Iranian Journal of Management Studies (IJMS) 2021, 14(3): 509-525
RESEARCH PAPER

The Effect of Manager Forecast of Future Sales on Company Risk During Sales Decline Using the Fama-French Five-Factor Model

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(Received: January 22, 2020; Revised: January 2, 2021; Accepted: January 9, 2021)

Abstract
A sales decline period disrupts the time series of earnings and, consequently, reduces their predictability. Such a situation can lead to inappropriate decisions by investors. Therefore, managers need to respond appropriately to negative news resulting from sales decline. Manager response is related to forecasting future sales situations, which could affect risk to the firm. Accordingly, the purpose of this study is to investigate the effect of managers' forecasts of future sales on the risk of companies that have experienced sales decline. In this study, the ratio of the changes in operating profit margin was used to compare companies with optimistic and pessimistic managers. To investigate the research hypotheses, the Fama-French five-factor model was used to depict a period of 11 years, from 2007 to 2017, for the companies that are accepted in the Tehran Stock Exchange. It should be noted that the market beta of the Fama-French five-factor model is distinguished by upside potential and downside risk factors, making it possible to study them individually. The findings imply that in companies with optimistic managers, the upside potential is more than the downside risk, but in companies with pessimistic managers, there is no significant difference between the upside potential and the downside risk.

Keywords: Sales decline, Upside potential, Downside risk, Fama-French five-factor model, Fama-French six-factor model.

Introduction

A sales decline period can lead to investor confusion and wrong decisions due to variation in the earnings-time series. Therefore, during sales decline, managers must respond correctly to negative news arising from sales and profit decline to restructure the normal and expected profit pattern of investors. Capital market studies have confirmed that the perception of analysts and investors regarding costs behavior is less accurate because of 'sticky costs' behavior when sales decline is expected (Ciftci et al., 2015). The traditional cost behavior pattern, regardless of the role of managers in the adjustment process and application of resources, associates costs with levels of activities and classifies the costs as fixed or varied based on the level of activity. On the contrary, the findings of some researchers such as Anderson et al. (2003; 2007) and Calleja et al. (2006) indicate that the rate of cost increase during a booming sales period is more remarkable than the cost decrease at the same level of sales decline. In management accounting, this is called the 'stickiness of cost.' Previous studies have confirmed, however, that the capital market analysts and investors cannot

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perceive the cost behaviors resulting from resource adjustment decisions by managers (Weiss, 2010). On the one hand, maintaining slack resources during sales decline periods (which arise from manager optimistic expectations of the profitability and future demands) imposes some costs during the current period and decreases the profitability. On the other hand, the manager's withdrawal of the resources (which arises from their pessimistic expectations of future demands) improves their profitability in the current period (Jholanjehad et al., 2017). The improper perception of the results of the manager's decisions and the cost behavior in sales decline periods could lead to improper estimation in the systematic risk of companies and, therefore, the inappropriate allocation of resources in the financial markets (Park, 2017).

During sales decline periods, the improper assessment of risk and efficiency of companies is more probable because of improper perception of investors regarding costs behavior (because of cost stickiness) and the reduction of earnings predictability (because of disruption in the time series of earnings). Such periods might confuse investors and analysts on company status since the sales decline periods are less iterative in company cycles of activity. Therefore, if it is possible to forecast the necessary decision variables more precisely during these periods using proper tools or models, the financial resources would be more appropriately directed and the market would move toward efficiency. Risk assessment tools that have been used by investors have failed to assess the real-world risk because of theoretical and practical constraints and, in some cases, overestimating and underestimating the risk. Concerning the significance of the market risk investigation in the sales decline period, as one of the likely events in the companies, a study in this field seems to be required. As the results of previous studies have confirmed the efficiency of the Fama-French five-factor model compared to other models, this study intends to ascertain the desirable and undesirable beta, by investigating the market beta status due to manager decision in sales decline periods based on the distinction of the beta factor of this model. This study also intends to specify how manager forecasts of future sales affect business risk that lead to the maintenance of slack resources (optimistic managers) or their withdrawal (pessimistic managers) during sales decline. Moreover, the present study seeks to clarify whether the actions of optimistic and pessimistic managers have been optimal during sales decline periods or not. Based on the investigations, this is the first study prepared on the effect of manager forecast of future sales on company risk during sales decline periods utilizing the Fama-French five-factor model. Another innovation of this study is that it has divided the market beta of the Fama-French five-factor model into 'desirable' and 'undesirable' to precisely study the upside potential and downside risk factors individually. The obtained results can be of help to stock exchange companies, policymakers, investors, and capital market analysts.

Research background and literature review, models, research variables, and testing hypotheses are presented as follows.

Hypothesis Development

How managers respond to sales decline depends on their future sales status (Banker & Byzalov, 2014). During a sales decline period, the optimistic managers would most likely keep the slack resources, and the pessimistic would withdraw them (Yasukata & Kajiwara, 2011). The optimistic managers believe that future increase in sales will lead to the reuse of slack resources; therefore, their maintenance will cause cost savings of withdrawal and retraining employees (Mortazavi, 2011). On the contrary, if managers expect future sales to remain low or even decrease, the company cannot utilize these resources in the future. Knowing that keeping the slack resources is costly, the pessimistic managers eliminate the future costs arising from these resources by withdrawing them. How the optimistic and

pessimistic managers respond to sales decline will affect the profitability of companies in two ways. In the first case, during sales decline in companies with optimistic managers, the maintenance of slack resources imposes operating costs on the company while generating no income; therefore, the company profitability will further decrease, and there will be an aggregation of cost stickiness (Anderson & Lanen, 2007). In the second case, the withdrawal of slack resources by the pessimistic manager will lead to a decrease in operating costs in the current period, which consequently reduces the pressure of operating profit reduction on these companies during the sales decline period. The more optimistic managers will keep more resources, while the more pessimistic will keep the least resources.

