Trading Puzzle, Puzzling Trade

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Abstract

We explore the return performance of individual investors with respect to various factors such as portfolio size, turnover and also demographic factors: gender and age. Concerning that Borsa İstanbul has one of highest turnovers in the world (141.8\% as of 2012), it is an ideal candidate to do this analysis. We examine the daily trades in Borsa İstanbul (formerly Istanbul Stock Exchange) of 20,000 individual investors over two year period 2011-2012. The main finding which contradicts other studies and the contribution of the paper is that, the return of the individual portfolio is positively correlated with the portfolio size. Other findings are: Almost 70\% of all individual investors cannot beat the market. Investors who have high turnover underperform compared to those who have lower turnover. Male investors trade more and lose more vis-à-vis the female and older investors have higher returns.

Key words: Turnover, Overconfidence, Portfolio Size, Stock Returns, Individual Investor

JEL classification: G02; G12; G14

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\textsuperscript{2} Disclaimer: The views expressed in this study are those of the authors and do not necessarily reflect those of Borsa İstanbul or its members.

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1. Introduction and Literature Review

Stock market movements are consequences of human judgment, interactions and behavior. Many studies provide extensive evidence that individual traders are imperfectly rational and prone to psychological biases that lead to costly investment mistakes. For example, the high trading level of the stock market was claimed to be inconsistent with the rational expectation models (Shiller (1981)). Glaser and Weber (2007) concluded that the rational motives for trade were not sufficient to explain the high trading volume in the stock markets. Even though there are few contrary results (see Ivkovich and Weisbenner (2005) as an example), many studies showed that individuals underperform the market (see Blume and Friend (1975), Odean (1999), Barber and Odean (2000), Grinblatt and Keloharju (2000), and Hirshleifer (2001)). The reasons of this performance have been attributed to many factors.

Overconfidence seems to be among the most discussed ones among mentioned biases. In a pioneering study, using a monthly aggregated dataset, Barber and Odean (2000) found that as investor’s turnover increases, their respective portfolio return decreases. They relate high turnover to overconfidence.

Several studies attributed individual investors’ performance to demographics too. Goetzmann and Kumar (2008) found that individual investors who are younger and poorer tend to hold more under-diversified portfolios, suggesting that they may exhibit stronger cognitive biases due to their demographic characteristics. In another related study, Korniotis and Kumar (2011) showed that cognitive abilities decline with age and they have found evidence to support the notion that investment performance declines with age. Another line of study investigates the gender differences on the return performance and trading behavior. Barber and Odean (2001) showed that men underperform women in stock trading with higher tendency to trade more and significantly inferior return performance. Choi et al. (2002) and Agnew et al. (2003) are among the other studies supporting the same result. Grinblatt et al. (1995) found that home bias, culture and demographic characteristics may have combined effect on the return performance. Bloomfield et al. (2009) noted the informational aspects on the return performance. However, Felton et al. (2003) and Feng and Seasholes (2008) found no significant evidence for the effect of gender characteristics on the return performance.

This study contributes to the understanding of investor behavior twofold. On the one hand, concerning the scarcity of individual trading data, we add a new market data to the existing field of research which is supposed to contribute to the comparison of investors from different cultures. Huang et al. (2011) noted that Asian markets differ in significant dimensions to the Western markets especially for the cultural pattern as individuals are more prone to cognitive biases. Also, individual investors dominate the market for the small size stocks. Their study concludes that the fundamental differences in culture can spur the overtrading in the stock market. Barber et al. (2008, 2009) and Gao and Lin (2010) analyzed the individual investors in Taiwan, Feng and Seasholes (2005, 2008) studied the individual investors in China; both studies have found supporting evidence for the...
cultural characteristics on the return performance. Our study is unique with its regional data, hence we do not only contribute to the psychological biases in the literature but also add an important analysis of an emerging country data to the behavioral finance literature.

