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Negative conversion premium☆

Zhijian (James) Huang [a,*], Li Xu [b]

[a] Saunders College of Business, Rochester Institute of Technology, LOW-3340, Rochester, NY 14623, USA
[b] Department of Finance, School of Business, New Jersey City University, Jersey City, NJ 07311, USA

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Abstract

We document frequent occurrences of negative conversion premium (NCP) events in the Chinese convertible bond market, when the bond is convertible and the underlying stock can be freely sold. This implies that when an NCP event occurs, existing stock holders can earn a riskless profit through a long-short strategy which sells the underlying stock and buys the convertible bond at the same time, then converts the bond into stocks. Facing short sale constraints, traders not holding any position in the underlying stock can still profit from an overnight trading strategy which buys the convertible bond at the NCP event day t, then sells the converted stock on day $t + 1$. We also find that the next-day opening prices following NCP events are significantly lower, which is evidence for the stock selling from the overnight trading strategy. Overall, our findings show that investors in China are aware of the NCP events and they earn abnormal returns through active trading. However, it remains as a puzzle why existing stock holders such as institutional investors do not trade away the negative conversion premium through the riskless long-short strategy.

JEL classification: G02; G14; G15; G24

Keywords: Convertible bond; Negative conversion premium; Chinese stock market; Price pressure; Arbitrage opportunity

1. Introduction

Conversion premium (CP), defined as the market price of a convertible bond minus its conversion value, is generally non-negative. In an efficient market, a negative conversion premium leads to the arbitrage opportunity of buying the undervalued bond and short selling the overvalued stock at the same time. In this study, we document frequent occurrences of negative conversion premium (NCP) events in the Chinese convertible bond market, when the bond is convertible and the underlying stock can be freely sold. To give a sense of the prevalence of NCP events, more than 1% of the bond-days in our sample have a conversion premium lower than −0.5% of the conversion value. In more than 15% of the trading days there is at least one NCP event with $CP < -0.5\%$.

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* Corresponding author. Saunders College of Business, Rochester Institute of Technology, LOW-3340, Rochester, NY 14623, USA.
E-mail addresses: zhuang@saunders.rit.edu (Z.(J. Huang), lxu@njcu.edu (L. Xu).
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Do traders exploit these NCP events? Yes. Since short-selling is difficult in the Chinese stock market, traders not already holding the underlying stock typically follow an overnight trading strategy which buys the convertible bond with negative conversion premium, makes the stock conversion overnight, then sells the newly converted stock shares immediately at the opening of the next trading day. We find the next-day stock opening prices following NCP events are significantly lower due to this selling pressure. In our sample, the average overnight (close-to-open) stock return following NCP events with $CP < -0.5\%$ is -50 bps (basis points) compared to only -7.5 bps for the entire sample. However, the large and negative overnight return does not completely wipe out the profit from the negative conversion premium. On average more than 50% of the profit is still realized by selling immediately at the next-day opening, despite the downward price pressure. Therefore, our finding is consistent with the Grossman-Stiglitz paradox [1] in which active traders earn a higher risk-adjusted return to reward their costly effort to identify and trade away the negative conversion premium.

To test the economic significance of our finding, we back-test two trading strategies focusing on the NCP events in the Chinese stock market: a long-short strategy for existing share holders of the underlying stock and an overnight strategy for traders not currently holding the stock. When there is no NCP events on a trading day, these strategies only earns the risk-free return through holding cash. While the long-short strategy earns a large riskless return overtime, the more risky overnight strategy also outperforms the market benchmark in raw return as well as in risk-adjusted performance measures. If a trader avoids the crowded selling at the next-day opening, and instead sells at the next-day closing, the performance is even better.

For convertible bond holders, selling at a slightly negative conversion premium is not irrational because that avoids the uncertainty from making the stock conversion overnight before one can sell in the next trading day. However, it is still puzzling why existing stock holders such as institutional investors do not trade away the negative conversion premium through a riskless long-short strategy. For existing stock holders who plan to hold the stock for at least one more day, such as index funds, they should sell the stock and buy the discounted convertible bond at the same time to earn a riskless profit. For stock buyers on a day when conversion premium is negative, they are always better off buying the convertible bond instead, then making the stock conversion overnight.[1] The existence of NCP events in the Chinese stock market implies that existing stock holders should keep checking conversion premiums for possible additional profits, while buyers of a stock need to make sure the corresponding convertible bond is not trading at a discount.

The Chinese convertible bond market has several unique features that make profitable trading opportunities possible after NCP events. First, stock conversion is fast and convenient in China. Stock conversion only takes one trading day. If an investor makes a conversion request before the close of trading day t, the converted shares will be available at the opening of trading day $t + 1$. In addition, the conversion request is sent directly to stock exchanges just like trading any other securities. In comparison, in the US market conversion request is an over-the-counter transaction which takes several days. This delay greatly increases the risk for traders who want to profit from a short-term price discrepancy. Second, in China convertible bonds are quoted and traded both at the clean price, while in the US convertible bonds are quoted in the clean price but traded at the "dirty" price which includes accrued interest since the last coupon payment. Therefore, as pointed out in[2]; in the US market negative conversion premium may not lead to arbitrage opportunities due to accrued interests, and this is not a problem in the Chinese convertible bond market. Finally, taxes, transaction costs, and bond covenants are relatively simple and uniform in the Chinese bond market. Investors do not need to worry about too many other factors when NCP events occur. For example, while convertible bonds are as liquid as stocks in China, coupon payments from bond also have the same tax rate as stock dividends, so tax consideration in making conversion decisions in the U.S. market[3] is not a concern in the Chinese market. Moreover, all bond covenants contain the dividend protection clause, so firms are anticipated to call back their convertible bonds when criteria are met as argued in.[4] This reduces conversion premium to a level close to or below zero when forced conversion is expected.

There is a large literature on the long-term convertible bond arbitrage strategy resulted from the undervaluation of convertible bonds.[2] Usually carried out by hedge funds, the long-term arbitrage strategy forms a delta-neutral portfolio with a long position in the undervalued convertible bond plus a short position of the underlying stock. Our paper

[1] The Chinese stock market follows the $T + 1$ trading rule so that newly bought stock shares can only be sold on the next trading day. Therefore, for both the convertible bond buyers and the stock buyers the earliest time they can sell newly bought stocks is the opening of next trading day.
[2] See, for example, Chan and Chen (2007),[10–12]; and.[13]

explores a new type of short-term trading strategies for those equity-like convertible bonds when a temporary undervaluation occurs. After considering limits to arbitrage such as short sale constraints, transaction costs, daily price limits, and non-convertible days, we find a strong performance of trading strategies exploiting NCP events in the Chinese market.

The remainder of the paper proceeds with data and methodology in Section 2. Section 3 presents our empirical results and Section 4 concludes.

2. Data and methodology

In this section, we first introduce the data used in this research with summary statistics of convertible bonds and underlying stocks. We then give an overview of the Chinese convertible bond market focusing on the forced conversion scenario where a negative conversion premium becomes possible. In Section 2.3 we discuss in detail why and when NCP events will lead to riskless profit for active traders. Finally, we estimate the total transaction cost of trading after NCP events.

2.1. Data

The basic information of all convertible bonds, convertible bond trading data, and individual stock and market return data are from the CSMAR (China Stock Market & Accounting Research) database. There are 209 convertible bonds up to October 17, 2018. Five bonds do not have any data for some data items. One bond (Ticker: 100795) has too many days with negative conversion premium as high as −30% on convertible days, so we believe there are data errors or the bond was not convertible at the time. After removing these six bonds, our sample includes 203 convertible bonds issued by 188 different firms, and 73,071 bond-days spanning from March 15, 2000 to October 17, 2018. We use the China Security Index 300 (CSI300) to calculate market returns after April 8, 2005 which is the date that index was first created. Before that date, we use the Shanghai Stock Exchange (SSE) Composite Index as the market benchmark.

In Table 1 we report summary statistics of the 203 convertible bonds in our sample. The first four variables are bond issuance information including the issuing amount, issuing term, initial coupon rate, and credit rating. We then provide bond and stock trading statistics starting with the number of trading days in our sample, followed by daily averages of bond and stock return, bond price, trading volume/amount, turnover ratio based on the unconverted amount of the bond, turnover ratio of the underlying stock, amplitude which is the difference between daily high and daily low divided by the daily closing price, conversion value as the value of the convertible bond if converted at the current stock price, conversion premium which is the percentage of the bond price exceeding the conversion value, and the percentage of institutional ownership of the underlying stock.

There are several notable findings from Table 1. First, the average bond daily return at 0.03% is much higher than the daily average return of the underlying stock at 0.0078%, while the bond standard deviation is also smaller than that of the stock. Therefore, convertible bonds outperform their underlying stocks in terms of holding period return, indicating the under-valuation of convertible bond in the Chinese market similar to the US.[5] In addition, we also notice that there is a high probability of early delisting due to forced conversion shortly after issuance. As we can see, while the average issuing term is 5.57 years, the average life span of the 110 already delisted bonds turns out to be only 2 years.[3] Since forced conversion requires a bond trading at least 30% higher than its face value, this also contributes to the abnormally high return of Chinese convertible bonds.

Another interesting finding is that convertible bond trading is quite active. As Table 1 shows, the average daily turnover ratio across all bonds is 3.47%, which is even higher than the underlying stocks whose average daily turnover is only 1.85%. The reason for such good liquidity of convertible bonds is the T+0 trading rule in the Chinese bond market that allows a trader to sell immediately after buying convertible bonds. In contrast, the Chinese stock market follows the T+1 trading rule so that newly bought stock shares cannot be sold until the next trading day. This superior liquidity of convertible bond ensures that active trading is possible when price discrepancy exists.