The operating profit margin is a ratio used to realize expectations and manager forecasts of future sales. This ratio is calculated by dividing the operating profit by the revenue. As far as the operating profit is obtained by subtracting operating costs from operating revenues, the maintenance of the slack resources by optimistic managers leads to cost reduction and, consequently, the reduction of the operating profit margin, which is aggregated by cost stickiness behavior. It should be noted that the decrease in the operating profit margin is not due to manager inability to control costs; rather, as far as manager decisions are concerned, based on their evaluations of the probability of increased demand in the future, the decrease in the operating profit margin will provide positive information about the future performance of the company. While the operating profit margin is kept at the current level or is even increased, following the withdrawal of slack resources by pessimistic managers, a large increase or decline of operating profit margin in a sales decline period indicates the manager's optimistic or pessimistic views, respectively. The investors could realize the manager's expectations by observing the variations in the operating profit margin (Park, 2017).

Investors require the identification of appropriate investment opportunities through the investigation of necessary decision-making variables such as risk and return. There are various criteria for measuring efficiency oscillations. The traditional criteria for measuring these oscillations are based on mean-variance behavior (Badri & Hashemlou, 2012), which draws on the decision framework of investors based on the volatility of return as the basis of 'modern portfolio theory.' Within this framework, the volatility of return around the mean is defined as risk. The upside potential is another criterion used to measure the volatility of return (Sadeghi et al., 2010). The upside potential shows the probability or potential of increased return on an asset or investment through percentage or price, which can be a criterion for the desirability of that asset. The higher the criterion is, the higher the investment attractiveness and desirability. Another criterion for the measurement of the volatility of return is based on the downside risk. The downside risk measures the probability that an asset price might decrease through investment or the loss that might result from the potential of price reduction. This approach is based on return asymmetry and the different reactions of investors on the volatilities below and above the mean (Sadeghi et al., 2010). In this framework, which is based on postmodern portfolio theory, it is believed that the investors consider the downward movement of return as risks and the upward movement as opportunities.

The 'rational decisions theory' (Simon, 1947) helps predict the risk factor of companies who have kept or withdrawn raw materials during the sales decline period. According to this theory, managers consider resource adjustment decisions as a benefit to the company value such that the immediate revenue, due to keeping the resources, is more than their maintenance costs (Abel, 1983; Hayashi, 1982; Yoshikawa, 1980). Despite sales decline in the current period, an increase in future demand is expected, thereby managers maintain slack resources sufficiently to achieve higher sales through their application (Mintz, 1999). In other words, companies that have kept slack resources forecasted an increase in future demand, which

overcomes the maintenance costs and allows them to expect an increase in their stock price because of the increase in future demand. An increase in stock price leads to an increase in expected return on company stocks. Therefore, their upside potential would be higher than the downside risk. On the contrary, companies that have withdrawn the selling of raw materials over the sales decline period expect that because of reduction in future demand their return on the stock (and downside risk) would be greater than the upside potential due to the maintenance of resources (Park, 2017).

After the sales decline period, the manager's expectations of the future profitability of companies will be gradually specified through periodic reports, and investors may reconsider the stock price of companies with optimistic managers; therefore, the demand for the stock increases (Park, 2017). The decision to preserve slack resources in companies with optimistic managers enables these companies to respond to the increased future demand and reach the level of their previous sales, and even go beyond it (Jensen, 1986). It is predicted that responding to increased future demand from the maintained resources could increase the upside potential in companies that have kept their resources despite sales decline. The increased upside potential in these companies indicates their ability to confront an increase in demand. Moreover, the market probably shows more reaction to good news, such as the increased unexpected demand, after a sales decline period. Therefore, in this study, it is expected that the return on the stock of companies that have maintained the raw resources in a sales decline period is more sensitive to the upward movement of the market portfolio.

Farago and Tedongap (2018) studied the relation between downside risk and the American stock market portfolio from 1964 to 2016. They proposed a five-factor model for pricing stock portfolio, right of first refusal (ROFR), and stocks. These five factors include market efficiency, market volatility, downstate factor, market downside factor, and volatility downside factor. This model has been given priority over the studied models in the literature review of the mentioned study. Hood and Malik (2018) presented an estimate of the downside risk of return on the stock using a structural failure test. Using simulations, they showed that the structural failure in market oscillations leads to abnormal elongation. The structural failure of oscillations in return on American stocks, along with an estimation of value-at-risk, was used to measure downside risk. The proposed model provides a more precise forecast of the at-risk value than other tested methods. Mansourfar et al. (2018), in their study entitled "Beta Reversibility Behavior Based on Different Levels of Portfolio Risk in the Tehran Stock Exchange" used the Fama-French four-factor model and the momentum factor, as introduced by Carhart, to study beta reversibility behavior based on various stock-risk levels in the Tehran Stock Exchange. The results of their study showed that beta reverse in the Tehran Stock Exchange has occurred for high-risk portfolios, and the elimination of high-risk portfolios is a controlling factor in beta reversibility behavior. Danısoglu (2017) provides ample evidence on the performance of asset pricing models in an emerging market setting. Tests are conducted on portfolios formed based on Fama–MacBeth betas, Fama–French size and book-to-market (BM) factors, the short and long-term past returns of Carhart, and the liquidity beta of Pastor and Stambaugh. The results of this study indicate that even when models are augmented by the size and BM factors, they are consistently significant and positive. Contrary to the evidence from developed markets, contrarian (rather than momentum) strategies are preferred among the investors, especially for larger firms. These larger businesses also are perceived to be less vulnerable when market-wide liquidity decreases. Park (2017), in his dissertation entitled "Change in Operating Profit Margin during a Sales Decline and Abnormal Returns" studied the variations of operating interest margin due to resource adjustment decisions by managers during sales decline. The results showed that the perceptions of analysts regarding variations of operating profit margin resulting from

