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RESEARCH ARTICLE

HAN Liyan, MOU Hui, XIE Duo, CHEN Zhi'an

"Pecking order" of Chinese capital market: Effects of convertible bonds' issue announcements

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Abstract This paper empirically shows that the announcements of the issue of convertible bonds (CBs) by Chinese firms have significant negative effects on shareholders' wealth. We find that when the samples are partitioned by equity component negative market responses towards the announcements of issuing equity-like CBs are more than that of debt-like CBs. This finding is different from the "pecking order hypothesis" of Myers and Majluf (1984). By analyzing the firm characteristics of convertible bond issuers, we find that the wealth effects are negatively related to equity component, firm size and issue size of convertible bonds, and are positively related to financial leverage, liquidity structure of equity, book value of non-liquidity equity and market-to-book ratio. The underlying reason of equity finance taking precedence of bond finance in Chinese capital market can be attributed the to special "two-system-ownership structure" and corporate governance of Chinese listed companies.

Keywords convertible bonds, issue announcements, wealth effects, pecking order, split of stock shares

1 Introduction

With the deepening reform and development of the Chinese capital market, refinancing conditions of listed companies become more and more strict. As a

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HAN Liyan (✉), MOU Hui, XIE Duo
School of Economics and Management, Beihang University, Beijing 100083, China
E-mail: hanly1@163.com

CHEN Zhi'an
School of Banking and Finance, The University of New South Wales, Sydney 2052, Australia

result, convertible bonds (in short, CBs) are coming into practice with increasing popularly, which are noted as innovative financial products. In early 1990s, Shenzhen Bao'an Group issued the first A-share convertible bond for its own new project, which meant the emergence of convertible bonds in mainland China. The development of CBs has gone through three major stages as follows: initial experiment from 1992 to 2001, post approval system restarting from 2001 to 2002, and then outburst from 2003 up to now. By the end of 2005, there have been 39 CBs issued in total, and nearly 50 billion RMB of capital raised, which means CBs have become the most popular channel for listed companies to refinance. In 2006, the CBs issuance has sped up. During the first two months of 2006 there are CBs with a total value around 22.3 billion RMB coming into market by 19 G-share companies.

Convertible bonds have embedded call options which allow investors to excise the options and convert the bonds into common stocks upon the contract. This convertible feature makes the CBs contains characters of bonds, stocks and options. Till now, the international academic research of CBs has mainly concentrated on the motivation of issuing CBs, the option pricing methods of CBs, the wealth effects of issue announcements, and the value transfer effects caused by redemption. However, there is little research on market response for CBs' issue, redemption and repurchase, and then the corresponding wealth effects in Chinese stock market, especially from the view of corporate finance.

The main contributions of this paper are as follows. First, we test the wealth effects of issue announcements of convertible bonds on the basis of the samples of Chinese listed companies between 1992 and 2004. Second, by using the sensitivity index of CBs value relative to stock price, we quantize the equity value contained in CBs. Third, we test the packing order of Chinese security market by analyzing the relation between CBs issuing announcement and equity value of CBs. Fourth, considering the unique Chinese "two-system-ownership structure", we introduce an index to measure the state of corporate governance and then test the relation between the issue announcement effects and the corporate governance of listed companies.

2 Literature review

The classical Myers and Majluf (1984) (M&M) model pointed out that, when assuming there exists asymmetric information, the managers would have more information about the firm real value than other investors, and informed traders could sell overestimated securities to increase their own wealth. Hence, by issuing stocks, risky bonds and mixed securities firms are able to transfer information towards the investors. Furthermore, if investors infer that the firm rationally

finances valuable projects, the firm would follow the pecking order known as "inner financing-debt financing-equity financing", as for protecting the firm value. From this point, it is held that a company has more incentive to take inner financing than outsider financing, and then to take debt financing than equity financing. Following the logic, the more equity embedded in the financial securities, the more overestimated it could be, so the more negative issue effect it has.

Succeeding to M&M theory, Stein (1992) argued that a company can issue CBs to enhance the equity ratio in its capital structure to lower reverse selective cost of pure equity issue. His model reveals that announcement of abnormal returns should be positively correlated to financial crisis with high debt cost. Because of high leverage, the investors can only choose the stocks with very optimistic estimation. Therefore the announcement of abnormal returns should be positively related to the level of leverage. Cooney and Kalay (1992) then revised the M&M model, and they argued that a company could invest on the project with negative net present value when the project has more uncertain future value than the value of the current capital stocks. In this case, stock issue could bring good news to the market.

Miller and Rock (1985) also proved that any beyond expected financing could transfer the message that the company is in the shortage of cash from the view of the current profit surplus. Thereby any security issue could cause negative impact on the firm value. The price press hypothesis by Barclay and Litzenberger (1988) supported that the increase in stock supply could make stock price fall steadily, and the absolute value of decreasing rate is positively related to issue size. The information signal model by Ross (1977) showed that the change of capital structure with leverage increasing transfers good news about the company's prospect, because only the company with enough cash flow is able to adapt debt financing under debt constraint. Dann and Mikkelson (1984) also showed that, because CBs is a kind of direct combination of bonds and share warrant, the impact of CBs financing on leverage is determined by the relative value of debt over equity, and therefore CBs financing could make the effect of leverage decrease and then transfer negative message to the market.

