Journal of Banking & Finance 37 (2013) 3548–3561

Contents lists available at SciVerse ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Overconfident individual day traders: Evidence from the Taiwan futures market

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ARTICLE INFO

Article history:
Received 14 February 2013
Accepted 22 April 2013
Available online 24 May 2013

JEL classification:
G10
G12
G13
C51

Keywords:
Overconfidence
Index futures
Day traders
Individual investors
Learning

ABSTRACT

A specific day-trading policy in Taiwan futures market allows an investigation of the performance of day traders. Since October 2007, investors who characterize themselves as "day traders" by closing their day-trade positions on the same day enjoy a 50% reduction in the initial margin. Because we can identify day traders *ex ante*, we have a laboratory to explore trading behavior without the contamination of potential behavioral biases. Our results show that the 3470 individual day traders in the sample incur on average a significant loss of 61,500 (26,700) New Taiwan dollars after (before) transaction costs over October 2007–September 2008. This implies that day traders are not only overconfident about the accuracy of their information but also biased in their interpretations of information. We also find that excessive trading is hazardous only to the overconfident losers, but not to the winners. Last, we provide evidence that more experienced individual investors exhibit more aggressive day trading behavior, although they do not learn their types or gain superior trading skills that could mitigate their losses.

1. Introduction

Day traders are both controversial and mysterious. Little research has been devoted to their investment behavior and performance mainly because we have lacked a way to identify them and to track their trading history. Most studies on their behavior are limited by identification *ex post* as completing at least one round-trip trade on the same trading day. Such an *ex post* identification strategy may obscure the traders' motive of profiting solely from the anticipation of short-term price movements. Trading behavior may be the result of other motives, including liquidity needs, portfolio rebalancing, or anticipation of tax law changes.

Ideally, researchers would like to have an *ex ante* way to identify day traders who trade only for profit as this would yield a more accurate documentation of their trading activities. We take advantage of a policy implemented in the Taiwan futures market that provides a clear-cut way to identify day traders *ex ante*, and study their trading behavior.

On October 8, 2007, the Taiwan Futures Exchange (TAIFEX) implemented a new margin requirement policy that allows investors to specify orders as day-trade orders and deposit half of the required margin. When a day-trade order is executed successfully, the position must be closed before the end of the trading day. Essentially, an investor commits to be a "day trader" *ex ante*.[2] Previous studies have relied on executed transactions to identify day traders. In our case, day traders reveal themselves by submitting the specific day-trade orders. Hence, we can focus on traders identified by their day-trade orders rather than investors who merely buy and sell the same security on the same day.[3]

Our contribution is to take advantage of this margin rule on the TAIFEX to examine several questions: Are these day trades profitable? Are the day traders susceptible to the overconfident bias in

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[2] Suppose that the original initial margin is 100,000 New Taiwan Dollars (TWD). Normally, the maintenance margin is set at 75% of the initial margin, or 75,000 TWD. In other words, a day trader can incur as much as 25,000 TWD before receiving a margin call. The 75% rule does not apply to the halved margin (50,000 TWD) for a day trader. In fact, a day trader is still allowed to lose up to 25,000 TWD before paying the variation margin. Therefore, by committing to day trades, an investor actually doubles its trading leverage.

[3] Henceforth, day trading refers to transactions executed by day-trade orders, and day traders are investors who submit day-trade orders.

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http://dx.doi.org/10.1016/j.jbankfin.2013.04.036

terms of information precision and biased in interpretation of information? Do they lose more money by trading more contracts? In other words, is trading hazardous to their wealth? Is there any difference in the relation between trading frequency and performance among winning and losing day traders? Finally, do day traders ever learn from their past trading experience and performance?

The first question is related to the research by Harris and Schultz (1998), Jordan and Diltz (2003), Garvey and Murphy (2005), Linnainmaa (2005), and Barber et al. (2011). Odean (1999) and Barber and Odean (2000) investigate the second and the third questions for regular individual investors, respectively. We believe that it is worth revisiting these questions with our day trader sample. In addition, exploration of the last two questions should give us a more complete picture of the investment behavior of day traders.

Several features motivate us to answer these questions by studying day traders in the Taiwan futures market. First, day traders in the TAIFEX have to close their positions before the end of the day, which engenders liquidation risk in addition to the market risk. Intuitively, those who engage in day trading should be either the most informed or the most confident that they are the informed as they are willing to take on extra liquidation risk for a reduced margin. If the former is the case, day trades should deliver a positive average return. This unique institutional setup gives us a better lens to reexamine the issue of investor overconfidence, when day traders believe that they possess valuable information but in fact they do not.