these decisions have been inefficient, and the analysts and capital market cannot realize the manager's expectation of future sales status at the proper time. This ultimately leads to an abnormal return on stocks for companies that have experienced a sales decline period. Habib and Hasan (2017) have studied manager capability, investment efficiency, and the risk of stock price drop. The investigation of 267154 year-company cases during 1987-2012 showed that the risk of stock price drop increases for companies that have incapable managers and are inefficient in making calculated investments. Faraji and Mehrani (2017) studied the effect of cost behavior and professional experience on cost forecast precision. To summarize, the results of their study showed that the precision of individual judgment and decision-making is higher when the income-costs relation exhibits a linear (symmetric), rather than asymmetric, behavior (stickiness and anti-stickiness) and when the individuals have a linear mental pattern in cost forecast. These results also show the highest uniformity, conformity, and quality in decision-making judgment compared to other asymmetric behaviors (stickiness and anti-stickiness). Moreover, the results of their study proved that individual professional experience has not led to a better perception of asymmetric or symmetric behavior costs, and that there is no interaction between the professional experience of individuals and the cost behavior. Christos and Vlismas (2016) studied the effect of manager capabilities on cost stickiness in American companies from 1991 to 2014. The results of their study showed that manager capabilities have a meaningful, positive effect on cost stickiness and that this capability leads to an increase in cost stickiness. Ramezani and Kamyabi (2016) conducted a study to compare the six-factor model with capital asset pricing models to explain expected return of the investors. The results of the research, using the monthly information of companies listed in the Tehran Stock Exchange during the period 2001 to 2015 showed that the ability to explain stock returns by the Fama-French five-factor model was more than the six-factor and four-factor models of Carhart and HXZ. The acceleration factor for the five factors did not increase the explanatory power of the model. Unlike the Fama and French findings in US stock exchanges, the value factor (HML) in the Tehran Stock Exchange was significant, but it was not recognized as a factor. Adding the two factors of investment and profitability to the model significantly increased its descriptive power. Chiah et al. (2015) investigated the five-factor model in the Australian stock market and concluded that it has higher explanatory power than the three-factor model. Moreover, despite the presence of profitability and investment factors, the value was still meaningful. Fama and French presented the five-factor model based on the Hou et al. study (2014) by adding investment and profitability to their three-factor model that better explains the extra return on the stock. The results of this study, which was carried out from 1963 to 2013, show that although the GRM test rejects the five-factor model, it explains the extra return on portfolio from 71% to 94%. Banker et al. (2014) showed that sale variations affect manager expectations. Managers remain optimistic about their future sales during temporary sales decline periods, which can continue for one year. However, if it persists for several years their approach toward future sales status would be pessimistic. Kama and Weiss (2013) showed that manager motivation to achieve a good estimation of company profits would lead to their extreme reduction of resources. When opportunistic managers are motivated to achieve profit objectives, they may act rapidly to eliminate slack resources due to sales decline. If their forecasts of sales decline were temporary, still facilitation of slack resources elimination for cost reduction would be more if motivation to achieve a profit objective existed than when they lacked such motivation.

Research Hypotheses

The discussion above, the mentioned theories, and the questions concerning the research hypotheses that the present study intends to respond are as follow.

1. In companies that have preserved their resources despite sales decline (optimistic managers), the upside potential is more than the downside risk.
2. In companies that have withdrawn their resources during the sales decline period (pessimistic managers), the downside risk is more than the upside potential.
3. In companies with optimistic managers, upside potential changes in the post-sales period are incremental compared to the pre-sales period.

Methodology and Model Explanation

Firms listed in the Tehran Stock Exchange were regarded as the statistical population of this study. For the final sample, firms were selected under the following conditions. Company fiscal year should terminate on the 29th of Esfand (March 19th). They must be manufacturing companies and not financial companies such as banks, insurance, or investment companies. They should not exit the list of Tehran Stock Exchange companies up to 2017 and should have ongoing performance. In lieu of having many zeros on company monthly returns, only active firms were included in the sample, as they should not have had more than 6-months transaction stops.

Considering the criteria mentioned above, 102 firms functioning from 2007 to 2017 were selected. To test research hypotheses, the Fama-French five-factor regression model (2015), a regression method based on sectional data, was used. To this end, the data required for the study was gathered using Rahavard Novin software, TseClient software, and the databank of the Tehran Stock Exchange. Finally, the data and the regression model were analyzed using Eviews (9) econometric software.

Portfolio Formation Method

Following a study by Park (2017), portfolios are formed in this study based on the variations of the operating profit margin to distinguish companies with optimistic managers and future sales from companies with pessimistic managers. The operating profit margin is calculated by dividing the operating profit by revenue. To this end, based on these margin changes, the portfolios are sorted in ascending order in sales decline periods. Decisions on maintaining slack resources in respect to future demand by optimistic managers leads to the low-limit operating profit margin for these companies. On the contrary, as far as a decision made on the withdrawal of the slack resources by pessimistic managers, a company will have a higher top-limit operating profit margin (40% criterion). Finally, out of 1,122 companies, 274 had experienced sales decline, and based on the criterion of changes in operating profit margin, 112 companies were selected with optimistic managers and 112 with pessimistic managers.