In the literature we could find a series of researches to support the above theories. For USA market, Smith (1986) found that CBs issue could cause significant market response by –2.07%, which is lower than that of equity issue as –3.14%, but higher than that of bonds issue as –0.26%. Janjigian (1987) investigated 357 cases of CBs issues from 1968 to 1983, and found the deducted function of CBs financing to financial leverage. He ran a regression of CBs return on the return of common stock and common bonds, and then found the equity return of CBs to be 40%–70% off the entire return, which supports the conclusion that the size of equity return relative to the entire CBs return is negatively related

to announcement returns. Kuhlman and Radcliffe (1992) borrowed convertible price to stock price (CP) ratio to test the relation between equity value and abnormal returns on the basis of the samples of 298 issue dates and 232 announcement dates from 1963 to 1986 in USA market, and they found a significant negative relationship between announcement wealth effect and equity ratio of CBs. Brennan and Her (1993) found that there exists a –2.2% negative effect within a time period of [–1, 0] on the basis of the 155 samples from 1976 to 1985. Davidson (1995) found that the abnormal returns during announcement period are positively related to the expected time of CBs on the money on the basis of 146 cases CBs of Moody's bond survey from 1980 to 1985, and he further implied that the announcement of CBs passes equity-like signal to the security market.

In recent years, some researches on the market in other developed economies came to the literatures. Burlacu (2000) found a negative wealth effect by CBs issue in French security market and a negative relation between market abnormal return and equity value of CBs, and his finding supports M&M model (1984). On the other hand, his research also showed mixed CBs issue announcement produces positive abnormal returns which agree with the revised model by Cooney and Kalay (1992). Kang and Stulz (1996) studied 561 cases of Japanese CBs from 1985 to 1991, and their results support the positive effect during issue announcement period. Roon and Veld (1998) investigated the announcement day wealth effects of 47 CBs issuances in Holland from 1976 to 1996, and their empirical results show the announcement effects are not significantly positively related to abnormal returns. Abhyankar and Dunning (1999) tested a sample of 261 CBs issues of UK listed companies from 1982 to 1986, and they found that CBs issues have a significant negative effect on shareholders' wealth.

The studies of issue announcement effects in China still focus on seasoned new issues and seasoned equity offerings. Liu (2003) analyzed the negative wealth effects of seasoned new issues, and she found that non-tradable-shareholders use seasoned new issues to transfer the wealth of common shareholders to non-tradable shareholders under the very unique Chinese "two-system-ownership structure". Therefore, issuances of seasoned equity shares would devalue the wealth of common shareholders and cause the negative effects. There hence the higher the proportion of non-tradable shares is, the stronger the negative effects of seasoned new issues are.

3 The equity component of CBs

Measuring the debt and equity components of CBs is subjected to complexity and subjectivity. Theoretically, only non-callable discount CBs without dividend payments to the common stocks can be separated into an ordinary discount bond

(the debt component) plus a warrant (the equity component) entitling the owner to purchase common stocks upon an exercise payment equal to the principal of the bond. It is more difficult to unbundle complex CBs with embedded both put and call options into a set of standard instruments because the different components generally interact with each other (Ingersoll, 1977; Casson, 1998).

Brennan and Schwartz (1977) used a numerical method to determine the value of complex CBs, and their method is often used for calculating the value of their standard components. The numerical method of Brennan and Schwartz (1977) relies on the restrictive hypothesis of optimal call strategy by managers and therefore underestimates the equity component. Billingsley et al. (1986) described the empirical problems caused by interdependencies between variables determining the equity and bond portions of CBs. Empirically, CBs are often classified by their "probability of conversion". This is the probability that the CBs will be converted to common stock before or at maturity. The "time to conversion" used by Davidson et al. (1995) reflects the ratio between the firm's signaled growth rate and the market prior expected growth rate. A low "time to conversion" indicates a high equity component because the CBs may rapidly be at-the-money implying a high probability that bondholders will convert under some given economic incentives. Kuhlman's (1992) proxy also quantified the ability of management to force the conversion after the CBs issue. The proxy used by Janjigian (1987) for the debt component takes into account the volatility of the underlying stock and the CBs maturity. All these proxies have been used to determine the relationship between the CBs equity component and announcement effects of CBs issues for the USA market. The results are generally identical; and the relationship is significantly negative, which confirms the negative information sent by the equity component of CBs. Barlacu (2000) used the CBs sensitivity to its underlying common stock as a proxy for the equity component. He found the similar results in French market. Table 1 summarizes the various proxies used in the (previous) empirical literature.

Table 1 Proxies used in the literature for approaching the equity component of CBs

Authors	Proxy for the probability of conversion	Remarks
Janjigian (1987)	$N\{[\ln(CP)-\ln(P)]\times sT\}$	CP, conversion price; P, current stock price; s, volatility of the underlying stock; T, time to maturity; N, cumulative probability under a standard normal distribution
Kuhlman (1992)	Conversion Ratio = Conversion price/stock price	
Davidson (1995)	Time to conversion $T=[\ln(CP)-\ln(P)]/\mu$	μ, rate of stock price appreciation
Barlacu (2000)	Delta	Delta (Δ), the CBs sensitivity to its underlying common stock

Under the restrictive assumption that a CBs may be considered as the sum of a standard bond and a European warrant which entitles the owner to purchase a fraction of the equity upon an exercise payment equal to the principal of the bond, and the delta of a CBs equals the delta of the embedded warrant. We use delta, which was presented by Barlacu (2000), as the proxy of the equity component of CBs. Delta is the sensitivity of the CBs value to its underlying common stock. Under the Black-Scholes assumptions, the value of delta is

$$\Delta = e^{-\delta T} N\left\{\frac{[\ln(S/B) + (r - \delta + \sigma^2/2)T]}{\sigma T^{1/2}}\right\}$$

where S is the current price of the underlying stock, B the conversion price, r the continuously compounded yield estimated from a year Chinese treasury bond on the issue date, σ the standard deviation of the continuously compounded common equity returns, T the number of years to maturity, δ the continuously compounded dividend yield, and $N\{.\}$ is the cumulative probability under a standard normal distribution function.

