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Investigating the Effect of Momentum Strategies on Investment Success in the Iran Stock Market

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Abstract

One of the most challenging observations in the capital market is that in contrary to the work market hypothesis, the regular portfolio's returns shows specific behaviors in different time periods and therefore it's possible to acquire higher returns than the market by following the investment strategy compatible with the intended time horizon. George and Hwang (2004) show that a stock's 52-week high price explains the momentum effect and that a strategy based on closeness to the 52-week high has better forecasting power for future returns than those strategies based on past returns. Cahan shows that absolute 52high price is better than 52high momentum for forecasting power for future. We demonstrate that the 52-week high and absolute 52high momentum strategies are robust in Iran Stock Market(ISM) over the period 2004–2008. Our sample exhibit statistically significant profits when implementing this 52-week high for 3, 6 and 12 month holding periods and 6 month holding period for absolute 52high momentum strategy. Then we measure its investment performance on the basis of the Fama and French 3-Factor to measure incremental performance. Our findings show that the 52-week high strategy generates significant, positive risk-adjusted returns within the framework of the Fama/French 3-Factor Model.

Keywords: Momentum Trading Strategies, 52high Momentum Strategy, Absolute 52high Momentum Strategy, Size

Introduction

For a long time, financial theorists have been theorizing the financial context and investigating individual's decision making process in the financial matters according to the assumptions of the neoclassic hypothesis. But in the recent years, many of these assumptions have been challenged. One of the most challenging observations of the stock market is that against the Efficient Market Hypothesis that is the basis for many of the modern financial theory, the performance of the regular portfolio shows specific behaviors in different time periods and individual investors can gain a better performance than that of the market's by bearing higher risks and utilizing a proper investment strategy. The studies show that in a time period of 3 to 12 months, the phenomenon of momentum or constant return exists in

the behavior of the regular portfolio and hence, the investment return can be increased by utilizing the momentum investment strategy. This phenomenon stands against the long-short time periods that contains the return reversal phenomenon and within which utilizing the inverse investment strategy results in higher returns acquisition. These observations mean that by historical pursuit of the regular portfolio's value, the return of a portfolio can be increased. Many researchers have attempted to justify the medium-term period returns phenomenon by using modern finance theory. Here, the excess return achieved by the utilization of the momentum investment strategy is indeed making amends for the unknown risks that the current theories are unable to explain. Some of the researchers have taken aid from psychological concepts rather than the financially rational human theory that has been the basis of the financial theories for years. According to them, the behavioral bias of the investors in the market is the reason for the mid-time returns protraction. For this reason, while proven in many of the developed and newfound markets, this study seeks to investigate the profitability of the 52high momentum strategy in Tehran's portfolio market. Many studies have documented that stock returns are predictable based on past price information. Jegadeesh and Titman (1993) (hence, "JT") show that when stocks are ranked into deciles based on past returns in a medium-term period, the top percent (winners) continues to outperform the bottom percent (losers) in a medium-term period, generates 1% exceed return per month DeBondt and Thaler (1985) document long-term reversals at horizons from three to five years.

George and Hwang (2004) (hence, "GH") propose a momentum strategy different from that of JT. At the end of each month, they calculate the ratio between a stock's current price and its past 52-week high price. Stocks with high ratios being considered winners while stocks with low ratios losers. They construct a zero-investment portfolio measure the performance of this portfolio. GH discovers a zero-investment portfolio that buys the top 30 percent stocks (winners) and sells bottom 30 percent stocks (losers) generates 0.45% return per month in the U.S. stock market (Liu et al, 2011:3)

Various studies evaluate the profitability of JT momentum strategy in international equity markets. Rouwenhorst (1998) finds significant JT momentum effect in all twelve European countries in sample. Rouwenhorst (1999) finds JT momentum effect in a sample of twenty emerging markets using data from the Emerging Markets Database. Hameed and Kusnadi (2002) find that there is no JT momentum effect in six Asian stock markets individually. Chui, Titman and Wei (2000) find strong evidence on Asian stock markets in aggregate excluding Japan. But, only Hong Kong exhibits statistically significant momentum profits.

In this paper, we study the 52-week high and absolute 52-week high effect momentum within Iran stock markets using portfolio analysis. We have three findings. First, the 52-week high and absolute 52-week high momentum effect is robust in Iran stock market. In our sample, Iran stock market exhibits statistically significant GH and absolute 52-week high momentum profits. Second, the risk-adjusted returns show that the risk factors (SMB and HML) for 6 month holding period and SMB for 12 month holding period can explain the GH momentum profits. Third, the amount of transaction cost that would need to be charged to make the 52high momentum strategy average monthly return amount to zero for 30% portfolio is 0.57%.

