

Overreaction and Optimal Portfolio Selection in Iran Stock Exchange

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ABSTRACT

There are numerous studies concerning market anomalies and capital market inefficiencies. The existing evidences challenge the efficient market hypothesis and declare that investors overprice the winners' stocks while the losers' are under-priced. This deficiency will be discovered by the market after a few times and there will be a balance then. The purpose of this paper is to present a new strategy of portfolio selection. This study is an applied research and covers eight years (2003-2010) of 60 firms listed on Iran Stock Exchange. The findings reveal that the higher the stock prices of the firms with higher (lower) abnormal accumulated return, the higher (lower) they are priced and finally their return in long-term will be lower (higher). Considering this issue leads to the profitability of the portfolio.

KEYWORDS: overreaction, market anomalies, portfolio, Contrarian strategy, Pricing.

INTRODUCTION

Efficient market hypothesis indicates that the market is sensitive to new information and will be influenced quickly. It also declares that the securities' price is a reflection of the data and shows the real value at any time. There is another hypothesis against this one called overreaction and is an anomaly of the market. According to the latter hypothesis, the stock price is determined far from the real value. It believes the investors to be overreacted confronted with information such that the stocks of the firms with better (worst) performance are over (under) priced. This is because investors generalize their past behavior of future and buy the stocks of those with the strongest performance and sell the ones with the weak performance, consequently. In fact, overreaction hypothesis contradicts the efficient market hypothesis in its weak form. According to the overreaction hypothesis, stock prices of an entity are not determined based on the rational evaluation of the future dividend (Grinblatt & Moskowitz, 2004).

It seems necessary to provide a suitable strategy in capital markets of Iran which is an emerging and developing market. This strategy might be applied to select the optimum portfolio. The vital role of capital markets in economic development should also be considered. Capital market is the place where the funds are gathered and financial sources of manufacturing firms are provided besides. It is also a good place for transferring funds into investment opportunities. Capital market performance is improved by providing a suitable investment approach along with profitability and productivity development which finally leads to efficiency and stock market dynamic.

The present paper seeks to find an answer to a main question about the existence of overreaction in the capital market of Iran. This is because of confirming the low efficiency of that capital market. Additionally, developing privatization and increasing the participants of the capital market led us try to introduce a better strategy among the Contrarian strategies.

Theoretical Background

Portfolio is a composition and a set of investments held by an individual or a firm aimed to profit maximization. It is one of the main challenges of the investors in financial markets. Researchers are eager to find suitable solutions for selecting optimum portfolio.

Overreaction

Many recent studies violate efficient market hypothesis and verify the overreaction of investors. Abnormal accumulated returns are measured to confirm the overreaction. The difference between real and expected return is used to calculate the abnormal return of each share. The modified market return model is employed to achieve the expected return of stocks. According to this model, expected return is equal to market return and is equal for all securities. Hence, the following equation holds true:

$$E(R_{jt}) = E(R_m)$$

Abnormal yield is also calculated as follows:

$$AR_{it} = R_{it} - R_m$$

Market return is measured by using TEPIX index such that:

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

Where in it;

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R_m = Return of Market

I_0 = Index in the beginning of the period

I = Index at the end of the period

The primary studies about overreaction of investors date back to De Bondt and Tahler in 1985. They examined the data about stock returns of United States of America from 1926 to 1928 and provided evidence about the overreaction by investors. Ahmad and Hussein also came to the same conclusion in 2001 in the Malaysian markets. Irrational behaviors of investors lead to lower pricing of stocks and finally under reaction. Parikakis & Syriopoulos (2008) explored the two hypotheses relating to overreaction and under-reaction to predict the movement of stock prices in the future. Their study covered four countries including Turkey, Brazil, America and Great Britain in eight years (1999-2007). They found the overreaction of investors in America, Brazil and Turkey; while this was not true for Britain.

Size

The difference between bids-ask prices of small firms and traders' policies in buying their stocks is a reason for the stock returns in two periods resulting from their size effect. There are extensive measures suggested to evaluate the size effect such as the market value of owner's equity logarithm, total assets' logarithm and sales logarithm. The present paper uses the natural logarithm of firms' sales to measure the size effect.

$$\text{Size} = \ln(\text{sales})$$

Lin & Swanson (2010) investigated the effect of price limitations on the performance of reverse transaction strategies in Taiwan Stock Exchange for a period covering 1997-2006. They used time series and multivariate regression to examine the performance of investments in any of the reverse strategies with regard to size and transaction cycle. Their findings reveal that price limitations delays overreaction. Lobe & Rieks (2011) examined the overreaction of firms listed on Frankfort Stock Exchange for the years 1998-2007 and controlled size effect. They challenged efficient market and confirmed that overreaction is not confined to small firms while emphasized on overreaction with size control. Trablesi(2010) considered size as a measure to portfolio selection and confirmation of overreaction. The findings of Jalilian & Jalilian (2011) assert the direct relationship between return and size.

