International Journal of
Business Management and Entrepreneurship

Journal homepage: mbajournal.ir

An Investigating the impact of quantitative trading strategies on the stock market crash according to the behavioral finance perspective (Case study: companies listed on the Tehran Stock Exchange)

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Received: 2022/07/15 Accepted: 2022/08/04 Published: 2022/09/01

Abstract

According to the study of Fang and his colleagues in 2021, in order to reduce the fall of the stock market, companies pay attention to trading strategies and behavioral financial perspective, which have evaluated the assumptions and goals set in this regard; But there may be a gap in this path that prevents the connection or effect between the above variables, which is discussed in this study. This study aims to determine the effect of quantitative trading strategies on the fall of the stock market according to the perspective of behavioral finance (case study: companies admitted to the Tehran Stock Exchange). In order to analyze the research hypotheses, the statistical population was selected from 2016 to 2021 and for 6 years and included listed companies; the statistical sample was selected by elimination method and 90 companies. The research method used is a descriptive-analytical method and historical research data was collected and classified by referring to the financial statements and financial reports of the companies admitted to the Tehran Stock Exchange. The panel data method was used to analyze the statistical data; And in the analysis section, descriptive statistics, inferential statistics and various relevant tests were performed and data analysis was done using Eviews version 9 software. According to the analysis of the regression model, the findings of the research show that the main hypothesis has been confirmed and it was found that quantitative trading strategies have a negative and significant effect on the fall of the stock market according to the behavioral financial perspective of the companies admitted to the Tehran Stock Exchange. So that in this research, based on the t-statistics, the effectiveness of both special hypotheses (fall-timing and movement-reverse) was determined, and according to the mediating variable of behavioral financial perspective, they can also play a positive and significant role in reducing the fall of the stock market. to be

Keywords

Quantitative trading strategy; stock market crash; Fall – Timing; movement - reverse; A behavioral finance perspective

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1. Introduction

Inspired by previous studies on stock market crashes, Fang et al.'s 2021 study used behavioral financial indicators to develop two quantitative trading strategies, namely the crash + timing strategy and the crash + move-reverse strategy. Empirical analysis shows that both strategies are effective and strong. Behavioral factors can be useful for investors when incorporated into their trading strategies. With the development of behavioral finance, many researchers seek to explain the causes of stock market crashes using behavioral theories. For example, Zemsky and Avery (1998) point out that herding behavior can lead to asset mispricing and price bubbles. Kim and Zhang (2016) show that companies whose CEOs are overconfident have a higher stock price crash risk than other companies. Zhang and Kang (2019) found that price collapses can be caused by overpricing caused by institutional investors. While existing studies focus on investigating the factors influencing stock market crashes or predicting stock market crash events, they have examined how investors can profit from these events. Inspired by stock market crashes, Fang et al.'s study develops two quantitative trading strategies and tests their performance. Empirical analyzes show: 1) the fall factor cannot act directly as a movement factor; 2) the momentum factor is useful in a market timing approach; 3) During a volatile market, a reversal strategy may fail while cognitive biases can lead to mispricing of securities, which is still effective (Fang et al., 2021). According to the above studies, price falls can be caused by investors' cognitive biases, such as herd bias and overconfidence or partiality. Even though such cognitive biases can lead to mispricing of securities, investors may theoretically expect too much. returns from the fall of the stock market until they rationally use certain behavioral deviations (Pelster, 2020. Therefore, it is very possible to realize excess returns from a stock market crash. During a stock market crash, stock prices typically move in a similar pattern. First, stock prices continue to rise for a long period until the bubble peaks. Then the bubble bursts and the market collapses in a sudden recession. The ability to pick stocks and time them is critical if one wants to profit from a stock market crash. Accordingly, this study adopts a behavioral finance approach to suggest two quantitative trading strategies based on a crash factor. One strategy is built based on the fall factor and market timing (ie, the fall + timing strategy), while the other is made by applying the fall factor and the momentum reversal strategy. Empirical analyzes confirm the stable returns and the effectiveness and robustness of these trading strategies based on the market crash (Fang et al., 2021). Therefore, the attempt of this research is to measure the effect of quantitative trading strategies on the fall of the stock market according to the perspective of behavioral finance (case study: companies admitted to the Tehran Stock Exchange).

