Price limits and the value premium in the Taiwan stock market

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ABSTRACT

By proposing a measure of limit-hit frequency, this paper provides the first investigation to understand whether and how price limits are related to the cross-section of stock returns. Based on a sample of listed stocks in Taiwan, we show that the value premium is stronger among stocks with lower limit-hit frequency. This evidence is consistent with the prediction of the limited-attention explanation and rejects the limits-to-arbitrage hypothesis for the value premium in Taiwan. Further analyses indicate that the association between limit-hit frequency and the value premium is robust to several alternative explanations.

1. Introduction

As one of the major circuit breaker mechanisms adopted in financial markets worldwide, the price limit is imposed to prevent asset prices from excessive fluctuation. Previous studies mostly focus on the pros and cons of price limits and the price behavior surrounding limit hits (e.g., Kim and Rhee, 1997; Cho et al., 2003; Kim et al., 2004; Kim and Yang, 2004, 2008; Chan et al., 2005). However, how do price limits affect stock prices and whether price limits are related to asset-pricing anomalies still remain unclear to the literature. The objective of this study is to provide the first investigation to fill up this gap.

Motivated by Kim and Limpaphayom’s (2000) empirical finding that stocks with higher degrees of behavioral characteristics (higher volatility, higher turnover, and smaller size) hit limit prices more often than other stocks, we propose a measure of limit-hit frequency which represents the dual role in capturing different behavioral biases and examine its impacts on the cross-sectional variations of stock returns. Specifically, for every month we define limit-hit frequency as the number of days that a stock’s closing price hits its up- or down-limit prices over the previous 12 months divided by the number of trading days.
during the same period. We hypothesize that the measure is associated with the degrees of limits-to-arbitrage and investor attention.

On the one hand, price limits represent a form of arbitrage risk that impedes arbitrageurs from engaging in arbitrage activities to correct for potential mispricing (Chou et al., 2013). If stocks hit their limit prices more often due to investors’ overreaction, arbitraging in these stocks may be more risky and costly, thus refraining arbitrageurs to exploit the profitable opportunities embedded in the mispricing. On the other hand, limit-hit frequency is also positively correlated with investor attention because Seasholes and Wu (2007) indicate that price limit events serve as a natural experiment of attention-grabbing events. They find that up price limit events display three characteristics associated with attention-grabbing events as in Barber and Odean (2008), including high returns, high volume, and news coverage. When stocks hit their up-limit prices, the event catches individual investors’ attention and further induce them to buy those stocks they have not previously owned.

But what is the channel through which limit-hit frequency relates to the cross-section of stock returns? The hypothesis of limits-to-arbitrage and the limited-attention theory have different predictions on the relation between limit-hit frequency and the return patterns of asset-pricing anomalies. The former suggests that when a stock is mispriced, arbitrageurs will engage in correcting such profit opportunities. Due to the fact that arbitrage is risky and costly in reality, implementable arbitrage opportunities are limited, especially when limits-to-arbitrage is severer. If asset-pricing anomalies are caused by mispricing, they are more difficult to be eliminated when risks and costs of arbitrage activities are higher. As a result, the hypothesis of limits-to-arbitrage predicts higher premia of asset-pricing anomalies among stocks with higher limit-hit frequency.

The hypothesis of limited-attention, however, proposes that when investors pay less attention to a stock, they are more likely to ignore or underreact to the stock’s information or news, and therefore are unable to instantaneously adjust prices to fundamental values. If asset-pricing anomalies are induced because of investors’ underreaction to information, the return premia of asset-pricing anomalies should be more pronounced among stocks that receive less investor attention. That is, the limited-attention theory suggests that premia of asset-pricing anomalies are negatively correlated with limit-hit frequency.

Taking the two arguments together, we empirically examine the relation between limit-hit frequency and the cross-sectional variations of stock returns in the Taiwan Stock Exchange (TWSE). During our sample period from July 1982 to December 2015, limit hits are triggered more often in TWSE because of a narrower price-limit rule of not more than $\pm 7\%$ than those imposed in most of the markets around the world. Hence, the Taiwan stock market serves as a natural experimental environment to examine the two alternative hypotheses that are associated with price limits.\footnote{Chung and Gan (2005) survey the price limit rules of 45 stock exchanges around the world and find that 26 out of them impose price limits. Among the 26 exchanges, only 6 of them have a price limit rule of not more than $\pm 7\%$, including Wiener Borse AG (Austria), Prague (Czech Republic), Luxembourg, Mauritius, Taiwan, and Istanbul (Turkey). We introduce the detailed history of price limit rules in Taiwan in Section 3.1.}

Unlike the U.S. and most developed markets, the Taiwan stock market has been extensively demonstrated to exhibit no premium for the book-to-market (BM) effect (Chen and Zhang, 1998, Chui and Wei, 1998; Ding et al., 2005). We first apply the Fama and MacBeth (1973) cross-sectional regressions to show that the earnings-to-price (EP) ratio is the only useful value strategy, while BM and the gross profitability (GP) of Novy-Marx (2013) fail to generate significant value premia in Taiwan. When limit-hit frequency is taken into account, we find that the positive relation between EP and stock returns is significantly stronger among stocks that hit their limit prices less frequently. This phenomenon also holds true for the portfolio-based analyses. Specifically, the EP premium constructed using equal weights is significant at 0.586% per month among stocks with low limit-hit frequency and is insignificant at $-0.265\%$ per month among stocks with high limit-hit frequency. This pattern is robust to value weights and the Fama and French (1993) risk adjustments. Thus, our evidence is consistent with the prediction of the limited-attention theory rather than the limits-to-arbitrage argument in explaining the value premium in Taiwan.

To ensure that our evidence supports the limited-attention hypothesis in explaining the value premium, it is important to establish the direct linkage between limit-hit frequency and investors’ attention. Using Barber and Odean’s (2008) abnormal trading volume as a proxy for investor attention, we show that a firm’s abnormal trading volume increases sharply around price limit events. Moreover, we show that during the formation period of limit-hit frequency, stocks that hit their limit prices more often also have higher abnormal volumes and thus capture investors’ attention. Stocks with lower limit-hit frequency, however, have lower abnormal volumes and are thus subject to the limited attention from investors. This evidence provides a direct linkage between limit-hit frequency and investor attention in supporting our finding that limited-attention theory is the main reason to underly the value premium in Taiwan.

In addition to discriminating cross-sectional return differences between high and low EP stocks, limit-hit frequency also captures market-wide attentiveness. By constructing an aggregate limit-hit frequency measure to capture investors’ attentiveness to the overall stock market, we show that the EP strategy is profitable only in low attention periods but not in high attention periods. This finding indicates the credibility of the market-wide limit-hit frequency in explaining the time-varying patterns of the value premium and strengthens our support for the limited-attention theory in capturing the value premium in Taiwan.

Although our results are consistent with the limited-attention explanation for the value premium, we cannot rule out the possibility that the information content embedded in limit-hit frequency is related to other explanations or theories. Indeed, we find that limit-hit frequency is positively correlated with idiosyncratic volatility and turnover, but unrelated to illiquidity, firm age, and skewness. This confirms our conjecture that higher value of limit-hit frequency reflects higher degrees of limits-to-arbitrage and investor attention. Moreover, limit-hit frequency is unrelated to illiquidity risk, information uncertainty, and investors’ lottery-like preferences.
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