Delta measures the likelihood that bondholders will convert the CBs (voluntarily or forced by managers) under certain economic incentives, as managers call for redemption (for callable CBs) or the distribution of a high dividend yield. The advantage of our proxy is that it gives an accurate measure of the equity component by taking more variables influencing the debt- and equity-portions of CBs into account, such as the dividend yield, the risk free rate of return, the common stock volatility and the time to maturity. A high delta means that the CBs is very sensitive to its underlying common stock and consequently the CBs has a high equity component. Inversely, when delta approaches zero, a CBs turns into a straight debt.

We calculate the delta of 33 convertible bonds in the Chinese market. The results show that 65.7% of them are equity-like convertible bonds, which means most CBs in the Chinese market are designed to convert to common stock in the future. This is consistent with the analysis of Yang (2002).

4 Data source and sample description

4.1 Data source

Our entire sample consists of 39 convertible bonds issued by Shanghai and Shenzhen in China from 1992 to 2004. According to the following six selection criteria, only 33 issues from the total sample are considered in our study.

(1) The common stocks of convertible bond issuing firm must be traded on the Shanghai Stock Exchange or Shenzhen Stock Exchange two years before the issue date.

(2) The underlying stock data is available from 347 days before and 121 days after the two announcement dates ($t = 0$ is the announcement date).

(3) The financial statements of the firm at the end of the fiscal year preceding the issue must be obtained from the publications. Accounting data, which are used to calculate the financial ratio, are from the end of the fiscal year preceding the issue.

(4) For each convertible bond issue, two announcement dates (the issue announcement date and the date of announcement for coming into the market) and the issuance date must be identifiable, and we can obtain the date from China Security Journal, Security Times and www.cninfo.com.cn.

(5) The event window is defined as the period from $t = -6$ to $t = 6$ days relatively to the announcement date ($t = 0$). There are not any other important announcements published during this period, such as the issue announcements of other securities, dividend announcements, stock split announcements, etc.

(6) Our sample does not include the convertible bonds issued by financial institutions.

Criteria (1)–(3) limit the sample to the firms of which stock price data and accounting data are available. Criterion (4) is included as an attempt to identify the time $t = 0$ in the event study. The issue announcement date at which the convertible bond issue has been approved by China Security Regulator Commission the first time when the issuer gives the exact information to the public that the firm will issue the convertible bond; the firm publishes the concrete information on the convertible bond issue at the date of announcement to the market; and the convertible bond starts to be traded on the Shanghai Stock Exchange or Shenzhen Stock Exchange at the issue date. The "true" announcement date is the issue announcement date. Because this is the first time the "official" issue decision and the exact issue characteristics are available for all investors through public media. However, in our study the date of announcement to the market is also considered, as this is the first time most investors are informed about the concrete time and procedure.

Criterion (5) excludes the influences of other significant announcements published by the issuers on their wealth, so that the wealth effects during the event window only indicate the effects of the issue announcements of the convertible bonds.

Criterion (6) maintains the consistency of our sample. The characteristics of financial institutions are quite different from those of the firms in other industries, so the convertible bonds issued by financial institutions are excluded from our sample.

The information of these events is drawn from the public announcement proposals in China Security Journal and www.jrj.com.cn which contain such information as the date of issue announcement, the issue date and the listed date. The data in this study, including the underlying adjusted stock price for the issuing firms are obtained from Datastream. The announcement reports of issuance and listing, as well as the annual reports of the issuing firms are taken from www.cninfo.com.cn. There is no stock index including the stocks of both the Shanghai Stock Exchange and the Shenzhen Stock Exchange. The total market capitalization of the listed firms on the Shanghai Stock Exchange is much larger than that of the firms on the Shenzhen Stock Exchange and thus the transactions are more active on the Shanghai Stock Exchange than on the Shenzhen Stock Exchange, the value-weighted A-stock index of the Shanghai Stock Exchange is used as the market index in our event study. This index is obtained from China Stock Market (CSMAR) Database.

4.2 Sample descriptions

Table 2 presents the summary statistics for CBs issues and issuers; while the Table 3 describes the pairwise differences in mean values with their significance level. Δ, the sensitivity of the CBs value to its underlying common stock, indicates the equity components of CBs. It measures the likelihood that bondholders will convert the CBs under certain economic incentives. According to Δ in the intervals [0, 0.33], [0.33, 0.66] and [0.66, 1], CBs are divided into three categories, "debt-like", "mixed" and "equity-like" CBs (hereafter "D-CBs", "M-CBs" and "E-CBs") respectively (Burlacu, 2000).

Table 2 demonstrates that the median size CBs issuer is a large-sized firm of China in the Chinese market, and the value of its total assets is 3.47 billion RMB. Convertible bond issuers have low growth opportunities and stable profit, the ratio between mean value and market-to book value is 0.70 (including non-tradable shares), which is quite different from CBs issuers in developed countries who have high growth opportunities and whose market-to-book ratios are more than 1 (Korkeamaki, 2005). The ratio of issue process and market value of common stocks is 45%, far higher than the issue process in French market 19%. The average premium is 1.7%, much lower than the premium in French market 12% (Burlacu, 2000). The average pre-issue cumulative abnormal return is positive (0.15%), while the average pre-issue cumulative abnormal return is negative (–0.03%). The change of the cumulative abnormal return implies that the CBs issuances in China are associated with high risk and low performance.