On the other hand, we aim to focus on the potential factors of individual investors that are correlated with their return performance. We explore the correlation of return performance of individual investors with respect to several factors such as portfolio size, turnover, gender and age. Here we improve the pioneering work of Barber and Odean (2000) by using a weekly aggregated data where the returns of individual portfolios are calculated weekly. Profitability of the trades of individual investors can switch when the analysis is conducted on weekly data rather than monthly. Barber and Odean (2001) noted that individuals, who trade frequently, make substantial benefits from intra-month trading. We think that Borsa Istanbul (formerly Istanbul Stock Exchange) may provide useful insight on this issue since it has 4th highest share turnover in the world. Since individuals have psychological biases and these cognitive biases affect their return performance (Kaniel et al. (2008)); the correlation of age, gender, turnover and portfolio characteristics with the return performance of individual traders have been studied.

This study is one of the few studies performed with individual data. Also, this is among the few studies that focus only on characteristics of individual investors in an emerging market stock exchange. Only study that uses individual data from Turkey beside ours is Fuertes et al. (2012), which tracked brokerage house tracking accounts of 59,951 individual investors between 2008 and 2010. They investigated the behavioral reasons for the portfolio diversification levels in Borsa Istanbul. Here, we study on the relationships between several characteristics of investors, portfolio size, turnover and returns.

Before starting the main findings and discussions, we present that investors in general underperform the market. Our results support the former papers that the return performances individual investors are inferior to the market index returns, ceteris paribus. We further demonstrate that, on the average, female investors have higher average weekly returns and lower turnovers than male investors.

We then focus on the relationship between turnover and return performance of the individual investors. As a high turnover stock market, analysis of the turnover of individual investors in Borsa Istanbul can give important insights about the investment practices. Even though only 37% of market capitalization belongs to domestic investors, 83% of all trades are executed by these investors. Individuals generally hold stocks for a very short period of time compared to the institutional investors (Kaniel et al. (2008) and Chordia et al. (2011)). This paper also contributes to the literature with the weekly performance analysis of individual investors. Our results indicate that as the turnover individual investors’ portfolio increases, the return of the portfolio decreases. This result can be considered as a supporting evidence for overconfidence hypothesis. (For further study on relation to the overconfidence hypothesis see Barber and Odean (2000))

Second, we explore whether age and gender characteristics of individuals together with turnover have an effect on their return performance. With vast literature developed for the effect of gender

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4 141.8% as of 2012 according to World Federation of Exchanges Statistics
5 See Barber and Odean (2011) for excellent coverage of the other individual level data studies across the many countries in developed and emerging markets.
characteristics on the aggressive trading strategies, we study both age and gender characteristics of individual investors. Here, we find that on average women have better performances than men. Likewise, age has a positive effect on the portfolio performance of individual investors. We also find that the coefficient “Age*Gender” has a negative and significant sign suggesting that females earn less compared to men when they get older.

Lastly, we present our main finding: We posit that effect of the portfolio characteristics on the return performance can give important information on the general structure of the stock market. Therefore we analyzed the return performance based on the portfolio size and conclude third and the main result of this paper: the bigger size portfolios have higher returns in general.

The rest of the paper is organized as follows. We explain the data and methodology in Section 2. Section 3 gives the empirical results and Section 4 concludes.

2. Data and Methodology

Our dataset, provided by the central security depository of Turkey (M KK), covers the all transactions and holdings in Borsa İstanbul Equity Market. Borsa İstanbul is one of the most important and liquid markets in the Eastern Europe and MENA region with being the world’s 4th largest bond market on electronic order book. Equity market has 405 listed companies with $347 billion annual traded value and $301 billion market capitalization as of December, 2012. Even though only 37% of market capitalization belongs to domestic investors, their traded value is quite high, making 83% of the whole trade. There are 1,090,059 domestic individual investors that capture 21% the market capitalization. For this study, individuals who traded at least once in the two-year period and held portfolios more than 1,000 TRY (approx. $560) as of the end of 2012 are selected which amounts to 250,827 investors (See also Barber and Odean (2001) and Statman et al. (2006) for data selection criteria). We randomly select 20,000 investors from these investors and used weekly aggregated daily trades for them. That is, the portfolio returns of the individuals are calculated weekly contrary to most the literature which uses monthly aggregated data. Higher frequency is preferred with aim of having clearer picture for the performance of individuals since the turnover of the Borsa İstanbul is higher than most other markets (4th highest turnover in the world). The representative power of our data compared to other studies stems from the fact that it is sampled from the depository agency (M KK) rather than a single securities firm. The data is also very reliable due to the fact that equities traded in Borsa İstanbul is fully dematerialized at MKK and therefore the data reflects the official records of the investors’ portfolios.

