Empirical Study on the Financial Characteristics
of Chinese Companies Issuing Convertible Bonds

Xiaodan Hu & Huixin Mao

School of Business Administration, Northeastern University

Shenyang 110004, China

E-mail: gracehsd@yahoo.com.cn

Abstract

At present, the convertible bonds advance side by side with allotment and additional issuing, and they have been the "troika" of the refinancing for Chinese listed companies. The single-factor analysis and Logistic regression analysis were adopted for Chinese listed companies which issued convertible bonds, allotment and additional share issuance from 2002 to 2004, and the results indicated that the companies which issued convertible bonds possessed many characteristics such as high growth property, large scale, low financial risk, low default risk, low stock price and shareholder concentration.

Keywords: Convertible bonds, Corporate financial characteristics, Logistic regression analysis

The corporate financial characteristics largely influence the choice of financing ways. According to relative theories, this article put forward some hypotheses and corresponding agent variables, used empirical data to validate these hypotheses, used the single variable analysis method to primarily review the significant differences of the financial characteristics of two kinds of issuing corporations, and used the Logistic regression analysis method to further review the influences of explanation variables.

1. Review of literatures

By the empirical test, Ke Dagang and Yuan Xianping (2006) pointed out that the scale, capital, R&D expenditure, the issuing scale of convertible bonds and the ownership structure of the company were positively correlative with the selection of convertible bond, but the default risk, growth opportunity and profit ability of the company were positively correlative with the selection of convertible bond. Based on foreign relative empirical research literature reviews, Liu Eping (2006) compared the financial characteristics of the company issuing convertible bonds and the financial characteristics of the company issuing additional shares, and the results indicated that for the choice of issuing convertible bonds or issuing additional shares to Chinese listed companies, the trade-off theory could be used to explain, and the explanation power of the agency theory and the information asymmetric theory was lower. In addition, the financial crisis hypotheses are very important to explain the differences of financial characteristics of two kinds of security corporations. Xu Ziyao (2007) empirically tested the three most authoritative foreign hypotheses by the data from Chinese listed companies issuing convertible bonds and additional shares in the period of 2001-2006, and the results indicated that the asset-liability ratio and the price to book ratio (P/B) of the company were significantly negatively correlative with the financing selection of convertible bonds, and the growth and the variability of management cash flow were significantly positively correlative with the financing selection of convertible bonds, and the scale, founded year, proportion of material assets and profit ability influenced little the re-financing selection for listed companies.

2. Research hypotheses and variable selection

Combining with Chinese special background, this article uses foreign relative theories to construct the financial characteristics of the company issuing convertible bonds and the company issuing allotment and additional shares, and puts forward following hypotheses.

Generally speaking, large company has low bankruptcy risk because it is inclined to multi-channel management, and the managers in large company have few freedom and growth opportunity, so it has stable cash flow, low financial crisis risk and strong debt bearing ability. In addition, the large company will offer more information to lenders than small company, so its exterior transparence and reputation class are higher, and it is easy to be supervised by the society, and the supervision is relatively lower, and it has strong debt ability. Therefore, the hypothesis 1 is proposed.

Hypothesis 1: The companies issuing convertible bonds have lower financial risk and default risk and larger scale than the companies issuing allotment and additional shares.

Because of the benefit conflict between shareholders and creditors, creditors are confronted with moral risk and converse selection. When the company issues debts, and invests these debts for the assets with higher risks, it can figure for values from creditors, so the asset substitution occurs, but the selling of secured liabilities can stop the asset substitution, because the secured liabilities can relieve the deficient investment, reduce the total cost of liabilities and enhance the values of the company. So the guarantee of material assets could reduce the cost of liability agency to some extent and limit this kind of opportunism behavior. Therefore, the hypothesis 2 is proposed.

Hypothesis 2: The companies issuing convertible bonds have more free cash flux, stronger growth property and more material assets than the companies issuing allotment and additional shares.

Gross & Hart (1980) put forward the concept of the private benefits of control, and they thought that the incomes of the controlling stake stockholder or the manger layer include cash flow value and the control value. The former is distributed according to controlling shareholders' stocks, and the latter belongs to the controlling shareholders' stocks. Because of the existence of the private benefits of control, the controlling shareholders or the management layer can ensure their controlling rights and corresponding private benefits of control through the financing structure arrangement. But the premise pursing private benefits of control is that the shareholder must have the controlling right of the company. Therefore, if the controlling shareholders occupy fewer stocks, they will incline to debt financing. Comparing with the equity financing, the debt property of convertible bonds is stronger. So the hypothesis 3 is proposed.