[3] Note that there are about 244 trading days per year in the Chinese stock market. In Table 1 the average number of total trading days of already delisted bonds is 487 days, or 2 years.

Table 1
Summary of Bond Statistics. This table presents the summary statistics of the 203 convertible bonds in our sample. For each bond, we consider all trading days including those non-convertible days. We first calculate statistics for each individual bond, then take average of these statistics across all convertible bonds. We report the mean, medium, standard deviation (*Stdev*), minimum (*Min*), maximum (*Max*), and number of samples (*N*) of each of the following individual bond statistics: issuing amount, issuing term, initial coupon rate (*Init Cpn Rate*), credit rating with 1 for AAA, 2 for AA+, 3 for AA, and 4 for AA-, number of trading days (*N Trading Days*), average daily bond return (*Avg Ret Bond*), average daily return of the underlying stock (*Avg Ret Stock*), average bond price at closing (*Avg Bond Stock*), average daily trading volume (*Avg Volume*), average daily trading amount (*Avg Trading Amt*), average daily turnover ratios of the bond (*Avg Turnover*) as well as the underlying stock (*Avg Stock Turnover*), average amplitude which is the magnitude between daily high and daily low divided by the daily closing price (*Avg Amplitude*), average conversion value of the bond (*Avg Conv Value*), average conversion premium which is the percentage the bond price exceeding the conversion value (*Avg Conv Premium*), and average percentage of institutional ownership of the underlying stock (*Stock Inst Ownership*).

	Mean	Medium	Stdev	Min	Max	N
Bond Issuance Information						
Issuing Amount (Million ¥)	2,302	978	4,802	114	40,000	203
Issuing Term (Years)	5.57	6.00	0.61	3.00	6.00	203
Init Cpn Rate (%)	0.71	0.50	0.51	0.20	3.50	203
Credit Rating[a]	2.15	2.00	0.93	1.00	4.00	202
Averages of Bond and Stock Trading Information						
N Trading Days[b]	487.06	405.50	309.73	21.00	1,178.00	110
Bond Ret (%)	0.0305	0.0143	0.1751	−0.6272	1.1490	203
Stock Ret (%)	0.0078	0.0116	0.7825	−1.6610	10.0478	203
Bond Price (¥)	116.63	111.02	25.03	88.85	299.34	203
Bond Volume (Million Shares)	0.67	0.19	1.55	0.02	14.65	203
Bond Trading Amt (Million ¥)	43.09	13.95	90.24	1.80	709.56	203
Bond Turnover (%)	3.47	1.60	5.82	0.12	45.69	203
Stock Turnover (%)	1.85	1.38	1.67	0.04	15.15	203
Amihud Bond	45.72	1.93	241.28	0.01	3168.73	203
Amihud Stock	0.67	0.34	0.88	0.01	6.85	203
Bond Amplitude (%)	1.71	1.42	0.96	0.50	6.08	203
Conv Value (¥)	100.37	94.91	28.35	49.97	302.86	203
Conv Premium (%)	22.28	16.14	21.28	−5.44	144.89	203
Stock Inst Ownership (%)	5.97	4.83	5.17	0.00	25.90	203

[a] One convertible bond does not have credit rating data.
[b] When calculating total number of trading days, we only include those convertible bonds delisted before the end of our sample period.

2.2. The Chinese convertible bond market

The Chinese convertible bond market is relatively small compared to the entire corporate bond market in China which stands at five trillion RMB in size at the end of 2017.[6] However, it is a very important market because the Chinese convertible bond market serves as an alternative for firms to raise equity capital during times when initial public offering (IPO) is difficult. In fact, out of the more than 200 convertible bonds, only a handful of them ended up paying back the principals upon expiration. The vast majority was converted into equity through forced conversion.

Fig. 1 shows the total number and size of convertible bonds in the Chinese market over time. At the end of our sample period, there are 93 convertible bonds totaling about 170 billion RMB in size. Opposite to the IPO market which booms in bull markets, firms issue more convertible bonds in bear markets as an alternative to raise capital, and most of those bonds are delisted through forced conversion in bull markets. As we can see, there was a surge of large offerings by big firms after 2010, starting with the 40-billion launch by the Bank of China in June of 2010 which is the largest issuance in our sample. Later on, these bonds were converted to equity during the 2014-15 bull market. Starting from October 2017, the China Securities Regulatory Commission (CSRC) boosted the number of convertible bond offerings at a time when IPO became more and more difficult during a market downturn.

Similar to the US market, one of the features of the Chinese convertible bond is the right of the issuing firm to call back the bond at a price slightly higher than the face value, if the underlying stock performs well. A typical clause reads like if the stock price is higher than 130% of the current conversion price in 15 days out of a 30-trading day period, the issuing firm can announce the buy-back of the convertible bond at a price of 106 yuan after a deadline which is one month from the announcement. Such a term is referred as the forced conversion clause. At issuance the

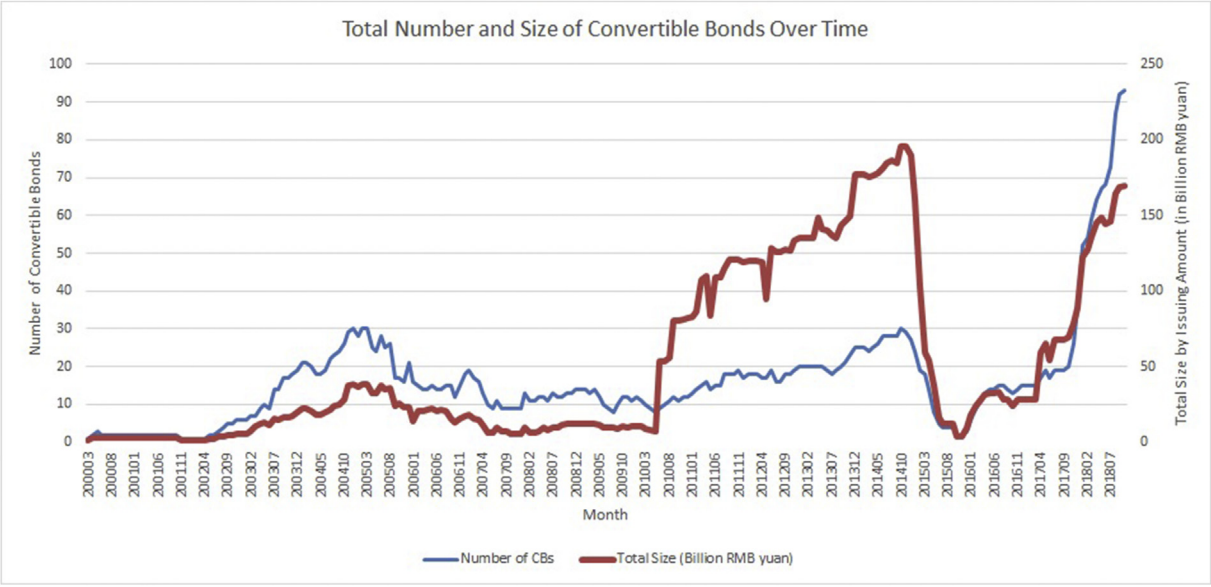

Fig. 1. This figure illustrates the total number and size of convertible bonds over time in the Chinese convertible bond market. The left vertical axis is the total number of convertible bonds in that month, and the right vertical axis is the total market value of convertible bonds in Billion Chinese Yuan.

conversion price is set to equal the current stock price, and by definition, the conversion value of the bond is the face value which is 100 yuan. When forced conversion is triggered after the stock price goes up for more than 30%, the bond already has a conversion value of higher than 130 yuan. Investors would suffer a huge loss after the deadline when the issuing firm buys back the bond for only 106 yuan. As a result, when a forced conversion is expected, convertible bond holders are under the pressure to get rid of their holdings through two strategies: sell the bond in the secondary market or convert it into the stock which takes one trading day. Let's analyze the pros and cons of these two strategies under two cases.

- Case 1: The convertible bond price is higher than its conversion value:

In this case, the conversion premium is positive. Investors would definitely want to sell the convertible bond rather than making a stock conversion. This downward price pressure pushes the bond price very close to the conversion value, or even occasionally below the conversion value, resulting a negative conversion premium.

- Case 2: The convertible bond price is lower than its conversion value:

When there is a negative conversion premium, however, making a stock conversion is not strictly better than selling the bond due to the uncertainty of the stock price on the next trading day. Therefore, risk-averse investors may choose to sell the convertible bond at a small discount immediately rather than making the conversion, then sell the stock in the next trading day, especially when they feel the current stock price is overpriced. If more investors think this way, the negative conversion premium could persist over time.

As a summary, when a forced conversion is expected, convertible bond holders may keep selling at a price with negative conversion premium to avoid overnight return uncertainty. However, the question remains as to whether stock holders could make riskless profits though a negative conversion premium event. In the next section, we will take a close look at NCP events in the Chinese convertible bond market, and how an active trader can make additional profit after NCP events.

2.3. Negative conversion premium and trading opportunities

2.3.1. An example

On Friday, December 5, 2014, the convertible bond (Ticker: 113001) of Bank of China (BOC) closed at 136.8 yuan, while its conversion value was higher at 140.84 yuan, implying a conversion premium of −2.87%. To earn a riskless profit, an investor who already own the BOC stock such as a mutual fund could sell the stock and buy the convertible bond at the same time. Below is a detailed example assuming 50 contracts (i.e., 500 shares) of convertible bond are traded.