The descriptive statistics of the sample is reported in Table 1. 83.1% of the individual investors are male (Percentage dominance of men was similar in Lease et al. (1974) as 80%, Barber and Odean (2001) as 78.7%). The average age of our sample individuals is 43 and average age of women is higher than that of men. Panel B shows that women have higher average portfolio size than men. Descriptive statistics indicate that distributions of the portfolio sizes are clearly positively skewed: the median portfolio size is $8,922, whereas the average of the portfolio size is $71,943.

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6 The data consists of approximately 11 million records.
7 According to WFE Statistics as of 2012.
Although median of the portfolio sizes are close to each other for males and females, the averages of the portfolio sizes greatly differ for different genders.

### Table 1
Descriptive Statistics by age, gender and portfolio sizes of individual investors in the Borsa İstanbul

<table>
<thead>
<tr>
<th></th>
<th>All individuals</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of individuals</td>
<td>20,000</td>
<td>3,390</td>
<td>16,610</td>
</tr>
</tbody>
</table>

**PANEL A: Age**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>43.4</td>
<td>44.8</td>
<td>43.1</td>
</tr>
<tr>
<td>median</td>
<td>42.0</td>
<td>43.0</td>
<td>41.0</td>
</tr>
<tr>
<td>standard deviation</td>
<td>11.5</td>
<td>12.6</td>
<td>11.3</td>
</tr>
</tbody>
</table>

**PANEL B: Portfolio size**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>$71,943</td>
<td>$90,810</td>
<td>$68,092</td>
</tr>
<tr>
<td>median</td>
<td>$8,922</td>
<td>$8,036</td>
<td>$9,083</td>
</tr>
<tr>
<td>standard deviation</td>
<td>$2,192,690</td>
<td>$3,003,394</td>
<td>$1,987,095</td>
</tr>
</tbody>
</table>

This table reports the descriptive statistics by investor’s age, gender and portfolio size on Borsa İstanbul. The values are as of the end of 2012. Portfolio size values are in USD dollars. Portfolio sizes are taken from MKK in Turkish Lira (TRY and converted to USD dollar by CBRT effective average exchange rate). The source of the raw data is MKK.

To begin the analysis, we first define the turnover as follows:

\[
\text{Turnover}_{jt} = \frac{1}{2} \left( \frac{\text{TradedValue}_{jt}}{\text{PSize}_j} \right) 
\]

where TradedValue is calculated as 0.5 times the average of weekly total trades in terms of market value for the each investor \( j \), and \( \text{PSize}_j \) represents the average of end-of-week portfolio holdings in terms of market value for the each investor. Hence, \( \text{PSize}_j \) is constant for the sample period. Weekly aggregated trade data includes number of shares and values whereas the position data includes only number of shares. Therefore, prices are calculated from trade data and these prices used to obtain end-of-week portfolio values. Then, we calculate weekly turnovers as the market value of stocks traded in each week divided by the \( \text{PSize}_j \). The second step is to estimate weekly returns of the investors using the portfolio data and adjusted stock prices, which are obtained from Bloomberg. We first calculate weekly returns of each stock and then calculate weighted weekly raw returns of portfolios:

\[
\text{r}_{\text{raw}} = \sum_{i=1}^{s} p_{ij} r_{it} 
\]

where \( r_{it} \) is the weekly return for stock \( i \) in week \( t \), \( p_{ij} \) represents the weight that was calculated by dividing the end-of-week market value for stock \( i \) to the end-of-week market value of portfolio held