Hypothesis 3: The controlling shareholders of the company issuing convertible bonds have fewer stocks.

When the economic situation is not optimal and the stock market is weak, the financing through issuing allotment and additional shares is difficult, or only low price can finance fewer capitals, which will harm the original shareholders' benefits. Here, to issue convertible debt could easily attract investors and correspondingly reduce the financing costs and issuing risk. When the economic situation begins to improve, the stock market explodes and the share price rises, the share transfer will successful more easily. So the hypothesis 4 is proposed.

Lan Faqin (2001) and Han Dezong & Li Yanrong (2003)'s research indicated that the refinancing sequence of Chinese listed company is from internal financing to exterior financing. The company with weaker profit ability has fewer retained earnings, lower interior financing quantity, which could not fulfill the financing requirements of the company, so the company will adopt the mode of exterior financing. The asset substitution hypothesis and the backdoor financing hypothesis all predict that the companies issuing bonds have higher profit ability than the companies issuing convertible bonds. So the hypothesis 5 is proposed.

Hypothesis 5: The companies issuing convertible bonds have higher profit ability than the companies issuing allotment and additional shares.

According to five above hypotheses, 9 explanation variables are selected in the article. Table 1 shows the company financial characteristic agent variables influencing the selection of the financing mode.

3. Sample data and modeling method

3.1 Sample composing

Relative data in the research mainly come from the information materials disclosed by the listed companies which issued convertible bonds or allotment and additional shares publicly from Jan 2002 to Dec 2004, such as the annual report of the company and the announcement of the general meeting of shareholders. The samples eliminating financial listed companies are 141 sample companies (including 30 companies issuing convertible bonds and 111 companies issuing allotment and additional shares).

3.2 Methods

(1) Single variable analysis. The single variable Mann-Whitney U test analysis method is adopted to analyze the characteristics of the companies with two kinds of financing mode including issuing convertible bonds and issuing allotment and additional shares (stock right financing), for making clear whether the significant differences exist in the financial characteristics of these two kinds of company.

(2) Multi-variable analysis. Because the company can select the financing mode issuing convertible bonds or the stock right financing, so at the appointed time, the probability that the company selects one financing mode can be denoted by a multinomial logarithm model, i.e.

$$\text{Logit } (P) = \log [P/ (1-P)] = \alpha + \beta'x \qquad (1)$$

Where, P is the probability issuing convertible bonds, and it can be defined as $P(Y=1 \mid x)$, and if the company issues convertible bonds, $Y=1$, and if the company issues allotment and additional shares, $Y=0$. x is the explanation variable, and it is the function of a series of characteristics $(x_1, x_2 \ldots x_n)$ of sample companies, i.e. the expression of $\beta'x$ is

$$\beta'x = \beta'1x1+ \beta'2x2 +…+\beta'nxn \tag{2}$$

α is the intercept, β' is the slope of the parameter. So the probability issuing convertible bonds can be denoted as

$$P = e\beta'x/ (1+e\beta'x) \tag{3}$$

The above multiple-logarithm regression model can be evaluated by the maximum likelihood program. In the article, the software of SPSS16.0 is applied to compute corresponding regression data.

4. Empirical results and analysis

4.1 Single factor analysis

In the article, the averages and medians of 9 financial characteristic explanation variables in two kinds of samples including the companies issuing convertible bonds and the companies issuing allotment and additional shares are respectively tested, and the descriptive statistic result and the Mann-Whitney U test result are seen in Table 2.

The data in Table 2 indicates that the median of the liability/asset ratio of the company samples issuing convertible bonds is 0.422, and it is significantly lower than the value of the company samples issuing allotment and additional shares, 0.48, on the level of 1%. The median of the company scale is 21.875, and it is significantly bigger than the median of the company scale of the companies issuing allotment and additional shares, 21.217, on the level of 1%. The median of the fixed asset proportion is 0.472, and it is significantly higher than the median of the samples issuing allotment and additional shares, 0.344, on the level of 1%. The median of price to book ratio is 3.158, and it is significantly lower than the median of the samples issuing allotment and additional shares, 4.127, on the level of 1%. The median of stock right structure (FS) is 58.8, and it is significantly higher than the median of the samples issuing allotment and additional shares, 45.96, on the level of 1%. To the growth property, the median of the samples issuing convertible bonds is 0.244, and it is bigger than the median of 0.23 of the samples issuing allotment and additional shares, but the test result is not significant. To the cash flow variability, profit ability and flow ratio, the medians of the former respectively are 0.036, 0.107 and 1.011, which are all less than the medians of latter, 0.043, 0.109 and 1.177, and the test results are not significant. To further test the test result of single variable, the following multi-logarithm regression analysis is performed.

