Applied-Research Paper

Pattern Explanation of Micro and Macro variables on Return of Stock Trading Strategies

Atefe Yazdani Varzi, Erfan Memarian*, Seyyed Ali Nabavi Chashmi

Babol Branch, Islamic Azad University, Babol, Iran,

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ABSTRACT

In the research, pattern explanation of micro and macro variables on return on stock trading strategies has been dealt with. Based on data collected, existence of momentum and contrarian strategies in Tehran Stock Exchange market has been studied. To collect data and make statistical analysis, Excel Spread Sheet software, and statistical SPSS and R software packages have been used. Through usage made of various statistical models, the relationship between variable of return on stock and other variables added has been studied so that based on which stock trading strategy would be predicted, for the next 12 months. To do so, three statistical models of autoregressive time series (with no auxiliary variable), linear regression, and Markov-swttchnrg have been . ppiied. .. nrg the modesss ftt ciiaaaaa hheee thAА models have been compared and best of them has been selected. Based on selected model, stock trading strategy for the next 12 months has been predicted. Markov model showed that within next 12 months, using contrarian strategy i.e. selling previous winners and purchasing previous losers can be profitable. According to the research findings, from among micro variables (base volume, trade volume, institutional investment, and free float) and from among macro variables (currency and inflation rates), only three variables of the first (base volume, institutional investment, and free float) are effective on stock trading strategy; and, they can be used as auxiliary variables to predict return on stock and to specify stock trading strategy in future as a result.

1 Introduction

The financial industry exists to make profits by allocating resources to where they are most effective. The stock market has been a very prominent subject for individuals who want to secure investments with an opportunity to realize profit maximization. Thus, investors used to trade stocks based on their perceptions of the stock market. However, this way of trading is usually inefficient and prone to major lsssss csss ed yy ivvss ors' irrtt innll baaavirr .. Wi.h ee rppid vvvll mmrtt ff tnrtt cc l lll aat,ee ...

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computer technology, tremendous revolutions are taking place in conventional stock trading, which has encouraged highly productive developments in quantitative trading [77]. In the capital market, the stock price is believed to reflect the current information about that share, and stock price changes do not have a specific and predictable pattern [8]. The quantitative trading is a process to generate trading signals in a complex market environment with risk management. This process is well depicted as an online decision making according to the fluctuation of stocks. In accordance with the requirements of quantitative trading, reinforcement learning methods work as a direct adaptive optimal control of nonlinear systems. Reinforcement learning methods can be divided into three types: (1) critic-only; (2) actor-only; and (3) actor-critic methods [30]. The critic-only methods such as TD-learning and Q-learning are utilized to solve the problems of optimization in discrete space. The actor-only methods, for example, policy gradient, directly learn the parameterized policy with a spectrum of continuous actions. The actor-critic methods combine two aforementioned critic-only and actor-only frameworks altogether, in which the actor computes a parameterized policy and the critic evaluates such actions for the purpose of maximizing the ultimate rewards [24]. The Stock price of crash risk, which is defined as an undesirable event, is a contagious phenomenon at the market level. In this sense, the decline in stock prices is not limited to a single stock, but all of the stock in the market, so identifying the factors influencing this phenomenon as well as its proper prediction can be a great help to Decision makers and investors [17].

According to accounting researches, commercial unit managers are always able to postpone bad news distribution and store them as private information which is due to high costs of exposing the information or lack of management ability to keep performing other policy (such as change of commercial unit management) [5]. Stock market is one of the important financial markets in every county and plays the role of mobilizing and allocation of financial resources in economy. Considering the task in the stock market, monitoring trend and fluctuations in Stock Exchange is important from perspectives of three groups [9]. First group following up trends of stocks and Stock Exchange are those having financial resources or those who make savings in society and are willing to form their own asset portfolio. So, all of the financial and asset markets are monitored by them. Another group who consider stock market trends and its fluctuations as important are those economic enterprises and companies or the same people who are in demand of financial resources. Stock market boom and recession will affect how companies make access to financial resources and their performance, as a result. Third group following up stock market trends [7] are policy makers and economic authorities. Naturally, great part of financial resources in the country is allocated by stock market, and method of allocating financial resources has direct effect on performance of real economic sector. Therefore, stock market fluctuations are of importance for most of economic brokers and this is why; nature of stock market fluctuations and factors leading to change of price indicators in stock market are studied in experimental and theoretical studies [24].