Second, the maximum investment horizon for day trades is just one day. Therefore, the realized end-of-day positions of our day traders are not related to intra-day returns. This is an important feature, as we can observe day traders' positions without the impact of the disposition effect.[4] Nor do we need to calculate average returns of several holding periods to accommodate different investment horizons for investors as in Odean (1999).

Third, our day traders can easily capitalize on negative information by taking short positions, because there are no short-sale constraints in the futures market. Jordan and Diltz (2003) point out that the conventional Wall Street wisdom holds that day trading is profitable when the overall market is trending up. One explanation is the high cost of selling stocks short. The cost of shorting futures contracts, however, is the same as going long. We are thus able to study the performance heterogeneity among day traders by examining the difference in profitability of both short and long day trades and of trades from both winning and losing day traders. Most interestingly, we can also investigate the learning process of day traders in the TAIFEX.

Finally, it is apparent that our day traders are not trading for consumption or liquidity needs as they cannot spend the proceeds from selling short. Instead, they have to deposit the margin. Portfolio rebalancing or diversification are unlikely to be behind day trades, because they are doomed to liquidation before the closing of a trading day. Moreover, there is no capital gains tax in Taiwan.

Overally we can safely conclude that the main purpose of submitting day-trade orders is to leverage up a position to maximize the trading profit from speculating on short-term price movements. The Taiwan futures market provides us with an ideal environment to answer our questions.

Using the complete trading record in the TAIFEX from October 8, 2007 through September 30, 2008, we find that for domestic individual day traders, the average net profit for a round-trip trade is −613 TWD (one US dollar is roughly 32 TWD during our sample period). The 3470 individual day traders on average incurred a significant aggregate loss of 61,500 TWD after accounting for transaction costs. According to Odean (1999), this result implies that individual day traders are overconfident regarding the precision of their information. Before transaction costs, individual day traders still suffered an average of 26,700 TWD loss. This indicates that day traders are not only overconfident but also have a biased interpretation of the information. For institutional day traders, results are similar but statistically insignificant because of a much smaller sample.

We also find that numbers of short positions and long positions are similar for individual day traders when we differentiate the direction of round-trip trades. Individual day traders are not as reluctant to short as US individual investors. Interestingly, the average profit of short-initiated round-trip trades is higher than that of long-initiated round-trip trades for individual investors, with a 160 TWD profit for short positions and a 676 TWD loss for long positions. This implies that when individual investors are short selling, they are less overconfident and more careful than when they are taking long positions.

Note that because the above analysis is based on the money profit of a single round-trip day trade, the results might be subject to a scaling issue. In particular, a day trader with a large margin account size in terms of the amount of deposited initial margin is able to trade more futures contracts in a round-trip trade and is thus exposed to a high level of profit and loss. Ideally, we should calculate the genuine realized returns for day traders based on the information about their margin account size. Unfortunately, such information is not available. Having said that, we do calculate two types of return, namely, index return and net return, to address the potential scaling issue.

The index return of a round-trip day trade for a day trader is computed as the aggregate gained or lost index points divided by the average longing or short-selling index point. This return should be able to largely alleviate the scaling concern even though it does not fairly reflect the true realized return for a day trader. In view of this, the net return, which is defined as the net profit from a single round-trip trade divided by the total initial margin required to complete the trade, helps us to gauge the realized return of a trader. For a typical individual trader who always deposits just enough money in his/her margin account for a round-trip day trade, this net return would be identical to his/her realized return. Note that this net return is calculated under the assumption that there is no margin call whatsoever due to the lack of margin account information.

We find that the average index return and net return for individual day traders are −0.22% and −3.73%, respectively. Both of them are significantly negative. The median returns are negative and significant as well. These results suggest that individual day traders in the TAIFEX are not only overconfident about the precision of their information, but also biased in interpreting their information. Moreover, we find that the median net return for a short-initiated day trade is −1.36%, much higher than the median net return of −2.77% for a long-initiated day trade. These results are consistent to those using trading profit in TWD as the performance measure. Given the data limitation that we do not have the detailed margin account information, we still rely on the trading profit in TWD as our main variable of interest as it reflects accurately the investment performance each day trader has.

In addition, we discover a smirk relation between trading frequency and performance of day traders. Estimating a quantile regression of profits on the number of traded contracts by every fifth percentile, we find that, below the 15th percentile in profit, the more the day traders trade, the more loss they incur. For day traders above the 60th percentile, the more they trade, the more profit they make. Collectively, the documented relation between

[4] Barber and Odean (2000) use monthly holding positions and calculate monthly returns to avoid such bias. By doing so, they need to assume that trading takes place on the last day of the month and also ignore intra-month trading.