4.2 Multi-factor analysis

The Logistic multiple-regression model is adopted to further test the single variable test result, and the binary variable of the companies issuing convertible is 1, and the variable of the companies issuing allotment and additional shares is 0. First select 4 optimal explanation variables to regress in 9 explanation variables by the forward stepwise logistic regression, and Table 3 shows the sequent arrangement of variables entering into the equation. Second, regress 9 explanation variables, and the regression result is seen in Table 3.

(1) The companies issuing convertible bonds have lower financial risk, lower default risk and larger company scale than the companies issuing allotment and additional shares. The hypothesis 1 is validated. If the companies with higher financial risks select the convertible bonds to finance, they can raise limited capitals, and the financing cost is high, and the secured company has not the enthusiasm of consignment-in. Therefore, the companies issuing convertible bonds have lower liability characteristic, i.e. the lower financial risk, which is the direct embodiment of the policy limitation of China's regulatory authority. Comparing with the stock ownership, the convertible bonds have certain liability property, so certain default risk exists, and generally speaking, the financial power of big company is stronger, and its ability to avoid financial risk is stronger too. At the same time, Chinese listed companies have intensive "financing thirsty disease", and the financing channels are narrow, but the large companies have stronger negotiation ability, so it is easily comprehensible that the scale of the large companies issuing convertible bonds is bigger than the companies issuing allotment and additional shares.

(2) The growth property of the companies issuing convertible bonds is better than the companies issuing allotment and additional shares, and their free cash flux is fewer than the flux of the companies issuing allotment and additional shares, and their material assets are higher than the material assets of the companies issuing allotment and additional shares. The regression coefficient of the total asset growth rate representing the growth property of the company in model 1 is 3.140, and the regression coefficient in model 2 is 3.614, and both coefficients are significant on the level of 5%, which indicate that the companies issuing convertible bonds are always in the asset expansion stage, and they need financing with large scale, and the companies issuing convertible bonds in China always acquire the financing amount than the companies issuing allotment and additional shares. The fixed asset ratio representing material asset proportion didn't enter into the equation in the selection by the forward stepwise logistic regression method, and in model 2, its regression coefficient is 1.57, so the result is not significant. At present, the admittance threshold issuing convertible bonds in China is higher, i.e. the higher requirement of asset yield, and the financial mess is not the consideration factor of the listed companies issuing convertible bonds. Hypothesis 2 has not been validated completely.

(3) The controlling shareholders' shares of the company issuing convertible bonds are higher. The regression coefficient of the largest shareholder's share proportion representing the controlling shareholder proportion is 0.045, but it is

significant on the level of 10%. That is opposite with the conclusion of the hypothesis, and the possible explanation is that the largest shareholders' shares of Chinese listed companies are generally higher, and the stock right financing influences little the controlling right status of the largest shareholder, and the companies with high controlling shareholder proportion issue convertible bonds makes for the adjustment of the capital structure.

(4) The companies issuing convertible bonds have lower share evaluation than the companies issuing allotment and additional shares. The price to book ratio is the characteristic index representing the share evaluation of the financing company, and its regression coefficient in model 1 is -0.337, and its regression coefficient in model 2 is -0.403, and both are significant on the level of 5%, which indicate that the shares prices of the companies issuing convertible bonds are relatively lower, i.e. the financing decision of the company has considered the factor of shares price, and the company with higher shares price selects the stock right financing, and the company with lower shares prices is inclined to issue convertible bonds for financing, and convert to the stock right financing when the shares price rises.

(5) The profit ability of the companies issuing convertible bonds is higher the companies issuing allotment and additional shares. For the financial characteristic index representing the profit ability of the company, i.e. the return on assets, its regression coefficient in model 2 is 5.714, and it didn't pass the significant test. According to the issuing conditions in China, under the situation according with supervision authorities' requirements about the return on assets of issuing convertible bonds, the companies have not obvious favor for the selection of financing mode.

5. Conclusions

The single-factor analysis and Logistic regression analysis were adopted for Chinese listed companies which issued convertible bonds, allotment and additional share issuance from 2002 to 2004, and the results indicated that the companies which issued convertible bonds possessed many characteristics such as high growth property, large scale, low financial risk, low default risk, low stock price and shareholder concentration. The material assets, cash flow variability and profit are not significantly different with the corresponding indexes of the companies issuing allotment and additional shares, and above results also proved that the largest shareholder's share proportion of the companies issuing convertible bonds was higher than the proportion of the companies issuing allotment and additional shares in China. The empirical tests can not completely support the foreign theoretical explanation about the issuing motivation of convertible bonds, which indicates that the foreign mature theoretical hypothesis of issuing convertible bonds doesn't be directly applied to explain the financial characteristic differences between the companies issuing convertible bonds and the companies issuing allotment and additional shares in China.