Shortly before the close on December 5, 2014, an investor sold 19,083 shares of the BOC stock at the price of 3.68 yuan—one cent lower than the 3.69 yuan closing price to account for the bid-ask spread. The gross proceeds before transaction costs from this sale is 70,225.44 yuan. At the same time, the investor bought 50 contracts or 500 shares of the BOC convertible bond at 136.80 yuan per share, paying 68,400 yuan before transaction costs. The investor then requested to convert the 500 shares of convertible bond into BOC stocks at the 38.1679-for-1 ratio, which takes one trading day to complete. In the morning of Monday, December 8, 2014, the investor would again have 500*38.1679 = 19, 083 shares of the BOC stock and no convertible bond. However, the account ended up with 1,825.44 yuan more in cash before transaction costs, or about 2.5% of the value of the initial BOC stock position. The total transaction cost is only about 0.2% as we will be discussing in Section 2.4.

The above example cannot be explained by stock or bond liquidity issue. As one of the four largest banks in China, Bank of China has superior liquidity in its stock. On that specific trading day, the turnover ratio reached 1.3% on a stock worth 727 billion yuan. The BOC convertible bond had a 13% turnover ratio on a size of at least 14.8 billion yuan.[4] In fact, even the highest convertible bond price on December 5, 2014 was only 138 yuan, much lower than the 140.84 yuan conversion value. In another word, even the buy order of the convertible bond was unluckily filled at the highest price of that day, there was still a 2% negative conversion premium left for exploitation.

While short sale is possible in Chinese stock market after 2010, it is highly constrained. Traders without any position in the underlying stock cannot trade like this. However, it is puzzling why existing shareholders, especially institutional investors such as a mutual fund, do not trade away the large, negative conversion premium. Before we further explore other trading strategies, let's first look at the limitations to the trading around NCP events.

2.3.2. Limits to arbitrage on NCP events

When there is a negative conversion premium, two conditions need to be both satisfied for possible profitable trading opportunities. First, the convertible bond needs to be convertible at the time. Second, the underlying stock can be sold freely. As a result, in all of our empirical tests we rule out the following three situations because under these circumstances, either the convertible bond is not convertible or the underlying stock cannot be sold freely on the secondary market.

1. Within the first six months after a convertible bond is listed, stock conversion is not allowed, so we only consider a convertible bond six months after listing.
2. When the underlying stock is about to pay a dividend or go through a stock split, its convertible bond cannot be converted for six to seven trading days before the ex-dividend day. Therefore, we exclude any convertible bond from seven trading days to one trading day before an ex-dividend day.
3. When the underlying stock reaches its lower daily price limit, which is 10% below the previous close, a trader cannot freely sell the underlying stock.[5] We exclude 413 days due to the lower price limit, and in 36 of these days conversion premium is negative.

[4] The information on the percentage of bond already converted is updated quarterly. By the end of December 2014, 63% of the original 40 billion yuan BOC convertible bonds are converted. Therefore, at any time before the end of 2014, the total tradable value of the BOC convertible bond should have been more than 37% of 40, or 14.8 billion yuan.

[5] In the Chinese stock market, when a firm is financially stressed, its stock can be labeled as “special treatment” (ST) and has a reduced 5% daily price limit. Our analysis on negative conversion premium is not affected because the conversion premium will be highly positive when the underlying ST stock price tanks. For example, the convertible bond of the ST stock Huifeng Bio Agriculture (Ticker: 128012) has a minimum conversion premium of 21.89% during the 588 trading days in our sample.

2.3.3. Summary of NCP events

Table 2 investigates how often NCP events at various thresholds occur and what happens on those event days. In Panel A, we report subsample information including the number of days when the underlying stock reaches the 10% daily upper price limit. Panel B lists convertible bond performance information starting with the average conversion premium in each subsample, followed by bond trading information as well as real-time conversion statistics such as conversion value and the percentage of bond already converted. Panel C looks into the underlying stock performance and market return on the event day and in the next trading day.

Columns 2 to 7 in Table 2 each represents a subsample when the bond is convertible or the conversion premium is lower than a threshold, starting with the full sample in Column 1. As we can see, we have 73,071 bond-days in total. There are about 0.81% or 591 days the underlying stock of the convertible bond closes at the daily upper price limit which is 10% above the previous close. Looking at the underlying stock returns for the whole sample, we could see an interesting finding that the overnight (close-to-open) return in the Chinese stock market is significantly lower than the open-to-close return, which is the opposite to the US stock market where overnight return is higher as documented in.[7] The low opening price in the Chinese stock market is caused by the "T+1" trading rule which prevents short-term traders from selling on the same day when shares are bought. This creates a price pressure on the opening price of the next trading day. The relatively low opening price can negatively affect investors who buy the undervalued convertible bond, make the stock conversion, then sell the stock at the opening of next trading day.

Column 2 is the subsample when a convertible bond is convertible *and* the underlying stock is not closing at the lower daily price limit. Specifically, we remove samples in the first six months since listing, seven trading days before each ex-dividend day, and when the stock price closes at the lower daily price limit so the stock cannot be sold. There is no major differences than the full sample except that the market and the underlying stock returns are much higher on those convertible days. This is not surprising because we remove days with a -10% stock return. In addition, as we discussed in Section 2.2, convertible bonds are typically issued during market downturns so the low returns in the first six months are excluded.

Columns 3 to 7 repeat those summary statistics on subsamples when the conversion premium is negative. From column 3 where the threshold is zero, we can see that the conversion premium is negative in about 3% of all samples or 4.5% of all convertible days. While profitable trading opportunities require a lower conversion premium to cover the transaction cost, a conversion premium even just slightly below zero implies that whoever buys the underlying stock on that day would be strictly better off buying the convertible bond instead, then converting the bond into stocks.

Column 4 of Table 2 uses the estimated real time transaction cost in Section 2.4 as the threshold for negative conversion premium. 2.17% of the total samples have a negative conversion premium big enough to cover the transaction cost to sell the bond and buy the stock. If we consider the bid-ask spread and other attrition such as the difficulty to buy the bond and sell the stock at the same time, we probably require a larger negative conversion premium. Columns 5 to 7 list cases with negative conversion premium bigger than 0.5%, 1%, and 2%, respectively.

Clearly, there are many days with very large negative conversion premium. Looking at convertible bond and market performance statistics, we can see negative conversion premium events are more likely to occur when the underlying stock return is high (especially if the return reaches the 10% daily upper price limit), when convertible bond is more equity-like as measured by a high conversion value, and when the market return is high.

In fact, the majority of NCP events happen in strong bull markets. Fig. 2 shows the monthly number of NCP events with conversion premium lower than -0.5% over time in a bar chart (the left vertical axis). We also present the level of the SSE composite index in a solid line (the right vertical axis). The two shaded areas represent two bull markets during our sample period: from June 2005 to October 2007 and from July 2014 to June 2015, a total of 40 months out of the 224 months sample period, or 18%. However, 529 NCP events out of the total 958, or 55%, occur during these two bull markets.

While negative conversion premium events occur more frequently under certain market conditions, they are, however, unpredictable in short term. Negative conversion premiums are neither predictable nor persistent. Table 2, Panel B, also lists the averages of lagged and lead conversion premiums when there is a negative conversion premium. These averages are close to zero so that a day with negative conversion premium is neither resulted from an earlier NCP event, nor predictive to future conversion premiums. Only for the -2% group in column 7 do we see that the lagged conversion premium is negative at -0.67%, meaning that big profitable trading opportunities ($CP < -2\%$) are more likely seen after another NCP event.