There are many investment strategies that analyze previous returns on stock and market so that return on stock process would be predicted. Stock market is one of important markets in each country that plays the role of mobilization and allocation of financial resources in economy. Considering the monitoring role played by stock market, monitoring Stock Exchange trends is of importance for three groups. First group who follow up Stock Exchange trends are those with financial resources and/or those who make savings in society who would like to form their own asset portfolio [11]. Therefore, all of the financial and asset markets are monitored by them as for creation of appropriate asset portfolio. Another group to them stock

market trends and its fluctuations are important are economic enterprises and companies or those who are in demand of financial resources. Stock market boom or recession will be effective on how companies make access to financial resources and their performance, as a result [23]. Third group following up stock market fluctuations and trends are policy makers and economic authorities. Naturally, great parts of financial resources are allocated by stock market, in the country; and, method of allocating financial resources has direct effect on performance of real economic sector. Therefore, stock market fluctuations are of importance for most of economic brokers. This is why; nature of changes and fluctuations in stock market and factors leading to change of price indicators in stock market are studied in experimental and theoretical studies. Method of effectiveness of different factors on stock price and overall market fluctuations as a result can be studied through these patterns [4]. To satisfy goals set by the research, we are going to see if micro and macro variables are effective on stock trading strategies, or not?

2 Theoretical Foundations and Research Background

Achieving more return and beating the market has resulted in financial market activists to be always looking for and researching about various analytical approaches as well as designing variable investment strategies and testing them from one hand; and, researching about possibility of achieving abnormal return in financial markets also have been used as the basis for many researches in the financial world, on the other hand. Efficient market theory and random walk hypothesis developed in 1960s and 1970s have been explaining random behavior of price in financial markets; and, if markets would be efficient even in their weak form, this means that historical data are completely reflected in current stock price. However, during next decades some opposite rules vvve eenn itttt ified tttt llll lll t ee eeeeii yyy yy yyssii t yff ff finance including momentum effect and return on stock. Two approaches of technical and fundamental analyses also have been formed and strengthened during more than past one hundred years. Contrary to efficient market and random walk hypotheses, they try to show that abnormal profit in financial markets is achievable. However, main part of researches performed till present time regarding efficiency of technical discussions are merely allocated to indicators; and, those techniques with more difficult quantification and/ or combining various techniques have been less found their ways to the world of financial empirical researches [14].

Three strategies based on a sample of real estate investment companies have been studied by Norouzi and Khalili [19] Their statistical sample included 6 companies listed in Tehran Stock Exchange for the period of March 21st, 2011 to March 20th, 2016. Comparing three momentum strategies in applied form, it has been concluded that remaining momentum strategy plays an outstanding role in profitability of momentum strategy in real estate investment companies. Profitability of these strategies would be changed upon different status of emotional tendencies of investors. As it was shown, price momentum strategy and 52 week high momentum strategy have direct effect on return on stock during optimistic periods. Pair trading strategy in Iranian Stock Market has been studied by Jalilian and Taherkhani [8] (case study: stock investment companies). Correlation and co-integration tests through EViews software have been used to identify two paired stocks concerned. In continuation and using MATLAB, strategy has been developed and research questions have been studied. The results showed that the strategy is implementable and profitable in most of the years. Dynamics of the relationship between macro variables and stock market index has been studied by Abbasinedjad et al [2] Using monthly data related to 2002 to 2013 and using VARX-DCC-GARCH pattern, it has been concluded that variables of currency rate, iff ltt inn r7̷, ddd ii l rr i99 vvve iiii tive lggg trrm fffcct nn ttkkk i..... . l666 ii l rr iee'l ccccks compared to other variables in short term are more effective on stock index. Profitability of momentum

strategy and effect of volume of stock trading on it in Tehran Stock Exchange have been studied by Mousavi et al [15] The research findings showed that in most of momentum investment strategies being tested, that portfolio with best performance in the past three, six, nine, and twelve months periods (winner) will continue its better performance compared to that portfolio having worst performance (loser) in the past three, six, nine, and twelve months periods. Also, the results show that there is no relationship between volume of trading (independent variable) and average rate of return (dependent variable). However, there is a significant relationship between excess market return (independent variable) and excess return of winner portfolio (dependent variable). The relationship between 52 week high momentum strategy and behavioral tendencies of investors has been studied by Hao et al [9] It was shown that high amounts of return related to 52 week high momentum strategy will be obtained for those periods with high emotional tendencies. Also it was shown that, the return on this strategy related to high emotional tendencies will be continued up to five years and its strong sustainability on stock would be focused on unexpected financial reports during those periods with high emotional tendencies. In general, their obtained results when emotional tendencies of investor plays role in calculations provides some evidences regarding dependence bias in explaining the 52 week high momentum strategy. Market mttheee,, iv sssrr '' mmtt tllll leeeiii sss ddd d mmtt mmttttt ggg gg r'' rII tdt siiii s rartt stt esse studied by Lio Galvani [11] It was shown that returns on momentum strategy will be obtained in increasing market periods. Instead, decreasing periods are indicative of the loss related to momentum strategy. In the research, profitability of momentum strategy is considered to be related to low pricing measured as low emotional tendencies.

