



Original Research

Providing the Optimal Model for Stock Selection Based on Momentum, Reverse and Hybrid Trading Strategies

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ABSTRACT

Momentum strategy, despite its outstanding performance, offers different results at different time intervals. In this study, we aimed to provide an optimal model for stock selection based on momentum, reverse and hybrid trading strategies using the data panel model. The present research method was applied on the information of 180 companies in the period 2011 to 2021 was used to estimate the model. (Eviews12) software has been used to estimate the models. Based on the results of 8 time periods of 3, 6, 9, 12, 24, 36, 48 and 60 months based on different momentum and inverse strategies and a combination of loser, winner and loser-winner, winner-loser were analyzed. According to the data panel method, the studied strategies in small companies give more additional returns to investors than large companies. Also, based on the results of hybrid strategies, investors will receive more additional returns in the long run than simple momentum strategies.

1 Introduction

Every investor, upon entering the capital market, seeks to achieve and apply strategies that can win over the market and gain additional returns. On the other hand, the modern financial theory and its main essence, the efficient market hypothesis, is the belief that it is impossible to win over the market and achieve returns above the market average. In this paradigm, it is claimed that there is no trend in the market's price and yield, and it is not possible to gain additional profit from the market's trends. The efficient market hypothesis has been challenged in many empirical studies, dominated by the assumption of rational decisions by investors. The results of these researches show the existence of irregularities that contradict the hypothesis of an efficient market and classical finance. Evidence suggests that some investors, in an attempt to outperform the market, have implemented trading strategies that appear to beat the market [1-5], and there is no sign of the tendency to outperform the market waning in popularity. It is estimated that investors spend 0.67% of the total stock market value every year in search of superior returns. According to the World Bank (2016) estimate, out of the total market capitalization of 61.902 trillion dollars in 2015, investors have spent about 415 billion dollars in search of superior returns [6-8]. Although countless trading strategies have been implemented by investors, Momentum and Reversal strategies have risen and continue to rise over the years, mainly because of their consistent and pervasive performance. For example, highlighted the popularity of the momentum strategy among

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institutional investors, while state that momentum and reversal are two of the most important market anomalies [9-13].

Although, the strong performance of Montium and inverse strategies has been proven over time and in different geographical locations, two additional strategy groups can be made that combine the characteristics of Montium and inverse strategies. Traditionally, ratings and holdings in momentum strategies are for the medium term (3–12 months), while ratings and holdings in inverse strategies are for the long term (2–5 years); Therefore, in the definition of momentum and reversal strategies, it is possible to create two new hybrid (combined) groups of trading strategies based on different rating and maintenance periods. One set of strategies, called the contratium strategy, ranks stocks for the long term (like the inverse strategy); But it keeps them in the medium term (like the momentum strategy). The second category of strategies, called Monterian (momentary) strategies, rank stocks in the medium term (like the Montium strategy); But they hold for the long term (like a reversal strategy).

Although the subject literature and the review of previous studies related to Montium and inverse strategies are relatively rich, there are very few studies regarding the performance of the combined portfolios of both strategies or considering the simultaneous performance of the strategies in periods with the same time horizon. In a way that this issue has not been examined in any of the domestic studies, and it is enough to simply compare the performance of the portfolios of each strategy; In the field of foreign studies, only 2 studies have examined the above topic [14-16]; Therefore, with the aim of filling the existing research gap, the current study analyzes the performance of portfolios based on Montium, reverse and hybrid strategies (Contratium and Montian); Also, in order to check whether the market anomaly should be searched in the data or not, the durability of the said anomalies over time and in different geographical markets (Iran's capital market) is investigated. In addition, today, due to the significant technological advances, daily transactions and with high frequency, investment horizons have been shortened. By documenting the performance of repeatable hybrid investment strategies, which can be of interest to investors across the spectrum, in comparison with the traditional performance of these strategies, due to having medium-term holding horizons, it helps both investors and academic literature. On the other hand, some previous research claims that when the existence of market anomalies is proven, they are expected to disappear after some time [17]. As a result, momentum and reversal trading strategies that originate from market anomalies are not profitable. The current research expands the subject literature in this field and examines whether these strategies perform well in the long term. Finally, one of the important challenges in the field of momentum and reverse strategy is to find out its origin to explain the reason for the occurrence of the mentioned phenomenon; For example, according to the risk-oriented approach, the profitability of the momentum strategy is due to its higher risk; But Fama and French [18] showed that winning portfolios do not necessarily involve higher risk than losing portfolios, and therefore the source of excess returns through higher risk is rejected; Considering the existing ambiguity as described above and the necessity of conducting studies in the field of determining the optimal portfolio, especially from the perspective of investors, the current research investigates the performance of the optimal portfolio in hybrid strategies using panel data; In this way, by systematically analyzing the final risk of each share from the set of shares of hybrid portfolios, stocks that meet the initial conditions for entering the portfolio are selected. In the next step, a panel data model is applied with the aim of maximizing diversification and eliminating unsystematic risk in the portfolio.

The proposed model uses two well-known portfolio risk management techniques, including risk share and maximum diversification ratio to increase the machine learning capability [19-21]. The method of budget (share), risk is used to identify the risky stocks of the stock portfolio in order to be removed for selection in the portfolio. In this way, a portfolio formation model is created using machine learning

methods to minimize the risk component according to the total assets under consideration and then increase the asset diversification by maximizing the maximum diversification ratio.

