

An Empirical Study on the Impact of Convertible Bond Financing on Corporate Performance

—*Taking China's A-Share Listed Companies as an Example*

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Abstract: Convertible bond is a financing means of both stock and bond, and it is also a refinancing means of listed companies in our country. Based on the study of convertible bonds, this paper analyzes the impact of convertible bond issuance on the financial performance of the issuer, and through the analysis of different financial indicators of China's A-share listed companies, draws the following conclusions: in 2017 and beyond, convertible corporate bonds can bring significantly higher return on total assets, and convertible corporate bonds have forward utility. And put forward the following reference suggestions, for the regulatory authorities, not only to gradually relax the threshold of bond issuers, but also to strengthen supervision. For investors, convertible bond financing can be used as a criterion to screen non-financial companies with a good business environment, and they should also continue to pay attention to the use of funds issued by convertible corporate bond companies.

Keywords: convertible bond, financial performance, regulatory policy, intermediary effect, earnings management

1. Introduction

Convertible bonds began in the 1950s and grew rapidly in the decades to come. China first issued convertible bonds in 1991 after decades of development abroad. Convertible bonds usher in a new chapter in 2017. This year, the CSRC issued a series of new policies on refinancing methods, raising the threshold for equity financing and limiting the issuance frequency, procedures and preconditions to some extent. Convertible bonds are regulated to some extent due to new regulations on fixed incremental financing methods. In addition, the CSRC revised the new regulations on the issuance of convertible bonds in September of the same year, changing fund subscription to credit subscription, lowering the threshold for the issuance of new bonds, and solving the problem of acquisition fund occupation. This series of policies greatly affected the refinancing options of listed companies and promoted the development of convertible bonds.

Convertible bonds bring different changes to the future performance of listed companies. Much of the foreign literature has empirically analyzed the specific manifestations of this effect. Majid and Kaveh found that during periods of uncertainty related to possible accounting changes, companies can effectively reduce the impact of accounting changes on financial reporting, so this function may

be valuable [1]. Kimura T and Shinohara find that with hedge fund dominance and non-callability in today's new convertible bond market, the spread risk of convertibility is lower, so the frequency of repurchase clauses in recent new convertible bond issues is reduced. This reflects the preference of capital suppliers in security design [2].

Lu and Xu found that for companies in financial distress, stock-biased convertible bonds can produce a risk transfer effect by accelerating the speed of equity conversion, but this effect will be weakened for companies with good financial status and high free cash flow [3]. Fan, Luo and Wu investigated institutional investors' views on corporate issuance of convertible bonds and found that convertible bonds were superior to equity financing in order to avoid equity dilution, which also verified financing hypothesis and risk transfer hypothesis [4].

By comparing the characteristics of the superior companies financed by the three refinancing methods of convertible bonds, corporate bonds and additional issuance in China, Xiang finds that the characteristics of the companies issuing convertible bonds partially conform to the conclusion of risk transfer hypothesis [5]. Deng also found that the risk transfer motivation of corporate managers is positively correlated with the shareholding ratio, and a large ratio of convertible bonds to equity can significantly weaken the risk transfer motivation of managers [6]. Huang found that China's listed companies have the purpose of alleviating agency problems by issuing convertible bonds, and realized that the option attribute of convertible bonds has the tendency to correct the risk transfer from shareholders to creditors [7]. Based on the research on convertible bonds, this paper analyzes the impact of convertible bond issuance on the financial performance of the issuing enterprises and its influencing mechanism.

Through this study, listed companies can better understand the impact of convertible bond issuance on corporate performance, provide reference for other listed companies that want to conduct convertible bond financing, and put forward effective suggestions, so that listed companies can choose appropriate financing methods and treat convertible bond financing correctly. on a Macintosh use the font named times, except on special occasions, such as program code.