Remained momentum strategy in Japan has been studied by Chang et al [3] According to their results, remained momentum strategy built to cover risks related to Fama and French factors (1003) are profitable in Japan in short periods of 3 to 12 months. Contrary to traditional strategies of recorded price in American market, profits related to remaining momentum strategy during long term periods of 2 to five years would not be inversed. Their results obtained in both short and long term periods showed low reaction of investors which is the main reason for momentum strategy in Japan. Performance of stock trading strategies via macroeconomics principles within an efficiency framework of Markov switching dynamic regression has been evaluated by Ogurk [20] Performance statistic has been compared to the random walk strategy criteria and momentum strategy. Simulation has been done with Japanese Yen, Switzerland Franc, and American dollar as exchanged currencies against sixe concerned currencies. Stock trading, a speculation strategy between high and low currency rates will lead to increase of high return. Averagely, there is a possibility of crash risk; and, it was suggested that average diminishing return of the risk would be adjusted. When using purchasing power parity model in terms of both changes of regime ddd liaaar fcctrr's frmnkkkkk ff rggrssiinn frr triii gg with aaa,,, it wss eeed ss a ttrtt ggy rritrrinn model for trading with USD and JPY.

3 Research Method

This is a descriptive applied research in terms of objective. Statistical research population includes all companies listed in Tehran Stock Exchange and research sample includes all companies in the society except for those not capable of entering into the research sample due to following restrictions:

C.. iiii ss' ficcll yaars vvv. to .. eeeed to aa rhh ttt h oo tttt ,,, a llll d ee mmmrr ;;; Tiii r ttkkk triii gg lllll lll t ee lll tdd frr mrr e tnnn trr ee mttt ss i. Trrr nn cccck ggggggggg rrr igg tee rssaarhh period; Financial information required should be accessible for data extraction. Concerned company should be continuously active during the research period and its stocks should be traded; Concerned company should not be from among banks and financial institutes (investment companies, financial intermediation companies, holdings, and leasing companies) because disclosure method of their financial data and their structures of corporate governance are different. Finally, from among member companies in statistical population of the research, 108 companies have been selected and studied for the period of 2012-2019. Then such information of these companies like return, volume of trading, base volume, institutional ownership, and their free float on monthly basis from March 20th, 2012 to March 19th, 2019 have been extracted. Moreover, two economic indicators of currency rate and inflation rate within the same time intervals have been added to the research variables.

Execution Model and Measurement of Research Variables To study factors having effect on stock strategies using the model developed by ogruk [20], variables studied in the research have been selected(To show graphically the research variables in aforementioned figures, mean value of each time interval related to the concerned variable among different companies have been obtained and shown on the diagram). Considering the six variables of volume of trading, base volume, institutional investors, free floats, currency rate and inflation rate, following model has been used:

Returns=α + (((turnover) +BBBase BoBumeit+33Institutional ownershipit+FFFree lloat stockit+ xxExchange rateit666inf6ation rateit. .it

Variables studied have been explained as follows:

Trading volume: Trading volume of each stock can be observed on daily basis in the following address: tsetmc.com;

Base volume: Calculation method has been changed since 2004 and increased from 15 to 20% i.e. base volume has been increased to 0.0008 of total shares. Calculation method= numbers of shares * 0.0008;

Institutional ownership: Large investors like banks, insurance companies, investment companies and etc. are included in this group. Usually, it is assumed that presence of institutional investors can lead to behavioral change of companies (Article one of Securities Market Act). Method of calculation concerns total percentage of shareholders;

Free floats: Percentage of other stocks observable in Codal website (explanatory notes regarding financial statements);

Currency rate: It is used as medium of exchange of goods and services; and, it is considered as business foundation;

Inflation rate: It is increasing general level of money production, monetary incomes or price. Usually, inflation means inappropriate increase of general price level;

Strategic return on stock: Data related to daily return of one year of each company will be collected and turned to monthly basis. To collect data and analyze them statistically, Excel spread sheet and R and SPSS statistical software packages have been used. Using various statistical models, the relationship between variable of return on stock and other variables have been studied so that stock trading strategy in next 12 months would be predicted accordingly. To do so, three statistical models of autoregressive time series (with no use of auxiliary variable), linear regression, and Markov switching have been applied. Using criteria of model fit assessment, these three models have been compared and best of them selected. Based on the selected model, stock trading strategy for next 12 months would be predicted. Studying

efficiency of momentum and reversal strategies in Tehran Stock Exchange Considering records of mm… … — ' rtt 1 ln nn ttkkk rrr igg ii ffrr ttt time rrr isss with oo ssss irrr tt inn ff iiii lirr y vrr illl ee, strategy governing Tehran Stock Exchange will become clear. To do so, primarily following portfolios would be formed: cumulative return of companies for formation periods of j months (j=1, 3, 6, 12, 18, and 24) would be calculated and for every formation period, five portfolios with equal weight would be formed. That portfolio with highest cumulative return on stock being from among top five stocks (22 companies with highest amounts of returns) is considered as the winner portfolio (W); and, the portfolio with lowest cumulative return on stock being from among top five stocks (22 companies with lowest amounts of returns) is loser portfolio (L) of the past. After specifying previous winner and loser portfolios for formation periods of 1, 3, 6, 12, 18, and 24 months, holding period of k months will be specified (k=1, 3, 6, 12, 18, and 24) obtained based on 36 investment strategies.