Can a trading strategy based on the performance of a specific period J and holding in a specific period k generate additional returns? Is there a significant difference in the excess returns resulting from momentum, reverse and hybrid trading strategies in the optimal portfolio compared to the initial combined portfolio? After the introduction, which examines the problem and necessity of the research, then in the other 4 sections, the theoretical foundations and background of the research will be examined, then the research method will be explained in the third section, and then in the fourth section, the model will be estimated, and finally We will present policy results and management suggestions.

2 Theoretical Foundations

The Efficient Market Hypothesis (EMH) gained the most dominance in financial scientific circles in the 1970s and 1980s. But trust and confidence in this hypothesis was gradually shaken by the discovery of behavioral irregularities in the stock market and patterns inconsistent with modern financial theories, as well as the observation of events such as the financial market bubble in America in 1987, as well as in other financial markets and other capital market events. Obtaining profit returns according to Momentum and reverse strategies are considered in the field of market anomalies; Because in financial theories, as emphasized in the asset pricing models of it focuses on explanations of returns based on the risk of stocks. In particular, asset pricing models, which have long shaped the way academics and practitioners think about average return and risk hypothesize that stock returns depend primarily on the level of systematic risk; Therefore, market anomalies arise when observed patterns in average stock returns cannot be explained by risk-based asset pricing models [22-25]. Because momentum and reversal trading strategies are investment strategies that depend solely on past stock returns, they are considered market anomalies. In fact, momentum and reverse are two of the most prominent anomalies in the financial market [26]. Momentum: Momentum anomaly is the top anomaly and the center of attention in recent years The result of this strategy is to obtain abnormal returns by buying stocks that have performed well in the recent past (past winners) and selling stocks that have performed worse in the recent past (past losers). While early authors such as [27-30] emphasized the possibility of momentum in stock returns, as important as it has been over the years, is, give strength Since then, other authors have reported evidence of momentum in different countries, including the United States [31].

All the mentioned research strongly confirms the existence of Momentum in different countries. However, there are more exceptions in Asia and specifically in Japan. report a negligible return of 0.04% for Japan, and also state that Japan is the only market among 26 developed stock markets with a negative (albeit small) return for momentum strategies; But the findings of that momentum is profitable in Japan, makes this long-standing concept controversial. The question of whether momentum strategies are profitable after taking into account real transaction costs has been discussed and The evidence seems to be mixed. While claim that the momentum strategy is profitable after accounting for real transaction costs, find evidence to the contrary [32]. suggested that trading volume can be a factor that connects momentum and reversal trading strategies. Stocks with high trading volume are more likely to experience a momentum reversal. The amount of trading volume can show where the stock is in the momentum cycle. This suggests that the trading strategy can be developed to balance the reversal and momentum approaches with trading volume, so that trading volume can be used as an indication for the timing of buying and selling in the momentum life cycle [33-35].

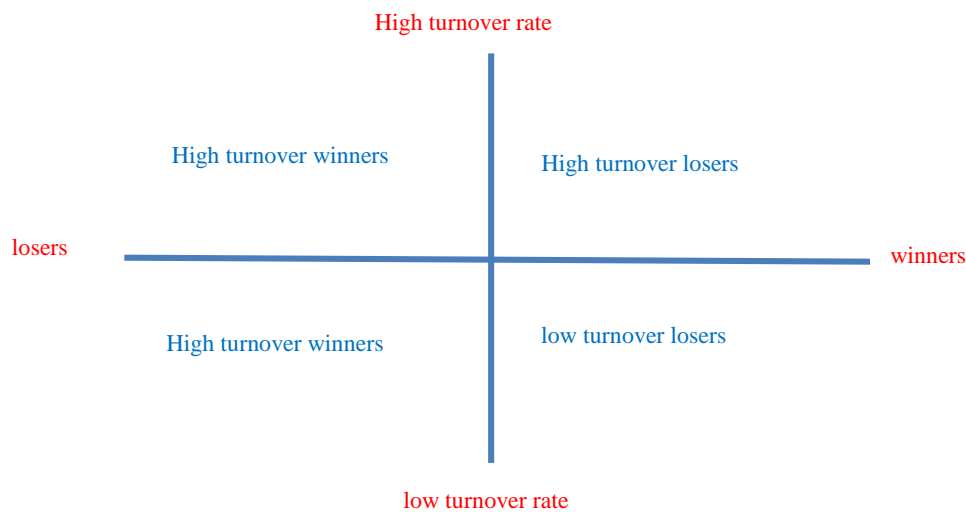


Fig. 1: Momentum Life Cycle

In Fig. 1, the high volume of winners is at the top of the momentum life cycle and the low volume of losers is at the bottom of the momentum life cycle. Both portfolios tend to return returns in the future. Meanwhile, winners with low volume at the bottom of the momentum life cycle and losers with high volume at the top of the life cycle tend to maintain their existing momentum. Forming a portfolio of long-term winners with low trading volume and short-term losers with high trading volume is called the previous stage momentum strategy. This is in contrast to the next-stage momentum strategy, which involves buying long-term winners with high trading volume and selling short-term losers with low trading volume. Reversal Strategy: Reversal strategy is based on buying past losers and selling past winners [36]. define reversal anomaly as the abnormal return of holding past losers and selling past winners when losers and winners fall within 3- or 5-year periods. Based on the fact that people tend to acquire too much information, showed that stocks that have performed poorly over the past 3 to 5 years have better returns than good stocks over the subsequent 3- and 5-year holding periods. with the same course [37]. other researchers including also documented the existence and persistence of the reversal anomaly [38], although show that in England, long-term reversals mainly lead to industry. The case that is confirmed in the research of regarding Montium and reverse strategies [39]. Regarding the usefulness of the reverse strategy, there are many contradictions; While showed that reversal strategies are profitable, recent research suggests that these strategies lose their performance [40].