References

He, Jia & Xia, Hui. (2005). Selection of Financing Tool for the Companies with Private Benefits of Control. *Economic Research Journal.* No.4. P.66-76.

Ke, Dagang & Yuan, Xianping. (2006). An Empirical Analysis on the Motivation to Issue Convertible Bond. *Journal of Xi'an Jiaotong University (Social Sciences).* No.26(4). P.7-15.

Lin, Zhenyan. (2007). *Operation and Application of Multi-variable Analysis SPSS.* Beijing: Beijing University Press.

Liu, Eping. (2006). Financial Characteristics of Firms Issuing Convertible Bond and of Firms Issuing Common Stock. *Journal of Sun Yatsen University (Social Science Edition).* No.46(1). P.105-110.

Xu, Ziyao. (2007). Empirical Study on the Choice of Convertible Bond Financing in Listed Companies In China. *Journal of Yunnan University of Finance and Economics.* No.23(5). P.50-55.

Table 1. Table of variable definitions

Name of variable	Denotation	Concrete definition	Meaning of variable
Dummy variable	CB	The value of the company issuing convertible bonds is 1, and the value of the company issuing allotment and additional shares is 0	Explained variable
Liability/asset ratio	TD	Total liability amount/total asset amount	Financial risk
Total assets logarithm	SIZE	The natural logarithm of total assets	Company scale
Total assets growth rate	GROWTH	(total asset amount of the present term- total asset amount of the last term)/total asset amount of the last term	Growth
Fixed assets ratio	TANG	Fixed assets/total assets	Material assets
Price to book ratio	MV/BV	Market price of each share/net asset of each share	Share price evaluation
Cash fluctuation ratio	CFV	Operation cash flow standard deviation/average asset amount	Free cash flow
Return on equity	PROFIT	Net profit/shareholder equity	Profit ability
Liquidity ratio	FR	Flow assets/ flow liability	Default risk
Share proportion of the largest shareholder	FS	The largest shareholder's share proportion in the total shares	Equity structure

Table 2. Single variable analysis of financial characteristics for issuing convertible bond companies, allotment companies and additional issuing companie

Variable	Samples of issuing convertible bonds companies		Samples of allotment and additional issuing companies		T test		Mann-Whitney Test	
	Average	Median	Average	Median	Value of T	Significance	Value of z	Significance
TD	0.392	0.422	0.481	0.480	-4.076***	0.000	-2.59***	0.01
SIZE	21.994	21.875	21.379	21.217	3.524***	0.001	-3.53***	0.00
GROWTH	0.421	0.244	0.266	0.237	1.859*	0.065	-1.06	0.29
TANG	0.461	0.472	0.366	0.344	2.246**	0.026	-2.67***	0.01
MV/BV	3.110	3.158	5.017	4.127	-1.867*	0.064	-3.14***	0.00
CFV	0.047	0.036	0.052	0.043	-0.815	0.417	-0.48	0.63
PROFIT	0.139	0.107	0.122	0.109	0.522	0.602	-0.07	0.95
FR	1.274	1.011	1.284	1.177	0.319	0.75	-0.87	0.39
FS	57.113	58.800	48.841	45.960	1.933*	0.055	-2.16**	0.03

Note: *** denotes 1% level significance, ** denotes 5% level significance and * denotes 10% level significance.

Table 3. Results of binary Logistic regression

Enter Equation variable	Forward stepwise regression (model 1)				All variables regression (model 2)			
	Coefficient	Standard deviation	wald	sig	Coefficient	Standard deviation	wald	sig
Constant	-13.909*	7.542	3.401	0.065	-14.38*	8.73	2.713	0.100
TD	-7.477***	2.045	13.367	0.000	-10.046***	3.04	10.918	0.001
SIZE	0.748**	0.342	4.794	0.029	0.728**	0.365	3.981	0.046
GROWTH	3.140**	1.258	6.237	0.013	3.614**	1.577	5.256	0.022
MV/BV	-0.337**	0.173	3.791	0.052	-0.403**	0.201	4.041	0.044
TONG					1.57	1.872	0.703	0.402
CFV					-4.773	7.625	0.392	0.531
PROFIT					5.174	3.46	2.236	0.135
FR					-1.037*	0.554	3.497	0.061
FS					0.045*	0.024	3.479	0.062
Observed amount	141							
Note: *, ** and *** respectively denote 10%, 5% and 1% level significance.								