Hypotheses Testing Model

To study the research hypotheses, the Fama-French five-factor model was used. However, as the hypotheses testing requires the calculation of the upside potential and the downside risk separately, the beta of the Fama-French five-factor model was made to distinguish 'desired' beta (β_i^+) and 'undesired' beta (β_i^-).

$$Ret_{it} = \alpha_i + \beta_i^+ Mkt_t^+ + \beta_i^- Mkt_t^- + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + \varepsilon_{it} \quad (1)$$

In this equation, Ret_{it} is the dependent variable and the risk-free extra profit and return that the investor achieves by purchasing stock, price variations, or dividing interest during the maintenance period, and is known merely as a 'stock risk'. It is calculated as $Ret_{it} = RI_t - RF_t$ where RI_t is the rate of return on securities or portfolios in period *t* and RF_t is the risk-free rate of return. Moreover, in this model, the extra return of the company is related to five factors that are the independent variables of the related model as follows.

(RM_t - RF_t): This is the risk-free rate of return and extra profit that the investor achieves from the purchase of the market portfolio during the maintenance period and is known as 'market risk'. This factor is called the 'market factor' in the formula presented by Fama-French and is represented by Mk_t. Simplified, Mk_t^+ is the market factor when $Mk_t > 0$, and Mk_t^- is the market factor when $Mk_t < 0$. SMB_t is the size factor, calculated from the difference between the mean return of the portfolio of the small and large-sized companies, respectively. HML_t is the book-to-market value ratio and is obtained from the difference between the mean return of the stock portfolio of companies with a high book-to-market value ratio, and the mean return of the stock portfolio of companies with a low book-to-market value ratio. RMW_t is a profitability factor and is obtained from the difference between the mean of stock portfolio return of companies with strong and, correspondingly, weak profitability. CMA_t is an investment factor and is the difference between the mean return of the stock portfolio of companies with low investment (conservative) and high investment (risk-taking). The symbol α_i of each portfolio shows the mean daily return on stock for one year of maintenance, while $\beta^+$and β^- indicate the upside potential and downside risk, respectively. Moreover, s_i,h_i, r_i, and c_i are the coefficients related to size, the book-to-market value, profitability, and investment.

Calculation of the Fama-French Five-Factor Model

Stock rate of return (R_{It}): The rate of return and profit gained by the investor for purchasing the stock during the maintenance period is calculated through the natural logarithm of stock price variations.

Risk-free return (R_{Ft}): This is the return gained by the investor without risk, which in this study, the risk-free rate of return equals the rate of return of securities as declared by the Central Bank of the Islamic Republic of Iran.

Market return (R_{Mt}): This is calculated through the natural logarithm variations of the total index of the Tehran Stock Exchange. Size indicates the amount of assets of the company, which is achieved by taking the logarithm of the total assets. BM (book-to-market value ratio) is achieved by dividing the book value of each share by the market price.

OP indicates company profitability and is calculated by subtracting the final price of the sold product and the utilization cost as well as general, administrative, and sales costs from annual revenue, then divided by the book value of the equities. Inv is obtained by dividing the assets growth by the total assets. In this study, the 2*3 method is used for the calculation of systemic risk.

*The 2*3 Method*

Each of the systemic risk factors is calculated based on '2*3' arrangement of size and intended risk factor. For the calculation of HML, first, all sample stocks are sorted each year on the 21st of March in ascending order and divided into large and small stock groups based on the median of market value. Then, the entire stock sample, independent of the previous classification, is divided into three categories based on BM ratio so that 30% has the least BM

of portfolio L, 30% has the highest BM of the portfolio, and 40% has the mean BM of portfolio N. The following equation is used for calculating the HML factor:

HML= (SH+BH)/2 – (SL+BL)/2

The same procedure is used for the calculation of RMW with the only difference being that the criterion for the second classification is operating profitability; therefore, RMW is calculated using the following equation:

RMW= (SR+BR)/2 – (SW+BW)/2

Calculation of CMA is also done in the same way, based on the following equation:

CMA= (SC+BC)/2 – (SA+BA)/2

In this method, SMB is calculated based on three smaller components of SMB_{BM}, SMB_{OP}, and SMB_{INV}, which are calculated using the following equations:

$SMB_{B/M}$= (SH+SN+SL)/3 – (BH+BN+BL)/3

SMB_{OP}= (SR+SN+SW)/3 – (BR+BN+BW)/3

SMB_{INV}= (SA+SN+SC)/3 – (BA+BN+BC)/3

The total SMB is achieved by an average of three SMBs mentioned above.

SMB= ($SMB_{B/M}$ + SMB_{OP} + SMB_{INV})/3

Findings

Table 1 presents the results of descriptive statistics, showing that in companies with pessimistic managers, the average stock return is -0/148, which is higher than the average stock return in companies with optimistic managers at -0/357, which can indicate the higher risk of these companies. As can be seen, the average profitability and investment for companies with optimistic managers are equal to -0/120 and 0/339, respectively, which are higher than the average profitability and investment for companies with pessimistic managers at -0/442 and 0/2647, respectively. This comparison indicates more profitability and investment by companies with optimistic managers. The statistical indicators related to Mk^+ and Mk^- are the same in companies with optimistic and pessimistic managers. Due to the market factor, $Mk_t = RM_t - RF_t$ is affected by the variables of market return and risk-free return, and the value of these variables is calculated as a fixed amount for each year.