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\( ^8 \) Our calculation methodology is similar to Barber and Odean (2000), Chuang and Susmel (2011)).
by investor \( j \), and \( s_{jt} \) is the number of stocks held by investor \( j \). Market adjusted returns are calculated weekly as follows:

\[
\begin{align*}
\bar{r}_{jt} &= \bar{r}_{jt}^{raw} - \bar{r}^{m}_t \\
\end{align*}
\]

where \( \bar{r}^{m}_t \) denotes corresponding weekly rate of return on BIST 100 Index (formerly IMKB 100 Index), main broad value-weighted stock index of Borsa Istanbul’s equity market. Having calculated market adjusted weekly returns in (3) and turnover in (1) for each investor, we calculate the average return \( \bar{r}_j \) and average turnover \( \bar{\text{Turnover}}_j \) for each individual \( j \) over \( T=104 \) weeks from January 2011 to December 2012 as:

\[
\begin{align*}
\bar{r}_j &= \frac{1}{T} \sum_{t=1}^{T} r_{jt} \\
\bar{\text{Turnover}}_j &= \sum_{i=1}^{T} \text{Turnover}_{jt}
\end{align*}
\]

Note that the “average return” is market adjusted by subtracting the market index from raw returns as in (3). Next, to analyze return differences between investors with respect to turnover, investors are sorted into quintiles based on weekly turnover. Also, investors are sorted on the basis of portfolio size. To extend the analysis on the effect of portfolio size, we employ Capital Asset Pricing Model (CAPM) in addition to market adjusted returns:

\[
\bar{r}_t - r_t^f = \alpha + \beta_1 (\bar{r}^{m}_t - r_t^f)
\]

where \( \bar{r}_t \) denotes the average return of investors for each week and \( r_t^f \) denotes the corresponding risk free rate. Risk free rate here is calculated as converting yields the Turkish treasury bonds to weekly returns, that is, involves the effect of weekly price changes of the bonds in the market. We further analyze the effects of turnover and portfolio size as well as gender and age on average return for each investor in the following cross sectional regression:

\[
\bar{r}_j = \beta_0 + \beta_1 \text{Turnover}_j + \beta_2 \text{Gender}_j + \beta_3 \text{Age}_j + \beta_4 \text{Gender \times Age}_j + \beta_5 \text{PSize}_j
\]

The variable “Turnover” which is defined in equation (5) is adjusted in a way that values higher than 100% are taken to be 100%. This restriction affects only 0.2% of the investors in the sample. \( \text{PSize}_j \) is a dummy variable indicating that the investor has a portfolio higher than the median. The gender is also a dummy variable which equals to 1 if the investor is female. The variable “Age” is the value of investor’s age divided by 10 (following Barber and Odean (2001)).
3. Results

First, we present our results by giving the return performance of individual investors. As Panel B of Table 2 indicates, the average market adjusted return is negative ($\bar{r}_j = -0.29\%$) which shows that in this high-turnover market, on average the individuals cannot beat the market. 71.1 percent of individuals’ market adjusted returns are negative. The Capital Asset Pricing Model (CAPM) regression given in Table 3 also yields negative (-0.24, with p-value of 0.13) intercept which says that the individuals’ excess return is less than the markets’ excess return. Therefore, the general performance of individuals is worse than the market average. This is consistent with the literature in the sense that Kramer (2012) and Coval et al. (2005) showed that only informed individuals can beat the market.

When we divide the data according to gender, women significantly outperform men in terms of average returns (-0.16% compared to -0.31%). The fifth and the last column show that equality of mean/median adjusted returns of both genders is rejected at 1% level. The results are consistent with the findings of Barber and Odean (2001) and Choi et al. (2002).

As Panel A of Table 2 shows, turnover for the whole sample is 113%. This result is significantly higher than 8.8% reported by Barber and Odean (2000), 2.52% reported by Kaniel et al. (2008) and 4.7% reported by Foucault et al. (2011). Moreover, the results indicate that both the mean and the median turnover are significantly lower for women than men on the average. In other words, women trade less than men. The results support the previous evidence that men are more likely to be overconfident than women.