Table 2
Summary of Negative Conversion Premium. This table compares summary statistics across subsamples with negative conversion premium. Column 1 is the full sample and Column 2 is the sample when a convertible bond is convertible and the underlying stock is not closing at the lower daily price limit. Columns 3 to 7 are subsamples when the conversion premium is lower than zero, transaction cost estimated in Section 2.4, −0.5%, −1%, and −2%, respectively.
Panel A reports subsample information including the number of bond-days (*N of Samples*) together with its percentage out of the total sample (*Pct of Samples*), the number of days when the underlying stock reaches the 10% daily upper price limit (*Upper PL*), its percentage out of the total sample (*Pct Upper PL*), the number of trading days with at least one sample (*N of Event Days*), and its percentage out of the total number of trading days (*Pct of Event Days*).
Panel B lists convertible bond performance information starting with the average conversion premium (*Conv Premium*), followed by averages of conversion premium on the previous day (*Lagged Conv Premium*) and on the next day (*Lead Conv Premium*), average daily bond return (*Ret Bond*), average bond closing price (*Bond Price*), average daily trading volume (*Volume*), average daily trading amount (*Trading Amt*), average daily turnover ratios of the bond (*Turnover*) as well as the underlying stock (*Stock Turnover*), average daily amplitude (*Amplitude*), average conversion value of the bond (*Conv Value*), average unconverted amount of convertible bond (*Amt Left*), and average percentage of bond converted (*Pct Converted*).
Panel C presents the performance of the underlying stock and the stock market on the event day and in the next trading day, including the average event day (day t) stock return (*Ret Stock*), the average overnight stock return from the closing of day t to the opening of day $t+1$ (*Lead Close-to-Open Ret*), the ratio of profit from the NCP that is reversed by the overnight loss (*Pct of Reversal*), the profit left after deducting overnight loss *Money Left*, the average stock return from the opening of day $t+1$ to the closing of day $t+1$ (*Lead Open-to-Close Ret*), the average next-day stock return from the closing of day t to the closing of day $t+1$ (*Lead Close-to-Close Ret*), the average stock trading volume on day t (*Stk Volume*), the average stock trading volume on day $t+1$ (*Lead Stk Volume*), the average event day market return (*Market Ret*), and the institutional ownership of the underlying stock *Inst Ownership*.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Subsample Information							
	All	Convertible	CP < 0	<-TC	<-0.5%	<-1%	<-2%
N of Samples	73,071	51,246	2,307	1,588	959	430	109
Pct of Samples (%)	100.00	70.13	3.16	2.17	1.31	0.59	0.15
Upper PL	591	411	60	52	39	28	8
Pct Upper PL (%)	0.81	0.80	2.60	3.27	4.07	6.51	7.34
N of Event Days (%)	4,508	4,396	1,412	1,059	705	351	101
Pct of Event Days (%)	100.00	97.52	31.32	23.49	15.64	7.79	2.24
Panel B: Bond Performance	All	Convertible	CP < 0	<-TC	<-0.5%	<-1%	<-2%
Conv Premium (%)	28.18	30.89	−0.64	−0.87	−1.22	−1.83	−3.13
Lag Conv Premium (%)	28.16	30.93	0.17	0.05	−0.08	−0.11	−0.67
Lead Conv Premium (%)	28.21	30.89	0.05	−0.01	−0.08	−0.18	−0.13
Ret Bond (%)	0.0432	0.0681	0.7884	0.8848	0.8995	0.8214	0.4188
Bond Price (¥)	116.44	116.60	156.37	159.82	166.24	174.20	184.53
Volume (Million Shares)	0.69	0.61	2.00	2.33	2.86	3.55	5.30
Trading Amt (Million ¥)	48.84	48.09	191.92	216.15	245.04	339.02	454.84
Turnover (%)	2.85	1.80	7.68	8.19	9.32	10.91	11.89
Stock Turnover (%)	1.68	1.68	4.35	4.72	5.15	6.13	7.75
Amplitude (%)	1.52	1.45	3.76	4.09	4.35	4.97	6.05
Conv Value (¥)	96.94	96.13	158.04	161.89	168.97	178.14	191.18
Amt Left (Million ¥)	2,997	3,200	2,309	2,252	2,134	2,421	3,208
Pct Converted (%)	8.86	12.09	30.04	30.39	31.53	31.49	25.49
Panel C: Underlying Stock and Market Performance							
	All	Convertible	CP < 0	<-TC	<-0.5%	<-1%	<-2%
Ret Stock (%)	0.0392	0.1028	1.6133	1.9134	2.3035	3.1382	4.8439
Lead Close-to-Open Ret (%)	−0.0753	−0.0678	−0.2397	−0.3196	−0.5044	−0.8683	−1.6196
Pct of Reversal (%)	N/A	N/A	23.11	27.55	37.62	45.59	52.95
Money Left (%)	N/A	N/A	0.68	0.92	1.27	1.91	3.17
Lead Open-to-Close Ret (%)	0.1137	0.1197	0.1860	0.2810	0.3036	0.4561	0.4250
Lead Close-to-Close Ret (%)	0.0365	0.0503	−0.0556	−0.0414	−0.2058	−0.4163	−1.1942
Stk Volume (M Shares)	20.63	22.92	74.42	77.70	79.40	105.86	153.63
Lead Stk Volume (M Shares)	20.70	23.06	71.48	73.59	75.48	97.90	147.37
Market Ret (%)	0.0247	0.0648	0.5063	0.5180	0.5481	0.5362	0.5397
Inst Ownership (%)	3.84	3.61	5.29	5.45	5.33	5.14	5.55

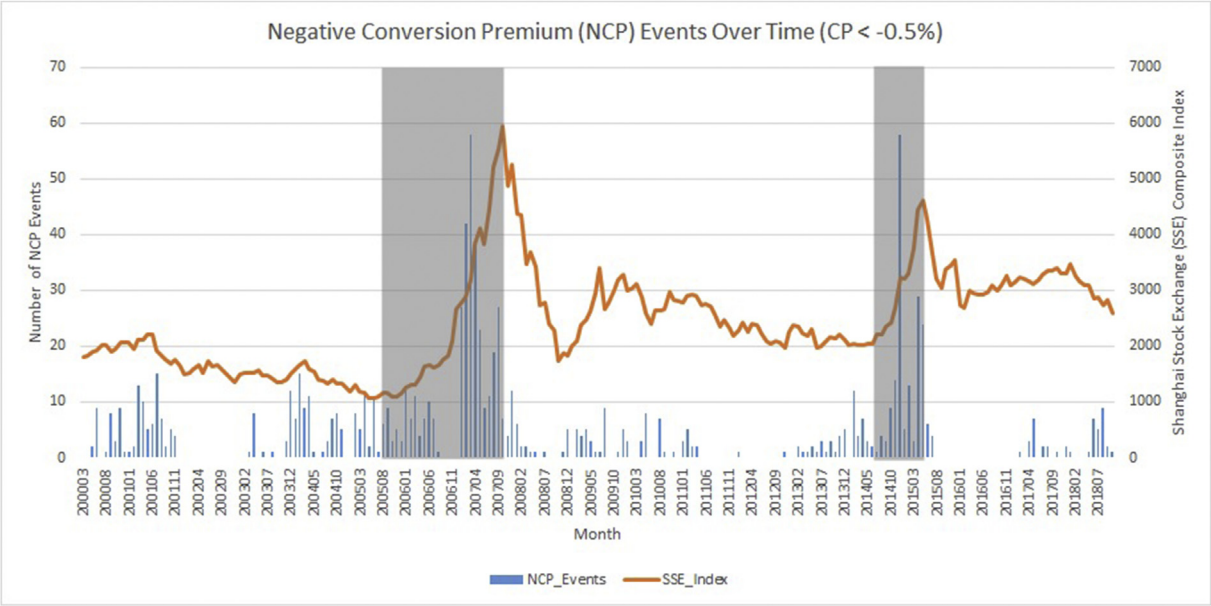

Fig. 2. This bar chart shows the monthly number of NCP events with conversion premium lower than −0.5% (the left vertical axis). We also present the level of the Shanghai Stock Exchange (SSE) composite index level in a solid line (the right vertical axis). The two shaded areas represent two bull markets during our sample period: from June 2005 to October 2007 and from July 2014 to June 2015.

If short-term convertible bond traders buy at a "discount" when they see a negative conversion premium, there might be a downward price pressure on the underlying stock in the next trading day when traders sell converted stocks. Panel C of Table 2 looks into the short-term price pressure after NCP events. When conversion premium is negative in columns 3 to 7, the overnight return (*Lead Close-to-Open Ret*) is much lower than the average of all samples or all convertible days. However, the large, negative overnight return does not completely wipe out the profit resulting from the negative conversion premium. We report the percentage of NCP being reversed by the overnight loss *Pct of Reversal* in Panel C. That percentage increases as the size of NCP increases, but even at the −2% level, only 53% of the profit is lost on average, leaving significant amount of profit to active traders. Also, the lower next-day opening price is a temporary price pressure because there is a strong reversal during the following trading day as the average next-day open-to-close return (*Lead Open-to-Close Ret*) is highly positive, which recovers some, but not all of the overnight losses. The overall next-day return following negative conversion premium events is negative. As a summary, Panel C of Table 2 shows there is a short-term downward price pressure at the next-day opening after NCP events. However, the overnight loss is much lower than the size of the negative conversion premium.

While we do observe a strong price pressure after NCP events, that downward price pressure could also be caused by stock traders who sell the stock at the next-day opening after a good return which accompanies NCP events as shown in Panel B of Table 2. How to find out if the price pressure is caused by convertible bond traders, or just stock traders? One simple method is to compare to a special sample of NCP events while the convertible bond is not convertible due to a forthcoming dividend payment as we discussed in point 2 in Section 2.3.2. If the price pressure is reduced on those non-convertible days, we can infer that convertible bond traders do contribute to the downward price pressure at the next-day opening price.

Fig. 3 uses candlestick charts to illustrate the price pressure at the next-day opening when there is an NCP event. The left column, i.e., sub-Figures (a), (c), (e), and (g) are for the 51,246 convertible days and the underlying stock can be freely sold. The right column, i.e., sub-Figures (b), (d), (f), and (h) are for the small sample of 1,988 non-convertible days we excluded in the analysis because they fall within seven trading days before an ex-dividend day. Clearly the close-to-open overnight return (the bar labeled with "CO") is much less negative in figures to the right. Therefore, short-term traders indeed buy convertible bonds at discount when there is an NCP event, then sell the converted stock in the next-day opening. In section 3.2 we perform a more rigorous regression analysis to test this result.

2.4. Transaction costs

There are two major charges when trading in the Chinese financial markets. The first charge is the stamp tax currently levied at 0.1% of total trading amount when a trader sells a stock. Stamp tax was higher and charged to both buyers and sellers before September 19, 2008. There is no stamp tax for bond trading. The second fee is the brokerage commission charges on both stocks and bonds which is about 2−3 basis points (bps) one-way. There are other small fees such as the stock transfer fee or minimum commission charge but those are negligible when trading at a reasonable amount. Therefore, in this study we set the commission fee at 5 bps one-way which covers all possible charges. As a summary, a trader who buys the convertible bond, converts the bond to stock, then sells the stock would incur a round trip commission of 0.1% plus the stock selling stamp tax of 0.1% for a total transaction cost of 0.2% after September 19, 2008. We increase the total transaction cost accordingly before that date when the stamp tax was higher.

3. Empirical results

3.1. What causes the negative conversion premium?

In this section, we run a pooled regression on the conversion premium to see which factors affect the conversion premium of a convertible bond. There is no doubt that the most important factor to conversion premium should be the conversion value, because it determines how much in-the-money the embedded call option is for a convertible bond. When that call option is deep in-the-money, i.e., the conversion value is high, the time value of that call option is low. Therefore, the bond price is closer to the conversion value as indicated by a small positive or even slightly negative conversion premium. In this case, the convertible bond is more “equity-like”. Conversely, if the conversion value is low, the embedded call is out-of-the-money. The convertible bond price more reflects the present value of a coupon bond. We will see a highly positive conversion premium and the convertible bond is more “debt-like”.