2. Theoretical foundations and an overview of research background

There are slightly different trading strategies in companies, which can be used to reduce or increase the risk of falling stock prices, or to strengthen these transactions using a behavioral financial perspective, and ultimately increase the profitability and growth of the company's stock sales. It also worked. They assessed the performance of behavioral, rational, and naïve investors in a number of investment settings represented by different characteristic data sets, using a range

of performance measures that represent both rational and behavioral. Utility Through a comprehensive sensitivity analysis, we examined how different aspects of an investor's behavioral preferences contribute to the relative performance of his out-of-sample investment. It also determines the marginal contributions of cumulative prospect theory value function, probability weighting function and investor memory in behavioral investor performance. The main findings can be summarized as follows (Richard et al., 2022). According to the research of Fang and his colleagues, quantitative trading strategies based on the fall of the stock market have been evaluated according to the behavioral financial perspective, which is likely to have an effective role in the fall of the stock market, but the behavioral financial perspective is also in the above effect. It plays a significant role. Therefore, quantitative trading strategies such as fall and timing strategy and fall and reverse movement strategy as independent variables and stock market fall also acts as a dependent variable that the behavioral financial outlook variable plays the role of a moderating variable. Given that today the stock market and its related activities are among the important variables for company managers and shareholders or investors; It is expected that by doing so, the risk related to the fall of the stock price will be minimized. Therefore, investigating the impact of quantitative trading strategies based on the fall of the stock market according to the perspective of behavioral finance (case study: companies admitted to the Tehran Stock Exchange) seems necessary.

Fall and Timing Strategy: The stock price can rise again from the current fall and possibly experience another fall. Investors can continue to trade by buying dips during the dip and selling stocks during the subsequent rebound. Fall factor is used to screen stocks. Specifically, 10% of the stocks at the end of the previous month are classified as falling, and 10% of the stocks at the end of the current month are considered as stocks whose bubble has just burst. However, stocks selected only on the basis of the crash factor can be retraced, so they cannot be directly invested in quantitative investments. The right timing for buying and selling is considered to be (i.e. market timing) associated with building a fall + timing strategy. Due to self-serving memory bias, investors usually repeat their previous behavior for a risky stock position (Goodaker et al., 2020). Therefore, it is assumed that before a stock market crash, the stock exhibits characteristics similar to those perceived during the period. The last fall of buying and selling strength/weakness in buying and selling positions before and after the fall will be the best indicator. Consequently, the relative strength index is used to measure market timing and is used to identify the best times to buy. It is used to capture stocks and a movement factor, which is defined as the corresponding 5-day movement at the previous month's high. Sell signals during an observation period are sold when the stock has the same movement coefficient as the peak movement coefficient in the previous month (Fang et al., 2021).

Fall and Reversal Strategy: Momentum and reversal are two well-known anomalies in the field of behavioral finance. However, momentum strategies suffer from major downfalls. During a kinetic fall, the movement often tends to reverse. That is, the portfolio with the least acceleration becomes the best performer, and the reverse movement strategy realizes additional returns.

Therefore, the reverse movement strategy can significantly increase investment efficiency (Daniel and Moskowitz, 2016). The second strategy is to combine the falling factor with the reverse movement strategy. First, the failure rate of the reverse momentum strategy is added to it, it adopts a scoring method to create a new comprehensive scoring factor, and from this new factor, the screen displays selected stocks that have fallen this month and are expected to fall later. to come back to the market, that is, the stock is underperforming and will probably perform better in the future (Bali et al., 2011). In the following, we will get to know each of the research variables.

