Is Price Limit Effective?

Xiuqing Ji, Baruch College, The City University of New York, USA

ABSTRACT

This is the first study to investigate whether the imposition of price limit influences market volatility in Mainland China. The results show that, market volatility in the period when price limit did not exist is not significantly different from the volatility in the period when price limit is present. This finding indicates that price limit is not effective in moderating market volatility.

INTRODUCTION

Circuit breaker includes both market halt and price limit. The New York Stock Exchange (NYSE) followed the recommendation of the U.S. government’s task force and has been using trading halts. Greenwald and Stein (1988) point out that the circuit breaker on the NYSE allows for an organized shut-down and reopening of the market. Lee, Ready, and Seguin (1994) find that trading halts on the NYSE increase volume and volatility. Brennan (1986) demonstrates that, joint with margins, price limit can reduce risk and lead to compact compliance, which explains why price limit is absent from the U.S. stock market, yet present in the futures and commodity markets. I focus on the stock market and thus price limit.

Regulators impose price limit to confine security price movement. Typically expressed as a percentage of the closing price on the previous trading day, price limit is a daily boundary that security price must lie in. The mechanism is prevalently used around the world. Besides the U.S. futures and commodity markets, the mechanism exists in many international stock markets: Austria, Belgium, Mainland China, Finland, France, Greece, India, Italy, Japan, Korea, Malaysia, Mexico, The Netherlands, Poland, Spain, Switzerland, Taiwan, Thailand, and Turkey.

Principal issues surrounding price limit are multi-fold and there is no consensus on the effectiveness of price limit. Regulators think that price limit restrains prices from moving excessively and should reduce market volatility; others feel the opposite and maintain that price limit interferes in the price discovery process. Fama (1989) show that, as a result of the interference in the price discovery process, volatility might increase. Ma, Rao, and Sears (1989a and 1989b) find that price discovery process in the U.S. futures market is delayed because of price limit and price reverses after price limit is hit, indicating the price limit curbs over-reaction and decreases volatility. Kim and Rhee (1997), Phylaktis, Kavussanos, Manalis (1999), and Kim, Kenneth A., and Limpaphayom (2000) discover that price limit does not reduce market volatility in Japan, Greece, Taiwan, and Thailand, respectively.

The debate on the necessity and magnitude of price limit itself and associated impacts are ongoing and the controversial opinions make it interesting to further explore if the mechanism is truly effective. This study takes a step in that direction and constitutes the first examination on the impact of the imposition of price limit in Mainland China. When a stock hits the price limit of 10%, the event is displayed on the trading screens of the exchanges. However, trading can still be accommodated, so long as the price is within the bracket of price limit. I examine if the market volatility in Mainland China changes before and after the price limit is effective. If volatility remains the same in both periods, it means that price limit is not instrumental in reducing volatility. If, on the other hand, volatility does decrease when price limit is put in place, then that is some evidence for policy makers that price limit is a useful structure.

This paper makes two contributions to the literature. First, it is the first study that examines how the imposition of price limit influences the stock market volatility in Mainland China. Although there are papers examining price limit in China, their focuses are different and are silent on how market volatility changes before and after price limit imposition. For example, Chen, Kim, and Rui (2005) find that, in comparison with their A share counterparts, B shares in Mainland China are less liquid and more likely to hit price limit. Chen, Rui, and Wang (2005) study the characteristics of stocks
hitting price limit in Mainland China and show how price limit asymmetrically influences price discovery and trading processes for upward and downward price movements. The second contribution of my research is to provide out-of-sample evidence on the debate regarding the effectiveness of price limit.

The rest of the paper provides a background of China’s stock market, introduces the data, carries out the empirical investigation, and concludes.

**STOCK MARKETS IN MAINLAND CHINA**

The growth and strength of the Chinese economy in the past two decades has attracted attention and acclaims from the world. The function of stock market in the entire economy is not as important as in developed countries. There are two stocks exchanges: the Shanghai Stock Exchange and the Shenzhen Stock Exchange, established on November 26, 1990 and April 11, 1991, respectively. Both exchanges have trading hours of 9:30-11:30 and 13:00-15:00. Tick size is RMB 0.01.

There are two classes of shares in Mainland China: A and B shares. Although they have the same cash flows, their ownership is different. Only Chinese citizens can purchase A shares and it was only until February 2001 that Chinese citizens were allowed to participate in the market for B shares. A shares are denominated in local currency, RMB; B shares are denominated in U.S. dollars on the Shanghai Stock Exchange and in Hong Kong dollars on the Shenzhen Stock Exchange, respectively.

In 1990, the Chinese government mandated the installation of price limit. The decision was reversed in 1992 to stimulate the growth of the stock market. In the following years, the market was indeed active and, furthermore, there were many speculative operations in the market. To preclude instability and enhance further development of the market, price limit was re-installed in 1996 and has been in place since then. Price limit is 10%, meaning that the price of a particular stock is to be bounded by 10% in both directions, up and down, from its closing price on previous trading day.

**DATA**

Data for this study comes from Datastream International. The month-end closing values of market index for China is used to calculate returns from July 1, 1996 to June 30, 1997. To clean up the data from Datastream, I test if the closing values are the same from month to month. If they remain the same for at least four months uninterruptedly, I only keep the earliest value and code the rest as missing. Such generated index values are used to compute daily returns. If any daily return is greater than 1000%, it is interpreted as data error and thus coded as missing.

**EMPIRICAL INVESTIGATION**

The structure of price limit is adopted on December 16, 1996. Accordingly, the pre-event period is July 1, 1996-December 13, 1996 and post-event period is December 17, 1996-June 30, 1997. To examine the impact of price limit on market volatility, I measure the variances of daily market returns for the two periods before and after the event, respectively, and conduct Levene’s test to assess the equality of the two variances. The null hypothesis is that the variances are equal. If the p-value is smaller than the significance level, then the null of equal variances should be rejected.

Figure 1 plots daily returns over the sample period and Table 1 displays the results for volatility. As can be seen, before price limit was in the market, daily volatility is 0.0297; after price limit became effective, daily volatility becomes 0.0235. Although the magnitude is smaller by 0.0062, the p-value of 0.7736 is larger than the commonly accepted significance levels of 0.01, 0.05, and 0.10 and thus the null of equal variances cannot be rejected. This means that, with price limit in place, market volatility does not decrease significantly.
Datastream International is the source for market returns. From December 16, 1996 to June 30, 1997, returns are computed from month-end closing values of the market index for China.

Table 1: Market Volatility in Mainland China
Before and After the Imposition of Price Limit

<table>
<thead>
<tr>
<th>Period</th>
<th>Variance</th>
<th>W-Stat.</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before the imposition of price limit</td>
<td>0.0297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After the imposition of price limit</td>
<td>0.0235</td>
<td>0.0829</td>
<td>0.7736</td>
</tr>
</tbody>
</table>

CONCLUSION

I examine if the imposition of price limit changes market volatility in Mainland China. Using daily market returns before and after the imposition of price limit, I discover that, after price limit is adopted, the change of market volatility is economically small and not statistically significant. This paper represents the first attempt to investigate the change of market volatility before and after price limit adoption in Mainland China; the findings serve as evidence for the ineffectiveness of price limit in moderating market volatility and they shed light on the debate on price limit.

REFERENCES


Park, Chul Woo, 2000, Examining futures price changes and volatility on the trading day after a limit-lock day, *Journal of Futures Market* 20, 445-466.