In addition, some researchers state that inverse strategies can be used with the three-factor model of the size factor or the systematic risk of inverse portfolio securities Although explanations for such anomalies have been proposed, including rational (risk-based) and behavioral explanations, their persistence and pervasiveness remain puzzling [41]. Since the rating and holding of the portfolio in the momentum strategies is for the medium term (3-12 months) and in the long-term reversal strategy (2-5 years), two new groups of strategies can be proposed: the interaction of the "long-term rating logic of the reversal strategies with "Medium-term maintenance of momentum strategies". In chart number (2), four groups of strategies have been suggested by the research, which can be implicitly extracted from the horizon of stock rating and holding [42]. Contratium (contraction) strategies, in the long term, are ranked like reversal strategies; But they are held in the medium term (like momentum strategies). On the other hand, momentian strategies are rated in the medium term (such as momentum strategies); But they are held for the long term (like inverse strategies). In the following, the explanations related to

each of the combined strategies adapted from the research of are provided. Contratium strategy: Contratium strategies are hybrid strategies in which portfolio ranking is based on a long-term time horizon (like the inverse strategy), but their holding time horizon is medium-term, like momentum strategies. Contravatiom strategies are predicated on the assumption that there is also an inverse performance in the medium term and therefore, buying stocks that have performed worse in the distant past (long-term losers) and selling stocks that have performed better in the distant past (past long-term winners). It creates abnormal returns in the medium term due to subsequent medium-term reversal [43]. In reviewing the topical literature, empirical evidence supports the potential benefit of contractionary strategies. Humpe and Macmillan [44] show that inverse strategies perform well in the medium term and found that inverse strategies are very profitable in the very short horizon of 1 month and the very long horizon of 2 years or more, and that Inverse strategies perform well in the medium term.

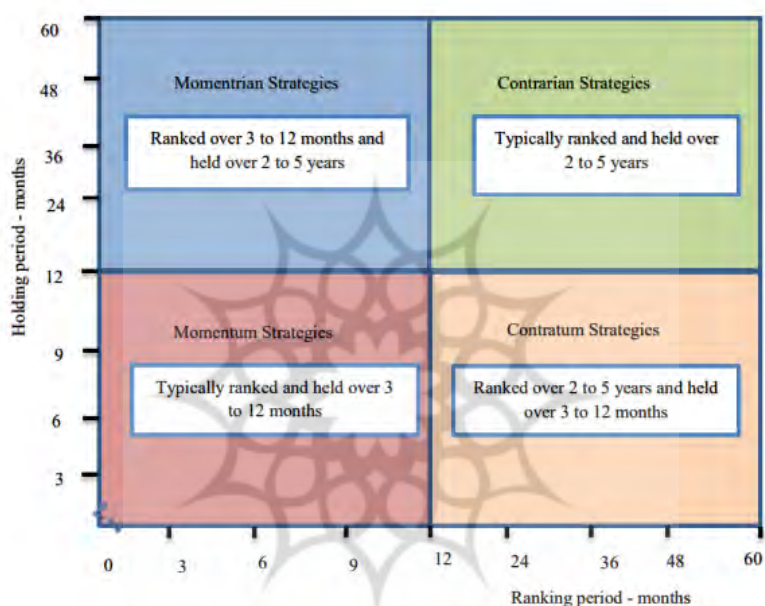


Fig. 2: Matrix of Investment Strategies Based on Momentum and Reversal, Considering the Time Horizon of Rating and Maintenance.

One rationale for the profitability of contraction strategies is to avoid regret. According to regret theory people who experience or anticipate regret and happiness experience or expect this when making a decision. Because overreaction leads to long-term return returns, which makes inverse strategies profitable in the long run, it is likely that investors who want to avoid the regret of not owning (selling) expected winners (losers), In the long term future, the losers (winners) of the past long term will soon be encouraged to buy (sell), and therefore the stocks that were expected to win (lose) in the long term future will become winners (losers) in the medium term (in other words, earlier than What the traditional reverse strategy says).

Regret can lead to increased demand (supply) for long-term losers (winners) in the medium term and, all else being equal, can lead to increased (decrease) prices and returns for past long-term losers (decrease) in the medium term. winners), potentially contributing to the utility of contratium strategies; Therefore, the possibility of buying (selling), medium-term long-term losers (winners), to avoid the

regret of not owning (remaining private), these winners (losers), the expected future, can contribute to the profitability of contrarian strategies or, in other words, to the profitability of reverse strategies in the medium term. help.

Momentarian strategy: Momentarian strategies are hybrid strategies in which the portfolio ranking and stock selection are based on a medium-term time horizon (like the momentum strategy), but are maintained over the long term (like the inverse strategy). Momentarian strategies assume that there is continuity of stock price performance over the long term, which means buying stocks that have performed better in the recent past (intermediate past winners) and selling stocks that have performed worse in the recent past (intermediate past losers). period), create abnormal returns in the long term. Momentum strategies are expected to perform worse than other strategies; Because strong evidence shows that the persistence of returns lasts only in the medium term; Therefore, with the assumption of long-term maintenance of medium-term winners, it is expected that the Monterian (momentary) strategy, in comparison with other strategies, will have a much weaker performance.

