Study on the Stock Price Effect of Different Types of Convertible Bonds

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Abstract: *Based on the analysis of China's convertible bond market, this article uses the event research method to study and analyze the stock price changes of large-scale stock exchange companies in China's securities market from 2007 to 2019. Convertible bonds are classified intopartial-share convertible bonds and partial debt convertible bonds according to Delta index to analyze the stock price effect of different partial convertible bonds.*

Key words: convertible bonds, abnormal yield, stock price effect

1. Introduction

Convertible bonds are a type of bond, but they are different from ordinary bonds. They are hybrid financial instruments with the characteristics of bonds, stocks, and options. The biggest characteristic of convertible bonds is their convertibility. After the convertible bond enters the conversion period, the holder of the convertible bond can convert the convertible bond into company shares in accordance with the agreed terms of the conversion bond, and realize the transformation of the creditor to the shareholder status. It can be said that the convertible bond is an investment financial risk management tools with extremely low risk.

The development of convertible bonds in China has only a history of more than 20 years, and the lack of understanding of the value of convertible bonds by many investment entities will lead investors to irrationally follow suit and convert stocks. It has aggravated the turbulence of the stock market, which will have an impact on the healthy and stable development of China's stock market. In addition, different types of convertible debt to equity will have different effects on stock prices. Here we define that those convertible bonds that are more able to incentivize the holders 'conversion behavior are partial-share convertible bonds. On the contrary, those convertible bonds that make holders more willing to be held in the form of bonds to maturity are defined as partial debt convertible bonds. Based on the above issues, whether the effects ofdifferent biased convertible bonds to share prices have the same effect on stock prices requires careful investigation.

2. Empirical Research

This paper uses the event research method to study the impact of convertible debt to equity on the underlying stock price. The event research method divides an event into three windows: an estimation window, an event window, and an afterthought window. The time period used to estimate the predicted normal return before the target event occurs is defined as the estimation window. The event window is defined as whether the event under study has caused price

fluctuations in the securities market and the degree of impact on prices in the recent period. After the event occurs, a period of time after the stock market has accepted the information about the occurrence of the target event is defined as an afterthought window. The hindsight window is mainly used to study the long-term impact of the occurrence of target events on stock prices and returns. To use the event research method, first of all, the event to be studied and the date of the event should be clarified. In most studies in the past, the date of occurrence of the event was often used as the 0 point of the event. This article takes the date of the announcement of the listed company's announcement of the results of the conversion of bonds and changes in shares and the announcement of the quarterly convertible corporate bonds conversion situation as 0. Set the ten days before and after the event as the event window, that is, the event window is [-10, 10]. Since the estimated window length generally requires greater than or equal to 100 days, we choose [-150, -11] as the estimated window.

The estimation of normal returns during the estimation window uses a market model. The market model assumes that there is a stable linear relationship between the rate of return of individual stocks and the rate of return of the market index in the market. The classic CAPM model is used to establish a regression equation. The formula is as follows:

$$R_{it} = a_i + \beta_i R_{mt} + \varepsilon_{it} \sim N(0, \sigma^2)$$

Where R_{it} is the rate of return of a stock at time t, R_{mt} is the rate of return of a market index at time t, and ε_{it} is a random error term. The formula for calculating R_{it} and R_{mt} is:

$$R_{it} = (P_{it} - P_{it-1}) / P_{it-1}$$

$$R_{mt} = (P_{mt} - P_{mt-1}) / P_{mt-1}$$

P_{it} is the closing price of the sample stock i on day t, and P_{it-1} is the closing price of the sample stock i on day t-1. P_{mt} is the closing price of the market index on day t, and P_{mt-1} is the closing price of the market index on day t-1. Using the least square method to substitute the daily stock returns in the estimation window and the corresponding daily market returns, the formula coefficients a_i and β_i are calculated.

Substituting the daily rate of return of the market index

during the event window into the formula gives the normal return of individual stocks during the event window. The abnormal rate of return is obtained by subtracting the normal rate of return from the actual rate of return of individual stocks. Use the return rate data during the estimation window to estimate the normal return rate of the stock in the event window, and subtract the normal return rate from the actual return rate to obtain the abnormal return rate AR_{it}.

$$AR_{it} = K_{it} - (a_i + \beta_i R_{mt})$$

K_{it} represents the actual rate of return of individual stocks during the event window at time t.