The Jarque-Bera test was used to examine the normality of the variables. Since the *p* value of the test for all variables at 95% level of confidence was less than 5% ($p \leq 0/05$), it can be stated that none of the variables were normal. Accordingly, to explore the correlation between the variables, the Spearman method was applied. Generally, the correlation test results among the variables indicated that there was no high correlation among independent variables, and hence, NOCO-linearity was supposed to happen among independent variables. To make collinearity optimal, the variance inflation factors for each variable should be less than 10. Moreover, the results of the VIF test on all variables showed that there is no multi-collinearity problem.

To measure the final credit, the White test was used and the results confirmed a lack of heteroscedasticity. Moreover, to investigate the autocorrelation (between error sentences), the Durbin–Watson (DW) statistic was used. Since its value for all estimates was in the range of 1/5 to 2/5, it can be claimed that the autocorrelation problem does not exist in error sentences. In conclusion, to test research hypotheses, four separate regressions were estimated using the regression model presented in Model 1 on the optimistic and pessimistic companies, and on the optimistic companies before and after sales decline using the sectional data.

Table 1. Descriptive Statistics Results

	Type	Mean	Med	Max	Min	Std.Dev	Skewness	Jarque-Bera (Prob)
RET	Optimistic	-0/357	-0/408	1.955	-1/135	0/453	2/382	0/0001
	Pessimistic	-0/148	-0/300	5/746	-1/069	0/8358	4/616	0/0001
	Opt –before	-0/218	-0/437	5/820	-1/135	0/904	3/834	0/0001
	Opt –after	0/0004	-0/237	5/747	-0/988	1/023	3/582	0/0001
Mk^+	Optimistic	0/171	0/099	0/853	0/0001	0/223	1/436	0/0001
	Pessimistic	0/171	0/099	0/853	0/0001	0/223	1/436	0/0001
	Opt –before	0/165	0/0001	0/853	0/001	0/288	1/562	0/0001
	Opt –after	0/211	0/044	0/853	0/0001	0/284	1/144	0/0001
Mk^-	Optimistic	-1/105	0/0001	0/0001	-0/391	0/157	-1/068	0/0001
	Pessimistic	-1/105	0/0001	0/0001	-0/391	0/157	-1/068	0/0001
	Opt –before	-0/181	-0/123	0/001	-0/391	0/168	-0/247	0/0001
	Opt –after	-0/086	0/001	0/001	-0/391	0/168	-0/247	0/0001
SMB	Optimistic	-0/144	-0/130	0/311	-2/478	0/449	-3/650	0/0001
	Pessimistic	-0/266	0/020	0/285	-1/720	0/621	-1/695	0/0001
	Opt –before	0/191	0/170	1/583	-0/721	0/514	1/016	0/0001
	Opt –after	-0/234	-0/047	0/193	-2/07	0/622	-2/498	0/0001
HML	Optimistic	-0/120	-0/237	2.793	-0/546	0/157	-1/068	0/0001
	Pessimistic	-0/442	-0/152	0/293	-2/904	0/953	-2/089	0/0001
	Opt –before	-0/433	-0/158	0/305	-1/845	0/611	-1/325	0/0001
	Opt –after	-0/541	-0/320	0/284	2/753	0/803	-1/988	0/0001
RMW	Optimistic	0/339	0/239	0/346	-2/793	0/5382	4/045	0/0001
	Pessimistic	0/2647	0/089	2/290	-1/267	0/851	1/392	0/0001
	Opt -before	-0/288	-0/163	0/700	-1/542	0/521	-1/190	0/0001
	Opt –after	-0/264	-0/153	0/270	-1/975	0/621	-1/957	0/0001
CMA	Optimistic	-0/157	-0/126	0/327	-2/163	0/399	4/045	0/0001
	Pessimistic	0/170	0/402	0/874	-1/017	0/516	-1/297	0/0001
	Opt -before	0/176	0/144	1/556	-0/477	0/496	1/398	0/0001
	Opt –after	0/0869	0/036	0/928	-0/237	0/302	1/987	0/0001

Hypothesis Testing and Analysis of Findings

H1. In companies with optimistic managers, the upside potential is more than the downside risk.

The results of fitting the Fama-French regression model on the companies with optimistic managers are presented in Table 2. The probability of the F statistic indicates that the model is meaningful at a reliability level of 95%. Moreover, the results of coefficient determination show that during the research period, 10% of dependent variable variation is affected by the independent variables. To examine the accuracy of the first hypothesis, the positive and negative coefficients of market factors must be compared. As observed, the positive market factor is 1/31, which is more significant than the negative market factor value of -0/28. To confirm this statistically, the Wald test has been used to the point that the probability of the Wald test statistic is 0/0001, and if below 0/05, the zero hypotheses of this test on the equality of two variables will be rejected. Therefore, since the results confirm that there is a higher value of positive market factors than negative market factors, the first hypothesis is confirmed.

Table 2. The Results of the Testing the Fama-French Five-Factor Model in Firms With Optimistic Managers

Variable	Symbol	Coefficient	T statistic	Probability	VIF
Positive market factor	Mk_t^+	1/312	5/5307	0/0001	3/29
Negative market factor	Mk_t^-	-0/2884	-2/ 5585	0/0119	1/47
Size factor	SMB	0/3926	1/5397	0/1266	8/05
B/M factor	HML	0/0086	0/0653	0/9480	3/60
Profitability factor	RMW	0/0475	0/2002	0/8417	5/03
Investment factor	CMA	-0/4191	-2/4453	0/0161	6/88
Constant coefficient	C	-0/6426	-7/0400	0/0001	-
R squared	0/10		F statistics	2219/076	
Durbin-Watson stats	2/08		F statistics prob	0/0001	

H2. In companies with pessimistic managers, the downside risk is more than the upside potential.