Literature Review

Most momentum strategies focus on stocks that have experienced extreme returns in the past. Jegadeesh and Titman (1991), presented some evidence about the relation of the gap between the purchase and sale prices with the recurrence of the short-term returns. In addition, Lo and Mackinlay (1990) believe that a large portion of the abnormal returns highlighted by Jegadeesh and Titman can be linked to the delayed reaction of the portfolio's price to general factors.

The recent studies show that opposite the short-term and long-term periods, the portfolio returns in the medium–term periods has a pattern that tends to keep its condition. In other words, the portfolio returns tend to keep the performance of the recent 3 to 12 months until the next 12 month. Therefore, utilizing the momentum strategy that advises to purchase the portfolio that has shown a better performance in the last 12 months and to sell the portfolio that has shown a lower performance in the same period, results in abnormal returns. Lo (1967) claims that the purchase of the portfolio which has shown a good performance in the last 27 weeks results in meaningful returns. Jensen and Bennington (1970) investigated the profitability of lo's exchange law in a period other than his studied period. They found out that in their period, lo's law of exchange has no better performance than the purchase and preserve strategy and therefore linked the results of his studies to the selection bias. Grinblatt and Titman (1989, 1991) showed that most of the joint investment funds tends to buy the portfolio's which their value has increased within the last season.

Jegadeesh and Titman showed that the momentum strategy can gain one percent higher return than the market's return per month. In their study over the portfolios exchanged in the U.S and New York stock exchange between 1965 to 1989, they grouped the portfolios into tenth's and then named the one with the highest returns as the winner portfolio and the one with the lowest returns as the loser portfolio. Finally, they concluded that the momentum strategy that buys the winner portfolio and sells the loser portfolio can gain a meaningful uncommon return in mid time periods. They believe the profitability of the momentum strategy to be the result of delayed reaction of the stock's value to the firm specific information (Jegadeesh & Titman, 1993).

Rouwenhorst studied the profitability of the momentum strategy in 12 European stock markets. He observed that in these markets, the momentum strategy still gains abnormal returns after the risk adjustment (Rouwenhorst, 1997). He also proved the occurrence of abnormal returns in 6 emerging markets (Rouwenhorst, 1999). Richard (1997) proved the profitability of the momentum strategy in 16 countries by utilizing the monthly profitability of returns. Hameed and Yanto (2000) showed that the momentum strategy gains little but meaningful profits in 6 Asian markets. Moskowitz and Grinblatt (1999) observed a strong momentum effect among the industries. The results of their work showed that purchasing the winner industries portfolio while selling the portfolio of the loser ones can result in additional returns. Conrad & Kaul also confirmed the effectiveness of the momentum strategy for the mid time and inverse investment strategy for the long–term periods. Marshall and Cahan (2005) apply the same 52-week high momentum strategy in the Australian Stock Exchange. The results of their work showed that the 52high momentum strategy is profitable. Liu et al (2006) apply the 52-week high momentum strategy in international stock markets. The results of their work showed that the 52high momentum strategy in Ten out of sixteen markets in their sample exhibit statistically and economically significant profits. Yu (2011) investigated the profitability of momentum strategies in 5 past reference prices in a medium-

term period. She found out that momentum strategies are profitable in 5 past reference prices and the 52-week high strategy is more profitable than the other momentum strategies.

We build on the basis of prior studies, and test whether strategies that refine the trading rules can be found that reliably result in significant, positive, risk-adjusted returns.

Our Data, Sample, and Basic Empirical Approach

We retrieve daily returns from the Iran Stock Market (ISM) Database for the years 2004 through 2008. We include only common stocks. All stock prices are adjusted for stock splits or stock dividends. In our final sample, we require the stock has at least one full year of daily price data in ISM. We refer to the stocks in our base sample as the group of eligible stocks. For the 52-week high momentum strategy, we use the methodology that propose by George and Hwang (2004) for 52high momentum strategy and use methodology that propose by Cahan for absolute 52high momentum and transaction costs. First for 52high momentum we find stocks that are near their 52-week high price. This is calculated for each stock at the end of each month using the following formula:

$$\text{Ratio of nearness to the 52 - week high price } = \frac{P_i\,t}{high_{i,t}}$$

(1)

Where:

P_i, t= the closing price of the stock at the end of the month, and
High i, t= the highest price of the stock during the previous 12-month period (52-week high). The 52-week high period ends on the last day of the month.