2.2 Background of Experimental Research

investigated the effect of value and acceleration in 18 emerging stock markets. Using stock data from January 1990 to December 2011, clear evidence is found for the quantity effect in all emerging markets and the momentum effect for all markets except Eastern European markets, as well as suitable patterns for examining value and momentum [45]. After the formation of the markets, the securities are classified based on their size and book-to-market ratio. These researchers use the well-known three-factor model to explain the returns of these securities based on factors and using local data, the United States, and the global complex. They used developed stock markets. Local factors done much better show emerging market segmentation. investigated the movement of expected profit varying with time using the two-state Markov change model with variable time transfer probability in order to examine the empirical validity of recent logical theories of profit movement. They [46] realized that in the state of economic prosperity, the expected return of the winning stocks is more affected by the overall economic conditions than the losing stocks; While in economic recession, the expected return of losing stocks is more affected than winning stocks. In other words, in economic recession, losing (winning) stocks have the most (least) effect; Therefore, the movement of securities returns shows an asymmetric reaction to the overall economic conditions in economic recession. As a result, the expected profit momentum offers changes in the direction of a strong business cycle. It can be said that profit fluctuations resulting from such expected returns have been realized and can be interpreted as an acceptable explanation for time-varying profit fluctuations.

Jegadeesh and Titman [47-48]; showed that the skewness and wide tail of momentum strategy return and as a result the risk of momentum strategy fall is caused by the fluctuation of the risk of the mentioned strategy's return over time and in this case, based on the theory based on rational expectations and the suggestion of managing the risk of return fluctuation over time it is possible to manage the risk of the fall of the momentum strategy. They also showed in their research that volatility managed portfolios, i.e. portfolios built on the basis of monthly returns divided by the realized variance of the previous month, will have lower risk for risk factors and higher alpha and Sharpe ratio when volatility is high. [49-55] showed that managed volatility portfolios provide positive and significant alpha in hedge regressions. Therefore, in this research based on the theory based on rational expectations and for the first time in the Tehran Stock Exchange, the existence of the risk of the fall of the momentum strategy and the aforementioned risk management has been tested. Mirjalili et al. [56] designed trading strategies based on the effect of momentum and return and by using the important floors and ceilings of the past.

Three trading strategies, the design and usefulness of using these strategies were tested in 226 companies admitted to the Tehran Stock Exchange between 2011 and 2016. It is by purchase and maintenance method.

Safari and Ashna [57], provided an optimal model for stock selection based on momentum trading strategy. The results show that there is a significant difference between the optimal portfolio return resulting from stock selection by the presented model and the market portfolio return (total price index of Tehran Stock Exchange), and the optimal portfolio has a higher return in time periods 3, 6, 9 and 12 months compared to the market portfolio. Fadajnejad et al [58]: evaluated the usefulness of momentum and reversal strategies of the industry in Iran's capital market. The results indicate that each of these approaches is superior in a certain period of time. In most shorter periods, industry momentum has been more beneficial than industry reversal; But in cases where the holding period is longer and more than one year, the reverse strategy has more returns than the momentum strategy. Khani et al [59]: evaluated the performance of the managed momentum strategy in the Tehran Stock Exchange. The results of the research show that by managing the momentum risk and scaling it, we can see a reduction in the standard deviation from 45% to 31%, negative skewness from -2.5% to almost zero, excess elongation from 7% to 1.5%, and the Sharpe ratio of 0.36 before Scaling to 0.53 was after scaling. As a result, based on the results of the research, momentum risk management is able to significantly eliminate the risk of momentum falling.

Samavi and Aghakochki [60]: Investigated the preference of momentum and reverse strategies based on over-reaction and under-reaction of investors. For this purpose, in a 7-year period from April 2013 to March 2019, companies admitted to the Tehran Stock Exchange were studied on the information of monthly returns and market value and volume of transactions (including institutional transactions), each of the shares on the last day of the month. given. The relationship between the volume of transactions of large institutional traders and the amount of investment in the shares of large companies is proven; Also, mainly the ratio of long-term/short-term size in the review of six loser/winner and big/small strategies is more than one, so the long-term investment strategy is more than its short-term one.

3 Research Methods

The above research is applied, inductive, descriptive and post-event. In the present research, the method of reasoning is deductive-inductive. In order to determine the portfolios based on the momentum strategy, as in the research of [21-24], stocks are evaluated in the last 3 to 12 months, then to invest in stocks for the next 3 to 12 months with an interval of one month. It is invested. The existence of a one-month lag in portfolio ratings is to ensure that strategies are not affected by short-term (weekly, monthly) reversals. In order to implement reverse strategies, stock ratings are done in the past 2 to 5 years, then portfolio maintenance is done for the next 2 to 5 years with an interval of one year. The one-year gap is also applied because, according to [41], in studies related to long-term return, when the year before the formation of the portfolio is included in the ranking, the continuation of the short-term gap results in long-term returns; Therefore, to ensure that inverse strategies are not affected by acceleration, 1 year is passed between the rating period and the formation of the portfolios. Some previous studies [13], which evaluate inverse strategies, also exclude a year between the rating period and portfolio formation. In order to implement contrarium (combined contraction) strategies, stocks are ranked over the past 2 to 5 years, then after one year, stocks are held for the next 3 to 12 months. According to the method of, returns are calculated using the unbiased continuous compound return method, which mimics the buy-and-hold strategy.