To test the second hypothesis, the Fama-French five-factor model was applied to companies with pessimistic managers, and the results are presented in Table 3. The probability of the F statistic (0/0001) indicates the meaningfulness of the regression model. To examine the accuracy of the second hypothesis, it was necessary to compare the upside potential and downside risk coefficients. As observed, the negative market factor (0/46) is higher than the positive market factor coefficient (0/39). In order to confirm this statistically, the Wald test was used. When the probability of the Wald test statistic is 0/78, the zero hypotheses of this test on the equality of two variables is not rejected. Here, although the negative market factor is higher than the positive market factor, there is no meaningful difference between the two variables. Therefore, the second hypothesis is rejected.

Table 3. The Results of Testing the Fama-French Five-Factor Model in Firms With Pessimistic Managers

Variable	Symbol	Coefficient	T statistic	Probability	VIF
Positive market factor	Mk_t^+	0/3923	3/5107	0/0007	3/29
Negative market factor	Mk_t^-	0/4606	1/6906	0/09119	1/47
Size factor	SMB	-0/4560	-7/9135	0/001	8/05
B/M factor	HML	0/1051	-0/9148	0/3680	3/60
Profitability factor	RMW	0/0074	0/3231	0/7417	5/03
Investment factor	CMA	-0/1809	-1/1721	0/2438	6/88
Constant coefficient	C	-0/2264	-3/2364	0/0016	-
R squared	0/09		F statistic	232/2705	
Durbin-Watson stats	1/77		F statistics prob	0/0001	

H3. In companies with optimistic managers, the variations of the upside potential after sales decline is increasing compared to the time before the sales decline period.

To test the third hypothesis, the positive market factor in two regression models related to the periods before and after sales decline is compared. The results of estimating these two regression models are presented in Tables 4 and 5. As the results indicate, when the probability of the F statistic is less than 0/05 in both models, the estimated models are meaningful at a reliability level of 95%. Concerning the results of the model estimation, the coefficient of upside potential before sales decline is 0/39, which is not meaningful at a reliability level of 95% and can be considered equal to zero. This coefficient has increased to 2/172 after the sales decline period and the probability of its related statistic is less than 0/05, which shows it is meaningful at a reliability level of 95%. Therefore, the third hypothesis of the study on the increasing trend of the upside potential variations is confirmed. Another significant result that is implicitly obtained from testing this hypothesis is that according to the results of estimating the Fama-French five-factor model in the period after the decrease in sales, the positive market factor coefficient is 2/172 (p-value: 0/0001), and the negative

market factor is -1/66 (p-value: 0/148). The results of the Wald test to compare these two coefficients confirm that the upside potential is greater than the downside risk in the period after the decrease in sales (Wald-Prob: 0/005). Therefore, it can be argued that in companies with optimistic managers, in a period after sales decline, the potential of increasing stock returns in the future is still higher than the potential of decreasing stock returns.

Table 4. The Results of Testing the Fama-French Five-Factor Model in Firms With Optimistic Managers Before Sales Decline

Variable	Symbol	Coefficient	T statistic	Probability	VIF
Positive market factor	Mk_t^+	0/3911	1/7753	0/0787	3/29
Negative market factor	Mk_t^-	-0/5389	-1/7949	0/0755	1/47
Size factor	SMB	0/1611	1/8718	0/0640	8/05
B/M factor	HML	-0/7661	-16/2363	0/0001	3/60
Profitability factor	RMW	0/1442	-1/6965	0/0927	5/03
Investment factor	CMA	-0.3953	-6/1577	0/0001	6/88
Constant coefficient	C	-0/6337	-11/5024	0/0001	-
R squared	0/093		F statistic	140/8332	
Durbin-Watson stats	1/79		F statistics prob	0/0001	

Table 5. The Results of Testing the Fama-French Five-Factor Model in Firms With Optimistic Managers After Sales Decline

Variable	Symbol	Coefficient	T statistic	Probability	VIF
Positive market factor	Mk_t^+	2/1720	4/0950	0/0001	2/07
Negative market factor	Mk_t^-	-1/6658	-1/4554	0/1488	4/38
Size factor	SMB	-1/0057	2/7180	0/0078	2/08
B/M factor	HML	-1/6656	-1/9559	0/0534	3/78
Profitability factor	RMW	0/2387	0/2413	0/8098	5/.34
Investment factor	CMA	-0/4862	-1/1047	0/02720	1/64
Constant coefficient	C	-1/1689	-3/0527	0/0029	-
R squared	0/81		F statistic	104/31	
Durbin-Watson stats	1/61		F statistics prob	0/0001	

Robustness Test

In this study, the six-factor Fama-French model (Fama- French five-factor + momentum factor) was used to test the strength of the main results. For this purpose, to repeat the test of research hypotheses, the Fama-French six-factor model was estimated separately for firms with optimistic and pessimistic managers and for the period before and after the decrease in sales. Due to the need to calculate the favorable and unfavorable risk factors separately to test the research hypotheses, the beta of the Fama-French model was divided into upside potential (βi^+) and downside risk (βi^-). Therefore, the Fama French six-factor model was used as follows:

$$Ret_{it} = \alpha_i + \beta_i^+ Mkt_t^+ + \beta_i^- Mkt_t^- + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + WML_t + \varepsilon_i \quad (2)$$

where WMLt is the momentum of past performance, which is equal to the difference between the average monthly return of the previous winning and past losing stock portfolios when the size factor is controlled. In fact, this variable explains the sensitivity of the expected stock return by the difference in past performance of company stocks in terms of returns they have already earned, and is calculated as follows:

Companies are divided into small (S) and large (B) groups based on market value, then each group is divided into three groups based on the cumulative return 12 months before t, including 30% high or winner (W), 40% medium, and 30% is divided as low or loser (L).

