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Full Length Research Paper

An evaluation of the investors overreaction to the past financial function criteria: Iranian evidence

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One of the assumptions of the Efficient Market Hypothesis is that logical reaction of investors to known and available data cause the cost of invested wealth to approach to its main cost. How ever the experience shows that the behavior of investors in capital market has not always been correct and market cooperators shows overreaction to new data. The aim of present a study determining whether the investors have assigned a higher level for the stock of companies that have acquired rather high criteria in the past from the real values and whether the prices of these stocks will return to original costs and experience the return of previous returns. Similarly, the companies that have had rather weak return in the past have been valued in lower price by experts and will acquire more return compared to their partners in next periods. Among financial functional criteria, Average of Sale Growth Rate, Average Growth of operational profit, Average Annual Return and Average Cumulative Abnormal Return (ACAR) have been selected and four hypotheses have been tested in Tehran Stock Exchange during 2001 to 2009. The evidences of the present research show that the investors in Tehran Stock Exchange have shown overreaction to financial function criteria.

Key words: Overreaction, output return winner portfolios, and lose portfolio.

INTRODUCTION

According to Efficient Market Hypothesis (EMH) there are two predictions about market prices behavior and return first which: the prices observed in tile market are equal to their innate values and second, the market output cannot be predicted by public available data. It means that all stocks are valued correctly and the stock prices are equal to present values of all future expected based on available data in evaluation date Experimental evidences in the last two decades show that the investors behavioral bias in data processing cause the stock prices to be diverted from their real values, which will end to abnormal return based on old data which implicitly refer to inefficiency even in low level in the market.

LITERATURE REVIEW

Debondt and Thaler (1985) is among pioneer works which used psychological evidences for explaining the investors' behavior. In their study, the share monthly abnormal return was calculated for 16 three- year period; they found that the share purchase with lower return in the last five years gains the return about 19.6% higher than the market within next 3-5 years. Whereas the investor's strategy in purchase share with higher return gains return about 5%lower than the market within the next 3-5 years. Debondt and Thaler (1985) findings can be explained by factors such as the company's size, secondary effects and temporary variations in risk factors. Debondt and Thaler (1985) showed that their previous evidences do not attribute to special characteristics of the company about risk, size and secondary effects factors. Zarowin (1989) studied overreaction in similar time return on Debondt and Thaler research in 1985-1987. He studied share return in 17 periods, and then compared successful and unsuccessful portfolios return function having controlled the size of the company. The results showed that the portfolios return difference has been eliminated for size factor, after size being controlled and in the companies being equaled no

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significant difference was observed in portfolios rerun (Zarowin, 1989).

Lakonishok and Shleifer (1994) presented evidences that value strategies make more returns since they use less optimal behaviors of the investor so these strategies are not innately risky.

Laporta (1996) studied differential return between growth share and value share regarding future profit growth rate predicted by financial analysts from 1982 to 1990. His findings showed that the companies with low expected profit overcome the companies with high expected profit about 20% within the first year after the formation of portfolios. The difference of return between share growth and share value will continue up to the fifth years after the formation of portfolios. Performing extra tests he concluded that his findings are not affected by factors of size, effects of B/M and other potential risks. The research results showed strong evidences of overreaction hypothesis (Alwathainani, 2006).

Gunaratne and Yonesawa (1997) made a research about the return reverse in Tokyo Stock Market. The results showed the strong return reverse in Tokyo stock market. In addition test also the portfolios return were compared considering risk time difference in ranking and test period. It showed that the risk difference in the two periods was very low but the return difference was high.

Barberis (1998) found evidences that markets showed overreaction to markets as the average share return in next periods to a series of good data is lower than the average return after a series of bad news.

Ahmad and Hossain (2001) studied overreaction and the effect of New Year in stock market of Malaysia. The results showed that for three periods found some evidences that showed markets have overacting about information, as the average return of the shares in its next periods to a series of good information is lower than average return to series of bad news.

Chan and Frankel (2004) studied two valuation effects related to two psychological biases (representative and conservative biases). This research did not find evidence of return reverse in companies which have function during past few years. This research also offered evidences confirming less reaction derived from conservative bias.