After collecting the monthly returns and also calculating the cumulative returns of three, two, twenty-four, thirty-six, forty-eight and sixty months, proceed to form portfolios based on the return of period J, keep it in period k and calculate its return in The period is k. These portfolios are formed in such a way that first the sample stocks are ranked based on the returns of period J, then the sample is divided into ten deciles or classes. Then, to perform tests and compare strategies, the first decile is selected as the criterion of the past winners and is kept for period k, and finally, the return of the portfolio is determined for this period; Also, the last decile or the last class is selected as past losers and kept for period k, and in this period the return of the portfolio is determined. In the next step, panel data method is used to optimize mixed portfolios. The information needed to examine and test the hypotheses in the field using the information of the companies admitted to the Tehran Stock Exchange, Kodal website, Tadbir Pardaz software, compact discs with pictures of financial statements and through the websites of the Tehran Stock Exchange, bourse.com www.iran is extracted. The society of this research includes all the companies admitted to the stock exchange during the years 2011 to 2021. By applying the limitations of determining the sample size, which are: it has been accepted in the Tehran Stock Exchange before 2013 and all the required information and data are available. Do not change the financial year. Except investment holdings, credit institutions and banks. no trading break of more than 3 months; 180 companies were selected as samples.

4 Model Estimation Results

Before entering the topic of panel data, it is necessary to examine the validity of the research data. To examine the hypothesis of the presence or absence of a unit root in the time series, in the current model, Levin-Lin and Chu's test has been used, the results of which are shown in Table 1 Provided. The software used in this section is Evioz 12 software.

Table 1: The results of Levin, Lin and Chu's unit root test (null hypothesis = non-identity of the series)

Variable Name	Statistic's value
Returns 3 months	-7.36
Returns 6 months	-8.16
Returns 9 months	-9.01
Returns 12 months	-10.22
Returns 24 months	-11.16
Returns 36 months	-9.54
Returns 48 months	-8.44
Returns 60 months	-6.86
Total market index	-7.85

The results of the unit root test on the desired variables in Table 1 show that all the variables are at the 5% probability level. See Fig. 3 for more information.

To determine the optimal model among the three methods of common effect, fixed effect and random effect in panel models, Limer and Hausman tests are used. Limer and Hausman panel statistics in different models are presented in Table 2.

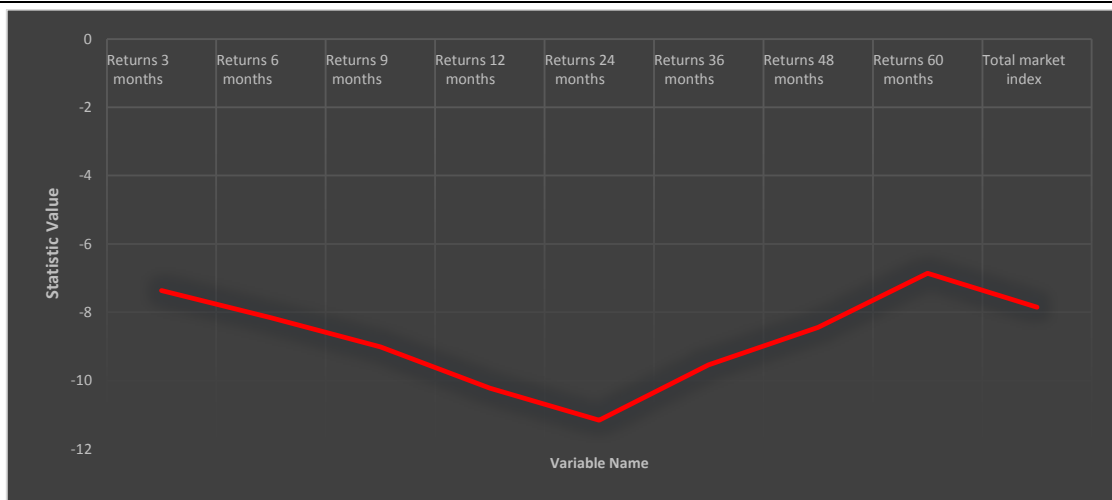


Fig. 3: Illustration of Levin, Lin and Chu's unit root test

Table 2: Linearity Test of Fixed Effects and Hausman

Model	test	statistic	value	Significant level	result	Estimate type
Returns 3 months	F Limer Test	F	4.62	0	reject	Estimation by random effect method
	Hausman test	K2	14.95	0.0923	confirm	
Returns 6 months	F Limer Test	F	3.65	0	reject	Estimation by random effect method
	Hausman test	K2	4.98	0.8924	confirm	
Returns 9 months	F Limer Test	F	5.97	0	reject	Estimation by random effect method
	Hausman test	K2	9.68	0.3767	confirm	
Returns 12 months	F Limer Test	F	4.17	0	reject	Estimation by fixed effect method
	Hausman test	K2	24.02	0.0075	reject	
Returns 24 months	F Limer Test	F	3.73	0	reject	Estimation by fixed effect method
	Hausman test	K2	18.68	0.028	reject	
Returns 36 months	F Limer Test	F	5.51	0	reject	Estimation by fixed effect method
	Hausman test	K2	35.28	0.0001	reject	
Returns 48 months	F Limer Test	F	3.92	0	reject	Estimation by random effect method
	Hausman test	K2	17.26	0.0687	reject	
Returns 60 months	F Limer Test	F	4.46	0	reject	Estimation by fixed effect method
	Hausman test	K2	18.51	0.0469	reject	

The results of the statistics are summarized in Fig. 4. The null hypothesis in Limer's F test is as follows:

H_0 : The parameters of the width from the origin are the same in all companies.

H_1 : The parameters of the width from the origin are not equal in all companies.

