. statistic*	*Test*
0.0000	5	62.350671	Hussmann

Source: Research findings

Given that the *p*-value was obtained as 0.0000, the null hypothesis of the test (estimating the equation using random effects) is hereby rejected, implying that the model shall be estimated using fixed effects.

In this section of the research, the data of the studied firm during 2009-2014 are used to estimate the research model. The model is as follows:

$$SR = \beta_0 + \beta_1 IRV_{i,t} + \beta_2 SMV_{i,t} + \beta_3 RBM_{i,t} + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} + \varepsilon_{i,t}$$

Table 5
Estimation of the research model.

Variable	*Coefficient*		*t-statistics*	*p-value*
	Magnitude	*Sign*		
Abnormal fluctuations of stock return	0.232994	+	4.117538	0.0000
Market stock value	0.049984	+	2.629991	0.0088
Ratio of book to market value	–0.243993	–	–0.130335	0.8964
Financial leverage	–0.002283	–	–0.368159	0.7129
Firm size	–0.001166	–	–1.975550	0.0398
Fixed value	0.018821	+	0.097527	0.9223
Prob (F) = 0.000, D.W = 2.28, $\overline{R}^2$ = 0.74, R^2 = 0.84				

Source: Research findings

The closer the R^2 to 1, the more appropriate are the number and type of the variables selected to describe the dependent variable during the regression analysis. As can be observed, corresponding coefficient of determination to this estimation was 0.84, indicating the number and type of the variables selected to justify the dependent variable in the regression process were appropriate, so that the mentioned independent variables succeeded to justify the dependent variable. Furthermore, the value of *F*-statistic was found to be 0.000, indicating good quality of the considered model in terms of statistics.

Autocorrelation test has become a classic standard for regression analysis. Durbin–Watson statistic is a test statistic which is commonly used to check for the presence of autocorrelation (i.e. correlation between values separated by time lags) in residuals in regression analysis. The value of this statistic is always between 0 and 4, with its acceptable thresholds being as follows: a value of 2 for this statistic indicates that no autocorrelation exists, which is favorable when it comes to residuals in regression analysis. A Durbin–Watson statistic of less than 2 indicates positive autocorrelation (where positive value of corresponding residual to one observation increases the chance of residuals of other observations being positive, and vice versa), while the values less than 2 indicate negative autocorrelation among the residuals. It is worth noting that, any value greater than 3 or smaller than 1 may act as an alarm for the presence of negative or positive autocorrelation among the residuals. As observed, the value of this statistic in the present research was found to be 2.28, indicating no autocorrelation, which is favorable when it comes to main assumptions related to the residuals.

Investigation of the *abnormal fluctuations of stock return* (as a variable) shows that, probability of the statistic of this variable is equal to zero, indicating significance of this variable, i.e. there is a significant relationship between *abnormal fluctuations of stock return* and *stock return* as the dependent variable. As a result, the main hypothesis of this research implying that "There is a significant relationship between abnormal fluctuations and stock return in the firms listed on TSE" is hereby confirmed.

The *p*-value of *market stock value* was found to be 0.0088, indicating that the variable is statistically significant, so that there is a significant relationship between market stock value and stock return, i.e., the first secondary research hypothesis implying that "There is a significant relationship between market stock value and stock return in the firms listed on TSE" is hereby confirmed.

Estimation of the research model shows that, probability statistic of the *ratio of book to market value* was 0.8964, indicating that the variable is statistically insignificant, so that there is no significant relationship between the ratio of book to market value and stock return, i.e., the second secondary research hypothesis implying that "There is a significant relationship between ratio of book to market value and stock return in the firms listed on TSE" is hereby rejected.

Investigation of the *financial leverage* (as a variable) shows that, probability of the statistic of this variable is 0.7129, indicating that the variable is statistically insignificant, so that there is no significant relationship between the financial leverage and stock return, i.e., the hypothesis implying that "There is a significant relationship between financial leverage and stock return in the firms listed on TSE" is hereby rejected.

The *p*-value of *firm size* was found to be 0.0398, indicating that the variable is statistically significant, so that there is a significant relationship between firm size and stock return, i.e., the hypothesis implying that "There is a significant relationship between firm size and stock return in the firms listed on TSE" is hereby confirmed.

Considering theoretical foundations and findings of the present research, the followings are recommended:

- Given the results of this research, financial regulation authorities (e.g. Audit Organization) are recommended to guide related laws and standards in such a way to enhance efficiency and thus reduce fluctuations in the efficiency.
- The Securities and Exchange Organization is herein recommended to deal with larger firms and those with smaller liabilities with more care, because such firms are susceptible to larger fluctuations in efficiency.
- Practitioners and officials at Securities and Exchange Organization are recommended to stick with their controlling strategies toward reducing market fluctuations.
- The Securities and Exchange Organization is recommended to deal with larger firms with more care, because such firms are susceptible to larger fluctuations in efficiency.
- Consideration of firm size and market stock value and calculation of related variables are not that difficult to undertake; as such, effectiveness of these two factors along with the simplicity of related calculations can provide professional and beginner investors with an opportunity to use these two factors. Therefore, it is recommended to use these two factors in Iranian capital market.
- When developing a portfolio, it is recommended to take into account the firm size and market stock value, because the results of the present research showed that, the two factors affect stock return significantly.

