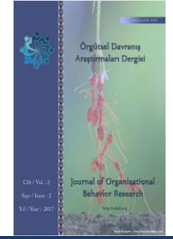




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COMPARISON OF PROFITABILITY OF THE SINGLE-VARIABLE AND MULTI-VARIABLE MOMENTUM STRATEGIES

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ABSTRACT

The present research has studied the single-variable and multi-variable momentum strategies. This research has aimed to compare these two groups of strategy's profitability. The study has included two main hypotheses consisting of some related secondary hypotheses. The results indicate that the single-variable momentum strategies of profit, income and price are all individually profitable. But in combined strategies, only combined momentum strategies of price and profit, price, and revenue, as well as combined cost, profit, and revenue momentum strategies were profitable for all periods including 3, 6, 9 and 12-months. Profit and revenue combined momentum was merely profitable during 6-month and 12-month time period.

Keywords: Momentum Profit, Multi-Variable Momentum Strategies, Single-Variable Momentum Strategies.

INTRODUCTION

The investors try to choose investment options which maximize their return by accepting a reasonable level of risk. Naturally, investors tend to use the strategies that can generate additional return for them. Since market prediction is one of the tools to reduce uncertainty, they always seek some ways to better predict stock return in order to earn the maximum return on their investment (Fallah Shams and Ataee, 2013). According to efficient market hypothesis, it is believed that we cannot win the market. This hypothesis states that there is no possibility of earning market's return more than average, because there is no trend in market's price and return and so, we cannot earn additional profit of market. According to efficient market hypothesis, if market is at weak efficient level, the investors are unable to earn additional return and using past stock information does not help them to earn additional return. However, we are faced with some patterns in capital markets that traditional costing theories cannot explain them and investors can gain more profit by using some certain patterns. One of these patterns is called momentum investment strategy. According to momentum investment strategy, contrary to the efficient market hypothesis, normal stock returns at different time intervals have particular behavior and we can gain a return more than market return by using investment strategy fits with desired time horizon (Fadaei Nejad and Sadeghi, 2006). In this research, we try to compare and study the profitability of momentum strategies in the form of single-variable and combined models.

THEORETICAL BASICS AND HYPOTHESES DESIGN

The efficient market hypothesis in the 1970s and 80s achieved the highest domination and sovereignty in the scientific and financial circles of the world. But trust and confidence in this

hypothesis was gradually shaken by discovering the behavioral disorder of the stock market and patterns incompatible with modern financial theories, as well as observing some events such as the bubble of the American financial markets in 1987 and also in other financial markets and other events in the capital market. Financial world has taken a long distance with those days when it is assumed that efficient market hypothesis has been strongly approved and confirmed. Behavioral financial management means examining financial issues from a broader social-scientific perspective including paying attention to psychology and sociology and also removing pure logical and rational frameworks. Behavioral financial management is one of the topics which are considered by many financial researches and it gains a more solid position day to day in order to confront against efficient market hypothesis. Today, this issue has been strengthened that the prices are more determined by psychological attitudes and factors than basic variables, and so the study of psychological and market excitements have been more important. Thus, since the 1990s, the focus of many financial discussions has changed from statistical analysis and econometrics on prices and profits to human psychology and behavioral financial management has increased its depth and richness by introducing more behavioral disorders. Behavioral financial management explain financial markets behavior with a more open look and using more realistic assumptions compared with new financial management (Shiller, 2003).

Nowadays, considering the importance and position of financial management as a modern approach in financial sciences and replacement with financial assumptions including the pure efficiency and rationality of decision makers and the newness of this field in financial research, market exceptions in most reputable exchange in the world have been studied. Momentum strategy is considered as one of these exceptions and disorders of capital market. Momentum is a concept in physics that states that a moving object tends to remain in motion unless there is a force from the outside. This law application in the market is that a price trend tends to stay until an external force stop it. This strategy involves investing in the market and claims that past positive and negative return will be also continued up to a specified period in future. This strategy involves moving in the same direction as the market and it believes that recent procedures will be continued and tries to predict future performance by using past information and makes additional return. This strategy is exactly the opposite of the market-efficient hypothesis. Efficient market hypothesis claims that there is no particular trend and pattern in return and securities prices and price behavior is random and unpredictable. According to efficient market hypothesis, portfolio performance is independent of its past performance (Hashemi and Miraki, 2013).