Alwathainain (2006) tested the hypothesis that investors show overreaction to growth and evenness of patterns in the last years financial from a983 to 1999 in NYSE, NASDAQ and AMEX stock markets.

The results displayed that past growth rates in each of the research variation led to moving the price to higher and lower levels. Then in long-term the prices would return to their innate levels causing higher and lower returns respectively. Mirada in 2005 overreaction in Tehran stock market from 1992 to 2003 results showed significant of ACAR information and testing and testing periods for winner and loser portfolios, which is the indicator of overreaction of common shareholders in Tehran stock market.

Bowman et al. (1998) tested the stock price features in New Zealand after a weekly great change in prices. The results showed that the existence of short term over-reaction in New Zealand stock market. Issues like time stability, risk, size and the resulting actions of differences in prices of sale purchase that can be indicators of overreaction hypothesis have also been studied in research. The results of extra teats found any evidence confirming the above supposition.

Ma et al. (2005) studied the effect of overreaction of markets on stock which has highest or lowest percentage of daily change in prices reported in wall street journal and New York stock in a two year period of 1996-1997. The results showed strong evidences of overreaction of stock market on NASDAQ stock.

In the companies' shares having the most capital Market value in England show efficient reaction to the market doubt data. Nonetheless the investors in the companies' share having average and small capital market value have shown so different behavior with weak reaction to the market doubts. More analysis showed that these group of investors show less reaction to the data including excessive events. This has mostly been shown in positive doubts.

Behavioral finance theory

Behavioral economy is one of the most active areas in economic research in extent and amount. This theory rejects the behavioral insight of the economic representatives based on maximization of expected ideal. Concentration of behavioral finance theory on one approved definition of human behavior is more under risk and uncertainty compared to a normal description. One of the goals of behavioral finance is the comprehension of psychological traits of economic representatives (Shleifer, 2000). Most financial and economic theories are defined as the individuals act intellectually and take all available data into consideration however; researchers have found great evidences abut this issue (Shelifer, 2000). This theory says that sometimes it is necessary to accept this probability that some factors in economy do not act quite intellectually in order to find an answer for finance experimental dilemmas (Thaler, 1999). The basic elements of behavioral finance theory are cognitive psychology (how individuals think and decide) as well as limitation in arbitrage that will be described as follows:

Cognitive psychology and decision making processes

I. Heuristic decision: it refers to roles in which individuals take complex decisions in uncertain situations. There are completely justified reasons for using heuristic decisions

Table 1. Needed variables of the study.

Period	Formation period	Test period
First	2001-2003	2005-2007
Second	2003-2006	2007-2008
Third	2004-2006	2008-2009

especially when the time of decision is limited. Heuristic processes can lead to non optimal decisions (Tversky and Kahneman, 1974; Ritter, 2003) same behavioral bias approved in psychology, related to cognitive psychology are described in brief.

II. Representativeness Bias: Representativeness bias guide individuals to overestimate the incidence of one occurrence based on similarity between the specifications of that occurrence and the specifications of original community of that occurrence (Tversky and Kahneman 1974; Barberis and Thaler, 2001). When evaluating whether something belongs to a group or not, people overuse that group representatives and rarely use base rate (like the similarities of one member of that group). For instance if somebody looks as a convict, people evaluate the probability that he is convict more than reality because they overuse the similarities but they rarely use the fact that convicts form a very low percent of the society. In behavioral models representativeness lead to over reaction, so it predicts return of the next output (over reaction).

III. Overconfidence: Overconfidence between the partners is a very clear problem. Overconfidence bias in financial science refers to the fact that investors think of their ability in valuation of negotiable documents more than it really is so the variance error of their predictions is less estimated.

IV. Self-attribution Bias: The investors' self-confidence grows when the general information parallels his personal information. But if they contradict each other this self-confidence does not grow equally. Psychological studies show that, people tend to be proud of their past success and attribute their failures to external factors and bad luck (Daniel et al. 1997).

V. Conservatism Bias: Edwards became popular by discovery of Conservatism Bias in 1968. This bias causes people to slowly update their opinions about what is used in Brav's' as rationality standard. It means that people overuse one base scale and rarely use available data. That is why Brav and Heaton (2002) classified Conservatism Bias as intuitive, contrary to representative bias in some concepts.