These overall results change when considering CBs-issuers accordingly to the type of CBs issued. Concerning the size, results indicate that E-CBs issuers are large firms (the median size equals 3.86 million RMB) while D-CBs issuers are significantly smaller (the median size is 2.95 million RMB). To the extent that

Table 2 Summary statistics for CBs issuers on Chinese market [a)]

Descriptive measure of the issuers and the CBs issued[b)]	D-CBs ($n=9$) [0, 0.33]		M-CBs ($n=3$) [0.33, 0.66]		E-CBs ($n=23$) [0.66, 1]		All ($n=35$)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Total assets (million Yuan)[c)]	4,300	2,950	1,970	1,910	5,750	3,860	5,010	3,470
Tangible asset/ total asset[c)]	0.73	0.77	0.55	0.67	0.63	0.67	0.65	0.7
Market-to-book[d)]	0.649	0.523	0.687	0.697	0.775	0.649	0.733	0.646
Issue process/ MVCS[e)]	0.418	0.358	0.618	0.566	0.44	0.464	0.45	0.464
Premium[f)]	0.052	0.055	0.059	0.058	–0.004	–0.003	0.017	0.02
Long-term debt/ total asset[c)]	0.059	0.048	0.007	0.003	0.079	0.034	0.067	0.025
Liabilities/assets[g)]	0.367	0.411	0.365	0.327	0.399	0.41	0.387	0.41
Dividend yield	0.031	0.022	0.009	0.007	0.01	0.009	0.016	0.012
Liquidity[h)]	0.64	0.707	0.679	0.671	0.607	0.626	0.623	0.667
Net assets per share[i)]	4.8	3.86	3.56	3.56	3.94	4.2	4.14	3.97
Pre-issue stock performance[j)]	–0.003	0.02	0.074	0.073	–0.027	–0.018	0.15	–0.007
Post-issue stock performance	–0.095	–0.075	0.061	0.108	–0.022	–0.015	–0.034	–0.039
Stock return volatility	0.014	0.011	0.012	0.012	0.038	0.016	0.029	0.015

Note: [a)] According to Δ in the intervals [0, 0.33], [0.33, 0.66] and [0.66, 1], CBs are divided into three categories: D-CBs; M-CBs; and E-CBs respectively

[b)] Given statistics are the means as well as the medians.

[c)] Accounting data are for the end of the fiscal year preceding the issue. The values of the assets, long-term liabilities and tangible assets are calculated in terms of book value. Tangible assets are fixed assets plus inventories.

[d)] Market-to-book = (market capitalization of equity + book value of long-term liabilities)/ book value of total assets; while, market capitalization of equity = the stock price on issue date × the number of shares tradable + the net assets per share × the number of non-tradable shares

[e)] MVCS (market value of common shares) = the stock price at the end of the month proceeding the month of the offering × the number of shares tradable on the issue date.

[f)] Premium = the value of CBs-Max (bond floor, equity floor)/ the value of CBs, where, the bond floor is estimated by discounting the promised coupon and principal payments by the yield of an equivalent straight bond at the issue time; the equity floor is the conversion value that is the stock price at issue multiplied by the conversion ratio.

[g)] Liabilities/assets = total liabilities/ total assets, which implies the financial risk.

[h)] Liquidity = non-tradable shares / total shares, where the total shares includes the shares tradable and the non-tradable shares.

[i)] Net assets per share = (total assets − total liabilities) / total shares.

[j)] The pre-issue stock performance is the cumulative abnormal return estimated over the period [–121, –2] before the issue, where 0 is the issue date, while the post-issue stock performance is the cumulative abnormal return calculated over the period [1, 121]. The abnormal return is the difference between the normal return and the return of the value-weighted stock index of Shanghai Stock Exchange. The volatility is the standard deviation (SD) of raw returns over the period [–121, –1], where 0 is the issue date.

Table 3 Pairwise differences in mean values for CB issuers on Chinese market[a)]

Descriptive measure of the issuers and the CBs issued[b)]	M-CBs versus D-CBs ($n = 9$)	M-CBs versus E-CBs ($n = 3$)	D-CBs versus E-CBs ($n = 23$)
Total assets (million Yuan)	–23.3	–37.8	–14.5
Tangible asset/total asset	–0.18	–0.080	0.098
Market-to-book	0.038	–0.089	–0.127
Issue process/MVCS	0.200	0.179*	–0.022
Premium	0.007	0.063**	0.057***
Long-term debt/total asset	–0.053	–0.073	–0.020
Liabilities/assets	–0.002	–0.034	–0.032
Dividend yield	–0.022	–0.001	0.021***
Liquidity	0.040	0.072	0.032
Net assets per share	–1.236	–0.373	0.863
Pre-issue stock performance	0.08**	0.100	0.024
Post-issue stock performance	0.156*	0.082	–0.073
Stock return volatility	–0.002	–0.026	–0.024

Note: [a)] The sample includes 33 convertible bonds on Chinese market, and CBs are classified as described in Table 2.