Table 3 presents the pooled regression result on conversion premium using 51,246 samples when the convertible bond is convertible and the underlying stock is not closing at the −10% lower daily price limit. In addition to the conversion value, we include additional explanatory variables on the performances of the underlying stock and the stock market. These variables are the underlying stock return, whether or not the stock reaches the 10% upper daily price limit (*Is Upper PL*), stock trading volume, daily amplitude of the stock price, and the market return. We also control for bond trading characteristics such as days to maturity, whether or not this is the last month before delisting (*Is Last Month*), amount left unconverted, and the ratio that has already been converted. Finally, we also consider two bond fixed effects: the issuing amount and the initial credit rating.

Model 1 in Table 3 includes all the variables. Consistent with the summary statistics in Table 2, conversion premium is lower when conversion value is high, when the return of the underlying stock is high, and when more bonds are converted due to negative conversion premium. We also find that other things equal, small issuances of convertible bond with low credit ratings are more likely to have a low conversion premium. This is reasonable as bond prices of small and risky firms should be lower to reflect the credit risk.

However, it is counterintuitive to see conversion premium higher when the underlying stock hits the upper price limit or has a high amplitude, when the market return is high, and when the bond is within one month before delisting (due to forced conversion for most cases). The reason we see these opposite effects as shown in the summary statistics is that these variables are subsumed into the conversion value variable. After excluding the conversion value in Model 6 of Table 3, we find all of the signs of these variables are reversed except for the upper price limit variable (*Is Upper PL*). We then run a univariate regression including only the *Is Upper PL* variable and its coefficient becomes insignificant at 1.25 (this result is not presented in the table). Therefore, although the percentage of days reaching upper price limit increases in subsamples with more negative conversion premium as illustrated in Table 2, Panel A, the overall effect between stock reaching its upper price limit and conversion premium is not significant.

Models 2 to 5 in Table 3 check the robustness of the regression result by removing some of the explanatory variables. The results hold with very little decrease in model fitness measured by the R-squared value. In Model 5 the univariate regression shows that the conversion value alone explains about 4.2% of the variation in conversion premium.

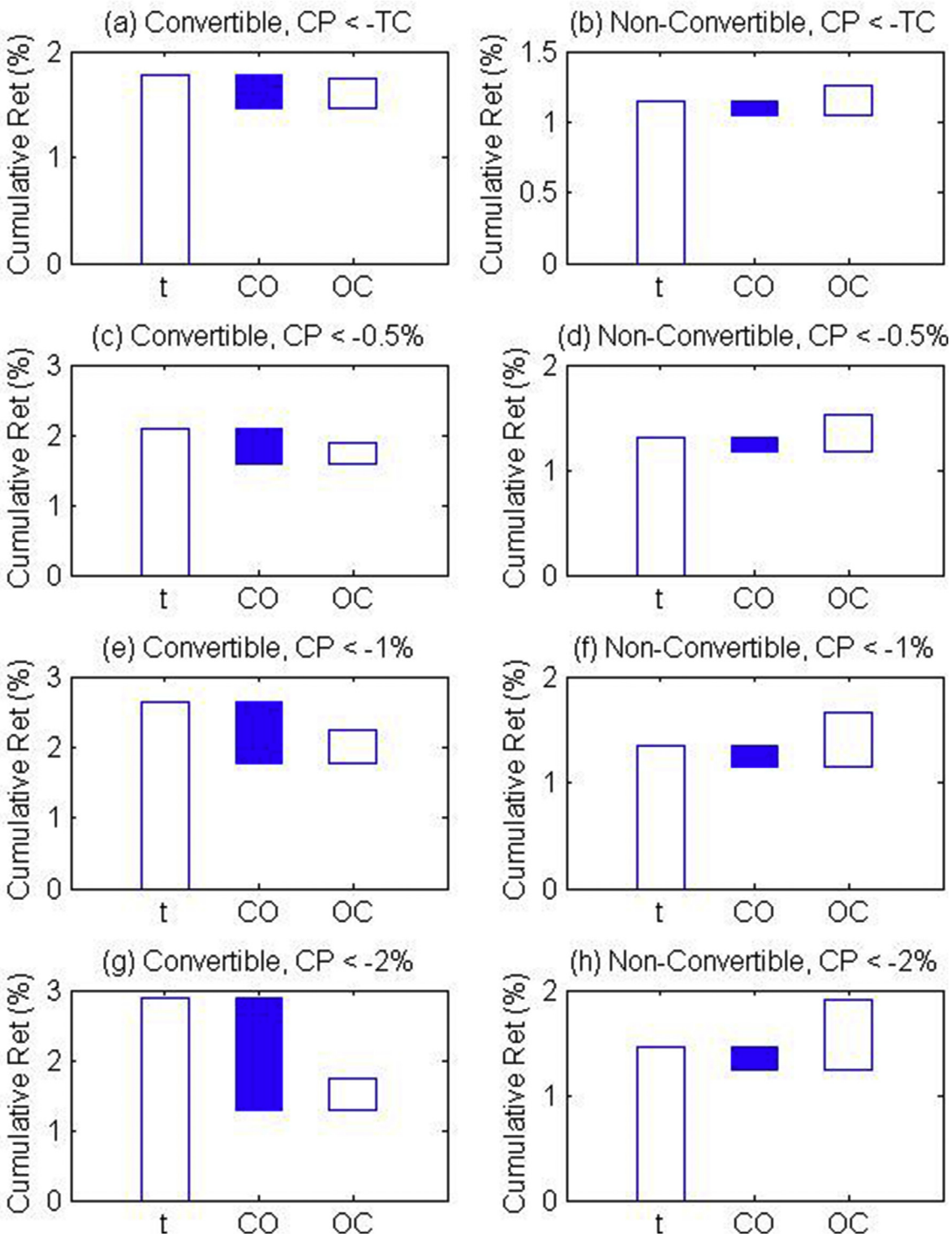

Fig. 3. Figures (a) through (h) illustrate the short-term return after negative conversion premium events. Figures (a), (c), (e), and (g) are for the 51,246 samples of convertible days, each case with a different negative conversion premium threshold of more than the transaction costs (*TC*), 0.5%, 1%, and 2%, respectively. Figures (b), (d), (f), and (h) are for the 1,988 samples of non-convertible days before ex-dividend dates. In each case, we present the event day return (*t*), the lead close-to-open overnight return (*CO*), and the lead open-to-close return (*CO*) in a candlestick style chart which uses while bars to indicate positive return and dark bars for negative returns.

Table 3
Pooled Regression on Conversion Premium (%). This table presents the pooled ordinary least squares (OLS) regression results on the conversion premium over the 51,246 bond-day samples when the bond is convertible and the underlying stock can be freely sold. Explanatory variables include (*conversion value*), underlying stock return (*Stock Ret*), indicator on whether or not the underlying stock reaches the 10% daily upper price limit (*Is Upper PL*), stock trading volume (*Stk Volume*), stock amplitude (*Stock Amplitude*), market return (*Mkt Ret*), number of trading days to maturity (*Days to Maturity*), whether or not this is the last month before delisting (*Is Last Month*), amount left unconverted (*Amount Left*), the ratio that has already been converted (*Ratio Converted*), issuing amount (*Issuing Amt*), and the initial credit rating with 1 for AAA, 2 for AA+, 3 for AA, and 4 for AA- (*Credit Rating*). A Durbin Watson statistic indicates that there is positive autocorrelation in standard errors, so we report *t*-scores based on White standard errors[9] in the bracket below each coefficient. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

X Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Conversion	−0.0478***	−0.0484***	−0.0621***	−0.0539***	−0.0534***	
Value (¥)	(−25.08)	(−25.67)	(−31.08)	(−28.83)	(−27.07)	
Stock Ret (%)	−0.1787**	−0.1795**	−0.1722**	−0.1226***		
	(−2.34)	(−2.37)	(−2.35)	(−3.09)		
Is Upper PL	4.5430**	4.5695**	4.6632***	5.6029***		3.1841*
	(2.55)	(2.56)	(2.61)	(3.36)		(1.90)
Stk Volume	−0.0008**	−0.0012***	−0.0052***			−0.0013***
(M Shares)	(−2.22)	(−4.57)	(−18.06)			(−3.77)
Stock	0.0054***	0.0054***	0.0067***			0.0042***
Amplitude (%)	(9.10)	(9.24)	(11.41)			(7.40)
Stock	−0.1748***	−0.1747***	−0.1603***			−0.3484***
Turnover (%)	(−5.67)	(−5.67)	(−5.56)			(−12.48)
Mkt Ret (%)	0.2207**	0.2217**	0.2259***			−0.0172
	(2.49)	(2.51)	(2.60)			(−0.34)
Days to	0.0005***	0.0010***				0.0004***
Maturity	(3.42)	(5.80)				(2.89)
Is Last Month	−2.4463***	−2.3206***				−3.6060***
	(−6.47)	(−5.96)				(−9.35)
Amount Left	−0.0439*	−0.1711***				−0.0928***
(Billion ¥)	(−1.78)	(−25.10)				(−4.07)
Ratio	−4.4189***	−4.6259***				−5.8564***
Converted	(−20.81)	(−24.73)				(−27.60)
Inst Ownership	0.0407***	0.0346***				0.0229***
(%)	(4.89)	(4.12)				(2.63)
Issuing Amt	−0.0982***					−0.0414*
(Billion ¥)	(−4.23)					(−1.92)
Credit Rating	0.7671***					0.8407***
1 (hi) to 4 (lo)	(10.35)					(11.16)
R^2	0.1073	0.1025	0.0663	0.0457	0.0416	0.0817

As a summary, our findings in Table 3 supports the summary statistics about NCP events in Table 2. Conversion premiums are lower when conversion value is high, when stock and market returns are high, when volatility is high, and when a large amount of the bond have already been converted toward the delisting of the bond.

