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## **Size, Book to Market Ratio and Momentum Strategies: Evidence from Istanbul Stock Exchange**

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### ABSTRACT

This paper examines the effects of size, book-to-market in explaining momentum at the Istanbul Stock Exchange during the period 1995 to 2010. The results show that momentum strategy appears to have a high performance for six month holding periods. Moreover, the results are robust and can be explained by size and by book-to-market effect. Besides, January effect is insignificant on the stock returns in the period 1995-2010. The result of this study also shows that the momentum is existing on stock returns in Istanbul Stock Exchange and the evidence suggests that the momentum strategies can be used to obtain abnormal returns by the investors in Turkey.

JEL Classification: G11; G14.

Key Words: Momentum Strategies; Behavioral Finance; Size, Book to Market Ratio..

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### 1. INTRODUCTION

Fama (1970) defines an efficient market as the market where security prices at any time always “fully reflect” all available information. In an efficient market, it is assumed that investors behave rationally and not to yield an abnormal return. However, various anomalies observed on markets have brought about discussions regarding the validity of the theory of efficient markets. The theory of behavioral finance emerging as an alternative theory for efficient markets are supposed that investors do not always behave rationally, behaves of irrational investors may bring about such anomalies as under-reaction and over-reaction. And also, abnormal return can be achieved by using these anomalies.

Momentum is a symptom of under-reaction which means that prices adjust too slowly to the updates (Hong et al. 2000). Prior researches have shown that the momentum strategy, which means buying past stock winners and selling past stock losers, can generate abnormal returns, that is, past winners / past losers tend to be future winners / future losers (Jegadeesh and Titman, 1993-2001).

Momentum profits have been documented to be related to various factors. However, the results are not conclusive and the reasons for the occurrence of these phenomena are not determined conclusively. There might be unexplored factors affecting momentum profit. There are still discussions on this subject.

Numerous studies on momentum strategies are well documented for the developed and emerging markets. Jegadeesh and Titman (1993) analyzed strategies which purchase stocks that have performed well in the past and sell stocks that have performed poorly in the past generate significant positive returns over 3 to 12 months holding periods. They found that the profitability of these strategies were not owing to their systematic risk or to delayed stock price reactions to common factors. However, part of the abnormal returns gathered in the first year after portfolio formation disappears in the following two years. A similar pattern of returns around the earnings announcements of past winners and losers has also been recorded.

Jegadeesh and Titman (2001) evaluated various explanations for the profitability of momentum strategies reported in Jegadeesh and Titman (1993). They found that momentum profits continued in the 1990s, indicating that the original results were not a product of data snooping bias. They also examined the predictions of recent behavioral models that suggested that momentum profits were due to delayed overreactions that were ultimately reversed. Their evidence provides support for the behavioral models, but this support should be carefully tempered.

Rouwenhorst (1998) reported international return continuation in a sample of 12 European countries during the period 1980 to 1995. An internationally diversified portfolio of past winners outperformed a portfolio of past losers monthly by about 1 percent. These relative strength strategies load negatively on conventional risk factors such as size and the market. The payoffs were therefore not consistent with the joint hypotheses of market efficiency and commonly used asset pricing models. Return continuation existed in all countries, and held for both large and small firms, although it was stronger for small firms than large firms. The European evidence was noticeably similar to the findings of the U.S. by Jegadeesh and Titman (1993), and made it unlikely that the U.S. experience was simply due to chance. Returns on European momentum portfolios were significantly correlated with relative strength strategies in the US.

Moskowitz and Grinblatt (1999) reported a strong and pervasive momentum effect in industry components of stock returns which explains much of the individual stock momentum anomaly. Particularly, momentum investment strategies which buy past winning stocks and sell past losing stocks, are considerably less profitable once they control for industry momentum. By contrast, industry momentum investment strategies, which buy stocks from past winning industries and sell stocks from past losing industries, appear quite profitable, even after controlling for size, book-to-market equity, individual stock momentum, the cross-sectional dispersion in mean returns, and potential microstructure influences.