2. Data and Method

2.1. Sample Selection And Variable Selection

2.1.1. Sample source

The data used in this paper are mainly from the wind database, combined with the annual report data of China's A-share listed companies. The selected samples are non-financial listed companies that raised convertible bonds from January 1, 2006 to December 31, 2019. From 2006 to 2019, a total of 301 non-financial listed companies issued convertible bonds.

This paper takes non-financial listed companies that issue convertible bonds as the experimental group and selects their holding companies. The selection criteria of the control company are as follows: (1) it belongs to the segment with the bond issuing company, and the segment classification adopts the new three-level industry classification; The New Full three-level industry classification is a more detailed industry classification standard that divides listed companies into more than 100 industries. (2) No Company has conducted convertible bond financing in the two years prior to the issuance of the Bonds; (3) If the first two conditions are met, the asset scale of the bond issuing company is closest to that of the previous year.

2.1.2. Selection Of Dependent Variable

The variables explained in this paper are selected based on previous research results, with reference to the articles of Tang, Xia and Yu [8]. The selected explanatory variables are the return on assets and the growth rate of receivables in the year after the issuance.

2.1.3. Selection Of Explanatory Variable

The explanatory variables in this paper are based on whether the company has convertible bond financing. It is 1 for firms with convertible bond financing and 0 for the control group without convertible bond financing.

In order to ensure the accuracy and validity of the argument, this paper sets the control variables. In order to solve the endogenous problem, this paper sets the control variables as various indicators before the company issues bonds. Control the important financial information before the issuance of the bonds to highlight the utility of the convertible bonds. When setting control variables based on previous literature [9], several aspects that may affect financial performance are selected. Including company size, operating ability, repayment ability, ability to obtain cash flow, capital intensity, market evaluation, profit ability, growth ability. The specific indicators used are the size of the company's assets, working capital ratio, cash interest protection multiple, capital intensity, Tobin's Q value, net profit margin. The table of variable definitions is as follows in Table 1.

Table 1: Variable definition of influencing factors

Type of variable	Description of variables	Symbol of variable	Description of variables
Variable explained	Profitability after bond issuance	ROA	Return on total assets (ROA) of the Company in the year after the issuance of bonds
	Growth ability after bond issuance	G	The company's revenue growth rate in the year after the bond is issued
Explanatory variables	The behavior of convertible bond financing	Issue	It is 1 for companies that issue convertible bonds, and 0 for companies that do not issue bonds
Variable control	Size of company	Lnsizes	The logarithm of the total assets of the company in the year before the issuance of bonds
	Proportion of working capital	WCA	Year prior to bond issuance (current assets - current liabilities)/ total assets
	Cash interest coverage multiple	CI	Cash/interest of the company in the year prior to the issuance of bonds
	capital-intensity	CAP	Total assets/operating income for the year prior to the issuance of bonds
	Tobin's Q value	Q	Market value/total assets in the year prior to bond issuance
	net profit ratio	NM	Net profit/operating income for the year prior to the issuance of bonds

Data source: wind database

2.2. Model Setting

The content of this paper is whether the financial performance of the company will change significantly after the financing of convertible corporate bonds, and the model hypothesis is made by referring to the article of Ren [10]. Among them, considering the new regulatory policy changes of convertible corporate bonds in 2017, the regression analysis is divided into two parts to emphasize the policy impact. One part is the regression of the sample from 2006 to 2016 and the other part is the regression of the sample from 2017 to 2019. Assuming that the company's bond issuance year is t , the explanatory variables used in this paper include the financial situation one year after the bond issuance, that is, the return on total assets and the increase rate of operating income in year $t+1$. The explanatory variables include whether the firm has issued a bond. The control variables are mainly data on financial indicators in year $t - 1$ and year $t - 1$. The indicators used include the number of total assets size of the company, the cash interest protection multiple, the net profit margin and the increase rate of operating income. It takes a certain amount of time for the approval, issuance and financing of convertible bonds to play a role, so different variables need to be set in different years. The approval of convertible bonds issued in year t is generally based on the financial data from T-3 to T-1, and it is more accurate to measure the data of the year prior to the financing of convertible bonds as the control variable. Therefore, the following assumptions can be made in this paper.