Quantitative trading strategies: A trading strategy consists of a detailed investment and trading plan that specifies investment objectives, risk tolerance, time horizon and tax implications. The best ideas and actions should be studied and learned well before being implemented. Trading planning involves the development of methods that involve buying and selling stocks, bonds, exchange-traded funds or other investments, and may even extend to planning more complex trades such as options or futures. Placing trades means working with a broker and identifying and managing trade costs, which include spreads, commissions, and fees. After implementing these things, the trading position should be monitored and managed, which includes adjusting or closing trades if necessary. Risk and return are also measured and analyzed like the effects of the stock portfolio on transactions. A trading strategy can be likened to a trading plan that considers various factors and costs for an investor. This program consists of three stages: planning, placing trades and executing trades. At each stage of the process, the metrics related to the strategy are measured and changed based on changes in the markets. There are many different types of trading strategies, but most of them focus on either technical funds or fundamental funds. What they have in common is that they both rely on quantitative data, which can be measured accurately using simulations. Technical trading strategies rely on technical indicators to generate trading signals. Technical traders believe that all the information about a specific stock or security is in its price and movement in trends. For example, a simple trading strategy might be based on a moving average crossover, whereby a short-term moving average intersects a long-term moving average above or below it. Fundamental trading strategy examines fundamental factors. For example, an investor may have a set of criteria in mind in order to generate a list of opportunities. These metrics are developed by analytical factors, such as revenue growth or company profitability. In this study, two types of quantitative trading strategies are used, which include the fall-timing strategy and the movement-reverse strategy (Fang et al., 2021).

Fall of the stock market: stock returns are one of the important factors in choosing the best investment, so predicting and comparing the stock returns of different companies is one of the ways to improve the investment process. Stock returns are one of the important criteria in choosing the best investment. Therefore, predicting returns is one of the ways to optimize the investment process. In order to make decisions about buying and selling shares of companies, shareholders need information to predict the returns of the companies' shares. Today, the hypothesis of predictability of stock returns has been accepted as a reality in financial management. In recent years, the existence of many effective factors that help predict stock

returns has been proposed. The capital asset pricing model is one of the stock return prediction models that has been used for many years. In this model, it is assumed that investors can earn additional returns by bearing additional risk. The beta coefficient in this model has the ability to predict stock returns. In recent years, the two variables of company size and the ratio of book value to the market value of equity have been used as very important variables in predicting stock returns, and it has been stated that these two variables, together with the market factor, explain the average return. . Also, in other surveys, factors such as sales growth and financial crisis index were tested in predicting stock returns. The results of these researches indicate that the combination of sales growth factors and the financial crisis index lacks the necessary explanatory power in describing the average stock returns of the studied companies (Ramshe et al., 2013).

Behavioral finance perspective: Behavioral science is one of the applied sciences that has entered the field of science in the form of a specialized field called psychology. The basic foundation of this knowledge is man and his inherent complexities, behavior and personality, which require understanding and recognition in a scientific framework under the title of psychology. The historical study of psychological knowledge has revealed the fact that in interaction with other sciences, while providing a practical answer to the problems of man's escape, it has promoted the knowledge of psychology on the one hand and provided the field for interaction with other human sciences on the other hand. Behavioral finance is a branch of behavioral science that examines financial issues from a wider social scientific point of view, including attention to psychology and sociology, as well as removing rational and logical frameworks. Accordingly, in the last two decades, the focus of many financial discussions has changed from statistical analysis and econometrics on prices and profits to human psychology, and with a more open view and using more realistic assumptions than modern financial management, to explain and explain the behavior of markets. They pay money (Rodpashti Guide, 2013). The behavioral finance school or view that was born from the integration of psychology and finance states that psychology plays a role in financial decision-making. Since cognitive errors and deviations affect investment ideas, they also affect financial options (Islami Bidgoli and Kordloui, 2019). Behavioral finance is the study of how people analyze and interpret information to make informed investment decisions. In other words, behavioral finance seeks to influence psychological processes in decision making. Today, the idea of completely rational behavior of investors who always seek to maximize their utility is not enough in order to justify the behavior and reaction of the markets, so behavioral finance can be considered a paradigm according to which financial markets are studied using models that It abandons the two main and limiting assumptions of the traditional paradigm, i.e. maximization of expected utility and complete rationality. In behavioral finance, it is claimed that sometimes in order to find an answer to the empirical puzzles in the financial field, it is necessary to accept the possibility that sometimes some economic factors do not behave completely rationally (Birenberg, 2011).