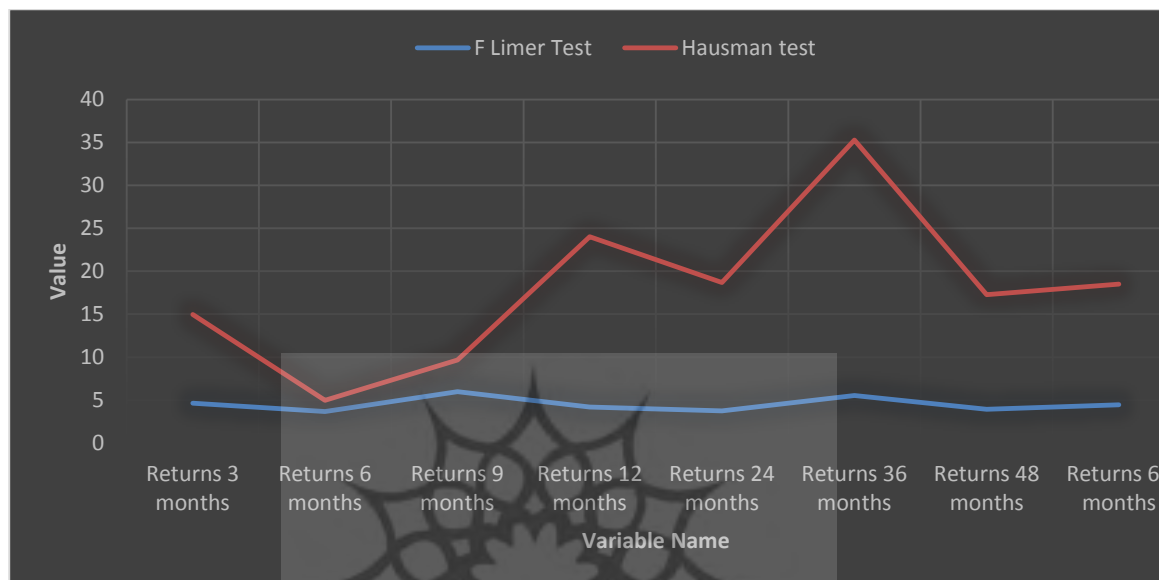


Fig. 4: The results of the statistics

Considering that the null hypothesis of Lemer's test has been rejected, the method estimation in the fixed effects mode is preferred over the model estimation using the joint effects method. As a result, now it is necessary to choose one of the fixed and random effects methods. To choose between these two methods, we will use the Hausman test. The null hypothesis in the Hausman test is as follows:

H_0 : $plimq = plim(\beta F, E-\beta GLS)$

H_1 : $plimq \neq plim(\beta F, E-\beta GLS)$

In the last column of the above table, we have made the conclusions of F-tests of Limer and Hausman and we have presented their results.

In order for regression to get our expected results, and in other words, the estimator of the model parameters has minimum variance and is without bias, a series of assumptions are applied to regression, which are known as regression assumptions or classical regression assumptions. In this research, three main assumptions of autocorrelation, variance heterogeneity and collinearity have been investigated. This assumption, in addition to playing a role in the hypothesis test, causes the estimates made through OLS to match the estimates of the maximum likelihood method, and therefore makes the OLS method asymptotically the most efficient method among the usual estimators; Of course, it should be noted that if the number of sample data under investigation is large enough and the assumptions of homogeneity of variance, non-existence of autocorrelation and zero mean of disturbance sentences are maintained, according to the central limit theorem, it is expected that the distribution of disturbance sentences is a The distribution is normal. After testing the autocorrelation and homogeneity and heterogeneity variance models, we have investigated the autocorrelation and heterogeneity variance tests.

Table 3: Estimation of Different Optimal Portfolio Formation Strategies Based on Panel Data Approach

Maintenance period (k)									
Rating period (J)		3	6	9	12	24	36	48	60
Panel A: Market Returns									
		0.0063 (8.75)***	0.0061 (10.72)***	0.0061 (6.87)***	0.006 (9.21)***	0.0058 (12.06)***	0.0055 (11.44)***	0.0051 (21.66)***	0.0049 (23.34)***
Panel B: Momentum / Monentrian Strategies									
3	win- ner	0.0134 (10.43)***	0.0126 (9.44)***	0.0125 (7.37)***	0.0116 (11.33)***	0.0082 (6.98)***	0.0071 (17.15)***	0.0063 (9.53)***	0.0056 (10.53)***
	loser	0.0108 (7.98)***	0.0106 (7.23)***	0.001 (19.05)***	0.0105 (7.22)***	0.0109 (5.84)***	0.0104 (7.22)***	0.0086 (12.44)***	0.0077 (19.56)***
	w-l	0.0032 (1.98)*	0.0025 -0.89	0.0031 -1.05	0.0016 -1.44	-0.0033 (-10.13)***	-0.0031 (-15.16)***	-0.0028 (-6.18)***	-0.0026 (-13.18)***
6	w	0.0144 (7.92)***	0.0139 (6.67)***	0.0129 (8.89)***	0.0111 (4.89)***	0.0072 (8.72)***	0.0065 (11.45)***	0.0057 (12.89)***	0.0051 (15.84)***
	l	0.0091 (8.82)***	0.0092 (9.81)***	0.0092 (10.62)***	0.0013 (9.51)***	0.0109 (19.52)***	0.0094 (10.41)***	0.0086 (10.52)***	0.0081 (9.31)***
	w-l	0.0058 (6.53)***	0.0053 (2.41)**	0.0041 (2.83)**	0.0013 -1.51	-0.0042 (-9.62)***	-0.0034 (-8.92)***	-0.0034 (-14.98)***	-0.0035 (-10.42)***
9	w	0.0143 (7.21)***	0.0131 (9.15)***	0.0114 (10.13)***	0.0096 (11.14)***	0.0063 (6.98)***	0.0058 (7.36)***	0.0051 (18.21)***	0.0044 (15.17)***
	l	0.0092 (8.04)***	0.0096 (11.93)***	0.0103 (4.27)***	0.0109 (9.13)***	0.0093 (7.24)***	0.0093 (6.89)***	0.0086 (13.54)***	0.0081 (34.16)***
	w-l	0.0056 (2.14)**	0.0041 (2.81)**	0.0018 -0.48	-0.0018 -1.16	-0.0055 (-8.25)***	-0.0041 (-7.91)***	-0.0042 (-6.71)***	-0.0042 (-12.11)***
12	w	0.0137 (7.98)***	0.0115 (8.43)***	0.0095 (7.45)***	0.0079 (8.98)***	0.0054 (8.87)***	0.0051 (9.73)***	0.0045 (11.75)***	0.0041 (12.98)***
		0.0107 (10.21)***	0.0109 (9.12)***	0.0114 (8.51)***	0.0118 (7.82)***	0.0114 (7.89)***	0.0096 (10.54)***	0.0089 (12.87)***	0.0083 (17.62)***
	w-l	0.0041	0.0011	-0.0024	-0.0044	-0.0065	-0.0051	-0.0051	-0.0049
		-1.84	-0.45	(-1.43)	(-4.96)***	(-8.91)***	(-11.98)***	(-13.81)***	(-14.76)***
Panel C: Contrarian / Contratum Strategies									