Hypothesis 1: In 2017 and beyond, convertible corporate bonds can bring significantly higher return on total assets, and convertible corporate bonds have a forward utility, but there is no significant forward promotion up to 2017.

Hypothesis 2: In 2017 and beyond, convertible corporate bonds can significantly bring higher corporate income growth rate, and convertible corporate bonds have a forward effect, but there is no significant forward promotion before 2017.

Based on the above hypothesis, the regression equation established in this paper is as follows:

$$ROA = \alpha_0 + \alpha_1 issue + \alpha_2 Lnsiz + \alpha_3 WCA + \alpha_4 CI + \alpha_5 CAP + \alpha_6 Q + \alpha_7 NM + \varepsilon \quad (1)$$

$$G = \beta_0 + \beta_1 issue + \beta_2 Lnsiz + \alpha\beta_3 WCA + \alpha\beta_4 CI + \alpha\beta_5 CAP + \alpha\beta_6 Q + \beta_7 NM + \varepsilon \quad (2)$$

3. Results

3.1. Descriptive Statistical Results

Descriptive statistics were performed for the variables mentioned in the above regression model, and the mean, standard deviation, minimum and maximum values of each variable were obtained. In addition, the research focus of this paper is to compare different performances in the old and new supervision policy environments, so the sample is divided into two periods: 2006-2016 and 2017-2019. In Table 2 below, the first five columns from 2006 to 2016 represent the sample situation from 2006 to 2016, and the last five columns from 2017 to 2019 represent the sample indicators of the new regulatory policy environment after 2017. As can be seen from Table 2 below, the average ROA increased slightly to 4.36 from 4.25 in the previous period, and the benchmark spread increased from 5.67 to 11. Increase in sales (G) fell to 10.57 from 14.39 in the previous quarter. In particular, from 2006 to 2016, the maximum and minimum values of the return on total assets (ROA) and the increase rate of operating income (G) are more extreme than the distribution in the previous sample. This reflects the impact of the convertible bond issuance policy. That is, the policy is more inclusive, the issuance threshold is lower, and more diversified companies are allowed to conduct convertible bond financing. That is, the quality gap of the firm is larger, but the overall profitability increases.

Table 2: Descriptive statistical results of relevant variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	2006-2016					2017-2019				
Variables	N	mean	sd	min	max	N	mean	sd	min	max
ROA	158	4.25	5.67	-26.94	22.19	439	4.36	11.00	-42.91	153.10
G	158	14.39	28.15	-68.72	155.70	439	10.57	42.02	-80.14	564.30
Issue	158	0.50	0.50	0.00	1.00	439	0.51	0.50	0.00	1.00
Lnsizes	158	22.77	22.77	20.26	28.14	439	22.31	1.07	20.24	26.63
WCA	158	11.07	11.07	-41.21	63.79	439	19.04	20.80	-46.71	76.72
CI	158	94.16	94.16	-107.70	7846	439	461.3	5506	-18763	102063
CAP	158	2.03	2.03	0.35	9.08	439	2.19	2.59	0.29	35.34
Q	158	1.44	1.44	0.09	8.00	439	1.87	1.59	0.00	13.01
NM	158	10.63	10.63	-12.61	48.23	439	9.05	46.96	-845.40	417.50

Data source: wind database

The change in the two periods can also be seen by the difference between the indicators of issuing and controlling firms. Table 3 below calculates the differences in various financial indicators between issuing companies and consistent companies, that is, the average between issuing companies and control companies, and the difference between the minimum and maximum values. After 2017, on the back of the new restrictive policy, the gap in the return on total assets (ROA) increased from 0.35 to 1.14, which is an increase compared to the previous period. The gap in the increase rate of operating income (G) also improved from the previous month, with the mean rising from 4.78 to 9.73. This reflects the further widening of the gap between the original bond companies and the control companies in the new stage in 2017, which indirectly indicates that convertible bond financing is easy to bring good development to the company under the new policy environment. In addition, in the largest case, the difference between the return on total assets (ROA) and the growth rate of imports (G) between the issuer and the controlling firm is significantly larger from period 2 than from period 1. This implies a significant improvement for individual firms.