The stocks are then ranked according to this ratio, starting from stocks with the highest ratio (closest to the 52-week high price) to those with the lowest ratio (furthest from the 52-week high price). The next step is to construct equally weighted portfolios where the top 30% of the ranked stocks represents the winner portfolio, and the bottom 30% represents the loser portfolio. All portfolios are held for 3, 6 and 12 months. Our empirical analysis begins with testing the effectiveness of 52-week high momentum strategy. We adopt two-tailed t tests of the significance of the spread of the monthly return between top and bottom portfolios.

For absolute 52high momentum stocks are first ranked by their nearness to their 52high price from lowest ratio to highest. The top percentage of stock on the list is classified as could be winner and the bottom percentage of stock are classified as could be losers the stock in the could be portfolio are then tested for past performance. Only stocks that have an increasing (decreasing) past return over the formation period, using close price data, make it into the final winner (loser) portfolio. The stocks in the winner and loser portfolio are then brought at the next month close price. Portfolio are held for six month and sold at the last months close price. For testing nearness to the 52high price we used George and Hwang (2004) methodology and for calculating the return over the 6 month before the date of formation used the below formula:

$$\text{Past return for absolute momentum} = \left(\frac{\frac{P_{i\,t}}{P_{i,\,t-n}} - 1}{n} \right) \times 100 \tag{2}$$

Where:

$P_{i,\,t}$ = End of month close price of a stock at formation;
$P_{i,t-n}$ = = End of month close price n month ago;
n = Number of months in the formation period.

Then, we investigate the investment performance of the 52high momentum strategy within the framework of the Fama/French (1996) three-factor model as following:

$$Rp - Rf = \alpha + \beta 1\,(Rm - Rf) + \beta 2 SMB + \beta 3 HML + \varepsilon \tag{3}$$

$$Rp_1 - Rp2 = \alpha + \beta 1\,(Rm - Rf) + \beta 2 SMB + \beta 3 HML + \varepsilon \tag{4}$$

Where RP = monthly return of the portfolio; Rp1 = monthly return of the top portfolio from each momentum strategy; Rp2 = monthly return of the bottom portfolio from each momentum strategy; Rf = one-month treasury bill rate (as a proxy for risk-free rate); RM = monthly return of the market; SMB = return difference between small and big stocks; HML = return difference between value and growth stocks.

Finally we calculate the amount of transaction cost that would need to be charged to make the 52high momentum strategy average monthly return amount to zero. For this we used below formula:

$$TC = \frac{WLR \times h}{4 + (WR \times h) + (LR \times h)} \tag{5}$$

Where:

TC = The transaction costs for each stock as a percentage that would need to be charged to make the return on the strategy zero;
WLR = Winner minus Loser return given as a percentage;
WR = Winner portfolio return as a percentage;
LR = Loser portfolio return as a percentage;
H = Holding period in month for the strategy.

Empirical Tests and Results

The Investment Performance of 52high Momentum Strategy

We begin with an examination of the average monthly returns of the three portfolios. We also examine the monthly return differential between top and bottom portfolios. All portfolios are formed based on price at the end of the month. The null hypothesis is that we cannot use past return to forecast future return. According to this hypothesis, momentum strategies cannot generate excess returns.

Table 1 reports the average monthly returns of the winner and loser portfolios, and the monthly return differential between top and bottom portfolios of 52high momentum strategy. All return differentials are statistically significant at 95% level. The average monthly performance of the top portfolio dominates to those of the middle and the bottom portfolios. This observation rebuts the null hypothesis that momentum strategies cannot generate positive excess returns.

Table 1. Returns of Momentum Portfolios Based on 52 Week-High Price Based on 3 Portfolios

		Monthly return		
K=12	K=6	K=3	Portfolio	J
0.0005	0.0027	0.0005	winner	52 Week-High Price
-0.0069	-0.006	-0.0068	loser	
0.0074	0.0087	0.0073	(Winner-loser)	
(2.046)**	(2.455)**	(2.849) **		
				Significance levels: * = 1%, ** = 5%, *** = 10%.