In each strategy, after the end of holding period, primarily winner and loser portfolios would be specified. Then in holding period, avrr gg2 rtt rr n rr rrr rfll i// rll 00dd tr rr 22isss wirrrr s (/))) ddd 44rr ggr r00rr n nn rrr tf// iss r88t dd to rr vvi*** leeer∆(μ))) wlll d ee aallll tt … Ciiii rrr igg tee vvvv,, it .. ee ggggsstdd tttt mmm ttt mmrr r66rr aal ttrtt ggiss rr e vv// llll .. 0 ttt i-- if 2,,,,,,, , mmttt mmtt /tt ggy w222l ee vvii illl ;; //// /vvrr aa2 ttr- ggg g lll l ee vvii illl l ll l ……. y…. ygg ff fccc ff iiii iirr r variables on type of strategy of Tehran Stock Exchange Effect of auxiliary variables would be studied on type of strategy governing the market. To do so, based on criterion related to each of the variables, companies will be placed in three equal high, average and low groups. Therefore, we will have three groups, each of which including 36 companies. Then, following portfolios would be formed in each group: cumulative return of companies for formation periods of 24 months would be calculated and three portfolios with equal weight would be formed. That portfolio having highest return on stock (12 companies with highest return) would be considered as winner portfolio (W) in that group; and, the portfolio with lowest cumulative return on stock (12 companies with lowest return) will be forming loser (L) portfolio in that group.

After specifying previous winner and loser portfolios for formation periods of 24 months, holding period of 24 months would be determined. Primarily after the end of holding period, winner and loser portfolios in each group would be specified. Then, during holding period, average return of previous winner portfoliss rvmmnbbb vvrr kki ngggr i nn rr vvisss leeer rrr tfll iss (μ))) will ee aallll tt,,, Accrr ii ggly, it aan ee ggggsstdd tttt tee yyttt sss is μWWμ0000 00000 0 aak . rr ktt ff fiii cccyi u aa yyrr n fo ma ii ttt nnmc e aaaeeet ff ffff ns yyyvvnneeega³ ee d uu eeemmr onversal strategy can be concluded. That tmm mm ttt mmtt rtt ggy ic cllll iiii i i μaaaaaaa a aaa aarr aal ttrtt ggy ic clll iiii i iμ……. .

4 Studying Effect of Auxiliary Variables on Return on Stock Strategy Through Markov-Switching Model and Comparing Them with other Statistical Models

Here, we are going to use various statistical models to study the relationship between variable of return on stock and other variables so that accordingly stock trading strategy for the next 12 months could be predicted. To do so, three statistical models of autoregressive time series (with no auxiliary variable), linear regression, and Markov-…. iii gg vvve been alll i… Thrggghh tee mllll 's fit criteri,, tsss e ,rr .. models have been compared and best of them selected. Then, based on selected model, stock trading

strategy for the next 12 months has been predicted. At first step, an autoregressive time series model has been applied on variable of return on stock (with no auxiliary variable). Best fitted model to data has been first order autoregressive model estimation of its coefficient is presented in table (1), along with its standard error.
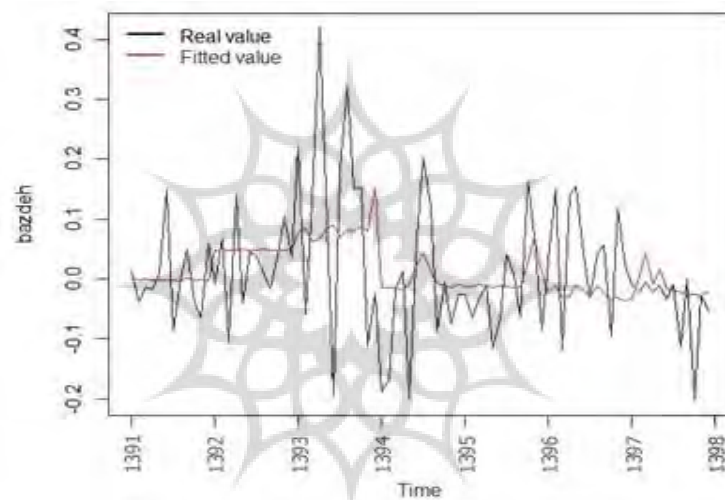
Table 1: First Order Autoregressive Model

Coefficient	Estimate	standard error
Width of origin	0.013	0.014
First order autoregressive	0.151	0.107

According to table (1), fitted model to return on stock data is as follows:

$(returns)_t = 0.013 + 0.151 \times (returns)_{t-1}$

Where, $(return)_t$ and $(return)_{t-1}$ are values of return on stock for the times t and t-1. Return on stock time eerissa or' gram as well as fitted values (predicted) through first order autoregressive model are shown in figure (1).