3. An overview of experimental research results in Iran and the world

Ebrahimi et al. (1400) investigated the explanation of managers' behavioral motivation in profit manipulation from the perspective of cumulative perspective theory. The results showed that by using the logistic regression model and considering the average performance of competitors in the industry as a reference point, it indicates the positive and significant effect of the management's estimate of the probability of loss compared to the reference point, which is higher and in the conditions that The lower the probability, the lower the probability of profit manipulation. Also, the probability of profit manipulation is higher when the manager underestimates the probability of achieving profit compared to the reference point, and when this probability is high, the probability of profit manipulation is lower. The findings indicated the loss aversion of managers. Therefore, the obtained evidence shows that the cumulative perspective theory can be used to explain the behavioral motivation of managers in profit integrity.

Saneifar et al. (2019) investigated the complex network of the impact of the corona virus on macroeconomic variables and the fall of the stock market. The results show that the interconnection of the modern economy, stock markets and economic variables has turned the health crisis into a global economic crisis. The corona virus has directly affected 35% of stock markets, this virus has had the greatest impact on the stock markets of European and Asian countries, and it has had the least impact on the stock markets of Arab and African countries. The corona virus has indirectly caused the fall of stock markets by affecting economic variables, the unprecedented drop in oil prices has caused a 56 percent drop in stock markets, and gold price fluctuations have affected 29 percent of these markets. The drop in silver and copper prices between 25 and 32 percent has caused the stock markets to fall.

Asadi and Emami (2018) designed trading strategies based on the effect of momentum and return and by using important floors and ceilings of the past. The research results indicate a significantly higher efficiency of using these strategies compared to the purchase and maintenance method.

Fang et al. (2021) investigated the impact of quantitative trading strategies on stock market crashes with regard to the behavioral finance perspective. Their results from experimental analysis show: 1) the fall factor cannot act directly as a movement factor; 2) the momentum factor is useful in a market timing approach; 3) During a volatile market, a reversal strategy may fail, while cognitive biases can lead to mispricing of the securities presented in this paper are still effective.

Gormsen and Kuijn (2020) in the article The Effect of the Corona Virus on Stock Prices and Expected Growth showed how data on dividend futures can be used to understand why stock markets have fallen sharply. They also concluded that the news of fiscal stimulus on March 24 boosted the market and long-term growth, but did not increase expectations for short-term growth.

Albolescu (2020) in the article Corona Virus and Financial Volatility: 40 Days of Fear investigated the issue that the death rate affects the volatility index of financial markets and the impact of this issue is greater outside of China. In addition, the greater the number of affected countries, the greater the financial volatility. Also, in another article titled Corona virus and the

fall in oil prices, he showed that daily reported cases of Corona virus in terms of new infections have a marginal negative effect on the price of crude oil in the long term.

The research hypotheses based on the study of Fang et al. (2021) have been compiled as follows:

The main hypothesis: Quantitative trading strategies have a significant effect on the fall of the stock market according to the behavioral financial perspective in companies listed on the Tehran Stock Exchange.

The first sub-hypothesis: Fall strategy - Timing has a significant effect on the fall of the stock market according to the behavioral financial perspective in companies listed on the Tehran Stock Exchange.

The second sub-hypothesis: the movement-reversal strategy has a significant effect on the fall of the stock market with regard to the behavioral financial perspective in the companies admitted to the Tehran Stock Exchange.

4. Methods Research

The method used is the type of post-event semi-experimental research in the field of accounting proof research, which was carried out using multivariate regression and econometric models. Research hypotheses have been tested based on panel data. Based on the selected topic, the research method is descriptive-analytical and applied. Based on the purpose of this topic, the correlation research method has been used because it seeks to investigate the effect of quantitative trading strategies on the fall of the stock market according to the perspective of behavioral finance (case study: companies admitted to the Tehran Stock Exchange).

