

SIZE AND MOMENTUM EFFECTS IN TURKISH EQUITY MARKET

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ABSTRACT

We analyze Turkish equity market data released between December 2004 and December 2015 for size and momentum effects. We observe that small stocks have the highest average return and standard deviation, while middle-sized stocks have the lowest average return and standard deviation. After dividing stocks into quintiles based on size, we find that alphas are insignificant in each quintile, except the biggest companies of which alpha is negligible. Additionally, we observe a contrarian effect on Turkish stocks over the eleven years.

Keywords: Size, momentum, asset pricing models.

1. INTRODUCTION

Understanding the factors that determine the risk premium is a subject of interest in finance. The Capital Asset Pricing Model (CAPM), a well-known model developed by Sharpe (1964), Lintner (1965), and Mossin (1966), attributes risk premium only to market premium. The empirical support for the CAPM is weak due to the assumption that the investors intend to follow a strategy based on market anomaly; therefore, the prices adjust themselves, and the anomaly disappears. However, according to the literature, some anomalies seem to persist, which contradicts to CAPM assumption.

The literature have studies investigate several factors determining risk premium. Accounting based ratios such as price-earnings ratio, book-to-market ratio; liquidity, leverage, macroeconomic factors such as exchange rate, factors related to calendar such as January effect, are example factors. Size and momentum are the most studied factors among them. These studies claim that considering only market factor is inadequate in explaining the equity returns.

Size effect, i.e., small-sized stocks outperform large stocks on average, has been broadly analyzed in the literature. Banz (1981) states that smaller firms have higher risk-adjusted returns on average than larger firms. Reinganum (1981) investigates CAPM and find "abnormal returns" based on firm size. Keim (1983) defines size effect as a calendar anomaly. Chan, Chen, and Hsieh (1985) and Fama and French (1992) describe size effect not as an anomaly, but rather as a justification for additional risk such as default risk that the market proxy does not cover. Fama and French (1993) suggest an adjustment to CAPM and propose three factor model by adding size and book-to-market ratio.

The studies conducted on Turkish equity market yielded similar results as in international markets. Aksu and Onder (2000) claim that size is a significant factor in Turkish stock market during 1993-1997 period. Canbas and Arioglu (2008), Sarioglu and Guzeldere (2012), Karaomer (2017), Özkan (2018) examine three factor model and five factor model of Fama and French, and conclude that the models with size factor capture some variation in Turkish equities over different periods. Eraslan's study (2013), despite the previous studies, result with opposite findings such that portfolios containing large firms have higher average excess returns than portfolios containing smaller firms over the period from 2003 to 2010.

Momentum, i.e., firms with high (low) returns in the previous period have high (low) returns in the following period, is another well analyzed effect in international markets by Jegadeesh and Titman (1993), Carhart (1997), Rouwenhorst (1998), Griffin et al. (2003). On contrary, De Bondt and

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Thaler (1985) suggest a contrarian effect that claims portfolios of “prior” losers are found to outperform prior “winners” after three to five years.

The existence of momentum effect on Turkish equity market is a debating subject while some studies find momentum effect, others claim that there is a contrarian effect instead. Rouwenhorst (1998, 1999) finds momentum in developed countries as well as emerging ones including Turkey. On the other hand, Atilgan and Demirtas (2015) claim that the average value of momentum factor is negative indicating that there is a reversal effect instead. Bildik and Gulay (2007), Alper and Aydogan (2017) are other researchers suggesting contrarian strategies.

In this study, we investigate size and momentum effects on Turkish equity market by analyzing the data between December 2004 and December 2015.

2. DATA, METHODOLOGY AND EMPIRICAL RESULTS

We use Turkish stocks that are active between December 2004 and December 2015. Borsa Istanbul (BIST) all stock-index return is accepted as market return, and Turkey three-month treasury bond yield as risk free return. In order to measure the size effect, we rank the companies at the end of each year, divide them into quintiles based on size, build value weighted portfolios, and compute the monthly returns of these five portfolios for the subsequent year. After calculating mean and standard deviation of each portfolio, we apply below regression model on the monthly portfolio returns to find CAPM implied returns and Jensen’s alpha.

$$r_{it} - r_{ft} = \alpha_i + \beta_i (r_{mt} - r_{ft}) + \varepsilon_{it}$$

where r_{it} is the return of asset i on time t , r_{ft} is the risk free return, r_{mt} is the market return and ε_{it} is the error term. The results are listed in Table 1.