The implied concept of conservatism valuation in behavioral finance theory is that this bias leads to lesser reaction. Therefore conservatism bias predicts speed in return. Conservatism can be seen as over self-confidence about individuals' previous information (Chan et al., 2004).

It should be number of behavioral finance models in the companies' noted that data processing bias is the infrastructure of a sequential function which foresees systematic errors in evaluation due to over or lesser reaction. While each author uses presuppositions and trends with little difference in developing his model, they all suppose that investors fail to have a correct interpretation the companies' previous function.

Barberis and Shleifer (1998) emphasized both representative and conservatism bias as stimulators of these systematic errors.

Limitation in arbitrage

The concept of arbitrage means that wrong valuation of a property creates profit without risk. According to arbitrage theory, the investors are in two groups: intelligent traders who are able to compensate other investor mistakes and common traders who have bias in decision making most of the time (Shiller, 2003). One of behavioral finance findings is limitation in arbitrage. i.e., when common traders cause deviation of the property price from its innate value intelligent traders can not do anything to increase market efficiency and returning the prices to their original levels due to limitation in arbitrage opportunities and costs of the trades.

METHODOLOGY

The population of current study is all listed companies in Tehran Stock Exchange. All companies having the following specification would elect as a member of statistical community:

1. The company should not be one of investors or financial intermediate's companies.
2. All needed data for calculating growth rates in financial function criteria (sale, profit) and return should be available.
3. The shares of the company should be transacted more than once during one year.
4. The company financial year should end to March 20th in each year.

Formation and test period studied companies and operational definitions of variations

Formation Period and Test Period for each tested functional criteria and also the number of studied companies is presented in Tables 1 and 2.

Table 2. Period of the study.

Studied variations for main hypothesis					Added variations in extra tests			
Sale Growth Average		Operational benefit growth average			Annual return average		Cumulative abnormal return	
Period	Studied companies	Winner and looser companies	Studied companies	Winner and looser companies	Studied companies	Winner and looser companies	Studied companies	Winner and looser companies
First	150	30	140	28	150	30	150	30
Second	150	30	150	30	150	30	150	30
Third	145	29	145	29	150	30	150	30

Varieties calculations and research sample abnormal return

Meaning of each share abnormal return is the difference between real and expected return of that share. In this research it has been supposed that the expected return for all negotiable instruments is the same and the return of each negotiable instrument is like market return. The market return is calculated as follows:

$$R_m = \frac{I_1 - I_0}{I_0}$$

Which I_0 is the total price and year index of all normal share announced by Tehran Stock Exchange in the beginning of the year, and I_1 is the value of this index for the end of year.

In this research the share real return is calculated as:

$$R_{i,t} = \frac{P_1(1+\alpha) + DPS - [P_0 + \alpha(1000)] + SD + SR}{P_0 + 1000(\alpha)}$$

Ri,t = real return of *i* company in *t* period, P1= share price in the end of period, P0 = share price in the beginning of period, DPS= divided profit of each share, a = Capital growth percentage of place of the earned and claims, SD[1] = Stock Dividends and SR[2] =Stock Right.

Nominal price of each stock companies share is 1000 Rials (Iranian Currency).

Finally the annual abnormal return is calculated as:

$$AR_{it} = R_{i,t} - R_m$$

Geometric average of sale growth

Sale growth shall be calculated by year to year change for each share. Then the geometric average is calculated for this variation within three years as:

$$SG_{jt} = \left[\prod_{T=-3}^{-1} (1 + \Delta SPS)_{jT} \right]^{\frac{1}{T}} - 1$$

SGj,t stands for Annual geometric average of sale growth rate of each share of ***j*** Company within last three years to the date of portfolios formation in *t* time. ΔSPS jT stands for years to year variations in sale for the share of ***j*** Company in ***T*** years.

Geometric average of operational profit growth

Operational profit growth shall be calculated by year to year variations in operational profit for each share which has been scaled by the properties in the beginning of the period.

The geometric average then calculated for this variety within last three years measurement as:

$$EG_{jt} = \left[\prod_{T=-3}^{-1} (1 + \Delta EPS)_{jT} \right]^{\frac{1}{T}} - 1$$

EG j,t stands for Annual geometric average of operational profit growth for each share of ***j*** Company within last three years measuring to date of portfolios formation in *t* time.