Hong et al. (2000) examined the gradual-information-diffusion model of Hong and Stein (1999). They found three key results. First, once one moves past the very smallest stocks, the profitability of momentum strategies declines dramatically with firm size. Second, holding size fixed, momentum strategies work better among stocks with low analyst coverage. Third, the effect of analyst coverage is greater for stocks that are past losers than for past winners. They state that these findings are consistent with the hypothesis that firm-specific information, particularly negative information, diffuses only gradually across the investing public.

Chordia and Shivakumar (2002) showed that profits to momentum strategies could be explained by a set of lagged macroeconomic variables and payoffs to momentum strategies ceased to exist once stock returns were adjusted for their predictability based on these macroeconomic variables. These results provide a possible role for time-varying expected returns as an explanation for momentum payoffs.

Griffin et al. (2003) investigated whether macroeconomic risk can explain momentum profits internationally. They couldn't find any evidence about that macroeconomic risk variable can explain momentum. They found that momentum profits around the world are economically large and statistically reliable in both good and bad economic states, and these momentum profits reversed over 1- to 5-year horizons, an action inconsistent with existing risk-based explanations of momentum.

Doukas and McKnight (2005) carried out an out-of-sample test of two behavioural theories that have been proposed to account for momentum in stock returns. They examined the gradual-information-diffusion model of Hong and Stein (1999) and the investor conservatism bias model of Barberis et al. (1998) in a sample of 13 European stock markets during the period 1988 to 2001. These two models predict that momentum is driven by (i) gradual dissemination of firm-specific information and (ii) investors' failure to update their beliefs adequately when they observe new public information. The results of this study are consistent with the predictions of the behavioural models of Hong and Stein's (1999) and Barberis et al. (1998). The evidence reveals that momentum is the result of the progressive diffusion of private information and investors' psychological conservatism reflected on the systematic errors they make in forming earnings expectations by not updating them sufficiently relative to their prior beliefs and by underestimating the statistical weight of new information.

Durand et al. (2006) examined the momentum effect using the J-month/K-month methodology of Jegadeesh and Titman (1993-2001). Their sample comprise stocks listed on the Australian stock exchange from January 1980 to December 2001. They didn't find any evidence for a momentum effect in Australia during this period. Rather, they found evidence of significantly positive returns for 'loser' portfolios in July—the first month of the Australian financial year.

Avramov and Chordia (2006) found that the time-varying beta versions of multifactor models could capture the size and book-to-market effects. Nevertheless, turnover and past returns were important determinants of the cross-section of stock returns even when return was adjusted by a liquidity factor or a momentum factor, or both. Pan and Hsueh (2007) investigated profits from momentum strategies when applied to national stock market indexes. The empirical results based on the stock market indexes of 12 European countries and the U.S. demonstrated significant momentum profits. However, their analysis also suggests that the international momentum effect may simply be an empirical illusion due to the use of overlapping data. Specifically, the international momentum effect ceased to exist when the analysis is applied on non-overlapping data. Their analysis reveals that the international momentum effect, if exists, is mainly driven by national stock market indexes' return autocovariances. However, they gathered no or little evidence of significant serial correlations in return for each of the stock market indexes, thereby leading further support to the finding that international momentum effects may not exist.

There are a few studies related to these issues reported on stock returns on the ISE. Bildik and Gulay (2007) investigate the profitability of momentum and contrarian investment strategies on stock returns in ISE between years 1991 and 2000. Results indicate evidence of momentum in stock returns. They find that contrarian effects or more specifically "winners and losers effect" exist on stock returns in ISE. Kandir and Inan (2011) find that momentum strategy appears to have a poor performance for 3, 6 and 9 month periods but seems to be profitable for 12 month formation period. The sample comprises of the stocks traded in ISE from July 2000 to June 2010. Bali (2011) has determined that the momentum strategy is successful only in 60 month holding period in ISE between years 1990 and 2008.