The followings are some recommendations for future studies:

- Interested researchers are recommended to retest the models presented in this research using other criteria for measuring abnormal fluctuations in stock return, and compare the results.
- Interested students and researchers are recommended to perform this research for longer periods, so as to further validate the findings.
- It is recommended to undertake similar research works separately in different industries, and compare the results with those of previous models.
- It is recommended to extend the research period and increase the number of investigated firms in future research.
- It is recommended to use more variables to explain stock return, such as risk, profitability, quality of profitability, E/P ratio, EPS, etc.
- It is recommended to investigate possible influences of lifecycle of firms on the relationship between abnormal fluctuations and stock return.

REFERENCES

Babalooyan, Shahram; Mozafari, Mehrdokht (2016). *A comparison among Fama and French five-factor model, Carhart four-factor model, and HXZ q-factor model for describing stock return*, Journal of Financial Knowledge of Securities Analysis (Financial Studies), Vol. 9, No. 30, pp. 17-32.

Davoudi SMM, Fartash K, Venera G. Zakirova, Asiya M. Belyalova, Rashad A. Kurbanov, Anna V. Boiarchuk, Zhanna M. Sizova (2018). Testing the Mediating Role of Open Innovation on the Relationship between Intellectual Property Rights and Organizational Performance: A Case of Science and Technology Park, EURASIA Journal of Mathematics Science and Technology Education, 14(4), 1359-1369.

Fartash K., Davoudi, S.M.M., Tatiana A. Baklashova, Natalia V. Svechnikova 4, Yulia V. Nikolaeva, Svetlana A. Grimalskaya (2018). The Impact of Technology Acquisition & Exploitation on Organizational Innovation and Organizational Performance in Knowledge-Intensive Organizations, EURASIA Journal of Mathematics Science and Technology Education, 14(4), 1497-1507.

Frank Key, Rayleigh; Kate C., Brown (2005). *Investment analysis and management of securities basket*, Translated by Eslami, Gh.; Heybati, F.; Rahnamay Roodposhti, F.; Research Institute for Economic Affairs Pub., 2nd Edition.

Hezbi, Hashem; Salehi, Allah karam (2016). *A comparison on explanatory power between Carhart four-factor model and Fama and French five-factor model in predicting expected stock return*, Journal of Financial Engineering and Securities Management (Portfolio Management), Vol. 7, No. 28, PP: 137-152.

Kamali, Reza (2008). *Investigation of the impact of macroeconomic indicators on stock return*, Master's thesis, Department of Economy and Accounting, Central Tehran Branch, Islamic Azad University.

Kashanipoor, Mohammad; Rezaei, As'ad (2011). *Investigation of the effect of changes in floating shares on stock return among listed firms on Tehran Stock Exchange*, Journal of Accounting-Financial Research, Vol. 3, No. 3(9), pp. 95-112.

Mansoori, Mohammad (2008). *Investigation of the parameters of Fama and French three-factor model*, Proceedings of the Accounting Conference at Al-Zahra University.

Mashayekhi, Bita; Menati, Vahid (2013). *Investigation of the factors affecting profit volatility*, Journal of Financial Accounting, Vol. 5, No. 20, pp. 66-89.

Nademi, Yunes; Abunoori, Esmaeil; Elmi, Zahra (2015). Presentation of a model for warning ahead of sever fluctuations in Tehran Stock Exchange: Markov switching GARCH approach, Journal of Financial Knowledge of Securities Analysis (Financial Studies), Vol. 8, No. 28, pp. 27-40.

Saghafi, Ali; Salimi, Mohammad Javad (2005). *Fundamental accounting variables and stock return*, Journal of Social and Humanitarian Science, University of Shiraz, Vol. 22, No. 2.

Tastan, S.B., & Davoudi, S.M.M. (2015). An Examination of the Relationship between Leader-Member Exchange and Innovative Work Behavior with the Moderating Role of Trust in Leader: A Study in the Turkish Context. Procedia social and behavioral sciences, Elsevier, 181, 23-32.

Zeynali, Mahdi; Mohammad-Shilan, Jamal (2011). *Investigation of the impact of capital structures on size, rate of return on investment, and per share earnings in the companies listed on TSE (case study: pharmaceutical industry)*, Journal of Financial Knowledge of Securities Analysis (Financial Studies), Vol. 4, No. 9, pp. 44-60.