[b)] Given statistics are mean differences with their significance in a *t*-test. *, ** and *** denote the significance level at the 10%, 5% and 1%, respectively.

large firms are more vulnerable to managerial discretion and free cash flow costs, this result supports models on the basis of "equity" agency costs. Concerning the ratio between market value and book value, D-CBs have the lowest growth opportunities. The average market-to-book ratio is 0.65 and the highest dividend yield is 3.1%, which is significantly higher than other two types. On the other side, E-CBs issuers have strong market-to-book ratios (0.72) and low dividend yields, therefore the expected profitability of future growth opportunities are high. This supports the underinvestment hypothesis (Myers, 1977), and firms having a higher part of their value in form of investment opportunities issue equity or "equity-like" securities to diminish underinvestment costs. Concerning the amount of the offering, there is no significant difference between the market value of common stock and the issue process for both E-CBs and D-CBs, being 46.8% and 55.3% as the median, respectively, which is not consistent with the hypothesis that adverse selection costs are positively related to the amount offered (Krasker, 1986). The premium of E-CBs is negative, which indicates that the issuers give up the high premium of CBs, to make CBs convert into the common stocks. Regarding the cumulative abnormal returns, the pre-issue stock performance of E-CBs shows average –2.7% cumulative abnormal return, while the cumulative abnormal return rises to –2.2% after the issuance. Comparatively, the cumulative abnormal return of D-CBs reduces to –9.5% from –0.2%. Therefore the market reaction of the D-CBs issuance is better than that of the E-CBs issuance. The characteristic of M-CBs is little distinct.

5 Announcement effect: The event study

In this section, the event-study methodology is used to compute common stock abnormal returns around CBs issue announcements. The abnormal return is the difference between the observed return and the normal return derived from a market and risk adjusted returns model approach. The model parameters are estimated over the period [−346, −122] before the announcement date ($t = 0$). This study chooses the issue announcement date as the real event date, instead of the issue date, because no further new information is transferred to investors on that day. Event window is situated, on average, six days before and after the announcement date, namely, [−6, 6] (Burlacu, 2000). The announcement date is defined as $t = 0$. The market reaction is analyzed respectively on each subset of D-, M- and E-CBs during the period between the two announcement dates (VISA COB date and BALO announcement date). The test statistics incorporates standardized abnormal returns for each firm (Pattel, 1976). This methodology is widely used for security issue announcements and therefore will not be detailed in this paper.

5.1 Event study results

Table 4 reports abnormal returns (AR) for days surrounding the announcement date and average abnormal returns (AAR) for some periods around the announcement date. Results are given for the two considered announcement dates (the issue announcement date and the listing announcement date) and we provide results for the entire sample and also for each of the three CBs subsets (D-, M- and E-CBs).

For the two announcement dates, the market reaction for the whole sample is negative and significant. Concerning the VISA COB date, the negative announcement effect (significant at 1% level) is strong and concentrated at $t = 0$ and $t = 3$. While the market reaction is significantly positive at $t = 1$ and $t = 5$. For the BALO announcement date, the negative impact at day $t = 0$ is smaller but remains significant at 10% level, and the positive announcement effect (significant at 1% level) is strong and concentrated at $t = 5$ and $t = 2$. Results obtained after splitting the sample according to the CBs type are interesting. As reported in Table 4 in columns 2, 3 and 4, the market reaction at the VISA COB date is significantly negative for D-CBs and M-CBs, while we observe insignificant negative reactions for E-CBs at $t = 0$. When all the information concerning CBs characteristics is publicly known at the BALO date, we observe insignificant negative reactions at $t = 0$ and insignificant positive reactions at $t = 2$ for D-CBs, while for E-CBs the market reaction is not significantly negative at $t = 0$ but strongly positive at $t = 2$. The market reactions for D-CBs at $t = 0$

Table 4 Common stock daily AR and ARR for the event window [−6, 6] on Chinese market[a)]

Day	Issue announcement date[b)]							
	All CBs (33)		Debt-CBs (9)		Mixed-CBs (3)		Equity-CBs (21)	
−6	0.000	−0.1	−0.008	−1.93*	0.004	0.597	0.002	0.912
−5	0.000	−0.15	−0.003	−0.82	0.001	0.071	0.001	0.325
−4	0.003	1.392	−0.003	−0.53	−0.001	−0.12	0.006	2.14**
−3	0.000	0.252	−0.001	−0.35	−0.002	−0.17	0.001	0.61
−2	0.000	−0.31	−0.005	−1.16	0.005	0.672	0.001	0.117
−1	−0.002	−1.32	−0.005	−1.31	−0.008	−1.1	0.000	−0.39
0	−0.008	−3.8***	−0.013	−2.8***	−0.041	−5.45***	−0.001	−0.86
1	0.006	3.081***	0.005	1.264	0.005	0.743	0.007	2.753***
2	−0.001	−0.51	−0.005	−1.41	−0.004	−0.46	0.001	0.45
3	−0.005	−2.23**	0.000	−0.07	0.020	2.275***	−0.010	−3.61***
4	0.001	−0.06	−0.002	−0.34	−0.008	−1.37	0.003	0.669
5	0.005	2.477***	−0.002	−0.34	0.026	3.87***	0.006	1.865*
6	−0.002	−0.82	0.003	0.487	−0.020	−2.75***	−0.001	−0.31
[−1,0]	−0.005	−3.62****	−0.009	−2.91***	−0.024	−4.63***	0.000	−0.88
[−1,1]	−0.001	−1.18	−0.004	−1.65	−0.014	−3.35***	0.002	0.868
[−2,2]	−0.001	−1.28	−0.005	−2.42***	−0.009	−2.5***	0.002	0.925
[−3,3]	−0.001	−1.83*	−0.003	−2.21**	−0.004	−1.32	0.000	−0.35
[−4,4]	−0.001	−1.17	−0.003	−2.24**	−0.004	−1.66*	0.001	0.626
[−5,5]	0.000	−0.36	−0.003	−2.38***	−0.001	−0.31	0.001	1.226
[−6,6]	0.000	−0.58	−0.003	−2.59***	−0.002	−0.88	0.001	1.294
Day	Listing announcement date[b)]							
	All CBs (33)		Debt-CBs (9)		Mixed-CBs (3)		Equity-CBs (21)	
−6	−0.001	−0.4	−0.002	−0.21	−0.007	−0.87	0.000	−0.03
−5	0.007	3.36***	0.002	0.314	0.017	2.42***	0.008	3.092***
−4	0.001	0.297	−0.001	−0.26	−0.005	−0.66	0.003	0.789
−3	0.001	0.666	0.005	1.547	−0.013	−1.57	0.002	0.414
−2	0.001	0.386	−0.002	−0.61	−0.004	−0.45	0.003	1.055
−1	0.002	0.592	0.006	1.477	−0.002	−0.31	0.001	−0.11
0	−0.004	−1.83*	−0.005	−1.35	0.003	0.482	−0.004	−1.59
1	−0.003	−1.31	−0.007	−1.37	−0.003	−0.44	−0.002	−0.58
2	0.008	2.966***	0.005	1.432	0.004	0.538	0.009	2.577***
3	0.003	1.428	0.009	2.286***	0.005	0.534	0.001	0.091
4	−0.005	−1.79*	0.001	0.227	−0.002	−0.36	−0.007	−2.26***
5	0.002	1.003	0.010	2.347***	0.002	0.145	−0.001	−0.33
6	−0.001	−0.34	−0.002	−0.61	0.005	0.716	−0.002	−0.29
[−1, 0]	−0.001	−0.87	0.001	0.088	0.001	0.122	−0.002	−1.2
[−1, 1]	−0.002	−1.47	−0.002	−0.72	−0.001	−0.15	−0.002	−1.32
[−2, 2]	0.001	0.36	−0.001	−0.19	0.000	−0.08	0.001	0.605
[−3, 3]	0.001	1.096	0.002	1.289	−0.001	−0.46	0.001	0.702
[−4, 4]	0.001	0.468	0.001	1.127	−0.002	−0.74	0.001	0.13
[−5, 5]	0.001	1.739*	0.002	1.822*	0.000	0.101	0.001	0.949
[−6, 6]	0.001	1.396	0.002	1.448	0.000	0.05	0.001	0.783