Table 3: continue

24	w	0.0156 (7.98)***	0.0149 (8.43)***	0.014 (7.45)***	0.0133 (8.98)***	0.0112 (8.87)***	0.0099 (9.73)***	0.0092 (11.75)***	0.0084 (12.98)***
	l	0.0048 (8.66)***	0.0053 (9.41)***	0.0053 (12.86)***	0.0051 (9.11)***	0.0042 (10.76)***	0.0039 (12.76)***	0.0036 (8.88)***	0.0033 (14.65)***
	w-l	0.0113 (12.66)***	0.0102 (10.41)***	0.0093 (21.81)***	0.0087 (6.12)***	0.0076 (9.45)***	0.0067 (9.65)***	0.0061 (8.56)***	0.0056 (15.98)***
36	w	0.0147 (9.87)***	0.0141 (11.76)***	0.0136 (12.53)***	0.0133 (9.85)***	0.0117 (9.85)***	0.0104 (10.75)***	0.0093 (12.75)***	0.0085 (14.87)***
	l	0.0052 (13.98)***	0.0045 (12.87)***	0.0039 (10.85)***	0.0037 (12.98)***	0.0038 (8.98)***	0.0035 (12.87)***	0.0031 (8.91)***	0.0028 (14.98)***
	w-l	0.0101 (10.85)***	0.0102 (12.65)***	0.0103 (12.98)***	0.0103 (10.64)***	0.0084 (10.54)***	0.0075 (9.71)***	0.0068 (16.86)***	0.0062 (12.98)***
48	w	0.0146 (8.44)***	0.0145 (6.79)***	0.0141 (14.98)***	0.0137 (9.61)***	0.0116 (17.11)***	0.0101 (17.23)***	0.0093 (10.67)***	0.0083 (7.12)***
	l	0.0048 (13.78)***	0.0039 (3.90)***	0.0038 (8.67)***	0.0037 (12.81)***	0.0037 (9.89)***	0.0028 (10.55)***	0.0027 (12.83)***	0.0026 (13.81)***
	w-l	0.0103 (12.54)***	0.0111 (10.62)***	0.0108 (9.66)***	0.0105 (5.81)***	0.0084 (6.31)***	0.0078 (8.94)***	0.0071 (7.52)***	0.0062 (9.41)***
60	w	0.015 (4.87)***	0.0145 (6.89)***	0.0137 (7.13)***	0.0132 (15.76)***	0.0114 (14.85)***	0.0099 (12.56)***	0.0089 (5.98)***	0.008 (10.76)***
	l	0.0035 (13.71)***	0.0031 (11.04)***	0.0032 (8.45)***	0.0034 (9.83)***	0.0029 (8.71)***	0.0022 (10.62)***	0.0024 (5.17)***	0.0021 (9.14)***
	w-l	0.012 (13.75)***	0.0119 (13.75)***	0.011 (13.75)***	0.0103 (13.75)***	0.009 (13.75)***	0.0082 (13.75)***	0.007 (13.75)***	0.0064 (13.75)***

In order for regression to get our expected results, and in other words, the estimator of the model parameters has minimum variance and is without bias, a series of assumptions are applied to regression, which are known as regression assumptions or classical regression assumptions. In this research, three main assumptions of autocorrelation, variance heterogeneity and collinearity have been investigated. This assumption, in addition to playing a role in the hypothesis test, causes the estimates made through OLS to match the estimates of the maximum likelihood method, and therefore makes the OLS method asymptotically the most efficient method among the usual estimators; Of course, it should be noted that if the number of sample data under investigation is large enough and the assumptions of homogeneity of variance, non-existence of autocorrelation and zero mean of disturbance sentences are maintained,

according to the central limit theorem, it is expected that the distribution of disturbance sentences is a The distribution is normal. After testing the autocorrelation and homogeneity and heterogeneity variance models, we have investigated the autocorrelation and heterogeneity variance tests.