The selected statistical population in this research includes companies admitted to the Tehran Stock Exchange between 2015 and 2019. Therefore, in order to determine the sample size, they must have the following conditions:

1. Their financial information should be available in the period under review and should not have any defects.
2. The end of their financial year is at the end of March and the financial year has not been changed during the period under review.
3. The companies must be admitted to the stock exchange during the research period and more than 2 years have passed since their membership.
4. During the research period, their equity should not be negative.
5. Companies should not have accumulated losses.

It should be mentioned that after performing the above screening, the statistical sample whose number reaches 90 companies.

Table 1 - Determining the statistical sample

All observations related to the statistical sample from 2016 to 2021	540
The financial information of the companies was not available or was incomplete.	(113)
The end of the financial year of the companies is not in March or the financial year has changed.	(110)
Companies have accumulated losses and their equity is negative.	(116)
The companies are not members of the stock exchange during the research period or 2 years have not passed since their membership.	(111)
Selected sample	90

The regression model adapted from the article of Latin Fang et al. (2021) is as follows:

Cash factor = $\beta_0 + \beta_1 ECS_{it} + \beta_2 EMM_{it} + \beta_3 PFC_{it} + \beta_4 MV_{it} + \beta_5 CF_{it} + \varepsilon$

The dependent variable:

Fall of stock market (Cash factor) i in year t

Independent variables:

Fall Strategy – Timing (ECS)i in year t

Move-reverse strategy (EMM)i in year t

Mediator:

Behavioral Finance Outlook (PFC) i in year t

Control variables:

Market value (MV) of firm i in year t

Net cash flow ratio (CF) of i in year t

5. The method of measuring research variables

The dependent variable; Stock market crash (Cash factor): obtained from the following relationship (Fang et al., 2021):

Crash factor = exp(C) / 1 + exp(C) + exp(J)

C = α0 + α 1RM12 + α2 EXRET12 + α3 TVOL + α4 TSKEW + α5 SIZE + α6 DTURN + α7 AGE + α8 TANG + α9 SALESG

J = β0 + β1RM12 + β2EXRET12 + β3TVOL + β4TSKEW + β5SIZE + β6DTURN + β7AGE + β8TANG + β9SALESG

where in:

Crash factor = crash of the stock market

exp(C) = obtained from the sum of the following variables:

1RM12 = return value of weighted index report during the year,

EXRET12 = market value or log weighted index return over the year,

TVOL = standard deviation,

TSKEW = the skewness of daily report returns over a period of 6 months,

SIZE = market value report,

DTURN = stock turnover minus its 18-month average,

AGE = the number of years of the company's shares,

TANG = dividing tangible assets by total assets,

SALESG = sales growth compared to the previous year.

Independent variable; Quantitative trading strategies: The following two modes are used for measurement:

Collapse Strategy - Timing (ECS): Relative strength index is used to identify time; First, it has considered 10% of the top stocks as the cause of the fall at the end of the month of the current year and the month of the previous year. Second, the stocks that were created in the current year and the previous year are removed and the rest are placed in the stock portfolio. Third, the remaining stocks in the basket are bought when they reach the buy limit during the period, and when they reach the sell limit order, they are sold if there is no loss, otherwise they are sold at the end of the period. arrives; To measure it, it takes into account the difference between the above purchases and sales (Fang et al., 2021).

Move-reverse strategy (EMM): to start the move, it starts from time t; First, 20% of the top shares are purchased based on the comprehensive invoice at the end of the month. The second is to keep the stock until the end of the next year or t+1 and then sell it. For this purpose, it is calculated from the amount of shares sold at the end of the following year, although four indicators such as annual return, sales ratio, maximum withdrawal, and interest rate are also used (Fang et al., 2021).

mediating variables; Behavioral finance perspective (PFC): For this purpose, the amount of errors or risks created during the period of one year are considered to minimize the amount of behavioral finance bias. For example, if the stock of the portfolio sells for $1,000, if $500 was the retail cost, they may feel good, but if the cost of buying the stock reaches $1,100, it is very worrying, so a Behavioral financial outlook occurs and for the future, they estimate its risk, in this regard, they consider the amount of risk or possible loss that may occur to the company from the sale of shares during the year, so by measuring the risk of the stock market , acquire a behavioral finance perspective (Fang et al., 2021).

control variables; Company market value (MV): The ratio of the total market value of tradable shares, non-tradable shares and liabilities to total assets is obtained (Fang et al., 2021).

