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The opposite disposition effect: Evidence from the Korean stock index futures market

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ABSTRACT

This paper examines the trading behavior of investors with respect to prospect theory from an intraday analysis. Using a unique data set of all trades on the Korean stock index futures market, we find that investors are more likely to hold losers longer than winners under a critical point, but to hold winners longer than losers over the critical point. Our finding suggests that the disposition effect under a critical point and the opposite of the disposition effect over the critical point play an important role in liquidation decisions.

1. Introduction

The general tendency to hold losers too long and to sell winners too soon, which Shefrin and Statman (1985) termed the 'disposition effect,' has been found in a variety of data sets and time periods.[1] The theoretical framework they employ is an extension of prospect theory (Kahneman and Tversky, 1979). Kahneman and Tversky (1979) suggest an S-shaped value function, which is defined on gains and losses relative to a reference point. In this setting, an investor will be risk averse in the domain of gains but he will be risk seeking in the domain of losses. Thus, the investor is more likely to sell winners because he is more likely to be risk averse. On the other hand, he becomes risk loving and will hold on to losers.

Kyle et al. (2006) also provide a formal framework to analyze the liquidation decisions of economic agents under prospect theory. Their model suggests that prospect theory preferences induce the agent to delay liquidation of a relatively inferior project if it is in losses and to accelerate liquidation of a relatively superior project if it is in gains. They explain that loss aversion induces the agent to be more risk averse near the reference point, and can induce liquidation near this point. This explanation suggests that the liquidation decisions can be varied across the magnitude of trading performance.

In this paper, we search for empirical evidence of the differential holding time of winners and losers. We examine how the liquidation decisions of investors are influenced by their trading gains and losses. Specifically, we investigate the effect of trading performances on the holding time of their positions.

Motivation for this analysis is derived from Barberis and Xiong (2009), who show results with respect to the trading behavior of an investor with prospect theory preferences. They find that the realized gain/loss model predicts the disposition effect more reliably than the annual gain/loss model. Nevertheless, they occasionally observe the opposite of the disposition effect in the realized gain/loss model (Ben-David and Hirshleifer, 2012). This result leaves us several questions. How are the liquidation decisions of investors

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[1] See, for example, Odean (1998), Heath, Huddart, and Lang (1999), Genesove and Mayer (2001), Grinblatt and Keloharju (2001), Shapira and Venezia (2001), Coval and Shumway (2005), Feng and Seasholes (2005), Locke and Mann (2005), Dhar and Zhu (2006), Frazzini (2006), Choe and Eom (2009), Kaustia (2010), Ben-David and Hirshleifer (2012), Li and Yang (2013), Chang, Solomon, and Westerfield (2016), Fischbacher, Hoffmann, and Schudy (2017), and Meng and Weng (2017).

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influenced by the magnitude of the realized gains and losses? Under what conditions does the disposition effect not appear? To answer these questions, we investigate the trading behavior of investors with real trading data.

In this paper, we examine the relationship between the liquidation decision and the magnitude of trading performance. In most cases, the holding time of losers is longer than that of winners, which is evidence of the disposition effect. When gains and losses are high enough, however, the holding time of winners is longer than that of losers, which is the opposite of the disposition effect. The main implication of these findings is that investors show the opposite disposition effect when gains are high enough to compensate for the risk aversion and loss aversion. These findings can shed light on the question of how investors trade in relation to their past gains and losses with respect to prospect theory. Furthermore, our findings provide fertile ground for the analysis of the out-of-sample portfolios forecasting or trading. Finally, our findings suggests that policy makers and practitioners should remind market participants of behavioral biases, and educate traders properly.

2. Data and analytical method

2.1. Data

In this paper, we analyze the entire history of transactions of the Korean stock index futures from January 2003 to March 2005.[2] The data include each trader's account information, identifiers for the buying trader and the selling trader, the price, and the time of each transaction. They also provide information on the country of residence of investors, and whether they are individuals or institutions. There are 69,391 different traders in the data. The numbers of individuals, institutions, and foreign investors are 59,081, 9,742, and 568, respectively. The percentage of individual investors is approximately 85%, which is strikingly higher than that of institutions (14%) and foreign investors (1%). However, on the basis of trading volume, the percentage of individual investors is lower. In 2004, 48.6% of the gross volume of trade was by individual investors, 29.1% of the gross volume of trade was by institutional investors, and 22.3% by foreign investors.

2.2. Calculating method of holding time and profit

In general, the disposition effect measure can be divided into two categories. One is a frequency approach and the other one is a duration approach. While Odean (1998) use the frequency approach, we apply the duration approach that is used in Coval and Shumway (2005) and Locke and Mann (2005).[3] We are able to calculate the trading speed, or how quickly trades are offset, using the holding time of each contract because we have the information of a trader's account, and the time for each transaction. In high-frequency trading environments such as index futures market in which informational advantages are usually very short-lived, traders are likely to hold their positions relatively for a short-term period. For this reason, it is better to analyze the disposition effect using the metric of time rather than frequency. Another advantage is that we can directly consider the closing versus holding decision for each contract.

We follow the Locke and Mann (2005) methodology to calculate trading profit and holding time using high frequency transaction data. We calculate the holding time and profit every minute for all traders. Holding time is the volume weighted holding time of the position. Realized profit is calculated when the trade reduces positions or buy and sell (or sell and buy) happen during one minute. It is categorized into realized gain, realized zero, and realized loss. Unrealized profit is calculated using the average cost and end price. It is also categorized into paper gain, paper zero, and paper loss.

3. Results

3.1. Holding time and profit

Table 1 reports the mean of holding time, realized profit, realized profit per contract, and round for all trades. As we expected, the average holding time in Panel A is very short (177 min) because futures contracts have a lot of risk such as unlimited liability and margin call. The average holding time of a loss is 221 min, which is much longer than that of a gain, 164 min. This result supports the disposition effect that investors have a tendency to hold losers longer than winners. The absolute magnitude of profit per contract in loss is KRW 0.27 million (approximately 270 U.S. dollars), which is much greater than that in gain, KRW 0.19 million. The round of a loss is 9.4 contracts, which is larger than that of a gain, 8.33 contracts. In addition, the number of a realized loss is about 5 million, which is much smaller than that of a realized gain, roughly 7 million. These results also support behavioral bias that investors are likely to realize small gain more frequently. From the perspective of holding time, magnitude of profit, and frequency, investors

[2] According to the Futures Industry Association (FIA), the Korean futures market is one of the key futures markets in the world. The Korean futures and options market is the world's number one active market and the Korean index futures market was ranked 4th in 2004, following the E-Mini S&P 500 Futures of CME, Euro STOXX 50 Futures of EUREX, and E-Mini NASDAQ 100 Futures of CME. In 2012, the Korean index futures market was ranked 8th, following the E-Mini S&P 500 of CME, RTS Futures of Moscow Exchange, Euro STOXX 50 of EUREX, Nikkei 225 Mini Futures of OSE, CSI 300 Futures of CFFEX, S&P CNX Nifty Futures of NSE India, and E-Mini NASDAQ 100 of CME.

[3] Odean (1998) measures the disposition effect as the difference between the proportion of gain realized (PGR) and the proportion of loss realized (PLR). Grinblatt and Keloharju (2001) and Kaustia (2010) model the decision to sell or hold each stock by employing logit regressions. Feng and Seasholes (2005) estimate the disposition effect using a Cox proportional hazard model.