Momentum strategies are used for taking advantage of serial correlation existed in market return and securities. This strategy represents a positive self-correlation in assets return in mid-term. In this strategy, additional returns can be achieved by buying past winning stocks and selling past losing stocks (Jegadeesh and Titman, 1993). The securities that have experienced good (bad) performance in the past tend to continue this good (bad) performance in the future. In the other word, momentum believes in continuity of historical mid-term return in future mid-term horizon. In this strategy, the extra returns earned are actually compensation for unknown risks that current theories cannot explain them. Today, momentum strategy is one of the dominant investment strategies on the world's stock exchange and it is widely used by individual and institutional investors.



Momentum includes several types one of which is profit momentum which states that the stock that has recently had a surprise in profit, it will also behave in the same direction in the near future. The other type is price momentum in which the stock will be selected that has a better performance compared with others and is held at a specified time based on relative strength index. The present research has investigated and compared profitability of single-variable momentum strategy including price, profit and revenue and multi-variable momentum which is a combination of momentum strategies at two levels of two-variable and three-variable at Tehran Stock Exchange. So in this regard, the research's hypotheses are developed as follows: The first main hypothesis: Additional return can be earned in capital market by using single-variable momentum strategy.

Secondary hypotheses:

- I. The use of price momentum strategy in capital market is profitable.
- II. The use of profit momentum strategy in capital market is profitable.
- III. The use of revenue momentum strategy in capital market is profitable.

The second main hypothesis: Additional return can be earned in capital market by using combined momentum strategy.

Secondary hypotheses:

- I. Simultaneous use of price and profit momentum strategy is profitable.
- II. Simultaneous use of price and revenue momentum strategy is profitable.
- III. Simultaneous use of profit and revenue momentum strategy is profitable.
- IV. Simultaneous use of price, profit and revenue momentum strategy is profitable.

RESEARCH METHODOLOGY

This is an experimental research regarding theoretic aspect and it is one of positive research group. In experimental researches, the author seeks to confirm what that exists. Regarding classification based on objective, this study can be considered as an applied research, because the suggested models can be used in order to compare momentum strategies. This is a post-event research, because in which past information has been used. The present research is one of inductive study in term of reasoning. It is considered as causal research regarding form. All the accepted companies at Tehran Stock Exchange in the present research were selected as statistical population. The below restrictions were applied for sample selection:

- The companies whose fiscal year has been ended by the end of March each year.
- The companies that are not a part of financial intermediation (banks, insurance, investment and leasing companies).
- Companies whose symbol has not had a three-month halt and their stocks have been traded over the years studied.
- Companies that provide research's required data

Considering the above limitations, 176 companies have been selected and studied during periods of 2011 to 2015 years using elimination method.

In the present study, required information including stock price of sample companies on a daily basis, stock price at the beginning of considered period, stock price at the end of each month and end of considered period, profit paid per each share, the number of shares issued by the company and other required information have been extracted from Tehran Stock Exchange



website and Codal site. Then, sample companies were divided into two winning and losing groups using the information of the years 2011 to 2015 and finally, research's hypotheses were tested.

RESEARCH'S FINDINGS

Descriptive statistic for research's variables

Table 1 shows descriptive statistic of research's variables including information related to average, median, standard deviation, Skewness and Kurtosis.

Table 1: Descriptive statistic for research's variables

variables	Central indexes		Dispersion index	Distribution index	
	average	median	Standard deviation	Skewness coefficient	Kurtosis coefficient
Portfolio maintained based on return	0.415648	0.241250	0.709859	5.852602	59.86949
Portfolio maintained based on unexpected profits	91.68272	121.3104	49.91661	-0.6353	1.589934
Portfolio maintained based on unexpected revenue	1492.079	1783.773	11278.56	-0.094222	20.65678
Portfolio maintained based on unexpected return and profit	511.8364	211.0000	1004.164	3.236338	19.88581
Portfolio maintained based on unexpected return and revenue	4.106500	0.719255	4.336130	5.569910	38.47114
Portfolio maintained based on unexpected profits and revenue	500.8975	230.0000	998.4221	5.478366	62.61158
Portfolio maintained based on unexpected return, profits and revenue	8332.479	5445.500	8597.068	2.710324	13.10497
Price	3.491702	4.090690	15787998	6.345284	54.16324
Unexpected profit	408.6538	167.0000	962.6838	6.300482	59.45451
Unexpected revenue	8242.438	5356.000	8404.158	2.700437	12.74402