This table presents the average equal-weighted monthly returns of portfolios that are created based on 52 week-high price for all the firms in the ISM during the period from January 2004 through December 2008. At the beginning of each month stocks are sorted into three equally-weighted portfolios according to the ratio of the current price to its 52 week high. Stocks with the lowest ratio (furthest from the 52-week high price) are assigned to the loser portfolio (loser). Stocks with the highest ratio (closest to the 52-week high price) are assigned to the winner portfolio. WML represents the 52 week-high price momentum strategy of winner –loser portfolio. K represents monthly evaluation periods (J = 3, 6 and 12 months). All positions are entered at closing prices 1 day after the portfolio formation day, and are held for 3, 6 and 12 months. A two-tailed t test is adopted to determine whether the average monthly performance difference between the top and bottom performing portfolios is statistically significant. T-statistics are in parentheses

52high Momentum using Different Portfolio Percentages in Feb 2004 – Dec 2008

In this part we examine different percentage of 52high momentum to measure which percentage is more profitable. GH use 30% for winner and loser portfolios. Stocks are held for 6 month. We test 5%, 10%, 20, 30%, 40% and 50% for winner and loser portfolios. The different percentages are tested over Feb2004 to Dec2008. Significance is shown in parenthesis.

Table 2 shows that the lower portfolio percentage and the larger portfolio percentage are not significant and 30% outperform the other percentages.

Table 2. 52high momentum using different portfolio percentage Feb 2004 – Dec 2008

Winner-loser	loser	winner	Portfolio percentage
0.0013 (1.12)	-0.0004	0.0009	5%
0.0034 (2.106)**	-0.0026	0.0008	10%
0.0063 (2.455)**	-0.0042	0.0021	20%
0.0087 (2.455)**	-0.006	0.0027	30%
-0.00184 (2.296)**	0.00044	-0.0014	40%
0.0027 (0.623)	0.0014	0.0041	50%

This table presents different percentages of 52high momentum to measure which percentage is more profitable. GH use 30% for winner and loser portfolios percentage. Stocks are held for 6 month. We test 5%, 10%, 20, 30%, 40% and 50% for winner and loser portfolios percentages. The different percentage is tested over Feb2004 to Dec2008. Significance is shown in parenthesis.

The Investment Performance of Absolute 52high Momentum Strategy

We begin with an examination of the average monthly returns of the three portfolios for 6 month holding periods and 3, 6 and 12 month formation periods. We also examine the monthly return differential between top and bottom portfolios. All portfolios are formed based on price at the end of the month. The null hypothesis is that we cannot use past return to forecast future return. According to this hypothesis, momentum strategies cannot generate excess returns.

Table 3 reports the average monthly returns of the winner and loser portfolios for 6 month holding periods, and the monthly return differential between top and bottom portfolios of absolute 52high momentum strategy. All return differentials are not statistically significant at 95% level except 6 month time horizon. The average monthly performance of the top portfolio dominates to those of the middle and the bottom portfolios. This observation rebuts the null hypothesis that momentum strategies cannot generate positive excess returns just for 6 month holding period.

Table 3. Returns of Momentum Portfolios Based on absolute 52 Week-High Price Based on
3 Portfolios and different formation period

Winner-loser	loser	Monthly return winner	
0.0012 (1.350)	- 0.0014	0.0026	3month formation
0.0089 (2.816)**	- 0.0045	0.0041	6month formation
0.0043 (1.303)	- 0.0025	0.0018	12month formation
			Significance levels: * = 1%, ** = 5%, *** = 10%.

This table presents the average equal-weighted monthly returns of portfolios that are
created based on absolute 52 week-high price for all the firms in the ISM during the period
from January 2004 through December 2008.

Absolute 52high momentum using different portfolio percentage Feb 2004 – Dec 2008

In this section we examine different percentage of 52high momentum. Stocks are held
for 6 month. We test 5%, 10%, 20, 30%, 40% and 50%. The different percentage is tested over
Feb2004 to Dec2008. Significance is shown in parenthesis.

Table 4 shows findings that the lower portfolio percentage and the larger portfolio
percentage are not significant and 30% outperform that the other percentages.

Table 4. Absolute 52high momentum using different portfolio percentage Feb 2004 – Dec
2008

Winner-loser	loser	winner	Portfolio percentage
-0.05154 (1.085)	0.152126	0.100584	5%
0.1085 (1.138)	0.29181	0.1085	10%
0.536143 (2.35)**	-0.32371	0.21243	20%
0.0089 (2.816)**	-0.0045	0.0041	30%
-0.22016 (0.6)	0.066429	-0.15373	40%
-0.05392 (0.667)	0.244189	0.190268	50%

This table present different percentage of absolute 52high momentum to measure which percentage is more profitable. Stocks are held for 6 month. We test 5%, 10%, 20, 30%, 40% and 50% for winner and loser portfolios percentages.

Different percentages are tested over Feb2004 to Dec2008. Significance is shown in parenthesis.

The investment performance of the momentum strategy within the framework of the Fama/French

It is common in return predictability studies to investigate whether the profits of the trading strategies arise as a compensation for other risk factors. In this paper the results of the GH momentum strategy have been risk-adjusted using Fama and French three-factor models. The below regression is examining how much of the 52-week High momentum trading strategy average monthly return can be explained away by the factors; return above the market, size and value.