Table 3: Descriptive statistical results of the difference of relevant variables between issuers and control companies

	Obs	Mean	Min	Max	Obs	Mean	Min	Max
	2006-2016				2017-2019			
ROA	79	0.35	17.5	-2.12	217	1.14	21.84	-65.16
G	79	4.78	31.71	59.74	217	9.73	31.00	432.45
Lnsizes	79	0.17	0.22	-0.51	217	0.07	-0.03	-0.13
WCA	79	-0.54	-2.08	-4.81	217	-4.18	15.29	-2.33
CI	79	50.91	44.20	3778.30	217	-887.93	-17433.14	-93904.77
CAP	79	0.02	0.14	0.09	217	-0.56	0.04	6.52
Q	79	-0.05	-0.02	-3.40	217	0.35	0.00	2.32
NM	79	2.06	14.03	4.95	217	8.81	846.32	336.77

Data source: wind database

3.2. Correlation Analysis Results

Before regression analysis, it is necessary to analyze the correlation between variables. Table 4 below tests the correlation of each independent variable, and calculates Pearson correlation coefficient and its significance. The results of correlation analysis are shown in Table 4 below:

Table 4: Multiple collinearity test of variables

	Issue	Lnsiz	WCA	CI	CAP	Q	NM
Issue	1						
Lnsiz	0.038	1					
WCA	-0.074*	-0.382***	1				
CI	-0.067	-0.023	0.056	1			
CAP	-0.086**	0.110***	-0.184***	0.004	1		
Q	0.082**	-0.427***	0.363***	0.055	-0.126***	1	
NM	0.087**	-0.011	0.144***	0.022	-0.112***	0.109***	1

Note:*** p<0.01, ** p<0.05, * p<0.1

It can be seen that the correlation between some variables is significant, but the degree of correlation is not high. Among them, the highest correlation is the correlation between company size and Tobin's Q value, which is - 0.427, reaching an intermediate correlation and showing a significant confidence level of 1%. This reflects a higher valuation of small firms by the market. Most of the variables have a low correlation with the explanatory variable Issue and are significant at the 5% reliability level. In order to confirm whether there is multicollinearity among the variables, this paper uses the variance inflation coefficient (VIF) to check each variable. In general, important multicollinearity cannot be considered if the VIF value is below 10. The maximum VIF value of the variables covered in this document is only 2.25, so it can be assumed that there is no significant multicollinearity.

The VIF test results are as follows in Table 5.

Table 5: VIF test of variables

Explanatory variables	VIF	1/VIF
Issue	1.03	0.971227
Lnsiz	1.14	0.876548
WCA	1.48	0.674019
CI	1.05	0.952473
CAP	1.95	0.513725
Q	1.46	0.684211
NM	2.25	0.443504
Mean VIF	1.44	

3.3. Results of Regression Analysis

According to the above regression model, the following explanatory variables and control variables are used for regression analysis, and different explanatory variables, namely return on total assets (ROA) and growth rate of operating income (G), are used to obtain the results of two groups. Table 6 reflects the regression results that interpret the return on total assets (ROA) as a variable, and Table 7 reflects the regression results that interpret the rate of increase in operating income (G) as a variable. In addition, the regression analysis is designed to consider different time stages, controlling for year and industry effects. Column (1) of the table below shows the sample from 2006 to 2016 before the substantial change in the regulatory policy on convertible bonds. Column (2) shows the sample represented by 2017 to 2019, that is, in the context of the new regulatory policy, without controlling the impact of year and sector. The results of the regression analysis are shown in Tables 6 and 7.