The average abnormal rate of return is as follows:

$$ARR_t = \frac{1}{n} \sum_{t=1}^{n} AR_{it}$$

The cumulative average abnormal rate of return is as follows:

$$CARR_t = \sum_{t=-10}^{10} AAR_t$$

According to the Delta index proposed by Burlacu (2000), convertible bonds with Delta index of [0, 0.66) are regarded as partial debt convertible bonds; convertible bonds with values of [0.66, 1] are partial-share convertible bonds.

This paper selects 63 behaviors of 58 listed companies whose convertible bonds were converted from 2007 to 2019 as research samples. The sample selection process has undergone rigorous screening and ruled out the pollution announcements around the date of the conversion announcement. There were 39 partial-share convertible bonds with 39 the behavior of convertible; 22 partial debt convertible bonds with a total of 24 the behavior of convertible.

After classifying convertible bonds by Delta index, the cumulative average abnormal yield of two different types of convertible bonds with different biases is counted.
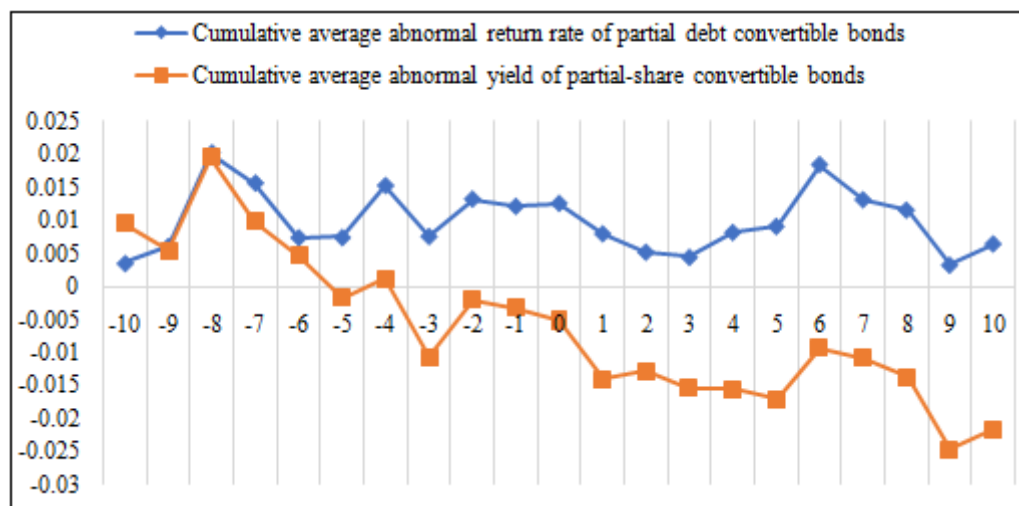

Chart 1: Line chart of cumulative average abnormal yield trend comparison of stock group and debt group.

The above chart shows that the cumulative average abnormal yield of partial debt convertible bonds fluctuates at the upper end of the 0 axis, and there is no significant fluctuation around the conversion date. Compared with the cumulative average abnormal return rate of the partial-share convertible bonds, the fluctuation range is smaller.

The cumulative average abnormal yield of partial-share convertible bonds has been gradually declining. Although there is an upward trend after the conversion date, the overall trend is declining. And the cumulative abnormal return rate of the partial-share convertible bonds has been in a negative state after the conversion date.

Then check whether the abnormal return in the event window is significantly 0. In this paper, the one-sample T test is used. If the abnormal return rate is significantly 0, it means that the occurrence of the event has a small impact on the stock price; if the abnormal return rate is not significantly 0, it means that the event has a great impact on the stock price.

One-sample statistics				
	Cases	average value	standard deviation	Average standard error
Cumulative average abnormal yield	21	.023839298305	.01966960477	.003047443856

One-sample test						
	Inspection value = 0					
	t	Degrees of freedom	Sig. （Double tail）	Mean difference	95% confidence interval for the difference	
					Lower limit	Upper limit
Cumulative average abnormal yield	-7.963	20	.000	-.023839298304	-.02704243883	-.01974352726

It can be seen from the results that the two-sided Sig value is 0.000 <0.05, so it is considered that at the significance

level of 0.05, the cumulative abnormal return rate is significantly different from 0. That is 95% probability of accepting the cumulative abnormal return during the event window .The rate is significant. It shows that the behavior of convertible bonds to shares has a significant impact on the target company's stock price.

3. Conclusion

The behavior of convertible bonds to stock swaps will have a significantimpact on the underlying stock price. Partially convertible bonds and partial debt convertible bonds will cause different fluctuations in the abnormal return rate of the stock price. The stronger the convertibility of convertible bonds theabnormal fluctuation of the stock price caused by it becomes more and more severe.

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