Research's hypotheses testing

The results of the first hypothesis's secondary hypotheses testing have been shown in table (2).

Table 2: Results of data analysis to test sub-hypotheses of first hypothesis

Portfolio maintained based on stock returns					
Variable		coefficient	Standard deviation	T statistic	p-value
Stock returns in Portfolio maintained in time intervals	Y-intercept	0.250965	0.008736	28.72918	0.0000
	Quarterly	0.000952	0.000105	9.074055	0.0000
	Six months	0.161162	0.026647	6.047992	0.0000
	Nine months	0.027652	0.003878	7.131053	0.0000
	Annual	0.025369	0.010655	2.381014	0.0175
Durbin-Watson statistic		1.91663	F-statistic		4.823643
Adjusted R-squared		0.202836	Prb(F-statistic)		0.0000
Portfolio maintained based on unexpected profits					
Variable		coefficient	Standard deviation	T statistic	p-value
Unexpected profits in Portfolio maintained in time intervals	Y-intercept	0.017654	0.005133	3.439144	0.0006
	Quarterly	0.236813	0.02569	9.218109	0.0000
	Six months	0.007047	0.002275	3.097002	0.002
	Nine months	0.195951	0.013721	14.28135	0.0000

	Annual	0.046701	0.006247	7.475396	0.0000
Durbin-Watson statistic		2.021608	F-statistic		11.979329
Adjusted R-squared		0.207477	Prb(F-statistic)		0.0000
Portfolio maintained based on unexpected revenue					
Variable		coefficient	Standard deviation	T statistic	p-value
Unexpected revenues in Portfolio maintained in time intervals	Y-intercept	0.00538	0.003143	1.711702	0.0874
	Quarterly	0.041911	0.015321	2.735433	0.0064
	Six months	0.002329	0.000615	3.785555	0.0002
	Nine months	0.026554	0.013429	1.977326	0.0484
	Annual	0.025369	0.010655	2.381014	0.0175
Durbin-Watson statistic		2.011618	F-statistic		11.383577
Adjusted R-squared		0.202942	Prb(F-statistic)		0.0000

According to results of regression models testing explained in table 2, it is observed that p-value related to f-statistic which indicates significance of total regression regarding all three secondary hypotheses of the first hypothesis was equal to 0.000 and it suggest that the model is significant at 95% confidence level.

The results also show that given that independent variable's coefficients in all three hypotheses in 3, 6, 9 and 12-month time intervals have been less than 5%, the results show these coefficients' significance at an error level 5% for all three hypotheses. These findings show that the use of price, profit and revenue momentum strategy individually over the 3, 6, 9 and 12-month periods is profitable.

The results of the second hypothesis's secondary hypotheses testing have been shown in table (3).