Table 5. Evaluation of average monthly excess returns: Fama/French model

HML	SMB	RM - Rf	Alpha		Holding periods
-1.621 (-0.851)	1.113 (0.402)	-1.33 (-0.226)	0.794 (2.737)	Parameter t-stat	3
-6.471 (-2.519)***	6.549 (1.765)**	6.06 (0.762)	1.18 (3.012)*	Parameter t-stat	6
-1.26 (-0.497)	-6.293 (-1.709)***	-1.286 (-0.164)	0.981 (2.538)*	Parameter t-stat	12

Significance levels: * =1%, ** = 2%, *** = 10%.

A Fama/French model is adopted in the following regression study. All top and bottom ratio portfolios are held for 3, 6 and 12 months.

$$Rp - Rf = a + b_1(RM- Rf) + b_2SMB + b_3HML + e$$

$$Rp_1 - Rp_2 = a + b_1(RM - Rf) + b_2SMB + b_3HML + e$$

Where RP is the average monthly return of either the top ratio portfolio (Rp1) or the bottom ratio portfolio of the same strategy (Rp2), Rf is the risk-free rate, RM is monthly return of the market, SMB is the return difference between small and big stocks, HML is the return difference between value and growth stocks

All coefficients are not significant except SMB which is significant at 5% level and HML which is significant at 10% level for 6 month holding period. For 12 month holding period just SMB is significant at 10% level. The result is showing that the larger difference between the

small cap and large cap return the less profitable the 52-week High momentum strategy becomes. As the alpha is significant, it appears that 52-week High momentum strategy is profitable after adjusting for risk for 6 and 12 month time horizon. In summary, ISM produced significant and positive risk-adjusted returns for the 52wk high strategy.

Transaction Costs

One of the major factors that influence a strategy's profitability is that of transaction costs.Table6 present the amount of transaction cost that would need to be charged to make the 52high momentum strategy average monthly return amount to zero. We use 5%, 10%, 20%, 30% and 50% portfolio percentage that were used in Cahan (2008). The result shows that the lower winner minus loser average monthly return needs the lower transaction cost to make GH momentum strategy return zero. For 30% portfolio percentage the transaction costs would need to be higher than 0.57%on the buy and sell side to return a negative winner minus loser result after transaction costs have been accounted for.

Table 6. Transaction costs to make the return from the 52hige momentum equal zero

Transaction Cost	Winner-loser	loser	winner	Portfolio percentage
0.19%	0.0013	-0.0004	0.0009	5%
0.52%	0.0034	-0.0026	0.0008	10%
0.91%	0.0063	-0.0042	0.0021	20%
0.57%	0.0087	-0.006	0.0027	30%
0.40%	0.0027	0.0014	0.0041	50%

This table presents the amount of transaction cost that would need to be charged to make the 52high momentum strategy average monthly return amount to zero.

Conclusions

The 52high momentum strategy was first published by George and Hwang in 2004. Their result show positive abnormal returns in the US market by buying stocks that are close to their 52 week high price and selling stocks that are far from their52 week high price. The absolute 52high momentum strategy was first published by Cahan in 2008. Her result show positive abnormal returns in the US market by buying stocks that are close to their 52 week high price and increasing past return over the formation period and selling stocks that are far from their52 week high price and decreasing past return over the formation period.

Marshall and Cahan (2005) apply the same 52-week high momentum strategy in the Australian Stock Exchange. The results of their work showed that the 52high momentum strategy is profitable. Liu et al (2006) apply the 52-week high momentum strategy in international stock markets. The results of their work showed that the 52high momentum strategy in Ten out of sixteen markets in their sample exhibit statistically and economically significant profits. Yu (2011) investigated the profitability of momentum strategies in 5 past reference prices in a medium-term period. She found out that momentum strategies are profitable in 5 past reference prices and the 52-week high strategy is more profitable than the other momentum strategies.

This paper studies the 52-week high and momentum strategy Iran stock market. We present three main results in this paper. First, we find that the 52-week high momentum and absolute 52high momentum profits are robust in Iran stock market. Second, SMB and HML risk factors in 6 month holding and SMB in 12 month holding period can explain the 52-week high momentum returns. In fact, the 52-week high momentum strategy becomes profitable after risk-adjustment. Third, the amount of transaction cost that would need to be charged to make the 52high momentum strategy average monthly return amount to zero is 0.57% for 30% portfolio percentage.

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