3.2. Price pressure after NCP events

As discussed in Section 2.3.3, trading activities after NCP events may lead to a short-term price pressure on the next-day open price. Specifically, with short sale constraint existing in the Chinese stock market, a trader without any position in the underlying stock must buy the convertible bond with a negative conversion premium on day t, make the stock conversion overnight, then sell the stock on or after day $t + 1$. To minimize the stock holding risk, a trader would prefer to sell immediately at the opening of day $t + 1$ after an NCP event on day t. Therefore, the overnight return, i.e., the close-to-open return from day t to day $t + 1$ is expected to be lower.

In Table 4, we investigate the effect of negative conversion premium to short-term future stock returns using the 2,307 samples when conversion premium is negative, the bond is convertible, and the underlying stock is sellable. We look at three return variables: the overnight return after the event day (*Lead CO Ret*), the open-to-close return on day $t + 1$ (*Lead OC Ret*), and the total return from the close of event day t to the close of day $t + 1$ (*Lead CC Ret*). For each

Table 4
Conversion Premium on Short-term Stock Performance. This table presents the regression results on short-term stock returns using 2, 307 samples when conversion premium is negative, the bond is convertible, and the underlying stock is sellable. The three short-term return dependent variables are the overnight return from the close of event day t to the opening of day $t + 1$ (*Lead CO Ret*), the open-to-close return on day $t + 1$ (*Lead OC Ret*), and the total return from the close of event day t to the close of day $t + 1$ (*Lead CC Ret*). Independent variables include the conversion premium at the close of day t (*Conversion Premium*), the day t stock return (*Stock Ret*), stock trading volume (*Stk Volume*), stock amplitude (*Stk Amplitude*), and stock size as measured by the total circulated stock value (*Stk Size*), day t market return (*Mkt Ret*), whether or not the stock closes at the 10% upper price limit on day t (*Is Upper PL*), and the number of calendar days to the next trading day (*D2Next*). For each dependent variable, we also control the corresponding market return during the same time period: (*Lead Mkt CO Ret*), (*Lead Mkt OC Ret*), and (*Lead Mkt CC Ret*). We report t-scores in the bracket below each coefficient. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

X Variable	Dependant Variable					
	Lead CO Ret (%)		Lead OC Ret (%)		Lead CC Ret (%)	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Conversion	0.4568***	0.4402***	−0.1211	−0.0755	0.3373***	0.4198***
Premium (%)	(11.70)	(10.74)	(−1.47)	(−0.87)	(3.75)	(5.23)
Stock Ret (%)		0.0092		−0.0038		0.0190
		(1.51)		(−0.29)		(1.59)
Stk Volume		−0.0004***		0.0004		−0.0002
(M Shares)		(−2.85)		(1.22)		(−0.65)
Stk Amplitude		−0.0004***		0.0004		−0.0005**
(%)		(−3.31)		(1.54)		(−1.98)
Stk Size		−0.0003		−0.0003		−0.0009**
(Billion ¥)		(−1.50)		(−0.71)		(−2.47)
Is Upper PL		0.5989***		0.4014		1.4573***
		(2.95)		(0.93)		(3.67)
D2Next		0.0457**		0.1598***		0.1081**
		(1.97)		(3.24)		(2.38)
Mkt Ret (%)		0.0477**		−0.0899**		0.0574
		(2.40)		(−2.09)		(1.47)
Lead Mkt		−0.0032				
CO Ret (%)		(−0.79)				
Lead Mkt				0.2504**		
OC Ret (%)				(2.52)		
Lead Mkt						1.1241***
CC Ret (%)						(30.56)
R^2	0.0561	0.0784	0.0009	0.0124	0.0060	0.3005

dependant variable, we first run a univariate regression using the conversion premium variable only, then add other control variables including the corresponding market return during the same time period. Additional control variables include the day t stock return, stock trading volume, stock amplitude, and stock size as measured by the total circulated stock value. We also control for the market return and whether or not the stock closes at the 10% upper price limit on day t. Finally, number of calendar days between event day t and $t + 1$ also affects the willingness of traders to hold the stock overnight. During major holidays, the Chinese stock market typically closes for an entire week.[6] Therefore, we control for the number of calendar days to next trading day in our regressions (*D2Next*).

Models 1, 3, and 5 in Table 4 are univariate regression results for the three short-term stock returns. The overnight return (*Lead CO Ret*) and the close-to-close return (*Lead CC Ret*) are strongly and positively related to the previous day conversion premium. That is, when the convertible conversion premium is more negative, the overnight return as well as the entire next-day return of the underlying stock are expected to be lower. After a low conversion premium on day t, there is a rebound during the trading day $t + 1$ as the coefficient is negative for (*Lead OC Ret*), but that effect is not statistically significant. Of all the three dependant variables, the overnight return has the highest R-squared value which is 5.6%, indicating that a good portion of the overnight return can be explained by the size of the negative conversion premium in the previous trading day.

[6] The longest market break in our sample is the 17-day recess from January 20, 2001 to February 4, 2001, around the Spring Festival on January 24, 2001.

Models 2, 4, and 6 in Table 4 include all the control variables. We find that the underlying stock reaching the upper price limit on the event day significantly improves the short-term future stock performance. Also, more calendar days before next trading day increases future stock returns. This indicates that traders are less willing to exploit an NCP event before weekend or long holidays as stock holding risk increase. Finally, in model 2, the overnight market return following an NCP event has an insignificant negative coefficient to stock return. Therefore, after an NCP event, the overnight return of the underlying stock is determined more by the selling pressure from converted shares rather then the market return. Overall, we find evidence that traders buy convertible bond at a discount when conversion premium is negative, then sell the converted shares at the opening of the next trading day.

3.3. Economic significance of the negative conversion premium

In this section, we test the economic significance of the NCP events through two trading strategies. The riskless long-short strategy for those who already own the underlying stock, and the overnight strategy that earns the discount of bond price relative to the underlying stock, but has to take the risk of holding the underlying stock overnight.

3.3.1. The long-short strategy

When a trader happens to be holding the underlying stock at the time of an NCP event, the trader can simply buy the convertible bond and sell the underlying stock at the same time to earn a riskless profit. The example in Section 2.3.1 illustrates such a case in detail. However, the challenge of this strategy is the requirement for stock holders to pay attention to the convertible bond price everyday for possible trading opportunities that only happen about 1 out of 100 trading days for a particular convertible bond. A more feasible scenario is the case with institutional investors, like an index mutual fund who owns most of the stocks over a long time. Such an index fund could make a large and riskless profit by following a long-short strategy when NCP events occur.

Table 5 presents the strategy return of an index fund who already owns every underlying stock of all the convertible bonds. We assume the index fund sets aside certain amount of cash as a separate small fund to trade NCP events. When there is no NCP events for a trading day, the return is the risk-free rate. When there are one or more NCP events, the small fund follows the long-short strategy as described in Section 2.3.1 equal-weighted on all these convertible bonds with negative conversion premium. Alternatively, the fund can also just focus on the convertible bond with the largest negative conversion premium to earn the maximum return, although this may require a good liquidity for both the convertible bond and the underlying stock.

In Table 5, each row represents a different threshold of conversion premium to trigger an NCP event, with more negative thresholds indicating fewer but more reliable trading opportunities. Columns (1) through (7) are performance measures including the raw daily average return of the trading strategy (*Raw Ret*), the benchmark return which is the average daily return of the market (*Mkt Ret*), the abnormal return which is the average daily difference between strategy and market returns, the one factor CAPM alpha,[7] the information ratio which is the active return per unit of tracking error in the sense of[8]; and the terminal wealths growing from 1 yuan using the long-short strategy return and the market benchmark return. Columns (8) through (11) are statistics of the technical details of the trading strategy. We report the total number of NCP events (*N of Events*) below that threshold, the total number of trading days in the simulation starting from the first NCP event, the total number of active days when there is at least one NCP event, and the percentage of active days (*Active Ratio*). The back-testing simulation starts from the date of the first NCP event based on a particular threshold, and ends at the last day of our sample which is October 17, 2018. Whenever there is a trade, we apply commissions and stamp taxes as transaction cost discussed in Section 2.4.

In Panel A of Table 5 we present the results for the long-short strategy that focuses on the most profitable NCP event, i.e., the convertible bond with the most negative conversion premium, when there are multiple NCP events. It is pretty clear that the long-short strategy beats the market return under any conversion premium threshold levels. The Chinese stock market during our sample period does not have a very strong performance. Over almost 19 years, one yuan invested in the Chinese stock market only grows to 2.14 yuan. The risk-free equivalent annualized return is only about 4.3%. Just as a reference, although there are spectacular bull markets in between, the SSE composite index level only increased 52% from 1681.47 points in March 15, 2000 to 2561.61 points in October 17, 2018. The number of

[7] The Chinese bond market performed slightly better than the equity market during our sample period. However, given the strong performance of NCP related trading strategies our results remain the same if we use the bond market as the performance benchmark.