Table 2

<table>
<thead>
<tr>
<th>Turnover and Return Performance of Individual Investors</th>
<th>All individuals</th>
<th>Women</th>
<th>Men</th>
<th>Gender Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of individuals</td>
<td>20,000</td>
<td>3,390</td>
<td>16,610</td>
<td></td>
</tr>
<tr>
<td>Panel A: Average Turnover</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>113.0%</td>
<td>73.3%</td>
<td>121.2%</td>
<td>-47.9%*</td>
</tr>
<tr>
<td>median</td>
<td>38.4%</td>
<td>31.2%</td>
<td>39.9%</td>
<td>-8.7%***</td>
</tr>
<tr>
<td>Panel B: Average Return</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>-0.281%***</td>
<td>-0.163%***</td>
<td>-0.311%***</td>
<td>0.148%***</td>
</tr>
<tr>
<td>median</td>
<td>-0.221%***</td>
<td>-0.109%***</td>
<td>-0.247%***</td>
<td>0.138%***</td>
</tr>
</tbody>
</table>

Average Turnover is calculated as in equation (5), average return is calculated as in equation (4). * , ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Tests for differences in medians are based on Wilcoxon signed rank and Wilcoxon/Mann-Whitney test statistics.

We further analyze the relationship between returns and turnover in more detail. In order to highlight the effect of turnover on the return performance, we sort the individuals according to their turnovers and divide them into quintiles. As Figure 1 clearly indicates there is an inverse relationship between turnover and average return (Appendix provides detailed results). That is, average return

Concerning that the mentioned studies use monthly data, our weekly calculated result would have been even higher if a monthly data had been used.
decreases as turnover increases. Consistent with Barber and Odean (2000, 2001), Kramer (2012) and Statman et al. (2006); higher trading activity leads to inferior return performance for individual investors. Note that, highest turnover quintile has almost four times higher turnover than the average individual investor and sixty times higher than the lowest quintile. This high turnover has mainly been attributed to overconfidence by many studies (Barber and Odean (2000, 2001), Statman et al. (2006)). However some other studies claim that high turnover is due to information asymmetry (Kramer (2012)), private information (Kaniel, et. al (2012)) or rather individual’s assessment of the firm characteristics (Hoffman et al. (2013)). Though these studies in the literature focus more on the reasons for overtrading, our study concentrates on the overtrading puzzle rather than the behavioral foundations of overtrading.

Figure 1
Relationship between Turnover and Return

We then find that there is also a positive relationship between average return and portfolio size. Figure 2 shows that, as portfolio size increases, the average return of the investor increases (see Panel B of Table 3 in Appendix for details).
Figure 2

Relationship between Portfolio Size and Return

![Chart showing relationship between Portfolio Size and Return](image)

CAPM analysis across the quintiles of portfolio size provided in Table 3 confirms the positive relationship. The excess return (α), negative in all quintiles, is significant in the lowest three quintiles and decreases consistently as portfolio increases.

Table 3

Relationship between Portfolio Size and Return: CAPM Results

<table>
<thead>
<tr>
<th>Quintile (portfolio size)</th>
<th>All investors</th>
<th>1 (low)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfa</td>
<td>-0.24%</td>
<td>-0.33%</td>
<td>-0.32%</td>
<td>-0.27%</td>
<td>-0.12%</td>
<td>-0.09%</td>
</tr>
<tr>
<td>(9.51)</td>
<td>(-2.05)**</td>
<td>(-1.92)*</td>
<td>(-1.64)*</td>
<td>(-1.22)</td>
<td>(-0.66)</td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>95.34%</td>
<td>95.36%</td>
<td>95.67%</td>
<td>95.61%</td>
<td>95.42%</td>
<td>94.80%</td>
</tr>
<tr>
<td>(20.87)</td>
<td>(20.26)**</td>
<td>(19.89)**</td>
<td>(20.06)**</td>
<td>(20.62)**</td>
<td>(23.27)**</td>
<td></td>
</tr>
</tbody>
</table>

This table presents the results of the time series regression analysis performed in equation (6). Alfa is the CAPM intercept and beta is the coefficient on \((r_{i,t} - r_{f,t})\). t-statistics in parentheses and *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Our results related to the return performance across different portfolio sizes contradict the previous literature. Barber and Odean (2000) have found that, small portfolios perform better though the return performance difference is not significantly different than zero. They argue that this difference is likely attributable to the fact that small portfolios tilt more heavily toward small value stocks (See Kumar (2007) also for portfolio diversification and small value stock relationship), which performed well during the sample period. In a similar paper, Shu et al. (2004) sorted the investors in the top turnover quintile by portfolio size and find that, in the highest-turnover quintile; investors with large portfolio values have higher returns. They argue that active investors with large portfolio values tend to be informed traders. However, their analysis is limited with the highest-turnover quintile and they do not report the relationship for the full sample. Hence, small number of investors...
with extremely high turnover may lead to their result. These investors are very likely to be professional traders and naturally may earn higher returns.