There are relatively fewer than the papers focusing on the effects of size, book-to-market in explaining momentum in ISE. The purpose of this study is to fill the gap on this issue. The paper is organized as follows. Section II presents the data and methodology. Section III presents the empirical results and Section IV concludes the paper.

## **2. DATA AND METHODOLOGY**

In this paper we investigate the momentum effect on ISE (Istanbul Stock Exchange) between January 1995 and December 2010. In this study, we have used all publicly listed firms on the ISE. Data used in this paper have been gathered from Istanbul Stock Exchange Statistics ([www.ise.org](http://www.ise.org)). The data are monthly and sample period is 1995:1-2010:12.

To determine whether the momentum effect in the ISE stock returns, we classify momentum portfolios similar to Hong et al.'s (2000) and Jegadeesh and Titman (1993, 2001) studies. We focus on the six-month / six-month strategy. The six-month / six-month strategy have been suggested by Hong et al. (2000) and Jegadeesh and Titman (1993). They rank stocks returns over a six month period based on past performance and hold those stock for six months.

Firm size (S) is measured by market capitalization or market value of equity. Firms are first ranked into three size deciles where size decile S1 includes the smallest size firms, S2 involves the medium size firms and S3 contains the largest size firms. Similarly, firms are sorted three book to market ratio deciles where book to market decile B1 involves the lowest book to market firms, B2 includes the medium book to market ratio firms and B3 contains the highest book to market ratio firms. In this study the strategy for January effect has been performed in order to better understand the behavior of January returns.

We then sort the firms into three portfolios based on past performance: P1, P2, and P3. The firms in the best performing 30 percent are assigned as the winner portfolio (P3) while the firms in the worst performing 30 percent are assigned as the loser portfolio (P1). Finally, P(2) portfolio which includes the middle 40 percent are determined. That is, high-momentum stocks are in quintile 3 and low-momentum stocks are in quintile 1. In this case, the basic measure of momentum is  $P3 - P1$ . These portfolios are equally weighted at the end of sample period and held for following six month. The trading strategy involves buying portfolio (P3) and selling portfolio P(1).

## **3. EMPIRICAL RESULTS**

We investigate the effects of size and book to market ratio in explaining momentum profits on Istanbul Stock Exchange between 1995 and 2010. It also examines January effect past returns of stocks. We also have adopted the strategy used by Hong et al. (2000) (six month / six month strategy; 30-40-30). That is, stocks are ranked into

three portfolios where the worst performing 30 percent of stocks are placed in portfolio (P1), the middle performing 40 percent of stocks are placed in portfolio (P2), and the best performing (30) percent are placed in portfolio P3. Momentum is measured by P3 – P1. These portfolios are equally-weighted at the end of formation period and hold for the next 6-month.

Table 1 reports that the P3-P1 trading strategy generates positive and significant returns for small, medium and large size firms. We determine return decreases as firm size increases. This result seems consistent with Jegadeesh and Titman (2001) and Hong et al. (2000). The momentum returns for all portfolios are statistically significant 10,5% (t-statistic = 2.77) for portfolio S1, 6,2% (t-statistic = 2,44) for portfolio S2 and 5,6% (t-statistic = 3,71) for portfolio S3 per month respectively. We find that the highest return holds for the past winner portfolio small firms S1 10,5% per month whereas the lowest return is also generated by the loser portfolio S1 - 4,1% per month. Besides, analysis on the study shows that January effect is insignificant for Turkey stocks in the period 1995-2010.