Table 6: Regression analysis of return on total assets (ROA)

	(1)	(2)
	Before 2017	After 2017
Variables	ROA	ROA
Issue	-0.062(-0.08)	2.424*** (2.66)
Lnsiz	0.284(0.38)	0.596(1.01)
WCA	0.038(1.04)	0.080*** (3.25)
CI	-0.001***(-3.03)	-0.000(-1.11)
CAP	-0.084(-0.16)	1.026** (2.16)
Q	1.109*(1.85)	0.654(1.49)
NM	0.210** (2.18)	-0.133***(-5.75)
Constant	-1.243 (-0.08)	-13.898 (-0.97)
Observations	158	439
R-squared	0.527	0.529
F test	0	0
r2_a	0.227	0.436
F	10.60	5.807

Note:*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regression analysis of operating income growth rate (G)

	(1)	(2)
	Before 2017	After 2017
Variables	G	G
Issue	5.745(1.42)	11.020**(2.56)
Lnsiz	3.803(1 .11)	-4.522(-1.50)
WCA	0.260(1.27)	0.101(1.00)
CI	-0.004(-1.40)	-0.000(-1.07)
CAP	5.063**(1.99)	-0.9 88(-1.66)
Q	1.305(0.55)	-3.626(-1.45)
NM	-0.696(-1.65)	0.044(1.90)
Constant	(-0.91)	(-1.54)
Observations	-10.915(-0.16)	122.178*(1.67)
R-squared	158	439
F test	0.562	0.265
r2_a	0	0.121
F	0.284	5.812

Note:*** p<0.01, ** p<0.05, * p<0.1

From the results of the test, the expected effect is achieved. On the one hand, it can be seen from Column (2) that under the new regulatory policy stage in 2017 and beyond, the explanatory variable convertible bond financing behavior (Issue) is significant for both explained variables. It is significant at the 1% confidence level for return on total assets (ROA) and at the 5% confidence level for the growth rate of operating income (G). Moreover, it is significant whether or not the year and industry effects are controlled. On the other hand, it can be seen from Column (1) that in the context of no significant changes in the new regulatory policies before 2017, the behavior of issuing convertible bonds has no significant impact on the explained variables, and even has disutility for the return on total assets (ROA) (although this is not statistically significant, it does not affect the conclusion). In

combination, it can be seen that the new policy environment has a more positive impact on the behavior of convertible bond financing, making it more conducive to promoting the improvement of corporate performance. Observing R-squared, all the regressions have high R-squared, and the regression results have good goodness of fit, so Hypothesis 1 and Hypothesis 2 are valid.

4. Robustness Test

(I) ROE is used to replace the explained variable

In the previous empirical analysis of this paper, the return on total assets (ROA) is used as the explained variable, and in the following, the explained variable is changed to return on equity (ROE). This paper makes the following hypothesis:

Hypothesis 3: In 2017 and later periods, convertible bonds can significantly improve the performance of corporate return on equity (ROE), and convertible bonds have a positive effect, but there is no significant positive promotion effect before 2017. The following model is constructed:

$$ROE = \gamma_0 + \gamma_1 issue + \gamma_2 Lnsiz + \gamma_3 WCA + \gamma_4 CI + \gamma_5 CAP + \gamma_6 Q + \gamma_7 NM + \epsilon \quad (3)$$

The regression results are shown in Table 8 below:

Table 8: Regression analysis of return on equity (ROE)