Book to Market Value of Owner's Equity

Due to the explanatory power of stock returns in relation to the B/M value of owner's equity, it is believed that the stock returns difference does not confirm the overreaction. This ratio is achieved by dividing the total owner's equity to the result of multiplying the share numbers by their market value. Chiao & Hueng (2005) investigated the effect of overreaction in a time period including 1975-1999 in Japan Stock Exchange. They found that overreaction is not only significant after controlling size effect and B/M ratio but also emphasizes on a portfolio based on past returns. These findings are not in consistent with Kort& Nielsen (2005). They replied to a question concerning the following: "is B/M value of owner's equity an indicator of risk?" They inferred that the risk difference is an important factor in interpreting the effect of B/M value ratio. They provided no reason for the carelessness of CAPM models for the relationship between book value to market value. In doing so, they discovered the misestimate of stock prices instead of overreaction. Their findings contradict the prior researcher's forecasts about overreaction.

Research Hypothesis

The present paper regards four hypotheses as follows:

H1: Stock prices of those firms with higher (lower) past abnormal accumulated returns are overpriced (under-priced).

H2: Stock prices of those firms with larger (smaller) size are overpriced (under-priced).

H3: Stock prices of those firms with higher (lower) B/M value are overpriced (under-priced).

RESEARCH METHODOLOGY

The present paper seeks to determine a strategy for selecting optimum portfolio in Iran Stock Exchange. This is an applied research with the post-event orientation which findings are useful in solving the related problems.

The statistical population of the present study includes all the firms listed on Iran Stock Exchange from 2003 to 2010. The final sample firms should be inconsistent with the following characteristics:

- Their end of fiscal year ought to coincide with the calendar year.
- There should be no transaction cease more than one year.
- Neither investment nor financial intermediaries should the firm have been classified.

Data Analysis

The required data are gathered through verified sources including World Wide Web or other experimental software available. We selected portfolio according to firm size, B/M value of shares and abnormally accumulated return. Then, we examined the effect of these factors on stock returns followed by providing a method for portfolio selection by using weighted average strategy.

H1: Stock prices of those firms with higher (lower) past abnormal accumulated returns are overpriced (underpriced) and their shares yield higher (lower) return in long-term.

Table 1 shows that those firms with higher (lower) abnormal accumulated return are overpriced (under-priced) and their shares yield higher (lower) return in the long-term. This is typically an indicator of overreaction.

Weighted Overreaction Strategy

This strategy will be based on Conrad et al. (1994) methodology. Initially, the weights of stocks in winning and losing portfolios are formed and the below formula is determined according to abnormal accumulated return.

$$W_{i,t,k} = \frac{R_{i,t-k}}{\sum_{i=1}^N R_{i,t-1}}$$

After determining the stock weights of the winner portfolio, lower weight stocks are selected, in the loser portfolio, higher weight stocks are selected and new achieved portfolios in the periods of formation and test are compared. The results are shown in table 2.

The results reveal that mean return difference for the loser portfolio in the formation period and test period is 87.38; while this difference for the winner portfolio is equal to -45/03. Significant level of $\alpha = 0.05$ indicates that assigning higher weights to those stocks with a bad performance in the past along with their selection in portfolio and holding them in a four-year period can cause a 87.38 percent return.

H2: Stock prices of those firms with larger (smaller) size are overpriced (under-priced) and their shares yield higher (lower) returns in the long-term.

Table 3 shows that portfolio selection with due attention to size effect leads to a loss in the next period. The significance level of $\alpha = 0.05$ also means that stock prices of larger (smaller) firms are overpriced (under-priced) and their stocks don't yield low (high) long-term return.

H3: Stock prices of those firms with higher (lower) B/M value are overpriced (underpriced).

As the table 4 shows, those firms with higher (lower) B/M value are not overpriced (under-priced) and their stocks will not yield lower (higher) return in long-term.

Strategy Comparison

This section compares the strategies of overreaction, size and B/M ratio by using mean equality test. We took the loser portfolios to attest for overreaction strategy (S1). For the effect size, we considered the strategy that consists in investing in lowly capitalized market stocks (S2). As for the B/M ratio effect, we chose the strategy based on the portfolios created by means of high B/M ratio stocks (S3). Finally, we took the loser portfolios to attest for weighted overreaction strategy (S4). (Table 5& 6). The findings disclose significant differences between overreaction strategy and the size and B/M ratio strategies. This shows that selecting a portfolio by an overreaction strategy leads to a higher profitability in a four year period.