Table 1: Mean, standard deviation, alpha and beta values of each portfolio.

	Mean	Standard Deviation	α (t-Stat)	β (t-Stat)
Smallest	0,0077	0,0935	-0,0012 (-0,2252)	0,9255 (13,8560*)
Small	0,0044	0,0851	-0,0045 (-1,0880)	0,9070 (17,0834*)
Medium	0,0005	0,0147	-0,0002 (-0,2289)	0,0629 (6,1034*)
Big	0,0050	0,0786	-0,0039 (-1,2342)	0,8958 (22,0168*)
Biggest	0,0054	0,0793	-0,0035 (-3,7332*)	1,0055 (83,9143*)

*Significant at 5% level.

We find that portfolio of the smallest stocks has the highest mean and standard deviation. However, the biggest portfolio has the second highest mean and the third highest standard deviation, while stocks in the medium portfolio has the lowest. Alphas are insignificant in each quintile except the biggest portfolio in which alpha is -0,0035 that is negligible. The betas are significant and the value is around 1.

The other factor we examine is momentum, the tendency for rising asset prices to rise further, and falling prices to keep falling. To create momentum portfolios, we rank all securities based on their performance, i.e., average monthly return of past 12 months, and determine 10 best and 10 worst performing stocks at the beginning of each year. After calculating the monthly returns of this momentum portfolio for one year, we re-evaluate winners and losers, and build a new portfolio. In other words, the constituents of the momentum portfolio dynamically change year by year.

The cumulative returns of the strategies (a) 3 month treasury bill that is accepted as risk free asset, (b) market portfolio and (c) momentum portfolio are listed in Table 2.

Table 2: The cumulative returns and standard deviations of the three strategies: (a) investing in the risk free asset, (b) investing in the market, and (c) investing in the momentum.

	Investing in the Risk Free Asset	Investing in the Market	Investing in the Momentum
Return	182%	37%	-91%
Standard Deviation	4%	8%	8%

Although we expect the opposite, investing in risk free asset, i.e, 3 month treasury bill, yields the highest return and has the lowest risk, while investing in the momentum portfolio has negative cumulative return.

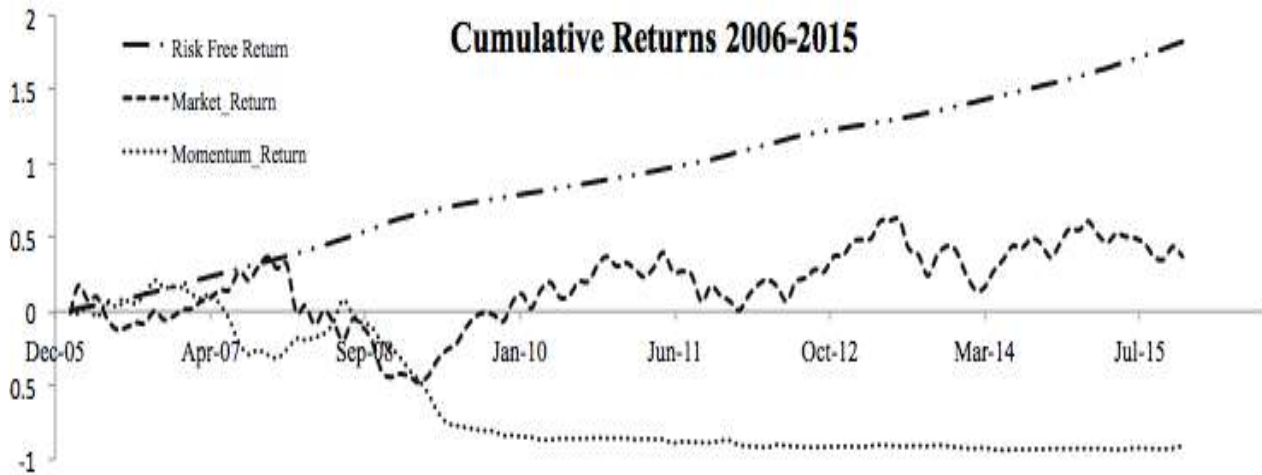


Figure 1: Cumulative returns of three strategies (a) investing in risk free asset, (b) investing in market portfolio, (c) investing in momentum portfolio.