Table 5

Performance of the Long-Short Strategy. This table presents simulation results of the long-short strategy that buys convertible bonds with negative conversion premium and at the same time sells the underlying stock. When there are multiple NCP events, the strategy can focus on the bond with the most negative conversion premium and the results are shown in Panel A. Panel B is for the case of investing all NCP events on the same day equal-weighted. Each row represents a different threshold of conversion premium to trigger an NCP event. Columns (1) through (7) are performance measures including the raw daily average return of the trading strategy (*Raw Ret*), the benchmark return which is the average daily return of the market (*Mkt Ret*), the abnormal return which is the average daily difference between strategy and market returns (*Abnormal Ret*), the one factor CAPM alpha (*Alpha*), the information ratio which is the active return per unit of tracking error in the sense of[8] (*Info Ratio*), and the terminal wealths growing from 1 yuan using the long-short strategy return (*Term W Strat*) and the market benchmark return (*Term W Mkt*). Columns (8) through (11) are statistics of the technical details of the trading strategy. We report the total number of NCP events (*N of Events*) below that threshold, the total number of trading days in the simulation starting from the first NCP event (*Total Days*), the total number of active days when there is at least one NCP event (*Active Days*), and the percentage of active days (*Active Ratio*). For abnormal return, CAPM alpha, and information ratio, we report standard errors in the bracket below each value. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Neg. CP Threshold	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Raw Ret (%)	MktRet (%)	Abnormal Ret (%)	Alpha (%)	Info Ratio	Term W Strat (¥)	Term W Mkt (¥)	N of Events	Total Days	Active Days	Active Ratio (%)
Panel A: Trade the NCP Opportunity with the Most Negative Conversion Premium											
-TC	0.1836	0.0310	0.1526***	0.1764***	0.0883***	3327.09	2.14	1588	4460	1059	23.74
			(1.7281)	(0.0085)	(1.5246)						
−0.5%	0.1741	0.0312	0.1429***	0.1669***	0.0826***	2166.71	2.15	959	4457	705	15.82
			(1.7298)	(0.0085)	(1.4728)						
−0.75%	0.1586	0.0312	0.1274***	0.1515***	0.0736***	1087.57	2.15	657	4457	510	11.44
			(1.7312)	(0.0085)	(1.4923)						
−1%	0.1374	0.0312	0.1062***	0.1304***	0.0611***	423.94	2.15	430	4457	351	7.88
			(1.7369)	(0.0084)	(1.4558)						
−1.25%	0.1218	0.0331	0.0887***	0.1148***	0.0511***	202.35	2.32	304	4416	264	5.98
			(1.7371)	(0.0083)	(1.4499)						
−1.5%	0.1032	0.0331	0.0702***	0.0963***	0.0404***	89.55	2.32	217	4416	192	4.35
			(1.7366)	(0.0081)	(1.4931)						
−1.75%	0.0874	0.0335	0.0539**	0.0805***	0.0310**	43.70	2.35	153	4391	138	3.14
			(1.7362)	(0.0079)	(1.5557)						
−2%	0.0739	0.0345	0.0394	0.0670***	0.0228*	24.20	2.45	109	4385	101	2.30
			(1.7310)	(0.0076)	(1.5304)						
Panel B: Trade All NCP Opportunities Equal Weighted											
-TC	0.1523	0.0310	0.1213***	0.1454***	0.0708***	843.57	2.14	1588	4460	1059	23.74
			(1.7136)	(0.0071)	(1.5090)						
−0.5%	0.1574	0.0312	0.1262***	0.1504***	0.0735***	1047.08	2.15	959	4457	705	15.82
			(1.7178)	(0.0076)	(1.4500)						
−0.75%	0.1470	0.0312	0.1158***	0.1400***	0.0673***	656.99	2.15	657	4457	510	11.44
			(1.7202)	(0.0077)	(1.5007)						
−1%	0.1307	0.0312	0.0995***	0.1238***	0.0575***	318.36	2.15	430	4457	351	7.88
			(1.7299)	(0.0079)	(1.4524)						
−1.25%	0.1189	0.0331	0.0858***	0.1120***	0.0494***	178.51	2.32	304	4416	264	5.98
			(1.7355)	(0.0081)	(1.4783)						
−1.5%	0.1012	0.0331	0.0681***	0.0943***	0.0393***	82.02	2.32	217	4416	192	4.35
			(1.7348)	(0.0079)	(1.4885)						

(*continued on next page*)

Table 5 (*continued*)

Neg. CP Threshold	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Raw Ret (%)	MktRet (%)	Abnormal Ret (%)	Alpha (%)	Info Ratio	Term W Strat (¥)	Term W Mkt (¥)	N of Events	Total Days	Active Days	Active Ratio (%)
Panel A: Trade the NCP Opportunity with the Most Negative Conversion Premium											
−1.75%	0.0861	0.0335	0.0526**	0.0792***	0.0303**	41.39	2.35	153	4391	138	3.14
			(1.7345)	(0.0078)	(1.4767)						
−2%	0.0733	0.0345	0.0388	0.0664***	0.0224*	23.55	2.45	109	4385	101	2.30
			(1.7300)	(0.0075)	(1.4190)						

NCP events decreases as the threshold is more negative, so do the number of active trading days and its ratio. For the −2% threshold case, even though there are only 108 trading opportunities in 100 trading days, the terminal wealth can grow to 24.2 from 1 over 18 years, a 19.4% annual return. This shows the power of compounding when there is risk-free trading opportunities, even returns are small and infrequent.

Panel B of Table 5 looks at strategies that invest in all NCP events equal-weighted when there are multiple trading opportunities. This way, the impact to liquidity is lower than trading only one convertible bond. The overall return for a trading day is the average return of all trading opportunities. The long-short strategy still outperforms the market benchmark in all cases by all performance measures. One interesting finding is that the case with a -TC% (i.e., negative conversion premium enough to cover transaction costs) threshold with 1,588 NCP events underperforms the case of the −0.5% threshold with only 958 events. That is because under the equal-weighted scheme, too many small trading opportunities dilute the overall portfolio return. Traders should pass some small opportunities and focus on events with large negative conversion premium.

Given the frequency and magnitude of NCP events, an institutional investor who holds the underlying stock should be able to earn a significant return using the riskless long-short trading strategy. However, that is probably not happening in reality because negative conversion premium would have been traded away when institutional investors buy discounted convertible bonds in large quantity. In the next section, we explore a trading strategy that can be used by *any* traders who do not hold the underlying stock.

3.3.2. The overnight strategy

The overnight strategy does not require the trader to already have the underlying stock when an NCP event occurs. This strategy requires the trader to buy the convertible bond on the event day t when conversion premium is negative, make the stock conversion, and sell converted shares at the next trading day (day $t + 1$). The trader can sell at the opening at day $t + 1$ to minimize the stock holding risk, or wait until the close of day $t + 1$ to sell the converted stock. In any case, the overnight trading strategy is not risk-free. If the underlying stock price declines overnight after an NCP event, a trader can suffer an overall loss if the loss from the stock is greater than the size of the negative conversion premium. On the other hand, the overnight strategy is essentially earning the overnight return or the one-day stock return of the underlying stock, plus the additional profit from acquiring the underlying stock at a discount which is the size of the negative conversion premium. If the daily stock return is not too bad, we should expect a positive average return for the overnight strategy.

Table 6 presents the back-testing results of the overnight trading strategy in a similar setting in Table 5. We run simulations with different thresholds for negative conversion premium, and test cases when the trader only focuses on the convertible bond with the largest NCP, or the trader evenly spreads the capital in all opportunities when multiple NCP events show up in the same day. Please note that different to the long-short strategy, the overnight strategy cannot predict which NCP event will eventually be the most profitable because of the uncertainty of overnight stock return. The convertible bond with the largest NCP is only the best trading opportunity *ex ante*. Panel A of Table 6 tests the overnight strategy that sells immediately at the opening of day $t + 1$, while in Panel B the strategy sells the converted stock at the close of day $t + 1$ after an NCP event.

As we can see, the performance of the overnight strategy that sells immediately at opening (Panel A) is much worse than the long-short strategy in Table 5, but the overnight strategy can still beats the market benchmark. Between the choices of investing in all opportunities versus only trading the (*ex ante*) best opportunity, it is still better to trade just the best opportunity as measured by the largest NCP.

These results imply that while NCP events attract a lot of active trading which causes a short-term impact on the next-day opening price, the profits from the negative conversion premium are not completely traded away. Sophisticated traders spend time and effort in the costly information acquisition about NCP events, so they are rewarded by having an overall positive return even it is a little bit too crowded at the openings after NCP events. This phenomenon in the Chinese financial market echoes in the Grossman-Stiglitz paradox proposed by.[1]

Fig. 4 presents the wealth of the overnight strategy growing from 1 Chinese yuan. The strategy buys all convertible bonds with conversion premium lower than −0.5% equal-weighted, then sells the converted stock shares at the opening of the next trading day. While the strategy earns most of the profit during the two bull markets when there are more NCP events, strategy returns during bear markets are still positive. Therefore, NCP based trading strategies are good defensive investment choices when the market is bearish or going sideways, yet still yield extraordinary returns during bull markets.