Table 3: Results of data analysis to test sub-hypotheses of second hypothesis

Portfolio maintained based on stock returns and unexpected profits					
Variable		coefficient	Standard deviation	T statistic	p-value
Stock returns and unexpected profits in Portfolio maintained in time intervals	Y-intercept	0.002742	0.003675	0.746143	0.4569
	Quarterly	0.204183	0.000908	2.249781	0.0000
	Six months	0.007659	0.003709	2.064854	0.0393
	Nine months	0.018713	0.002917	6.415404	0.0000
	Annual	0.002123	0.000646	3.28469	0.0011
Durbin-Watson statistic		1.577066	F-statistic		50.61515
Adjusted R-squared		0.797418	Prb(F-statistic)		0.0000
Portfolio maintained based on stock returns and unexpected revenues					
Variable		coefficient	Standard deviation	T statistic	p-value
Stock returns and unexpected revenues in Portfolio maintained in time intervals	Y-intercept	0.001406	0.001081	1.300554	0.1939
	Quarterly	0.001895	0.00065	2.912992	0.0037
	Six months	0.007521	0.00195	3.856088	0.0001
	Nine months	1.021363	0.369408	2.764866	0.0059
	Annual	0.00195	0.000518	3.764691	0.0002
Durbin-Watson statistic		2.075304	F-statistic		3.034399
Adjusted R-squared		0.231536	Prb(F-statistic)		0.0000
Portfolio maintained based on unexpected profits and unexpected revenues					
Variable		coefficient	Standard deviation	T statistic	p-value
Unexpected profits and unexpected revenues in Portfolio maintained in time intervals	Y-intercept	0.001089	0.000675	1.614983	0.1068
	Quarterly	0.000875	0.000825	1.060856	0.2891
	Six months	0.004377	0.001311	3.339312	0.0009
	Nine months	0.006962	0.00372	1.871627	0.0617
	Annual	0.01528	0.003149	4.534391	0.0000



Durbin-Watson statistic		2.084074	F-statistic		2.912166
Adjusted R-squared		0.220695	Prb(F-statistic)		0.0000
Portfolio maintained based on stock returns, unexpected profits and unexpected revenues					
Variable		coefficient	Standard deviation	T statistic	p-value
Stock returns, unexpected profits and unexpected revenues in Portfolio maintained in time intervals	Y-intercept	0.000915	0.000632	-1.446566	0.1485
	Quarterly	0.001903	0.000618	3.077532	0.0022
	Six months	0.005524	0.002057	2.685286	0.0074
	Nine months	0.83196	0.051871	16.03904	0.0000
	Annual	0.924496	0.038605	23.94755	0.0000
Durbin-Watson statistic		2.118833	F-statistic		2.79645
Adjusted R-squared		0.582786	Prb(F-statistic)		0.0000

According to results of regression models testing explained in table 3, it is observed that p-value related to f-statistic which indicates significance of total regression regarding all four secondary hypotheses of the first hypothesis was less than 5% and this suggest that the model is significant at 95% confidence level. The results also show that given that independent variable's coefficients in all four hypotheses in 6 and 12-month time intervals have been less than 5%, the results show these coefficients' significance at an error level 5% for all four hypotheses. Therefore, all four secondary hypotheses of second hypothesis for 6-month and one-year time intervals are confirmed.

But, since statistic p-value for 3 and 9-month periods, only in the first, second and fourth secondary hypotheses have been less than 5% and this statistic is more than 5% regarding the third secondary hypothesis in these intervals, so this indicates lack of significance of the third secondary hypothesis in these courses. Therefore, while confirming the first, second, and fourth sub-hypotheses for the 3 and 9th months, the third sub-hypothesis is not confirmed in relation to these courses.

So, we can conclude that simultaneous use of price, profit and revenue momentum strategies for 3, 6, 9 and 12-month period are profitable. But the use of profit and revenue momentum strategies is merely profitable in 6-month and one-year time intervals.

DISCUSSION AND CONCLUSION

This research evaluated and compared profitability of single-variable and combined momentum strategies. The research's first hypothesis assessed single-variable momentum strategies of profit, revenue and price. The results of the first hypothesis's secondary hypotheses indicated profitability of momentum strategies of profit, revenue and price for all periods including 3-month, 6-month, 9-month and 12-month. The research's second hypothesis also assessed combined momentum strategies. This hypothesis includes four secondary hypotheses. The results of these secondary hypotheses' test show that in the realm of the present research, simultaneous use of momentum strategies of price and profit, price and revenue and also momentum strategies of price, profit and revenue have been profitable for 3, 6, 9 and 12-month periods. But the use of momentum strategies of profit and revenue has been profitable only during 6-month and one-year time periods and it has not been profitable for 3 and 9-month time periods. At the end, it is suggested that some tests should be prepared and developed to study and determine the reason of momentum's effect and investigate its behavioral reasons. Also, it is suggested that these strategies' profitability should be investigated by considering transactions cost.



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