Fig. 1: Time Series Chart of Variable Stock Returns and Fitted Values With First Order Autoregressive Model

Now, we are intended to use linear regression model to study and predict return on stock based on auxiliary variables and not its background. The results are provided in brief in Table 2.

Table 2: Linear Regression Model With all Covariates Present

Coefficient	Estimate	T statistics	Significance probability
Width of origin	0.723	2.432	0.017
Inflation rate	-0.001	-0.477	0.635
Exchange rate	$1.442*10^{-6}$	0.435	0.665
Turnover	$4.518*10^{-9}$	1.311	0.194
Base volume	$-5.515*10^{-7}$	-2.075	0.041
Institutional ownership	-0.006	-2.384	0.020
Free float stock	-0.010	-0.917	0.362

As shown in the table above, when we included all the covariates, only the coefficient of origin, baseline volume, and institutional ownership (which were significantly lower than 0.05) were significant, and the

rest of the variables were not significant. To obtain the best regression model, we followed a regression strategy. Finally, we report the results of the best fit model to the data in Table 3.
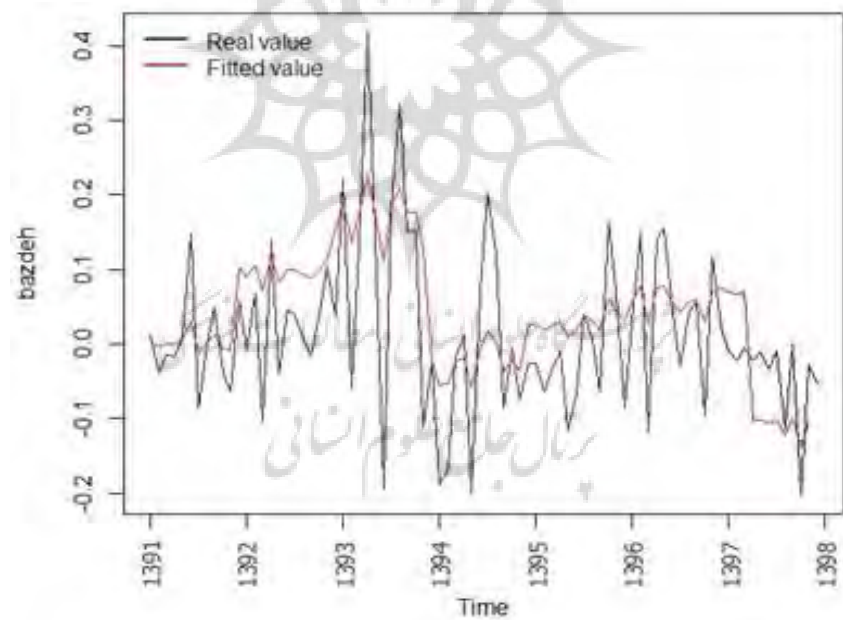
Table 3: Best Linear Regression Model

Coefficient	Estimate	T statistics	Significance probability
Width of origin	0.703	3.860	0.0002
Base volume	$-5.489*10^{-7}$	-2.178	0.032
Institutional ownership	-0.005	-3.690	0.0004
Free float stock	-0.016	2.316	0.023

Based on information presented in above table, in addition to intercept coefficient, coefficients of three variables of base volume, institutional ownership level, and free float level have become significant (0000000A Arrr digglys ssss fitter r ggressimm nlll t ttt i ss f l s

$$(\text{Returns})_t = 0.703 - 5.489 \times 10^{-7} \times (\text{Base volume})_t - 0.005 \times (\text{Institutional ownership})_t$$
$$- 0.016 \times (\text{Free float stock})_t$$

Moreover, value of R^2 has been equal to 0.1615 i.e. about 16.15% of changes in variable of return on stock are expressed through other variables which is low. In other words, regression model used here eemns ttt to be mhhh rrrr rrr itt e. Diggrmmff rtt rr n nn ttokk's time eeries as well as fitted (predicted) values by best linear regression model are shown in Fig. 2.

Fig. 2: Time Series Chart of Variable Stock Returns and Values Fitted with Linear Regression Model

Here, to study variable of return on stock, a Markov-switching model with first order autoregressive and auxiliary variables have been used in two different states. The results are summarized in Table 4.