We clearly document that, even if not including the effect of small-size stock returns mentioned in Barber and Odean (2000), as portfolio size increases market adjusted return decreases. This reverse relationship can be consequence of the fact that high returns for bigger portfolios may be attributed to lower liquidity constraints for wealthy investors, e.g., they may not have to liquidate their stocks in hard times. The fact that decreasing turnovers as portfolio size increases (Table 5 in Appendix) except the highest-turnover quintile also supports our view. Small investors may try to gain by trading impatiently in the short term with their limited money which may not be allocated solely and comfortably for the equity investment. This behavioral pattern may be an explanation for the combined analysis of return, turnover and portfolio size.

Second, they may also benefit more from professional investment services of the industry. As Kramer (2012) and Chang et al. (2009) noted that the individual investors who are superior informed or have better financial advice earn higher returns compared to uninformed high turnover traders. Our findings also extend the evidence suggesting that irrational investor behaviors are weaker for wealthy investors for several other behavioral biases.

Final analysis is performed via a cross section regression of the returns on the before mentioned variables: turnover, portfolio, gender together with age. This regression is done in order to control other variables’ effect on returns. Results of the equation (7) are given in Table 4, which indicates that all the independent variables considered in this study are significant at 1% level. The main finding of our analysis is confirmed here: Portfolio size has a positive and significant coefficient, implying that wealthier investors have better earnings. This may be due to two main reasons as it is discussed above: First wealthier investors may be benefiting more from professional services. As Kramer (2012) pointed that “advised portfolios perform much better than self-directed portfolios, thus reducing avoidable risk.” Second wealthier investor may have lower liquidity constraints to sell their stocks especially in hard times.

The other variables have expected signs and the significance levels consistent with the literature: Turnover has a negative effect on returns consistent with our previous findings and literature (Barber and Odean (2000, 2001), Statman et al. (2006)). The gender dummy indicates that women have higher returns than men, which confirms our previous findings and the results given by Barber and Odean (2001), Agnew et al. (2003) and Lusardi and Mitchell (2006). Regression results also indicate that the age has a positive impact on investors’ performance. This can be explained by Koestner et al. (2012)’s finding that individuals do learn from their mistakes. Previous literature on learning suggests that, older investors might accumulate greater investment knowledge and exhibit greater awareness of the fundamental principles of investing. Their accumulated investing wisdom could help them make better investment decisions and they might also be less prone to behavioral biases as they grow older and become more experienced (Korniotis and Kumar (2011) and Nicolosi et al. (2009)). On the other hand, the coefficient of genderxage is negative, which suggests that women earn less than compared to men as they get older. According to Korniotis and Kumar (2011), the age-related decline in cognitive abilities is steeper among older women.
Table 4
Cross Sectional Regression of Return

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Market adjusted return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.656 (-36.99)***</td>
</tr>
<tr>
<td>Turnover</td>
<td>-0.012 (-6.46)***</td>
</tr>
<tr>
<td>Gender dummy</td>
<td>0.314 (8.18)***</td>
</tr>
<tr>
<td>Age/10</td>
<td>0.066 (17.83)***</td>
</tr>
<tr>
<td>Gender X Age</td>
<td>-0.039 (-5.16)***</td>
</tr>
<tr>
<td>Portfolio size high</td>
<td>0.166 (20.18)***</td>
</tr>
<tr>
<td>R²</td>
<td>6.7%</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>6.7%</td>
</tr>
<tr>
<td>F-value</td>
<td>287.57</td>
</tr>
</tbody>
</table>

This table presents the results of the cross-sectional regression analysis performed in equation (7). Reported are the estimated coefficients with their t-statistics in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors are corrected for heteroscedasticity.