Table 6

Performance of the Overnight Strategy. This table presents simulation results of the overnight strategy that buys convertible bonds with negative conversion premium, makes the stock conversion, and sells the converted shares in the next trading day. Panel A is the case when converted shares are sold at the next-day opening, while Panel B is the case when converted shares are sold at the next-day closing instead. Each row represents a different threshold of conversion premium to trigger an NCP event. When there are multiple NCP events, the strategy can invest in all NCP events on the same day equal-weighted (Columns 1 to 5), or focus on the bond with the most negative conversion premium (Columns 6 to 10). For each case, we report performance measures including the raw daily average return of the trading strategy (*Raw Ret*), the abnormal return which is the average daily difference between strategy and market returns (*Abnormal Ret*), the one factor CAPM alpha (*Alpha*), the information ratio which is the active return per unit of tracking error in the sense of[8] (*Info Ratio*), and the terminal wealth growing from 1 yuan using the overnight strategy return (*Term W Strat*). Column (11) is the average daily return of the market (*Mkt Ret*) and Column (12) is the terminal wealth for the market benchmark strategy (*Term W Mkt*). For abnormal return, CAPM alpha, and information ratio, we report standard errors in the bracket below each value. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Neg. CP Threshold	All Opportunities Equal Weighted					Only the Best Opportunity					Market	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Raw Ret (%)	Abnormal Ret (%)	Alpha (%)	Info Ratio	Term W Strat (¥)	Raw Ret (%)	Abnormal Ret (%)	Alpha (%)	Info Ratio	Term W Strat (¥)	Mkt Ret (%)	Term W Mkt (¥)
Panel A: Sell at the Next Day Opening Price												
-TC	0.0685	0.0375	0.0614***	0.0206*	18.41	0.0906	0.0596**	0.0833***	0.0320**	47.31	0.0310	2.14
		(1.8208)	(0.0121)	(1.5002)			(1.8598)	(0.0137)	(1.4293)			
−0.5%	0.0769	0.0457*	0.0700***	0.0256**	27.72	0.0894	0.0582**	0.0824***	0.0321***	46.97	0.0312	2.15
		(1.7856)	(0.0103)	(1.4718)			(1.8148)	(0.0116)	(1.4783)			
−0.75%	0.0705	0.0393	0.0637***	0.0219*	20.64	0.0807	0.0495*	0.0738***	0.0274**	32.11	0.0312	2.15
		(1.7978)	(0.0106)	(1.4489)			(1.8074)	(0.0111)	(1.4774)			
−1%	0.0591	0.0279	0.0524***	0.0156	12.64	0.0648	0.0336	0.0580***	0.0188	16.16	0.0312	2.15
		(1.7836)	(0.0098)	(1.4700)			(1.7885)	(0.0102)	(1.5529)			
−1.25%	0.0532	0.0202	0.0465***	0.0113	9.54	0.0575	0.0244	0.0507***	0.0137	11.46	0.0331	2.32
		(1.7819)	(0.0098)	(1.5106)			(1.7843)	(0.0100)	(1.5678)			
−1.5%	0.0487	0.0156	0.0417***	0.0090	7.97	0.0511	0.0180	0.0441***	0.0103	8.84	0.0331	2.32
		(1.7461)	(0.0087)	(1.5005)			(1.7495)	(0.0089)	(1.5119)			
−1.75%	0.0425	0.0090	0.0355***	0.0052	6.05	0.0443	0.0108	0.0373***	0.0062	6.54	0.0335	2.35
		(1.7376)	(0.0082)	(1.4719)			(1.7400)	(0.0083)	(1.4926)			
−2%	0.0360	0.0015	0.0291***	0.0009	4.57	0.0369	0.0024	0.0300***	0.0014	4.75	0.0345	2.45
		(1.7321)	(0.0078)	(1.5197)			(1.7332)	(0.0079)	(1.6476)			
Panel B: Sell at the Next Day Closing Price												
-TC	0.1167	0.0857**	0.1099***	0.0376***	105.28	0.1415	0.1105***	0.1344***	0.0465***	285.44	0.0310	2.14
		(2.2817)	(0.0236)	(1.4471)			(2.3745)	(0.0257)	(1.5002)			
−0.5%	0.1132	0.0820**	0.1066***	0.0379***	102.15	0.1336	0.1024***	0.1268***	0.0459***	235.02	0.0312	2.15
		(2.1613)	(0.0206)	(1.4280)			(2.2285)	(0.0223)	(1.4824)			
−0.75%	0.1081	0.0769**	0.1016***	0.0365***	85.69	0.1237	0.0925***	0.1171***	0.0431***	164.96	0.0312	2.15
		(2.1084)	(0.0192)	(1.4753)			(2.1471)	(0.0203)	(1.4720)			
−1%	0.0930	0.0618**	0.0865***	0.0300**	46.07	0.0998	0.0686**	0.0933***	0.0331**	61.30	0.0312	2.15
		(2.0559)	(0.0177)	(1.5117)			(2.0740)	(0.0183)	(1.5140)			
−1.25%	0.0778	0.0447	0.0714***	0.0222*	23.75	0.0839	0.0508*	0.0774***	0.0250*	30.56	0.0331	2.32
		(2.0132)	(0.0165)	(1.4949)			(2.0288)	(0.0171)	(1.5353)			

−1.5%	0.0593	0.0262	0.0528***	0.0135	11.13	0.0664	0.0333	0.0598***	0.0170	14.94	0.0331	2.32
		(1.9407)	(0.0146)	(1.4797)			(1.9579)	(0.0153)	(1.4829)			
−1.75%	0.0622	0.0287	0.0555***	0.0151	12.78	0.0651	0.0316	0.0584***	0.0166	14.42	0.0335	2.35
		(1.9010)	(0.0139)	(1.4867)			(1.9078)	(0.0141)	(1.5396)			
−2%	0.0470	0.0125	0.0402***	0.0067	6.71	0.0484	0.0139	0.0416***	0.0074	7.10	0.0345	2.45
		(1.8673)	(0.0129)	(1.5004)			(1.8720)	(0.0131)	(1.4622)			

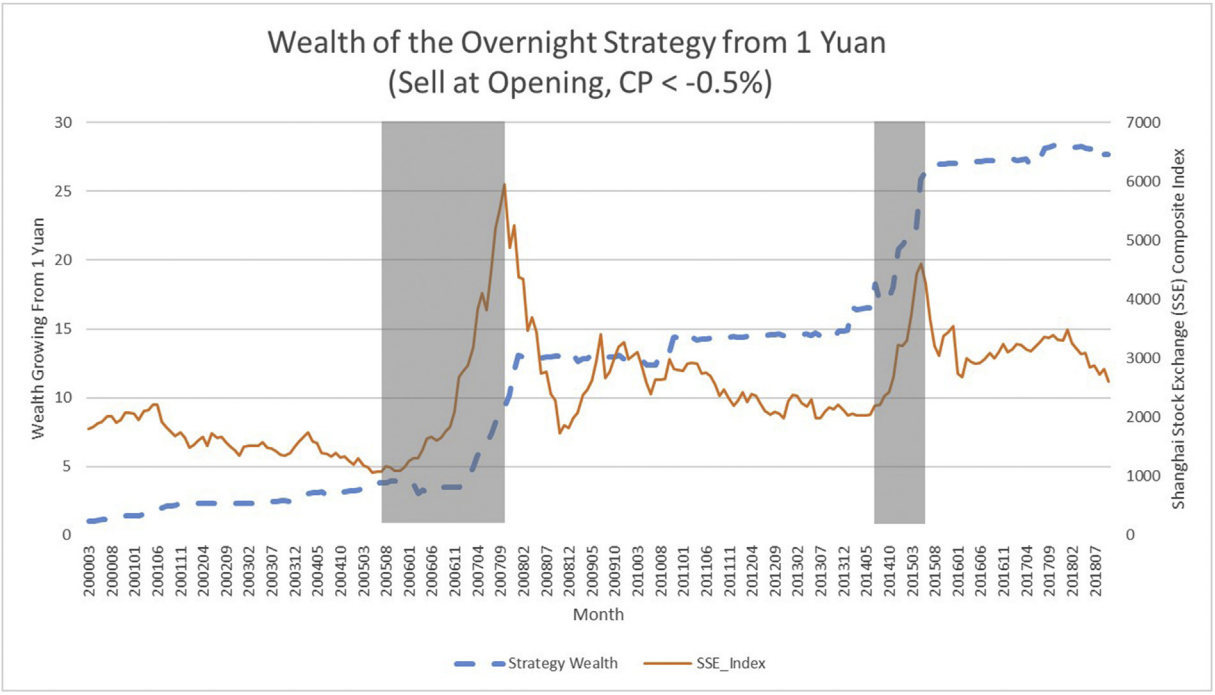

Fig. 4. The dashed line presents the monthly wealth of the overnight strategy over time from 1 yuan (the left vertical axis). The strategy buys all convertible bonds with conversion premium lower than −0.5% equal-weighted, then sells the converted stock shares at the opening of the next trading day. The solid line is the level of the Shanghai Stock Exchange (SSE) composite index level (the right vertical axis). The two shaded areas represent two bull markets during our sample period: from June 2005 to October 2007 and from July 2014 to June 2015.

Panel B of Table 6 shows that it is much less crowded at the close of day $t + 1$. If traders hold the underlying stock through the entire trading day after an NCP event, the performance of the overnight strategy can be dramatically improved. Finally, the best NCP thresholds for both strategies selling at opening or at closing are −0.5% or −0.75%, indicating that we need as many NCP events as possible, but there should be some profit margin above the transaction cost which is 0.2% during most of our sample period.

4. Conclusion

In this paper we document the frequent occurrences of negative conversion premium events in the Chinese convertible bond market. While convertible bond holders may sell at a discount due to the pressure from a forced conversion, it is puzzling why existing stock holders and new stock buyers do not buy the undervalued convertible bond for an immediate profit. We find some smart traders buying the discounted convertible bond then sell converted stock shares at the opening of the next trading day which causes a strong downward stock price pressure at the market opening after NCP events. These smart traders are still able to keep more than 50% of the profit from the negative conversion premium despite the low next-day stock opening price. Our findings imply that existing stock holders and new stock buyers in the Chinese stock market should pay more attention to NCP events of convertible bonds.

One limitation of this research is the use of daily data so that we only have the conversion premium information at the daily close. An important future research is using intraday data of Chinese markets to study negative conversion premium. With intraday data, we could find out the magnitude of the negative conversion premium within a trading day. If there is a fixed number of smart investors who keep buying undervalued bonds throughout a day, would the negative conversion premium grow larger towards the end of a trading day as fewer traders are left available to trade? Alternatively, as more and more smart traders buy the underpriced convertible bond, would the negative conversion premium reduces overtime? The intraday pattern of negative conversion premium is very important to practitioners because a good timing in buying undervalued security can greatly increase performance. Also, it helps to find out what causes conversion premium to go negative.

Conflicts of interest

There is no conflict of interest.

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