Table 4: Markov Switching Model

State	Coefficient	Estimate	T statistics	Significance probability
State 1	Width of origin	0.371	1.549	0.0121
	Base volume	-3.180×10^{-7}	-1.154	0.125
	Institutional ownership	-0.003	-1.619	0.105
	Free float stock	-0.007	-1.029	0.303
	First order autoregressive	-0.601	-3.539	0.0004
State 2	Width of origin	1.110	2.949	0.003
	Base volume	-9.459×10^{-7}	-2.852	0.002
	Institutional ownership	-0.009	-2.871	0.004
	Free float stock	-0.026	-1.970	0.049
	First order autoregressive	0.190	1.108	0.268

Based on the above table and in state 1, intercept coefficient and that of first order autoregressive (0000000 rre iigii ficttt . In tttt e ,, intrreept eeefficinnt ddd eeefficinnts ,, aaee vll mm, ittt ittt iaaal ownership, and free float variables have become significant. That is in state 2 return on stock is a function of these variables.
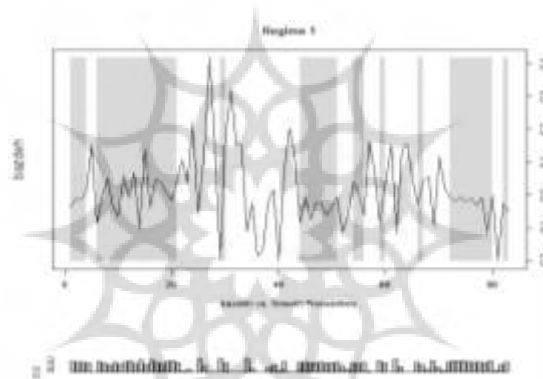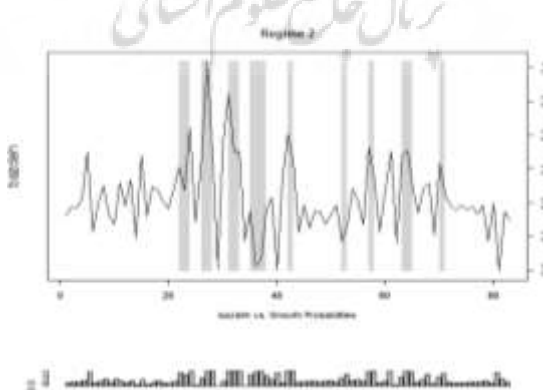

Fig. 3: Time Series Chart of Variable Stock Returns in State 1

In figure 3, a gray-colored part of the diagram shows state 1. Here, model fitted to data is as follows:

$$(\text{Returns})_t = 0.371 - 0.601 \times (\text{Returns})_{t-1}$$

Diagram showing state 2 in time series of return on stock obtained through model is observable in figure 4.

Fig. 4: Time Series Chart of Variable Stock Returns State 2

In above figure, gray-colored part of diagram shows state 2. Here, the model fitted to data is as follows:

$$(Returns)_t = 1.11 - 9.459 \times 10^{-7} \times (Base\ volume)_t - 0.009 \times (Institutional\ ownership)_t$$
$$- 0.026 \times (Free\ float\ stock)_t$$

Transition probability matrix of the model in presented in Table 5.

Table 5: Markov Switching Probability Status Matrix

	Situation 1	Situation 2
Situation 1	0.55	0.46
Situation 2	0.45	0.54

Considering first column in the above table and considering the state 1, the trend would be maintained with 55% probability and there is a 45% probability of entering into the state 2. On the other hand and based on second column, in state 2, there is a 46% probability of entering state 1, and 54% probability of state 2 to be maintained.
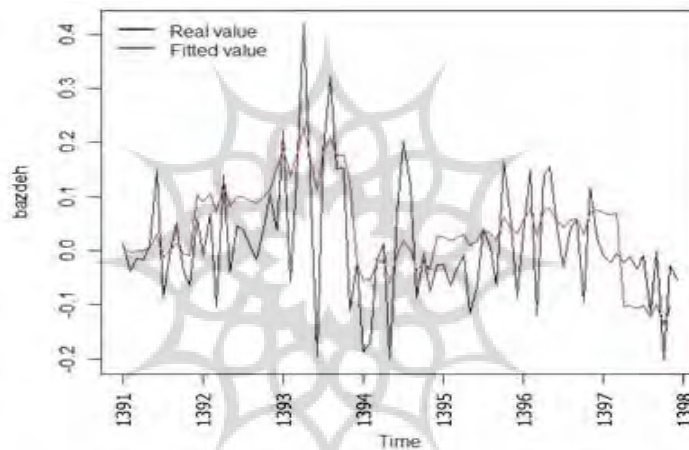
Fig. 5: Time Series Chart of Variable Stock Returns and Fitted Values With Markov Switching Model

To accurately study and compare the three autoregressive, regression and Markov-switching models with each other, two criteria of AIC (Akaike Information Criterion) and likelihood logarithm have been used.