Table 4: The Results of the Heterogeneity and Autocorrelation Variance Test

	Statistics name	Statistics kind	Degree of freedom	value	Significant level	result
Returns 3 months	autocorrelation	F	F(1,179)	1.099	0.5733	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	2.87	0.6744	There is no heterogeneity variance.
Returns 6 months	autocorrelation	F	F(1,179)	0.885	0.6746	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	1.65	0.7935	There is no heterogeneity variance.
Returns 9 months	autocorrelation	F	F(1,179)	1.275	0.5323	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	3.56	0.6534	There is no heterogeneity variance.
Returns 12 months	autocorrelation	F	F(1,179)	0.3467	0.8875	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	2.067	0.8056	There is no heterogeneity variance.
Returns 24 months	autocorrelation	F	F(1,179)	1.2224	0.5098	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	2.687	0.5123	There is no heterogeneity variance.
Returns 36 months	autocorrelation	F	F(1,179)	0.8644	0.5733	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	1.547	0.6067	There is no heterogeneity variance.
Returns 48 months	autocorrelation	F	F(1,179)	0.6844	0.7849	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	2.648	0.5674	There is no heterogeneity variance.
Returns 60 months	autocorrelation	F	F(1,179)	0.7858	0.4895	There is no autocorrelation.
	Variance heterogeneity	chi2	chi2(180)	1.6678	0.5967	There is no heterogeneity variance.

Table 5: Estimation of Different Optimal Portfolio Formation Strategies Based on the Size of the Companies Based on the Panel Data Approach

	Winners (P1)	P2	P3	P4	Losers (P5)	w-l
Panel A: Momentum						
Small firms	0.0099 (15.76)***	0.0104 (12.41)***	0.0084 (13.98)***	0.0049 (14.97)***	0.0026 (6.81)***	0.0087 (9.17)***
Big firms	0.0142 (15.91)***	0.0091 (10.16)***	0.0089 (11.81)***	0.0093 (12.71)***	0.0108 (10.24)***	0.0049 (10.16)***
Panel B: Contrarian						
Small firms	0.0068 (12.18)***	0.0088 (11.06)***	0.0097 (10.10)***	0.0112 (15.14)***	0.0131 (12.42)***	0.0078 (10.16)***
Big firms	0.0026 (12.61)***	0.0036 (10.75)***	0.0049 (12.51)***	0.0064 (10.44)***	0.0082 (8.91)***	0.0074 (11.54)***
Panel C: Hybrid						
Small firms	-0.0054 (-17.41)***	0.0039 (13.23)***	0.0080 (15.98)***	0.0069 (14.89)***	0.0135 (9.51)***	0.0174 (14.96)***
Big firms	0.0056 (21.44)***	0.0071 (13.12)***	0.0079 (15.07)***	0.0106 (15.81)***	0.0159 (9.41)***	0.0118 (13.98)***

Based on the results of autocorrelation and heterogeneity variance tests, due to the low probability level of these tests, the null hypothesis of these tests was rejected. Considering that according to a global standard, all classical null hypotheses are written in such a way that there is no problem in the estimated

model. As a result, based on the results of Table 5; Because the null hypothesis is rejected, as a result, the model has the form of autocorrelation and heterogeneity variance. In the following, the results of different scenarios are presented according to the size of the estimated companies.

5 Summarizing the results and presenting policy suggestions

Momentum strategy, despite its great performance; But it provides different results in different time periods. In this research, we decided to provide an optimal model for stock selection based on momentum, reverse and hybrid trading strategies using panel data. Based on the results of 8 time periods of 3 months, 6, 9, 12, 24, 36, 48 and 60, based on different momentum and reversal and combination strategies in loser, winner and loser-winner, winner-loser situations were analyzed. Based on the panel data method, the strategies investigated in small companies provide more additional returns to investors than large companies. It should be noted that combined strategies compared to the simple momentum strategy gave more additional returns to investors in the long term. According to the research results, the following suggestions are presented:

Considering that by comparing the yield of these strategies with the buy-and-hold method compared to the hybrid method, the hybrid method had a higher average stock yield in the buy-and-hold method of separate methods, as a result, the implementation of hybrid investments should be placed on the agenda of investors. But it is worth mentioning that due to the long time of the hybrid strategies, adjustment of the inflation index should be taken into consideration in the investment by people active in the stock market. As a result, comparing the results of this research with the efficiency of other profitable markets such as housing, gold and foreign exchange should be considered.

- The results of the research show that the efficiency of the combined strategies is higher than separate approaches; As a result, financial market activists and investors are also suggested to use behavioral analysis and technical analysis and a combination of methods to improve their buying and selling decisions along with fundamental analysis, so that they can design more efficient trading strategies to obtain more returns.

- Based on the results of the research, it can be concluded that the momentum strategy in the Tehran Stock Exchange, which itself confirms the existence of the hypothesis of underreaction in the Iranian capital market, it shows that the investors in this market are more affected by the change of the basic fundamentals affecting the price. The stocks show less reaction, so that the correction of the stock price of these companies takes place slowly until reaching its inherent price; Of course, factors such as the volatility limit, base volume and the law of the trading node also fuel this slowness and cause the price correction to take place with a delay by the formation of buying queues and the down process. The market helps, as a result, it can be said that the momentum policy and, of course, based on the research results of the combined approaches, do not have the ability to create abnormal profits for their investors in the capital market.

- Based on the results of the research, it is suggested that investors use the combined strategies to obtain additional profit compared to the market average.

- Due to the fact that a significant portion of the return is derived from large ones, it is suggested that investors invest a higher share of their capital in small companies.
- The use of additional profit discovery software, due to the large volume of data, facilitates and accelerates investment.

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