Net cash flow ratio (CF): The ratio of net cash flow from operating activities at the end of the year to the company's total assets is obtained (Fang et al., 2021).

6. Findings Research

Table 2- Descriptive statistics of variables

Variable name	Average	Middle	The maximum	minimal	standard deviation	Elongation	crookedness
Stock market crash	0.76	0.74	0.96	0.011	1.55	1.64	1.78

Variable name	Average	Middle	The maximum	minimal	standard deviation	Elongation	crookedness
Fall Strategy - Timing	0.47	0.46	0.97	0.091	0.49	0.17	1.15
Movement strategy – reversal	0.61	0.59	0.88	0.06	1.28	1.19	1.99
A behavioral finance perspective	0.48	0.45	0.98	0.07	0.49	0.1	1.01
The market value of the company	0.14	0.12	0.79	0.06	0.35	1.98	1.93
Net cash flow ratio	0.48	0.46	0.97	0.01	1.44	0.76	1.46

If it is observed that the average is close to the median and this problem shows the normality of the distribution of the variables. In all cases, the standard deviation of the data is small, and this issue also indicates the proper distribution of the data. Also, the skewness obtained according to the above table for all variables is shown with positive values, which indicates an asymmetric distribution towards higher values or positive skewness.

6-1. Pearson correlation test

Table 3- Correlation between variables using Pearson's correlation coefficient

	Stock market crash	Fall Strategy - Timing	Movement strategy – reversal	A behavioral finance perspective	The market value of the company	Net cash flow ratio
Stock market crash	1.000 0.000					
Fall Strategy - Timing	-0.03 0.002	1.000 0.000				
Movement	0.02	0.008	1.000			

	Stock market crash	**Fall Strategy - Timing**	**Movement strategy – reversal**	**A behavioral finance perspective**	**The market value of the company**	**Net cash flow ratio**
strategy – reversal	0.04	0.48	0.000			
A behavioral finance perspective	0.51 0.000	0.17 0.000	0.63 0.000	1.000 0.000		
The market value of the company	0.22 0.03	0.14 0.11	0.51 0.000	0.41 0.006	1.000 0.000	
Net cash flow ratio	0.13 0.02	0.15 0.09	0.26 0.11	0.35 0.05	0.13 0.6	1.000 0.000

In the above table, the degree of correlation is written in the first line and the significance of the correlation is written in the second line. If the significance is less than 0.05, the desired correlation is statistically significant.

6-2. checking the model using Chow and Hausman tests

Table 4-Result of Chow and Hausman test

title of exam	Test statistics	Degrees of freedom	Significance level	Result
Chow's test	4.01	(89 , 719)	0.000	Using the panel model
Hausmann	14.20	5	0.01	Random effects

To reject the null hypothesis and confirm the use of the mixed data model, the significance level must be less than 0.05. As can be seen, the significance level of Chow's test is less than α=0.05 in both equations, so the possibility of estimating both models using the combined data model is confirmed with 95% confidence.

To reject the null hypothesis and confirm the use of fixed effects, the significance level must be less than 0.05. As it can be seen, the significance level of the Hausman test has been examined for both equations, considering that the significance level of the Hausman test for the second equation is equal to 1.000, the Hausman test prob is used in this equation. Gives fixed effects; Because in the case of the level of significance of Hausman's test being equal to the number one, it is the only case that despite the significance level being more than 0.05, the result of Hausman's test cannot be trusted and random effects must be used.

6-3. Testing hypotheses

As can be seen in this table, the results obtained from the estimation of the regression model related to the sub-hypotheses show the confirmation of the effect of quantitative trading strategies on the fall of the stock market according to the company's behavioral financial perspective.

