

Effects of Short-Selling and Margin-Trading on Pricing Efficiency

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Abstract: China launched a pilot scheme in March 2010 to lift the ban on short-selling and margin-trading for stocks on a designated list. The number of list is up to nearly one thousand. We find that during the experiment period, the margin-trading and short-selling system has improved the ability of individual stocks in reflecting their own special information, but it rarely played an ideal role in promoting stocks to absorb market information. In general, the policy of margin financing and short selling has limited effect on the improvement of stock pricing efficiency.

1. Introduction

It has been 8 years since the margin-trading and short-selling business was launched in 2010. The list of margin trading and short selling stocks has been expanded five times, and more than 900 stocks can be bought or sold short. This policy provides more opportunities for investors as well as injects strong vitality into Chinese stock market and greatly promotes the prosperity of the stock market. However, some experts questioned that margin-trading and short-selling gave malicious short-sellers the opportunity, which made the sharp rise and fall of Chinese stock market happen more frequently in recent years. Many scholars have done researches on foreign mature securities markets about the impact of the financial instrument on the stock market. Given the uniqueness of China's securities market, foreign research conclusions may not be applicable to China. From the perspective of the efficiency of margin-trading and short-selling on stock pricing, this paper takes the list of newly added stocks in the fifth expansion in December 2016 as the sample to solve the problem: whether margin-trading and short-selling policies can promote stocks to approach their real value.

2. Literature review

Before margin-trading and short-selling were launched in Chinese stock market, the constraint of short-selling existed for nearly 20 years. Investors who were optimistic about the stock and expected the stock to rise would invest, and investors who expected the stock to fall could not express their ideas through short selling. The dilemma resulted in the overvaluation of stock prices. Diamond and Verrecchia [1] pointed out that the short-selling restriction would reduce the efficiency of information reflection and make the stock price absorb the positive information faster than the negative information. The development of margin-trading and short-selling business breaks the constraint and enables pessimistic investors to express their views. Zhong Zheng and Xinmin Hu [2] came to the conclusion that the pricing efficiency of sample stocks had been significantly improved after they were added to the list. At the same time, they pointed out that when the market was in a bear market, short selling mechanisms had a better effect on the pricing efficiency of stocks. It is worth noting that the research sample of Zhong Zheng et al. is relatively small, and the sample time span is only one year, which may have an impact on the accuracy of the research. Menghua Tong et al. [3] came to different conclusions: margin trading and short selling in a stable period can significantly improve the efficiency of stock pricing, while in a bear market and a bull market, the impact on the efficiency of pricing is not significant.

However, some scholars believe that margin-trading and short-selling have little impact on the improvement of pricing efficiency. Hongwei Xu and Chen Xin [4] believed that this system can reduce the probability of stock price collapse, but rarely have effect on Inhibition of surge.

3. Research

The research sample period is from March 1, 2014 to March 31, 2018, a total of 974 trading days. During the fifth expansion in December 2016, 77 stocks were added to the list of margin-trading and short-selling. In order to ensure the continuity of data, number of treatment group is 72. The control group selected 70 non-margin stocks. Data retrieved from the China Stock Market Trading Research (CSMAR) database provided by GuoTaiAn (GTA) Company include daily stock returns and high frequency trade and quote data. We obtain daily short-selling volume, margin-trading volume, and the respective covering volumes for eligible stocks from WIND.

The pricing efficiency is an index to measure whether stock price can accurately, timely reflect all available information in the market. It is believed that in an efficient market, stock price should contain historical and existing information about the value of the company. It includes the company's past stock price, public information and insider information. At the same time, the stock price has to adjust to the new information in the market. Generally speaking, the pricing efficiency of stock includes two aspects: the speed of stock price's response to new information in the stock market and the stock heterogeneity information.

First, it studies the efficiency of individual stock price in absorbing new market information. The ability of stock prices reflecting market information is not timely. The deeper the stock market influenced by the past market, the longer it takes for the stock to fully absorb market information, and the lower the pricing efficiency is. Hong and Moskowitz [5] creatively used the speed of stock price absorbing the market information to measure the pricing efficiency. Based on the methods of Hong and Moskowitz, we constructed the following formula:

$$r_{i,t} = \alpha_i + \beta_t \times R_{m,t} + \sum_{n=1}^5 \theta_{i,t-n} \times R_{m,t-n} + \varepsilon_{i,t} \quad (1)$$

$r_{i,t}$ is the rate of return on the stock under t period, $R_{m,t}$ is the rate of return on the market under t period. If the coefficient of the current market return rate is significantly different from zero and the coefficient of the lagging market return rate is significantly 0, the individual stock can fully and immediately absorb new market information, and there is no lag effect. Therefore, this paper measured the pricing efficiency of individual stock by using the ratio between the coefficient of market return in the lag period and the coefficient of market return in the current period. Based on the preliminary study, we selected the market with a lag of five periods:

$$e_{i,t} = \frac{\sum_{n=1}^5 |\theta_{i,t-n}|}{|\beta_t| + \sum_{n=1}^5 |\theta_{i,t-n}|} \quad (2)$$

$e_{i,t}$ (pricing efficiency 1) represents the proportion of the sum of the absolute market return of the lagging 5 period in the sum of the absolute market return of the current period and the absolute market return of the lagging 5 period. The smaller the proportion is, the smaller the impact of individual stock i on market information in the lagging period is. In other words, individual stock i absorbs market information quickly and has a high pricing efficiency.