Note: [a)] The sample includes 33 convertible bonds on Chinese market, and CBs are classified as described in Table 2.There are two dates in this study, the issue announcement date and the listing announcement date.

[b)] Z-test is used to test the significance of the AR and AAR. The null hypothesis is that the standardized AR is zero. *, ** and *** denote the significance level at the 10%, 5% and 1%, respectively.

and $t = 2$ are not significant. The volatility of abnormal return repeats, which results from the overreaction of the information in the stock market.

The stock prices overreact to the information, which indicates that Chinese stock market is a speculative market (Ma, 1996). Most investors in Chinese stock market are speculative, who pay more attention to the short-term profit, and could bear the relatively high risk. Therefore, the volatility in Chinese stock market is larger.

5.2 Interpretation of wealth effects

As shown in Table 4, the empirical results are statistically significant negative at both the issue date and the listing date, which are consistent with the M&M model and its implicit pecking order hypothesis. At the issuing date, the total sample experiences significant price decline (–0.7%); which is less than the wealth loss in French market (–34%) (Burlacu, 2000), USA market (–2%) (Eckbo and Masulis, 1995), or UK market (–1.2%) (Abhyankar and Dunning, 1999). The wealth effect at the listing date is also significantly negative but less important than for the issuing date (only at the 10% significant level). When the issue announcement is publicly released at the issuing date, outside investors know most details; while the information from the listing announcement only plays a complementary effort on the investment decision of outside investors. As a result, the wealth effects of the listing announcements are less significant.

Our results show that the announcement effect is not the same for the three CBs types. After splitting the sample according to the delta, the market reaction for D-CBs is most negative among these three kinds, which is different from the "pecking order hypothesis" of Myers and Majluf (1984) model, and market reacts more negatively towards issue announcement of equity-like CBs than that of debt-like CBs, and this is also inconsistent with the "pecking order hypothesis" of Myers and Majluf (1984) model.

There are three main reasons why the listed companies prefer the equity financing in China. First, the low cost of the equity financing is the direct reason that causes the equity preference in Chinese security market (Huang and Zhang, 2001). The cost of the equity financing consists of the issuance charge, dividend and the tax of dividend. The issuance charge of the equity financing in China is approximately 3.2%, while the interest rate of three-year corporate bond and the five-year corporate bond are up to 3.78% and 4.03% respectively. Moreover, the level of dividend payment in China is very low. Besides, the other cost of the equity financing is not severely restricted, except for the tax of dividend. Comparatively, the bond needs pay the interest periodically. Second, there is the special corporate governance structure of Chinese listed firms, which is the duality ownership structure. The ownership structure of Chinese listed firms consists of the tradable shares and the non-tradable shares, and the non-tradable

shares cannot be traded freely in the security market. Therefore, there is the unfair phenomenon in Chinese stock market, and the stocks of the same listed company have different right. The wealth increase of the shareholders of the tradable shares depends on the development of the operational performance and the competitiveness of the listed company, which may result in the rise of their stock price. Comparatively, the wealth increase of the shareholders of the non-tradable shares is related to the high premium from the financing, instead of the trend of stock market and the change of the stock price. As a result, the shareholders of the non-tradable shares prefer the equity financing with the high premium, from which they can participate the value of the issuance of the liquidity right, but also they can obtain the wealth transferred form the tradable shareholders through high premium (Liu, 2003; Wu, 2004). Third, the agency cost is also a key factor. The public shareholders are extremely sporadic, so the non-tradable shareholders play an absolutely dominant role. In fact the ratio of the non-tradable shares to the total shares is average 64.60%. Especially, the state-owned shareholders hold the majority shares, the ratio of the state-owned shares to the non-tradable shares is up to 69.94%, while the ratio of the state-owned shares to the total shares is 45.18%. As the agency of the shareholders, managers have to maximize the wealth of the state-owned shareholders first. The state-owned shareholders, however, should pay attention to the development of the listed company, but also to the social stabilization and the control right. As a result, the aim of managers would be changed, and the agency cost may increase. Besides, the ratio of the holdings of managers is very low, so it is difficult to encourage them to use more debt financing. Thus, managers would prefer the equity financing first, as same as the state-owned shareholders.