Table 5- Results of regression model fitting

Response variable = stock market crash				
Independent variables	**Coefficients Regression**	**standard deviation**	**Test statistic t**	**Level meaningful**
Equation constant (α)	1.96	0.13	14.43	0.000
Fall Strategy - Timing	-0.17	0.020	-11.45	0.000
Movement strategy – reversal	0.057	0.036	1.56	0.000
A behavioral finance perspective	-0.048	0.013	-3.71	0.000
The market value of the company	0.26	0.0033	7.84	0.000
Net cash flow ratio	0.108	0.000	3.47	0.000
Statistical test F = 791.9			Significance level = 0.000	
Statistics D.W: 2.20			Adjusted coefficient of determination = 0.85	

As can be seen in table 5, the effect of quantitative trading strategies on the fall of the stock market has been tested according to the behavioral financial perspective of the companies listed on the Tehran Stock Exchange. Watson: 2.20 has been reported and since this number is between (1.5 and 2.5), it confirms the above hypothesis. Also, the adjusted coefficient of determination and the F test statistic are not ineffective in confirming the above hypothesis.

Table 6. The results of the jarek test

The residual of the regression model	Test statistics	Significance level	Result
	57.72	0.000	Non-normality of model residual distribution

As can be seen, the significance level of Jarak's test is calculated for less than α=0.05, so with 95% confidence, the distribution of residuals is not normal.

6-4. Examining hypotheses at a glance

The final confirmation or rejection of the assumptions is summarized in the following table:

Table 7. The results of checking the hypotheses

Row	theories	Result
The main hypothesis	Quantitative trading strategies have a significant effect on the fall of the stock market according to the behavioral finance perspective in companies listed on the Tehran Stock Exchange.	confirmation
The first sub-hypothesis	Fall strategy - Timing has a significant effect on the fall of the stock market according to the behavioral financial outlook in companies listed on the Tehran Stock Exchange.	confirmation
The second sub-hypothesis	The movement-reverse strategy has a significant effect on the fall of the stock market according to the behavioral financial outlook in companies listed on the Tehran Stock Exchange.	confirmation

7. Discussion and conclusion

Based on the obtained results and analysis, it was found that quantitative trading strategies can affect the fall of the stock market according to the behavioral financial perspective of the companies admitted to the Tehran Stock Exchange, so that quantitative trading strategies reduce the market fall. It can be said that in this research, two independent variables of fall - timing and movement - reverse have been used. The first variable has a negative and inverse effect and the second variable has a positive and direct effect, but since the effect of the fall-timing variable is more negative, it can be said that the effect of the independent variable on the dependent variable (quantitative trading strategies on the fall of the stock market) is also negative. is; On the other hand, the mediating variable of behavioral financial perspective also has a negative and inverse effect, and this process can also neutralize the positive effect of the movement-inverse variable.

The results of the research regarding the main hypothesis indicate that the effect of quantitative trading strategies on the fall of the stock market was confirmed according to the behavioral finance perspective in the companies admitted to the Tehran Stock Exchange; According to the regression model analysis, quantitative trading strategies can have an impact on the fall of the stock market according to the behavioral finance perspective, so that according to the t-test in this research, the role of the independent variable is negative and inverse on the dependent variable, but the movement strategy variable - The reverse can lead to the fall of the stock market and lead the company to bankruptcy, while the fall strategy variable - timing can lead to the improvement of the stock market situation. Therefore, according to the perspective of behavioral finance, it can be said that the role of the independent and mediating variable on the dependent variable is negative and significant. These results are consistent with the research of Fang et al. (2021), Gormsen and Koijen (2021), Ebrahimi et al.