Then the simple average return is calculated for each group. Based on the six portfolios formed, the past performance tendency factor is calculated as follows:

WML= (SW+BW)/2 – (SL+BL)/2

Tables 6 - 9 provide an overview of the robustness test performed and summarize the relevant results. If the test of research hypotheses is repeated with the Fama-French six-factor model, the previous results will be confirmed for all three hypotheses. It should be noted that the R^2 value obtained through the implementation of the six-factor Fama-French model to test all three hypotheses is less than R^2 value obtained through the estimation of the Fama-French five-factor model. This confirms that the addition of the momentum factor to the Fama-French five-factor model does not increase the explanatory power of the model.

Table 6. The Results of Testing the Fama-French Six-Factor Model in Firms With Optimistic Managers

Variable	Symbol	Coefficient	T statistic	Probability
Positive market factor	Mk_t^+	0/593	2/016	0/046
Negative market factor	Mk_t^-	0/366	1/591	0/ 114
Size factor	SMB	0/112	0/461	0/645
B/M factor	HML	-0/216	-1/509	0/134
Profitability factor	RMW	-0/080	-0/585	0/559
Investment factor	CMA	0/433	1/363	0/175
momentum factor	WML	-0/721	-4/597	0/0001
Constant coefficient	C	-0.425	-5/493	0/0001
R squared	0/07		F statistic	4/6500
Durbin-Watson stats	2/03		F statistic Prob	0/0001

Table 7. The Results of Testing the Fama-French Six-Factor Model in in Firms With Pessimistic Managers

Variable	Symbol	Coefficient	T statistic	Probability
Positive market factor	Mk_t^+	0/928	0/144	0/885
Negative market factor	Mk_t^-	0/235	0/062	0/950
Size factor	SMB	0/103	0/032	0/974
B/M factor	HML	0/060	0/019	0/984
Profitability factor	RMW	-0/187	-0/246	0/008
Investment factor	CMA	-0/636	-0/097	0/922
momentum factor	WML	-0/349	-0/159	0/873
Constant coefficient	C	-0/235	-0/114	0/909
R squared	0.05		F statistic	3/815
Durbin-Watson stats	2.25		F statistics prob	0.0001

Table 8. The Results of Testing the Fama-French Six-Factor Model in Firms With Optimistic Managers Before Sales Decline

Variable	Symbol	Coefficient	T statistic	Probability
Positive market factor	Mk_t^+	0/666	0/215	0/830
Negative market factor	Mk_t^-	-0/699	-0/123	0/901
Size factor	SMB	-0/110	-0/059	0/952
B/M factor	HML	-0/588	-3/709	0/007
Profitability factor	RMW	-0/032	-0/014	0/988
Investment factor	CMA	-0/047	-0/019	0/984
momentum factor	WML	0/042	0/074	0/0941
Constant coefficient	C	-0/666	-0/403	0.0001
R squared	0.060		F statistic	9/496
Durbin-Watson stats	1/86		F statistics prob	0.0001

Table 9. The Results of Testing the Fama-French Six-Factor Model in Firms With Optimistic Managers After Sales Decline

Variable	Symbol	Coefficient	T statistic	Probability
Positive market factor	Mk_t^+	1/044	2/093	0/038
Negative market factor	Mk_t^-	-1/293	-1/481	0/141
Size factor	SMB	-1/447	-3/929	0/0002
B/M factor	HML	-1/490	-3/356	0/001
Profitability factor	RMW	0/511	-0/826	0/410
Investment factor	CMA	0/185	0/298	0/766
momentum factor	WML	1/767	3/187	0/001
Constant coefficient	C	-1.1689	-3.0527	0.0029
R squared		0/80	F statistic	90/737
Durbin-Watson stats		1/55	F statistics prob	0/0001

Conclusion and Recommendations

One of the main problems of the capital market of most countries with emerging economies is the inappropriate allocation of financial resources. Currently, the capital market of Iran is experiencing such a situation. Tackling this problem requires the recognition of appropriate investment opportunities using instruments that are more precise to predict necessary decision-making variables such as risk and return. The risk evaluation tools that have been used by investors so far have not been able to evaluate risk as it is in the real world because of theoretical and practical deficiencies (Sadeghi et al., 2010) by making over- or under-estimations. Traditional measurement criteria for volatility are based on the behavior of the mean-variance, which frames investor decisions based on the volatility of returns and underlies modern portfolio theory where volatility of returns around the mean is defined as risk. Due to the increase in computing power, many problems in financial and portfolio theories, are solved, and the result is called a 'postmodern' theory. Postmodern portfolio theory has two basic advancements over modern portfolio theory, namely the utilization of downside risk instead of standard deviation as a risk measurement tool, and the inclusion of abnormal distribution.