Table 1.Overreaction Strategy

Variable	Average Annual Return (82-85)	Average Annual Return (86-89)
P ₁	-1.94	
P ₂	1.74	
P ₁₁		71.03
P ₁₂		-17.05
Additional Return		t-statistics
P _{1Δ}	72.95	0.022
P _{2Δ}	-18.79	0
		p-value
		-2.74
		4.83

Table2. Weighted Overreaction Strategy

Variable	Average Annual Return (82-85)	Average Annual Return (86-89)
P ₁	-29.71	
P ₂	71.98	
P ₁₁		57.67
P ₁₂		26.95
Additional Return		p-value
P _{1Δ}	87.38	0.002
P _{2Δ}	-45.03	0.001
		t-static
		-3.712
		4.544

Table 3.Size effect Strategy

Variable	Average Annual Return (82-85)	Average Annual Return (86-89)
P ₁	27.57	
P ₂	44.03	
P ₁₁		24.25
P ₁₂		19.68
Additional return		p-value
P _{1Δ}	-3.32	0.802
P _{2Δ}	-24.35	0.113
		t-statistics
		0.252
		1.603

Table4. Size effect Strategy

Variable	Average Annual Return (82-85)	Average Annual Return (86-89)
P ₁	18.25	
P ₂	14.37	
P ₁₁		25.12
P ₁₂		36.62
Additional Return		p-value t- statistics
P _{1Δ}	6.87	0.578 -5.59
P _{2Δ}	22.25	0.006 -2.86

Table5.Mean comparison

Variable	Mean difference		result
(S ₁ , S ₂)	S ₂	S ₁	Overreaction strategy is better
	-3.32	72.95	
(S ₁ , S ₃)	S ₃	S ₁	Overreaction strategy is better
	22.25	72.95	
(S ₂ , S ₃)	S ₃	S ₂	There is no significant relationship between Size effect Strategy and Size effect Strategy
	22.25	-3.32	
(S ₃ , S ₄)	S ₄	S ₃	Weighted Overreaction Strategy is better
	87.38	22.25	
(S ₁ , S ₄)	S ₄	S ₁	There is no significant relationship between Overreaction Strategy and Weighted Overreaction Strategy
	87.38	72.95	
(S ₂ , S ₄)	S ₄	S ₂	Weighted Overreaction Strategy is better
	87.38	-3.32	

Table 6.Mean Equality Test

Variable	t-static	p-value
(S ₁ , S ₂)	3.975	0.001
(S ₁ , S ₃)	-4.666	0
(S ₂ , S ₃)	-1.87	0.083
(S ₃ , S ₄)	2.523	0.029
(S ₁ , S ₄)	-1.36	0.895
(S ₂ , S ₄)	-2.214	0.040

CONCLUSION AND DISCUSSION

There are prior literature reviews about overreaction and their results are an indicator of investors who overreact to stock price. Hence, the present paper aims to investigate the effect of market anomalies on stock returns through a portfolio formation in a four-year period. This study is based on real stock market data and the required data are gathered from financial statements and other management reports. It covers eight years of firms listed on Iran Stock Exchange with the specific situations. The mean equality test was applied to test the hypothesis which finally led to the following:

- The stock prices of firms with higher (lower) abnormal accumulated return are overpriced (under-priced). This is in consistent with the findings of Ahmad and Hussain, Trablesi (2010), De Bondt and Thaler (1985).
- The stock prices of past larger (smaller) firms are not overpriced (under-priced). This contradicts the findings of Lin and Swanson (2010) but is in consistent with Lobe and Rieks (2011), Trablesi(2010), Chiao and Hueng's (2010) finding.
- The stock prices of those firms with higher (lower) B/M ratios are not overpriced (under-priced) and this is in line with the findings of Chiao and Hueng (2010) and kort& Nielsen (2005).

Therefore, those investors who buy a low Abnormal accumulated returns stock and sell the stocks with a high Abnormal accumulated returns will achieve more profit. However, this profitability will increase with buying (selling) stocks with more (less) weights established in a loser (winner) portfolio. In other words, the stock return might be increased by considering a Contrarian strategy instead of a momentum strategy. This is not therefore consistent with book to market and size factor.

The following suggestions are provided according to the findings:

According to the non-significant difference between mean returns of formed portfolios with a reference to size effect and B/M value of owner's equity are not suggested to be applied in portfolio selection. Weighted overreaction strategy leads to additional return and finally long-term profitability of the portfolio. Hence, investors and financial managers are offered to employ this method for portfolio selection. The applied finding related to the investors and shareholders shows that a successful firm in terms of abnormal accumulated return is not necessarily a good opportunity for investments because its stocks might be priced so high while its intrinsic value is lower than the market price. On the other hand, a firm with a lower level of success in abnormal accumulated return has a lower intrinsic value. It is a

good opportunity for investment, however. Further researches can consider beta coefficient, standard deviation and liquidity instead.

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