**Table 1: Size Deciles Momentum Returns**

Past Returns	Size Deciles		
	S1	S2	S3
<b>P1 (loser)</b>	-0,041 (-0,66)	-0,016 (-1,89)	-0,015 (-2,14)
<b>P2</b>	0,048 (2,34)	0,041 (2,38)	0,34 (2,02)
<b>P3 (winner)</b>	0,064 (3,32)	0,046 (2,75)	0,041 (3,04)
<b>P3-P1</b>	0,105 (2,77)	0,062 (2,44)	0,056 (3,71)
	January		
	S1	S2	S3
<b>P1 (loser)</b>	-0,008 (-0,76)	0,001 (-1,89)	-0,001 (-0,91)
<b>P2</b>	0,007 (0,34)	0,006 (0,89)	0,011 (0,34)
<b>P3 (winner)</b>	0,011 (1,12)	0,005 (1,32)	0,007 (0,87)
<b>P3-P1</b>	0,019 (1,02)	0,004 (0,82)	0,008 (0,46)

*Notes: The table shows momentum profits for ISE stocks from January 1995 through December 2010 and shows the average monthly returns during the holding period of the winner and loser portfolios and momentum returns. T statistics are in parentheses.*

Furthermore, it has also been found that winner (loser) stocks win (lose) in the future as well. This study can be suggested that the strategy buy winners and sell losers based on returns over the previous six months generate raw returns for size decile portfolios. The findings of the study are consistent with those of Jegadeesh and Titman (1993).

Table 2 displays that the P3-P1 trading strategy generates positive and significant returns for all book to market ratio firms. We have determined return increases as book to market increases. The momentum returns for all portfolios are statistically significant 3,6% (t-statistic = 2,01) for portfolio B1, 4,7% (t-statistic = 3,99) for portfolio S2 and 7,7% (t-statistic = 2,46) for portfolio B3 per month. We find that January effect is insignificant for Turkey stocks between 1995-2010.

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raw returns for size decile portfolios. The findings of the study are consistent with those of Jegadeesh and Titman (1993). The tables show that the momentum profits are significant in the sample period. In short, the evidence has indicated that momentum anomaly is not only limited to the US and European markets but also to those in Turkey as in the emerging market.

**Table 2: Book to Market Deciles Momentum Returns**

PAST	Book to market ratio deciles		
	B1	B2	B3
<b>P1 (loser)</b>	-0,002 (-0,88)	0,003 (1,24)	-0,011 (-2,87)
<b>P2</b>	0,022 (2,55)	0,024 (1,98)	0,025 (3,01)
<b>P3 (winner)</b>	0,039 (4,43)	0,045 (3,60)	0,066 (3,17)
<b>P3-P1</b>	0,037 (2,01)	0,042 (3,99)	0,077 (2,46)
	January		
	B1	B2	B3
<b>P1 (loser)</b>	-0,000 (-0,55)	0,000 (0,33)	-0,002 (-0,52)
<b>P2</b>	0,003 (0,44)	-0,002 (0,29)	0,002 (1,74)
<b>P3 (winner)</b>	0,009 (1,82)	0,001 (1,02)	0,007 (1,07)
<b>P3-P1</b>	0,009 (1,22)	0,001 (1,02)	0,009 (0,98)

*Notes: The table shows momentum profits for ISE stocks from January 1995 through December 2010 and shows the average monthly returns during the holding period of the winner and loser portfolios and momentum returns. T statistics are in parentheses.*

#### 4. CONCLUSION

This paper documents the effects of size and book to market ratio in explaining momentum profits in one of the leading emerging markets, Istanbul Stock Exchange between 1995 and 2010. It also examines January effect past returns of stocks. We have found that the momentum strategy of buying the past winners and selling the past losers could result in significant positive return for an investor for the intervals of six month considered. It has also found that January effect is insignificant for Turkey stocks on momentum returns between 1995 and 2010. Based on the results for a six month sample period, momentum strategy appears to have a high performance. Moreover, the results are robust and can be explained by size and by book-to-market effect. We have concluded that our results indicate that momentum in Turkish stocks is positively related to firm book-to-market and negatively related to firm size. The findings are consistent with those argued by Fama and French (1993, 1996). Portfolio managers and investors can utilize the momentum strategies to obtain abnormal returns.

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