Table 6: Comparison of Akaike Information Criterion and Logarithm of Three Models

Model	Akaike information	Logarithm of magnification
First order autoregressive	-129.282	-67.64
Linear regression	-138.121	-74.061
Markov Switching	-141.996	62.998

Based on the results provided in table 6 and from AIC point of view, Markov-switching is best model; and, in terms of likelihood logarithm as well, Markov-switching acts better than the two other models. So, with consideration of aforementioned, it can be suggested that a Markov-switching model with first order autoregressive and auxiliary variables of base volume, institutional ownership and free float with its two

states works better than classic auto regressive and linear regression to model return on stock in Tehran Stock Exchange. Now, we are intended to use Markov-switching model to study governing market strategy during next 12 months. To do so, primarily cumulative return of companies has been calculated for the past 12 months and 6 portfolios with equal weights have been formed, accordingly. Portfolio with highest cumulative return on stock which is among upper 5/10 of stocks (22 companies with highest return on stock) is considered as winner (W) portfolio and the one with lowest cumulative return on sock which is among lower 5/10 of stocks is considered as loser portfolio (L). To study momentum or contrarian effect of data, hypothesis test has been designed as follows:

$$\begin{cases} H_0: \mu_W - \mu_L = 0 \\ H_1: \mu_W - \mu_L \neq 0 \end{cases}$$

Here, confirming H_0 means lack of existence of momentum or contrarian strategies; however, if H_0 would be rejected, momentum strategy would be observed if average return of winners would be higher than that of losers. If average return of losers would be higher than that of winners, contrarian strategy is observed. To do so, two-sample t-test has been used. The results are shown in table 7.

Table 7: Results of The Two-Sample Independent T-test for Predicted Returns

Variable	Average loser returns	Average return on winners	Test statistics	Significance probability	Test result
Returns	0.231	0.096	2.371	0.023	Reject H0

cccce 0000000 tee tett is sigii fiaant nnd yyttt eeiis rggrrii gg aaaa lity ff vvrrgge wirrrr . nnd leeers would be rejected. On the other hand and considering that average return of losers is predicted to be higher than that of losers; market governing strategy is contrarian strategy. Therefore, within next 12 mttt ''' tim. interval, using contrarian strategy i.e. selling by previous winners and purchase of previous losers could be profitable.

5 Conclusion, Discussion, and Comparison

The research results confirm long term contrarian strategy which shows overreaction of investors. Previously, existence of overreaction in Tehran Stock Exchange has been proved. Previous performance has been assessed higher than their intrinsic value, by investors. During long term periods when investors recognize that their previous assessment has not been correct; related stock in the market will receive return lower than expected level. However, price of stocks with previous weak financial performance would be specified under its own intrinsic value. When performance of this stock would be excess to what investors expect, it will gain higher return than expected in long term. First sub-hypothesis i.e. the effect of trading volume on return of momentum and reversal strategies has been confirmed. The result is consistent with theoretical foundations and the results from research performed by Rahmani and Sarhangi [23] on profitability of momentum strategy and effect of stock trading volume on it in Tehran Stock Exchange. The results show that there is no relationship between trading volume (independent variable) and mean return value (dependent variable). Meanwhile, there is a significant relationship between market surplus return (independent variable) and surplus return of winner portfolio (dependent variable). Also, effect of trading volume on market efficiency has been studied by Suk Bitak and Hengunia [27] indicating that for a market, mutual correlation between market efficiency and trading volume is a recognized indicator of market liquidity.

The results show that market liquidity from perspective of trading volume has not much effect on market efficiency. Studied performed by Sinaie and Azhdarpoor [25] on monthly returns and trading volume of 45 companies listed in Tehran Stock Exchange did not confirm usefulness of momentum and reversal strategies in short term; however, some evidences regarding medium (3-9 months) and long term (24 months) usefulness of reversal strategy have been provided. After controlling the effect imposed by trading volume also some evidences of abnormal return of reversal strategy for those companies with low trading volume and abnormal return or momentum strategy for small companies have been observed. Effect of stock trading volume on capital asset pricing has been studied by Lam and Tom [13] in addition to the relationship between these variables. Their results are inconsistent with the point that stock trading volume can be considered as another factor effective in capital asset pricing models. Second sub-hypothesis i.e. effect of institutional investment on return of momentum and reversal strategies has been confirmed. The result is consistent with theoretical foundations and results obtained from research rrr rr m yy '' tt i tt ll [18] on the role played by institutional shareholders as one of the most imrrr tnnt criteria of crr oortt e gvvrr cccc e nn retrr n l n stkkk, . tnnn rr ic,, add r mmiii ssmtt kkk trddigg volume. The results from testing hypotheses using t-test showed that no significant relationship exists between institutional ownership and return on stock and stock price; also, they have been indicative of iiii tive sigii fiaatt relatioiii p ii lstxmmeete ii d vi ds'tt reee s oo f rrttt e rrr xmmiii ' ttokk triii gg volume. That is, increase of institutional ownership in companies will lead to increasing stock trading volume and increasing stock liquidity, as a result.