As the special condition in Chinese stock market, managers would prefer to issue the stock instead of the bond. When managers decide to issue the bond, based on the asymmetric information about the firm value, outsider investor would believe that the operation performance of firms is too serious to issue the stock. Consequently, the market reaction of the bond issue announcement is more negative.

6 Cross-sectional regression results

6.1 Cross-sectional regression methodology

We next use cross-sectional regression to analyze the relation between the announcement period abnormal returns and firms' characteristics. The regression equation is given as follows:

$$AAR_i = \alpha + \gamma \Delta_i + Sum_j(\gamma_j V_{i,j})$$

where AAR_i is two days [−1, 0] average abnormal return at issue announcement date for firm i; $V_{i,j}$ is the jth control variable for firm i; and Δ_i is the probability of conversion for the CB issued by firm i.

The variable Δ controls the equity component of CBs. In line with the original M and M model and we should find a negative and significant coefficient for γ.

Stein (1992) suggested that if a company has substantial financial leverage, it will choose convertible debt only if it is relatively optimistic about its future stock price. Thus a positive relationship would be expected between the announcement period abnormal return and the firm's financial leverage position. We use debt ratio the year before the issue as proxy of the firm's financial leverage, the coefficient of which should be positive (Janjigian, 1987). Brennan and Kraus (1987) suggested that announcement period abnormal returns are positively to debt ratio of CBs, which is in line with the empirical results of Mikkelson (1984).

The market value of firms is the sum of current assets value and future increasing opportunities. The higher the current assets value is, the higher the ratio of uncertain growing opportunities and uncertain current assets value is. We use market-to-book ratio as the proxy of growth. Green (1984) implied that announcement period abnormal returns would be related to future growth opportunities after controlling for differences in corporate investment policy shifts and underinvestment. Stein (1992) suggested the same result because high market-to-book means high potential growing opportunities.

Miller and Rock (1985), for example, suggested that any unexpected outside financing conveys negative information about the firm's prospects. Since the issue size reveals the extent of the divergence between the actual and expected internally generated cash flows, the larger the unexpected funding, the larger the decline in value is. Thus issue size is negatively related to stock price reactions. Price pressure hypothesis (Barclay and Lizenberger, 1988) also suggested that increasing stock supply will persistently decrease stock price. Thus the proxy of issue proceeds/market value of common stock (MVCS) is included in the regression equation with a supposed positive coefficient.

Firm size could be considered to be a proxy for the degree of information asymmetry. In the context of the Stein model, since larger firms are more likely to have greater analyst coverage and to undergo greater scrutiny by institutional investors, firm size is positively related to abnormal return. However, Brennan and Kraus (1987) and Brennan and Schwartz (1988) suggested that announcement period abnormal returns are negatively related to firm value. Brennan and Schwartz (1988) and Brennan and Kraus (1987) proposed a model, which explains a firm's choice of financing instruments when investors and management disagree about the riskiness of the company. Their model predicts that it is the smaller, riskier high growth firms which will be most likely issuers of convertible

debt; specifically they predict a negative relation between announcement period prediction errors and firm size.

6.2 Results of the OLS regression analysis

According to our ordinary least squares (OLS) regression results (in Table 5), the known variables used by the former theoretical models cannot explain the announcement period abnormal return in Chinese market. This is because of the special "two-system-ownership structure" of Chinese listed firms. Non-tradable stock shares cannot be circulated in the market, thus CBs issue pricing is not determined by the market. Shareholders of non-tradable stock shares and their underwriter can subjectively decide the issue price of the current stock, and exchange tradable stock shares on the basis of this price in the secondary market, while non-tradable stock shares will be priced and exchanged in other negotiating places.

Considering the special ownership structure in the Chinese market, we present two new variables to explain the announcement period abnormal return. We define a variable, liquid (LIQU), as the proxy of the liquidity structure of Chinese listed firms, which is the ratio of non-tradable shares to the total shares. He and Xia (2005) believed higher LIQU means lower liquidity, therefore the controlling shareholders will benefit much more from equity financing. This will dilute the value of tradable shares and result in negative market reactions. However, Wei (2005) suggested that the conflict between the group of tradable shareholders and the group of non-tradable shareholders will decrease the firm value during the privatization of state-owned-enterprises, especially when the government keeps the grand ownership after the privatization. This means that the ratio of non-current stock is positively related to the market reactions. In another way, we use net equity, which stands for net assets per share, as the proxy of book value of non-current stock. It ensures the shareholder's equity, and is positively related to the announcement period abnormal return.

In Table 5, we can see most coefficients of the OLS equation are statistically significant at 10% after adding the variables of liquid and net equity. Column 3 shows that delta, debt ratio and liquid are significant at 10%; Issue size/MVCS and net equity are significant at 5%, while market-to-book and total assets are not significant. This means LIQU and net equity are two important variables determining announcement effects, and improve the significance of the regression. Due to heteroskedastic errors tested in the OLS equation, we employ generalized least squares (GLS) with White (1980) correction.