ΔSPS jT stands for year to year variation in operation profit for each share of ***j*** Company in ***T*** year which has been scaled by the properties in the beginning of the period.

Test methods

Test methods used in present research for confirmation or rejection of the hypotheses will be done in two parts; Main portfolios test and extra portfolios test. Companies will be ranked in five groups for each studied period and studied criterion.

Then loser and winner portfolios will be formed based on each financial operation criterion. These portfolios will be kept for three years since formation, and ranking period return (formation period) and maintenance period (test period) are calculated for each year (from one to three years).

RESULTS

It should be noted that these stages are just for

Table 3. Results for successful Portfolio (ranking based on average sales growth).

period	Formation period			Test period				Result
	Average cumulative actual return	Average of accumulated market gain	ACAR	Average cumulative actual return	Average of accumulated market gain	ACAR	p-value	
First	264.68	159.10	105.58	111.69	202.12	-90.43	≤0.01	Rejected H_0
second	194.79	154.03	40.75	73.41	138.35	-64.94	≤0.01	Rejected H_0
third	199.70	232.74	-33.04	38.92	14.73	24.19	0.06	H_0 confirmed

geometric average growth sale criterion in three years before formation (for the geometric average growth criterion of operation profit growth three years before formation in the same way is repeated):

1. First the data related to sale and return growth calculation in ranking period are collected for all statistical society shares.
2. The qualified shares will be ranked in formation period based on geometric average of annual sale growth rate. Then 20% of shares with the most geometric average of annual sale growth rate are determined for each studied period as winner portfolios and 20% of shares with the least geometric average of annual sale growth rate is determined for each studied period as loser portfolios.
3 .In this stage, at first abnormal return for each share is calculated annually. The Cumulative Abnormal Return (CAR) for each share within three years period is calculated as:

$$CAR_{i,t} = \sum_{t=1}^{t} AR_{i,t}$$

4. Average Cumulative Abnormal Return (ACAR) for each portfolio for formation and test period is calculated as:

$$ACAR = \frac{1}{N} \sum_{t=1}^{t} CAR_{i,t}$$

5 .In the final stage ACAR of each portfolios for formation and test periods are compared and will be decided for confirmation or rejection of main hypotheses.

Research hypotheses

H_1: In the companies of which proportional sale growth is higher, the ACAR in portfolios formation period is more than test period. This hypothesis can be expressed in the form below null hypothesis can be:

$$H_0 : ACAR_{fpw} \leq ACAR_{tpw}$$

As can be seen in Table 3, in the first period, the ACAR of winner portfolios in the test period is much less than in the formation period. This average has reduced from 105.58% in the formation period to -90.43% in the test period (that is, 196.01% has been reduced).

This reduction has taken place in the second period as well the other words in the second period ACAR has reduced from 40.75 to -64.94% (that is, 121.73% has decreased). Thus in the first period and second period, the null hypothesis H_0 is rejected and the result is that companies that sell higher relative growth, the average cumulative abnormal return of these companies formed during the test period Portfolios more. Study in the third period, the average non-cumulative output during the test period has been established that indicate more hypothesis is confirmed.

H_2: In the companies of which proportional operational profit growth is higher, in portfolios formation period is more than in the test. This hypothesis can be expressed in the form below null hypothesis can be:

$$H_0 : ACAR_{fpL} \geq ACAR_{tpL}$$

The result test shows in Table 4 which in each three periods of studied confirmed hypothesis H_0. In the first period ACAR in formation period is 42.54% which has reduced to -79.2% in test period (that is, a reduction of 121.74%). The rate of reduction in the said average in the second period is -26.52% of the formation period to test period. In the third period the value of this average has increase from -23.82% (that is, it had an increase of 1%) but the increase rate has not been meaning full and the second hypothesis of the third period is not also approved.

Therefore, the loser portfolio (having been formed based on the sale growth average in the last three years) is resulted to be optimum in formation period than in test period.

H_3: In the companies of which proportional operational profit growth is higher, ACAR in portfolios formation period is more than in the test period. This hypothesis can be expressed in the form below:

$$H_0 : ACAR_{fpw} \leq ACAR_{tpw}$$

Table 4. Results for unsuccessful Portfolio (ranking based on average sales growth).