Figure 1 shows that the momentum strategy has its worst performance due to the market decline in 2008. Grundy and Martin (2001) argue that momentum has a negative beta following bear markets, positive beta after bull markets. We calculate beta for each year, and construct a second portfolio that long market and short momentum if the beta is negative, and long momentum and short market if beta is positive. As momentum has a positive beta only during 2011 and 2013, our portfolio long the market except these years.

Table 3: The cumulative returns and standard deviations of the three strategies: (a) beta based investing, (b) investing in the market, and (c) investing in the momentum.

	Beta Based Investing	Investing in the Market	Investing in the Momentum
Return	25%	37%	-91%
Standard Deviation	8%	8%	8%

Although beta based investing strategy has positive return, it is still under the cumulative market return. Additionally, we apply CAPM-like regression using

$$MR_t = \alpha_t + \beta_t (r_{mt} - r_{ft}) + \varepsilon_t$$

where MR_t is the momentum returns, and $(r_{mt} - r_{ft})$ is the excess returns. The computed alpha and beta are -0,0170 and -0,1947 respectively, and they are statistically significant at 0,05 level.

Based on this results, we can say that there is a contrarian effect. If we follow a contrarian strategy, our portfolio outperform both the market and risk free return. We listed our results in Table 4. The cumulative return graph is in Figure 2.

Table 4: The cumulative returns and standard deviations of the three strategies: (a) investing in the risk free asset, (b) investing in the market, and (c) investing in the contrarian portfolio.

	Investing in the Risk Free Asset	Investing in the Market	Investing in the Contrarian
Return	182%	37%	373%
Standard Deviation	4%	8%	9%

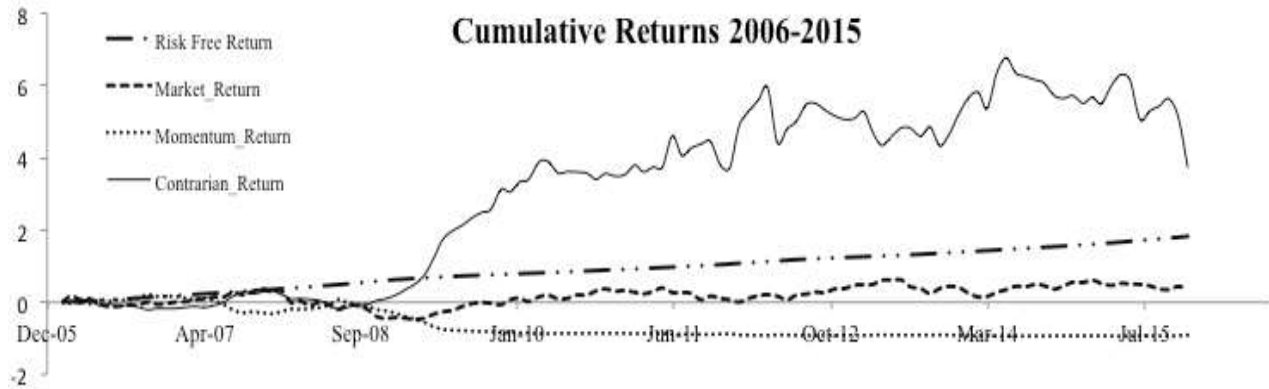


Figure 2: Cumulative returns of three strategies (a) investing in risk free asset, (b) investing in market portfolio, (c) investing in momentum portfolio, (d) investing in the contrarian portfolio.

3. CONCLUSION

In this study, size and momentum effects are analyzed on Turkish equity market data between December 2004 and December 2015. At the end of each year, stocks are divided into quintiles based on their size, and monthly returns are calculated for the subsequent year. In accordance with the theory, stocks in the smallest portfolio have the highest return and standard deviation. However, unlike the theory, medium portfolio has the lowest return and standard deviation. Investing in these different size portfolios does not generate a significant alpha.

For momentum effect, average returns of stocks are calculated at the end of each year, and after choosing 10 best and 10 worst performing stocks, the performance differential (momentum returns) is used over the subsequent year. Examining momentum suggests that there is a contrarian effect among Turkish equity market. Momentum strategy and beta adjusted strategy do not outperform investing in market or risk free asset. On the contrary, a contrarian strategy outperforms both of them.

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