Post-hit dynamics of price limit hits in the Chinese stock markets

Ting Wu, Yue Wang, Ming-Xia Li

Research Institute of Sports Economics, East China University of Science and Technology, Shanghai 200237, People’s Republic of China
School of Business, East China University of Science and Technology, Shanghai 200237, People’s Republic of China
Research Center for Econophysics, East China University of Science and Technology, Shanghai 200237, People’s Republic of China
Postdoctoral Research Station, East China University of Science and Technology, Shanghai 200237, People’s Republic of China

HIGHLIGHTS

- We investigate all normal A-share stocks hit the price limit.
- A “W” shape can be found in the characteristics of expected profits.
- Time span of continuously hitting is an influence factor of expected profit.

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ABSTRACT

Price limit trading rules are useful to cool off traders short-term trading mania on individual stocks. The price dynamics approaching the limit boards are known as the magnet effect. However, the price dynamics after opening price limit hits are not well investigated. Here, we provide a detailed analysis on the price dynamics after the hits of up-limit or down-limit is open based on all A-share stocks traded in the Chinese stock markets. A “W” shape is found in the expected return, which reveals high probability of a continuous price limit hit on the following day. We also find that price dynamics after opening limit hits are dependent on the market trends. The time span of continuously hitting the price limit is found to a predictor to forecast the expected profit after the limit hit is open. Our analysis provides a better understanding of the price dynamics around the limit boards and contributes potential practical values for investors.

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1. Introduction

Price limit rule is very effective to restrain the surge and crash of stock price in intraday trading because such rule provides a cooling time for investors to rationally rethink the stock valuation [1]. However, it is reported that limit rule will incur the magnet effect [2–5], that the price will accelerate to hit the limit board when the price is approaching the limit board. Arak and Cook study the impact of price limit on the price behavior in the treasury bond futures market and provide evidence of the magnet effect [6]. By analyzing the 5-min return time series of 345 stocks traded on the Taiwan Stock Exchange from 1998/01/03 to 1999/03/20, Cho et al. find a statistically and economically significant magnet effect that stock prices accelerate towards the up-limit and provide weak evidence of acceleration towards the down-limit [7]. In Chinese
In this paper, we try to find the events of hitting price limits for all stocks and investigate price dynamics after opening the limit hits. The rest of this paper is organized as follows. In Section 2, we describe the data set. In Section 3.1, we analyze the statistics of the price limit open events. Section 3.2 defines the expected profits after opening limit hits. In Section 3.3, we compare the expected profits from bullish and bearish periods. The correlation between time factor and the expected profits are presented in Section 3.4. We summarize our results in Section 4.

2. Data sets

Our data sets, which are provided by financial data company RESSET, are composed of all A-share stocks traded on the Shanghai Stock Exchange (SHSE, 975 stocks) and Shenzhen Stock Exchange (SZSE, 1433 stocks) from 2000/01/04 to 2011/12/31. By excluding 28 days on which the data are missing, we finally have 2873 trading days. In both markets, the price limits are ±10%. The special treated (ST) stocks with limits of ±5% are not included in our analysis. On this condition, we pick out 2408 stocks. For each stock, we can assess the information of trade time, trade price, trading volume, trading amount, the top 5 best ask/bid price, and the top 5 best ask/bid size.

Table 1 reports the summary statistics of four financial variables for all stocks. Results are obtained by using the mixture of the variables for all stocks in those two exchanges, SHSE and SZSE. We find that the daily return $r$ and the daily volatility stock markets, the current ±10% price limits were fixed since 1996/12/16 for A-share common stocks. Many studies have been conducted on testing the existence of the magnet effect. However, these empirical analysis do not provide consistent results [8–13], some are in support of the magnet effect, and some are not.

Observing price limits hits is common for new-born stocks, especially for small-cap stocks. This can be linked to the phenomenon of initial public offering (IPO) premium. The stock prices will continuously hit the up limits for several consecutive days right after their IPOs. For example, Fig. 1 presents the price trajectories of two stocks (300431 and 300450) after their IPOs. The price of 300431 rises from 7.14 (IPO Price) to 327.01 during 41 trading days and the price of 300450 increases from 21.21 (IPO Price) to 186.79 during 20 trading days. The average daily logarithmic return is about 0.093 and 0.1088. Investors may be attracted by this great return. However, the bid orders are hardly executed until the price limit hit is open. Hence, it is interesting to investigate the price dynamics after opening price limit hits. As shown in Fig. 1, we can see the price limit is open on $T_i = 30$ and $T_i = 17$ for 300431 and 300450. The stock price keeps going up and reaches the highest price with a return approximating to 10% for 300431 and 33% for 300450.

In this paper, we try to find the events of hitting price limits for all stocks and investigate price dynamics after opening the limit hits. The rest of this paper is organized as follows. In Section 2, we describe the data set. In Section 3.1, we analyze the statistics of the price limit open events. Section 3.2 defines the expected profits after opening limit hits. In Section 3.3, we compare the expected profits from bullish and bearish periods. The correlation between time factor and the expected profits are presented in Section 3.4. We summarize our results in Section 4.
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