Secondly, from the perspective of individual stock price containing company heterogeneity information, Roll [6] measured the information content of stock price by using R^2 of the regression equation of individual stock yield to market return. The larger R^2 is, the more the return volatility of a company's stock is explained by the market return volatility, and the less company-specific information contained in the stock price.

In this paper, using model of Roll, we got the second pricing efficiency indicators:

$$E_{i,t} = 1 - R_{i,t}^2 \quad (3)$$

$R_{i,t}^2$ represents the goodness of fit of CAPM model in period t of individual stock i. This model had a rolling window of 50 trading days. The greater the value of $E_{i,t}$ (pricing efficiency 2), the less the stock is affected by market returns, and the more idiosyncratic information it contains.

In order to more accurately test whether margin-trading and short-selling had an impact on the efficiency of pricing, this paper used the Difference-in-Differences(DID) Model to eliminate systematic differences.

Combined with other factors, the following model was constructed:

$$y_{i,t} = \alpha_2 + \alpha_3 d_{i,t} + \alpha_4 T_{i,t} + \beta \times d_{i,t} \times T_{i,t} + \theta \times Control_{i,t} + \varepsilon_{i,t} \quad (4)$$

$y_{i,t}$ refers to the pricing efficiency of individual stock i in period t, $d_{i,t}$ is the group dummy variable, $d_{i,t}=1$ means individual stock i in the experimental group, and $d_{i,t}=0$ represents individual stock i in the control group. $T_{i,t}$ is the dummy variable in the period. $T_{i,t}=1$ represents the experimental period. $d_{i,t} \times T_{i,t}$ is the interaction and $Control_{i,t}$ is the Control variable. The regression coefficient of the interaction term can reflect the net impact of margin financing and short selling on the stock pricing.

According to the analysis in table 1, the regression coefficient between pricing efficiency 1 and group dummy variable is -0.0191, which is significant at the significance level of 99%, indicating that the pricing efficiency of margin stocks is higher than that of non-margin stocks. The coefficient of the time dummy variable is significantly positive, that is, after the implementation of the policy, the pricing efficiency of all sample stocks is reduced. The coefficient of cross term is 0.0174, which is significant at the significance level of 99%. Therefore, this paper believed that margin trading and short selling policies have not improved the speed of stock's reflection in absorbing market information.

From the perspective of the heterogeneous information reflected by individual stocks, the regression coefficient of the cross term is positive and is significant at the significance level of 99%. After the implementation of margin trading and short selling in China's securities market, the ability of stocks to reflect private information is improved, and the influence of the company's own information on the stock price is deeply. The regression coefficients of pricing efficiency 2 and group dummy variables were significantly negative, indicating that the pricing efficiency of the experimental group was lower than that of the control group, and the stocks of the experimental group had weak ability to reflect their own unique information. The regression coefficient of pricing efficiency 2 and group dummy variables was significantly positive. After the implementation of the policy, the ability of individual stocks to reflect their own historical information and private information increased slightly.

To sum up, the margin-trading and short-selling in the experimental period only reflected the unique information of individual stocks a, but rarely played a prominent role in absorbing new market information.

At the same time, it should be noted that investors can really carry out these financial transactions accounted for a relatively small proportion of the transaction volume. Due to the complex and large stock market, investors' buying and selling of stocks are more "speculation" behavior than the real long-term holding investment behavior, resulting in the large bubble of Chinese stock market, which may lead to the inaction of margin trading and short selling in accelerating the speed of stock market information absorption.

Table.1. The Result of Difference-in-Differences Model

Variables	Efficiency 1	Efficiency 2
group dummy variable	-0.0191*** (0.00121)	-0.0375*** (0.00164)
Time dummy variable	0.00927*** (0.00134)	0.0208*** (0.00182)
interaction	0.0174*** (0.00178)	0.0257*** (0.00242)
Constant	0.428*** (0.00142)	0.610*** (0.00192)
Observations	124,439	124,439
R-squared	0.138	0.180

Note: the values in brackets are p, *** means $p < 0.01$, ** means $p < 0.05$, * means $p < 0.1$

4. Summary

Based on the stock data of Chinese stock market from March 2014 to March 2018, this paper studied the role of margin-trading and short-selling policy in the price discovery of Chinese stock market through DID model. The study found that the policy played a promoting role in improving the inclusion of individual stocks' own idiosyncratic information, but there was no significant change in accelerating the market absorption speed. In general, margin trading and short selling improved the efficiency of stock pricing to some extent during the experimental period, but it still did not play an ideal role. In addition, this paper found that bull market stocks absorbed new information faster, but their ability to reflect their own idiosyncratic information was weakened. The higher the turnover rate was, the greater the liquidity was, and the faster the market information was absorbed. However, the stock price contained less information about itself.

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