As a result, modern portfolio theory is a particular case of postmodern theory. The modern theory explains the calculated risk through standard deviation, while postmodern theory explains investor behavior and the criterion of optimal portfolio selection based on the relationship between return and downside risk. In other words, if we define risk as the probability of loss, in ultramodern portfolio theory, desirable changes (i.e., an increase in the rate of return on financial assets) are not considered as risk; rather, only those observations that are lower than the average rate of return are considered as risks (Rom & Ferguson, 1994). Since the emergence of sales decline periods leads to investor confusion in identifying appropriate investment opportunities, the study of main decision variables in these periods becomes more significant (Park, 2017). Therefore, if it is possible to predict precisely the required decision variables using appropriate tools or models, the financial resources would be more appropriately directed and the market would move toward efficiency. The main purpose of this study was to investigate the effect of manager forecasts on future sales and the risk to companies that had experienced sales decline. For this purpose, risk assessment was performed in the form of postmodern portfolio theory using the Fama-French five-factor model. Three hypotheses were proposed according to the mentioned discussion. To test the first hypothesis, the Fama-French five-factor model was estimated for companies with optimistic managers, which confirmed the first hypothesis. This means that in companies with optimistic managers, the upside potential is higher than the downside risk, which indicates that when managers are optimistic about the future of the company, they act based on the

rational decisions in the interests of the company. This result is consistent with the results obtained by Park (2017) who showed that companies that retain slack resources in anticipation of a future increase in operating profitability - despite current sales decline - have higher upside potential than downside risk. As a significant result, in companies with optimistic managers, the downside risk is less than the upside potential. It can be argued that the probability of decreasing the return on assets in these companies (risk) is less than the probability of increasing the return on assets (opportunity). It is, therefore, a position of less risky investment.

To investigate the second hypothesis, the Fama-French five-factor model was used as an estimation method for companies whose managers were pessimistic about their future sales status. The results indicated that the downside risk was not higher than the upside potential in these companies, including an inaccurate forecast of these managers and the future of their companies or improper resource adjustment. This result is contrary to Park's (2017) results, which showed that companies that reduce slack resources during a sales decline do not exhibit an increase in the upside potential, but their downside risks are more significant than the upside potentials. The results of testing the second hypothesis are consistent with the results obtained by Chen et al. (2012) who showed that in China, the behaviors of managers on establishing an Emperor force them to make decisions on the maintenance of resources and, therefore, cause an improper management of the resources of the company. The manager inclines toward increasing the size of the company to extend the domain of the Emperor. Therefore, the manager resists price reduction during the demand reduction level of the company. Hence, the ratio of price change during demand increase is not the same as demand reduction, affecting the cost asymmetry. Based on the test results of this hypothesis, in companies that report good profitability during a sales decline period, there is no significant difference between the potential to increase investment attractiveness and to decrease the risk of stock returns in the future. Therefore, this investment position is riskier than companies that have reported lower profitability during periods of declining sales.

The third hypothesis on the increasing the trend of upside potential variation after sales decline compared to the period before a sales decline was confirmed. This indicates that optimistic managers have responded to increased future demand in sales-booming periods through the maintenance of resources in sales decline periods, have achieved their previous sales levels, and have even shown an increase in this regard. It can also be claimed that because the market reacts to good news after a period of sales reduction, these companies have recovered not only the returns before the sales decline period in the post-sales decline period, but they have also achieved greater returns than the ones in the pre-sales decline period. In the period after the decline in sales, the upside potential is higher than the downside risk, and it can be said that the potential to increase the return, or stock price, of these companies will continue at least in a period after the decline in sales, placing these companies in an attractive investment position.

The results of this study implicitly indicate that the Fama-French six-factor model (in which the momentum factor is added to the Fama-French five-factor model) does not increase the explanatory power of the model, which confirms the research results of Ramezani and Kamyabi (2016).

The confirmation of the first hypothesis and the higher rate of the upside potential compared to the downside risk in companies with optimistic managers during the sales decline period indicate that the maintenance of the resources by optimistic managers has been due to their accurate forecast of future demand increase. Furthermore, it indicates that managers' decision has been according to managers' rational decision theory and the increase in the long-term value of the company. Therefore, it is suggested that investors, creditors, and

analysts make wrong decisions during sales decline periods merely because of decreased profitability of companies, since it is indicative of the optimal future of the company and manager actions for an increase in the value of the company. In other words, in their decisions and efforts to determine their expected returns, it is necessary to pay attention to the criteria of favorable risk and unfavorable risk separately, and consider only the unfavorable risk as a risk factor. Moreover, because the potential of increasing returns in these companies is more significant than the potential of lower returns, they are less-risky options for investment.

Furthermore, since the second hypothesis is rejected, it is recommended that investors decide cautiously about the companies that have reported good profitability despite sales decline. As the results of testing the second hypothesis indicated, the reason is that these manager actions are not toward optimizing the value of the company or in accordance with the rational decision theory. Rather, some factors such as personal interests prevent the actions of managers in this regard. Considering that the company stock price will probably increase in these companies is not significantly different from the possibility that company stock price will decrease. Investing in these companies will be riskier than the companies that have reported a decrease in profit.

As the third hypothesis is confirmed on increasing the upside potential after sales decline compared to before sales decline, it is suggested that the managers keep sufficient resources to respond to increasing future demand if they are optimistic about the future of the company during sales decline periods. The reason for this is that the market reacts in an extreme manner to good news such as increased unexpected demand after a sales decline period. In such situations, managers will be able to benefit from the increasing demand for stocks and, consequently, the increasing prices and a return on stocks.

Based on this research, the following points are recommended for future studies.

1. Studying the research topic with other pricing models of capital assets and comparing results;
2. Expanding the scope of the research to the developed and developing countries and the comparison of the results, and
3. Using other financial ratios, or the difference of actual and expected earnings, rather than the variation ratio of operating profit margin for the classification of companies to those with optimistic and pessimistic managers and comparison of results.

Limitations

- In this study, unlike Fama-French (2015), which uses breakpoints derived from NYSE only (to avoid small stocks), breakpoints used to form the factors were derived, in the small sample size, from the universe of stocks. All companies listed in the Tehran Stock Exchange were considered as the primary statistical population.
- In a similar study conducted by Park in 2017, the 20% measure of operating profit margin changes was used to differentiate companies into companies with optimistic and pessimistic managers. However, a 40% criterion was used in the present study due to the limited number of sample companies.

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