6.3 Results of the GLS regression analysis

Generalized least square is used in cross-section regression to solve the problems of heteroskedastic errors. The control variables were combined in different

manners to measure the effect of their inclusion in the regressions. The coefficients of most variables are different from the predicted signs, which show the particularity of Chinese market. Column 1 in Table 5 shows the predicted signs in theoretical models and columns 5–8 show the results of GLS regression.

The results of GLS regression show that abnormal return is significantly positive to equity component value. Delta has a positive and significant coefficient and this against the revised M&M model. This can be ascribed to the low cost of equity financing and special "duality" equity structure in Chinese market, which results in this contrary "pecking order" (Wu, 2004). Investors think that the firms which choose equity financing are better than the firms which choose debt financing. The market reaction in announcement period for the firms with equity financing is more positive (less negative).

Debt ratio has a positive coefficient and this supports Stein's prediction. This means the market reaction is positively related to the debt ratio. If a company has substantial financial leverage, convertible debt financing will result in relatively positive market reaction. Market-to-book has a positive coefficient, and this is consistent with Green's (1994) results. High uncertain net present value (NPV) indicates that the firm value is underpriced, thus financing will result in positive market reaction. The coefficient of issue size/MVCS is negative, which is inconsistent with Cooney and Kalay (1993). This means issue size is negatively related to the market reaction. A possible explanation is most issue firms are large-size enterprises, and investment size is positively related to the uncertainty of future investment's NPV. Total assets have a negative coefficient and this supports Stein's prediction. That is, the higher the firm's value is, the more negative information is sent to the market.

The last three columns of Table 5 show the regression results after including special Chinese variables. Including liquid and net equity increases the explanatory power of the model in a significant way, and R^2 increases to 0.999 9. This suggests that the variable liquid and net equity are strong predictors of announcement effects. Net equity has a positive coefficient and this is consistent with our prediction. This means the higher the book value of current stock, the more the possible guarantee investors getting in the future, thus the negative market reaction will be smaller. The coefficient of liquid is positive. This suggests that if state-owned stock ratio is high, the ratio of non-current stock is positively related to the announcement period abnormal return.

7 Conclusions

Based on research data of convertible bonds issued by Chinese listed companies from 1992 to 2004, we analyze the announcement effect of CBs issuance and

Table 5 GLS estimates of coefficients in cross-sectional regressions [a)]

Variable [b)]	Predicted sign	OLS	OLS	GLS 1	GLS 2	GLS 3	GLS 4
Constant		0.02	–0.014	0.042**	–0.05***	–0.026***	–0.002
Delta	–	0.012	0.016*	0.009***	0.012***	0.011***	0.014***
Debt ratio	+	0.03	0.043*	0.039***	0.052***	0.024***	0.05***
Market-to-book	+	0.006	0.007 3	0.010 3***	0.017***		0.008
Issue size/MVCS	+	–0.021	–0.033**	–0.018 7***	–0.014***	–0.034***	–0.03***
LN(total assets)	–	–0.002	-0.002	–0.003***			–0.003**
Liquid	–		0.039*			0.04***	0.036***
Net equity	+		0.003**		0.003***		0.003 6***
Adjusted R^2		0.05	0.188	0.831	0.981	0.998	0.999

Note: [a)] [–1, 0] Average abnormal returns at the issue announcement date for 33 CBs issued in China during 1992 to 2004 are explained by the probability of conversion (delta) and other control variables. ***, ** and * indicate that the coefficient is significant at the 0.01, 0.05 and 0.1 levels.

[b)] Debt ratio is calculated on the financial data at the end of the last year before the announcement. The market-to-book is the ratio between, on one hand, the mean market value of common stock over the period [–30, 30] around the announcement date plus the book value of debt and, on the other hand, the book value of the firm at the end of the fiscal year before the announcement. Issue size/MVCS is the ratio between the amount issued and the market value of common stock. LN (total assets) is the proxy for firm size. Liquid is the ratio between current stock and total stock, which is current stock value/ (current stock value + non-current stock value). Net equity is the net equity of the firm at the end of the last year before announcement.

have discovered that issues of convertible bonds have negative effect on shareholders' wealth. Our results are basically consistent with the other research findings in USA market, and support the conclusion by M&M model (1984) that the asymmetry information can make issue price fall. We also find there is overreaction to issue announcement in Chinese stock markets, which reveals the speculating characteristics of the markets.

Based on the sensitive index, we find that the Chinese listed companies prefer issue equity CBs. The regression results also state that the market announcement effect is reversely related to the equity strength of CBs, in other words, the extreme debt ness of CBs has the most negativity while the extreme equity ness has the minimum negativity, which are different from the findings of Myers and Majluf (1984). It is a unique feature of Chinese CBs. The main reason could be explained as follows: first, the most listed companies in mainland China equipped with "two-system-ownership structure", by holding the majority non-tradable shares the control holders prefer equity financing because of lower cost; second, due to very few dividend paid, the most individual investors prefer capital gain than dividend yield, and even hold the confidence that issuing debt CBs means no greater growing in company's near future, in fact the short-term investors dominate the market so far.

We introduce tradable index and non-tradable book value as the proxies of the "two-system-ownership structure" in further study of ownership structure's

impact on issue announcement effect. Our empirical results have shown that abnormal returns of CBs issue period have negative relation with financial leverage, equity floating structure and non-tradable book value, respectively; especially have a very significant positive relation with issue size and firm size, and then have a positive relation with market-to-book ratio.

The conclusions logically match stock features in the transitional economy of China. With historical split status of shares being solved, improving of legal protection of shareholders, and corporate bonds developing, the current pecking order of Chinese listed companies with transitional characteristics will be surely changed, which will provide new opportunities for further study.

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