4. Conclusion

Concerning the high volume of trade in stock markets, one can ask whether these trades generate high returns or not. As Glaser and Weber (2007) suggested, the rational motives for trade are not sufficient to explain the high trading volume in financial markets. Here, we investigated the individual investors from a behavioral perspective. With the important specialty of the Borsa İstanbul which is having one of highest turnover in the world (141.8% as of 2012), we used weekly aggregated daily trades of 20.000 individual investors from January 2011 to December 2012. Regarding the limited number of individual data sets utilized in the literature, we expand the data covered in this line of research to a new market, which has one of the highest turnovers throughout the world. This study first documents turnover and return performances of individual investors and analyzes the relationship between the two. This analysis is repeated for the return and portfolio size. A regression analysis is carried out to find the effects of several variables such as turnover, portfolio size, age and gender on the portfolio returns of the individuals. Our analysis provides five important results:

- The main result of the study is that there is a positive relationship between portfolio size and returns. That is the bigger the portfolio size, the higher the returns.
The other results are:

- First, the individual investors underperform the market.
- Second, there is a reverse relationship between turnover and returns.
- Third, men are trading more than women, and hence they underperform the women.
- Fourth, age has a positive effect on the portfolio returns.

These results are consistent with the behavioral finance literature which suggests that individuals (mainly due to their overconfidence) that trade aggressively have lower returns compared to the average investor. We contribute to the literature by presenting evidence on the reverse relationship between portfolio size and returns. One of the important aspects of our study is that, different from the general tendency in the literature, the analysis is performed with weekly aggregated portfolios. Moreover, we present important evidence for high trading activity from an emerging market which can have some different behavioral patterns compared to the most of the studies in the literature. Any further studies that elaborate more on the behavioral aspects of these individuals from emerging markets can give important inferences to the understanding of the behavioral patterns behind the individual investors’ actions and also cultural characteristics that affect those actions.
APPENDIX

Table 5
Returns for Investor Quintiles Based on Mean Turnover and Portfolio Size

<table>
<thead>
<tr>
<th>Quintile</th>
<th>All investors</th>
<th>1 (low)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: by turnover</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean turnover</td>
<td>113.0%</td>
<td>7.3%</td>
<td>20.8%</td>
<td>38.8%</td>
<td>71.5%</td>
<td>427.8%</td>
</tr>
<tr>
<td>Raw return</td>
<td>-0.051%</td>
<td>0.089%</td>
<td>0.020%</td>
<td>-0.038%</td>
<td>-0.077%</td>
<td>-0.251%</td>
</tr>
<tr>
<td>Market adj. return</td>
<td>-0.286%</td>
<td>-0.103%</td>
<td>-0.190%</td>
<td>-0.269%</td>
<td>-0.332%</td>
<td>-0.538%</td>
</tr>
<tr>
<td>Panel A: by portfolio size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean portfolio size</td>
<td>$71,943</td>
<td>$1,653</td>
<td>$4,647</td>
<td>$9,644</td>
<td>$21,651</td>
<td>$298,316</td>
</tr>
<tr>
<td>Mean turnover</td>
<td>113.0%</td>
<td>197.6%</td>
<td>94.5%</td>
<td>92.8%</td>
<td>81.5%</td>
<td>98.9%</td>
</tr>
<tr>
<td>Raw return</td>
<td>-0.051%</td>
<td>-0.138%</td>
<td>-0.121%</td>
<td>-0.080%</td>
<td>-0.011%</td>
<td>0.093%</td>
</tr>
<tr>
<td>Market adj. return</td>
<td>-0.286%</td>
<td>-0.444%</td>
<td>-0.365%</td>
<td>-0.301%</td>
<td>-0.217%</td>
<td>-0.104%</td>
</tr>
</tbody>
</table>

Records of 20,000 investors are sorted into quintiles based on weekly turnover. Quintile 1 contains investors with the lowest turnover; quintile 5 contains investors with the highest. Raw return is the average weekly return for the average investor. Market adjusted return is calculated as subtracting benchmark market index from raw return. The values are as of the end of 2012. Mean Portfolio size values are in USD dollars. Portfolio sizes are taken from MKK in Turkish Lira (TRY and converted to USD dollar by CBRT effective average exchange rate for 2011 to 2012). The source of the data is MKK.

REFERENCES