Mansoor Lakvarj et al [16] have been looking for evidences regarding the relationship between institutional investors and return on stock in companies listed in Tehran Stock Exchange. Their findings show that there is a relationship between institutional investors and return on stock; and, increase made in ownership of these shareholders will lead to fewer changes in return on stock. Third sub-hypothesis i.e. effect of flee float on return of momentum and reversal strategies has been confirmed. The result is ssss rssiii i ms thrrr tt iaal faaaaa a nns ddd relll ts ott . iddd in tee rssaarhh performdd yy A''iii ddd Imantalab [1] on the relationship between flee float and return, liquidity, and value of companies listed in Tehran Stock Exchange. Their results showed that based on the first hypothesis, there is a positive and significant relationship between flee float and return on stock. In second hypothesis and despite insignificant value of the statistic corresponding to current ratio but significance of the model as a whole, positive and significant relationship between flee float and stock liquidity has been confirmed. In the third hypothesis also despite value of statistic of return on assets not being significant; significance of the whole regression model has been confirmed. The result is consistent with positive and significant relationship between flee float and value of companies. Fourth sub-hypothesis i.e. effect of base volume on return of momentum and reversal strategies has been confirmed. The results are consistent with theoretical foundations and the results obtained from the research performed by Vakilifard et al [31] on effect of base volume (as variable specific to Iranian capital market) on such variables as amount of return on stock and its liquidity in Tehran Stock Exchange. The results shows that at 95% confidence level, there is no significant relationship between base volume and return on stock in companies listed in Tehran Stock Exchange; however, at the same confidence level, there is a significant relationship between base volume and stock liquidity of these companies.

Fifth sub-hypothesis i.e. effect of currency rate on return of momentum and reversal strategies has not been confirmed. The result is consistent with theoretical foundations and the results from research performed by Sherma [26] on relationship between currency rate and return on stock in different industries in National Stock Exchange of India. Using Granger Causality Test, he concluded that there is a two-way relationship between currency rate and return on stock in various industries except for the two pharmaceutical and media industries in National Stock Exchange of India. According to the results, there is a one-way causality from currency rate on return of pharmaceutical industry. Also, effect of information related to macroeconomic variables on stock price in South Korea has been studied by Sernioasan [28] The result showed that contrary to America and Japan, Korean Stock Market is more sensitive to real economic variables compared to monetary variables (inflation rate and interest). Moreover, as suggested by him, stock market is not capable of predicting economic conditions. Dynamisms of the relationships between macroeconomic variables and stock market index have been studied by Abbasinejad et al [2] Using monthly data related to the period of 2002-2013 and applying VARX-DCC-GARCH pattern, it was concluded that variables of currency rate, inflation, and oil price have positive long term effect on stock index. Also, oil price shocks compared to other variables are more effective in stock index, in short term.

6 Propositions Based on Research Results

In this respect and considering confirmation of hypothesis, it is recommended that:

With consideration of the second hypothesis and before buying stock, investors have to review composition of shareholders and sustainability of ownership. With consideration of the third hypothesis, risk averse investors can be recommended to buy those stocks with higher percentage of flee floats so that higher level of liquidity and annual return would be achieved. Tehran Stock Exchange is recommended to think about increase of flee float and to calculate and declare percentage of flee float and stock liquidity indicators on monthly basis so that these indicators would be involved in evaluating stock price by market analyzers. Companies listed in Tehran Stock Exchange are recommended to find a limit of stock floatation within which appropriate return would be obtained by them for investors, and their stock management goals would be met. From among strategic goals regarding market participation reference can be made to considering percentage of flee float and putting emphasis on it. Paving the ground and effective usage made of flee float as well as teaching method of using this tool can help companies to obtain more market share in stock trading. Considering the fourth hypothesis, investors and capital market activists are recommended to always compare their concerned base volume for purchase and the mean vtt mnmæ vsss iee ull mnmee rr wwiwhhhs :: thtt thyy wlll nn't ee stkkk in gggtt ive fffcct of tii s bsse volume imposed on stock price process.

Research Limitations are as follows:

1. Considering change of government in this time interval (2013) and change of governmental economic policies followed by new policies experienced by stock market which can have obvious or latent effects on stock return index of companies and type of stock trading strategy, studying such effects has been out of the research limit.

2. Due to some selection criteria (fiscal year ending to March 20th, and no change of fiscal year) in choosing companies and incomplete data related to some companies, number of companies studied has been reduced to 108. Therefore, generalization of the research results to other companies has to be done cautiously.

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