Period	Formation period			Test period				Result
	Average cumulative actual return	Average of accumulated market gain	ACAR	Average cumulative actual return	Average of accumulated market gain	ACAR	p-value	
First	201.64	159.10	42.54	122.92	202.12	-79.20	≤0.001	H_0 Confirmed
second	101.03	154.03	-53.00	58.83	138.35	-79.52	0.20	H_0 Confirmed
third	208.92	232.74	-23.82	15.73	14.73	1.00	0.32	H_0 Confirmed

Table 5. Results for successful Portfolio (Ranking based on average operating profit growth).

Period	Formation period			Test period				Result
	Average cumulative actual return	Average of accumulated market gain	ACAR	Average cumulative actual return	Average of accumulated market gain	ACAR	p-value	
First	325.61	159.10	166.51	148.54	202.12	-53.58	≤0.001	H_0 Rejected
second	284.04	154.03	130.00	87.93	138.35	-50.42	≤0.001	H_0 Rejected
third	277.27	232.74	44.54	41.27	14.73	26.54	0.35	H_0 Confirmed

As can be seen in Table 5, ACAR in test period has reduced to 220.09 compared to the formation period.

In the second period this average has reduced from 130% in the formation period to -50.42%. (that is, equivalent to 180.2% decrease is observed). But in third period the fall in this average, from the formation period to test period is not meaningful statistically.

So the H_0 hypothesis is rejected in the first and second periods and so it is resulted that in the companies in which the relative growth of functional profit is higher, the average of abnormal accumulated gain of these companies in the formation period is more than what in the test period.

H_4: In the companies of which proportional operational profit growth low, ACAR in portfolios formation period is lower than test period. This hypothesis can be expressed in the form below null hypothesis can be:

$$H_0 : ACAR_{fpL} \geq ACAR_{tpL}$$

As can be noted in Table 6, fourth hypothesis tests results show that ACAR in the first period in formation period was 42.12% which has reduced to -103.12%. In the test period, so fourth hypothesis is rejected in the first period it has a %4 increase to -69.961%. That it is shown by p- value the increase in not meaningful, therefore H_0 hypothesis is approved in this period as well. In the third period ACAR has increased from -98.41% to 17.03% in the test period for loser portfolios (Means that it has increased 115.44). So in the third period H_0 has been rejected. In the companies of which the relative functional profit growth is lower, the average accumulated abnormal gain in the formation period is higher than in test period.

Conclusion

This paper presents evidence consistent with the hypothesis that individual investors overreact to information in stale public news stories. News-event returns partially reverse only in stocks with an abundance of old information, based on several alternative measures. The information released during these news events is likely to contain substantial overlap with past information, and hence likely to be stale. By contrast, news events likely to convey more new information elicit

Table 6. Results for unsuccessful Portfolio (Ranking based on average operating profit growth).

Period	Formation period			Test period				Results
	Average cumulative actual return	Average of accumulated market gain	ACAR	Average cumulative actual return	Average of accumulated market gain	ACAR	p-value	
First	116.98	159.10	-42.12	99.00	202.12	-103.12	0.01	H0 Confirmed
second	79.97	154.03	-74.07	68.39	138.35	-69.96	0.45	H0 Confirmed
third	134.33	232.74	-98.41	31.76	14.73	17.03	≤0.001	H0 Rejected

much smaller return reversals, or even return continuations In classic economic theories it is assumed that people are completely rational and have limited processing capacity. Standards models of output like the model of pricing the capitalistic properties, the hypothesis efficient market and Arbitrage pricing theory are based upon these two assumptions.

However experimental evidences in decision making processing and judging shows that divergence is more prevalent than to be considered as exception among investors because of limitation in information processing capacity time and other source cognitive constrains. The main question of this paper was does investing over react to financial function criteria?

These prediction indicates that investors who had pessimistic for optimistic ideas about past financial experienced cause the share price to be higher or lower thus its real value. The evidences provided in this research showed that the companies which the period of time had less average sale growth, annual average outcome, were more superior to those companies which were in higher status. In these regards, which means they are more efficient.

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