	(1)	(2)
	Before 2017	After 2017
Variables	ROE	ROE
Issue	1.435 (0.89)	3.569*(1.93)
Lnsiz	0.503(0.38)	1.386(1.42)
WCA	0.091(1.26)	0.062(1.49)
CI	-0.003***(-2.97)	-0.000(-0.26)
CAP	0.173 (0.14)	-0.783(-1.49)
Q	0.855(0.85)	0.704(0.99)
NM	0.207(1.31)	-0.004(-0.16)
Constant	3.114(0.12)	-25.147(-1.07)
Observations	158	439
R-squared	0.436	0.269
F test	0	0
r2_a	0.0780	0.125
F	3.798	4.842

Note:*** p<0.01, ** p<0.05, * p<0.1

With the change of explanatory variables, return on equity (ROE) is utilized as a measure of corporate performance. It can still be seen from Column (2) that under the background of the new regulatory policies in 2017, convertible bond financing can bring better financial performance to the company, with a coefficient of 3.569, which is significant at the level of 10%. As can be seen from Column (1), the utility of convertible bond financing in the previous period is not significant. In addition, it can be seen from columns (1) and (2) that the R-squared reaches 43.6% and 26.9% respectively, which means that the suitability of the regression results is ideal. Hypothesis 3 is true. The stability check proves the above conclusions and the hypotheses of this paper, indicating that the results of this paper are reliable to some extent.

5. Conclusion And Suggestion

5.1. Conclusion

Based on previous studies, this paper empirically studies the financial performance of non-financial listed companies and their holding companies that raised convertible bonds from 2006 to 2019. According to the phased characteristics of the development of the convertible bond market, this paper divides the sample into two stages, with 2017 as the watershed. The first period covers the period from 2006 to 2016, and the second period covers the three years after the introduction of the new regulatory policy from 2017 to 2019. This paper uses the single table method to study the financial performance of firms and holding firms after convertible bond financing. The indicators reflecting the financial performance are the return on total assets and the increase rate of operating income. The results show that in 2017 and beyond, convertible corporate bonds can bring significantly higher ROA, and convertible corporate bonds have forward utility; Convertible corporate bonds can significantly bring higher corporate income growth rate, and convertible corporate bonds have a forward effect; The above empirical analysis shows that under the new regulatory policy conditions in 2017, the development of the company is more healthy and steady after the financing of convertible bonds. The new regulation on convertible bonds makes up for the previous shortage of refinancing and promotes the high-quality development of the capital market, which is a reasonable direction verified by practice.

5.2. Suggestions

This paper makes the following suggestions for regulators and stock investors:

For the regulatory authorities, one is to further clarify the position of convertible corporate bonds, clarify the applicable laws and policies, appropriately adjust the previous regulatory rules on the unilateral use of bonds or stocks, and establish a regulatory scale that ADAPTS to the risks of convertible corporate bonds. Second, appropriately relax the threshold of bond issuers, correspondingly improve the information disclosure and supervision requirements after issuance and listing, and reduce moral hazard. Third, strengthen the supervision of the terms of convertible bonds, with reciprocity as the guiding principle. On the one hand, the interests of the financing party should be considered, and on the other hand, the reasonable rights and interests of investors should be protected. The regulatory authorities should regulate the financing terms of convertible bonds accordingly, and according to the principle of reciprocity, avoid major shareholders abusing their unequal position to intentionally damage the legitimate rights and interests of public investors.

For equity investors, first of all, when selecting stocks, equity investors can use convertible bond financing as a criterion for screening non-financial companies with good business environment. The high probability of convertible bond financing means that the company may still be in a highly prosperous state, and the company's subsequent financial performance, especially its profitability and growth ability, is the most concerned issue of investors, and it can often perform well.

Second, investors should continue to pay attention to the use of funds issued by convertible corporate bonds. If the company that invests in or has invested in has issued convertible bonds, investors should carefully read the announcement related to the issuance of convertible bonds and understand the investment project. Through the exchange investor interaction platform, listed companies investor reception points, company announcements, media reports and other forms, you can track the follow-up progress of the raising project. Once the information channels of all parties confirm that the raised funds are used improperly, the investment amount should be re-evaluated in time or even adjusted to some extent.

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