The results of the research regarding the first sub-hypothesis indicate that the impact of the fall-timing strategy on the fall of the stock market was confirmed according to the behavioral finance perspective in the companies admitted to the Tehran Stock Exchange; According to the analysis of the regression model of the fall strategy - timing can affect the fall of the stock market according to the behavioral financial perspective, so that according to the t-test in this research,

the role of the independent variable is negatively and inversely related to the dependent variable, and also The mediating variable of the behavioral financial perspective is also not ineffective in this regard and reduces the fall of the stock market; In other words, the greater the amount of falling strategy - timing and behavioral financial perspective, it can reduce the fall of the stock market; These results are in line with the research of Fang et al. (2021), Albolescu (2020), Sanei Far et al.

The results of the research regarding the second sub-hypothesis indicate that the effect of the reverse movement strategy on the fall of the stock market was confirmed according to the behavioral finance perspective in the companies admitted to the Tehran Stock Exchange; According to the analysis of the regression model, as it was said, the movement-reverse strategy can have a positive and direct effect on the fall of the stock market of companies; But the mediating variable of the behavioral financial perspective reduces the effect and leads to a decrease in the fall of the stock market, and this performance can to some extent prevent the effectiveness of the reverse movement strategy, because if this trend continues, it may cause the bankruptcy of the stock market. These results are consistent with the research of Fang et al. (2021), Yan et al. (2020), Asadi and Emami (2018).

8. Practical suggestions for future researchers

According to the results of the main hypothesis, it can be suggested to the Tehran Stock Exchange Organization to prepare programs and provide them to the managers of the companies so that they can use it in order to reduce the fall of the stock market, which is one of the factors of the trading strategy. There is little that should be prevented from falling in the stock market according to the included strategies. Also, the behavioral financial perspective can also help this effect, so it should be paid attention to and by using its criteria, the stock market can be expanded and lead to the volume of stock transactions. In this regard, the necessary training can be provided to shareholders or managers of companies so that they can strengthen the stock market of companies with better performance.

According to the results of the first sub-hypothesis, it can be suggested that company managers pay attention to the fall-timing strategy in order to reduce the fall of the stock market, so that by following it, the amount of stock transactions can be increased and prevent the fall of the stock market. In this regard, guidelines can be prepared and provided to the shareholders or managers of the companies, so that by observing the specific points related to this process, they can take an effective step in the direction of the stock market of the companies and the continuation of its activity according to the fall-timing strategy. Also, in order to improve the stock market, it is possible to refer to the behavioral financial perspective and its related points, and by observing it in time, they can prevent the fall of the stock market.

According to the results of the second sub-hypothesis, it can be suggested that company managers should pay attention to the reverse movement strategy in order to reduce the fall of the stock market. Because this index caused the stock market to fall. In this regard, guidelines can be prepared and provided to the shareholders or managers of the companies in order to prevent the bankruptcy of the stock market by observing the special points related to this process and the

achievements prepared. participate, pay attention to this strategy or that they can minimize the fall of the stock market by considering the behavioral financial perspective and following the related points.

According to the results of the research, it can be suggested for future researchers:

• Investigate the effect of quantitative trading strategies based on stock market crash with regard to economic crisis, environmental factors and market uncertainty conditions using fuzzy logic and compare the result with this research.

• The effect of quantitative trading strategies based on the fall of the stock market should be measured with regard to government ownership and real ownership.

• Investigate the effect of quantitative trading strategies based on the fall of the stock market with regard to the role of financial statement preparers.

• Investigate the impact of quantitative trading strategies based on the stock market crash with regard to the role of tax avoidance and evasion.

• Investigate the effect of quantitative trading strategies based on the fall of the stock market according to the role of cultural factors and its application.

• The effect of quantitative trading strategies based on the fall of the stock market should be investigated with regard to the auditor's role and audit fees.

• The effect of quantitative trading strategies based on stock market crash should be investigated based on structural equations approach.

• Evaluate the effect of quantitative trading strategies based on the fall of the stock market with regard to profit management and profit distribution.

• Evaluate the effect of quantitative trading strategies based on stock market crash with respect to business credit and company value.

• Measure the effect of quantitative trading strategies based on stock market crash based on information asymmetry and investment efficiency.

• To evaluate the effect of quantitative trading strategies based on the fall of the stock market according to the probability of bankruptcy.

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