Economics Bulletin

Volume 30, Issue 2

Does Bank Loan Ratio Affect Investment of China's Listed Companies?

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Abstract

In this paper, we analyze whether the total debt ratios and bank loan ratios of Chinese listed companies had any impact on their fixed investment in 2001-2006, and whether this impact, if it existed, differed among companies with differing investment opportunities. The analysis led to the interesting result that the bank loan ratio had a stronger impact on fixed investment than the total debt ratio, and actually had the strong effect of restraining investment particularly by low-growth companies, implying that in China, banks supervise the investment activities of companies more strongly.

The authors would like to express their gratitude to Hiroshi Gunji, Nao Saito, Takuma Matsuda and anonymous referees of Economics Bulletin for their valuable comments. Any errors and all opinions remain the authors' own.
Citation: Yuan Yuan and Kazuyuki Motohashi, (2010) "Does Bank Loan Ratio Affect Investment of China's Listed Companies?", *Economics Bulletin*, Vol. 30 no.2 pp. 1173-1181.
Submitted: Oct 13 2009. **Published:** May 03, 2010.

1. Introduction

According to the Modigliani-Miller Theorem (MM Theorem), the level of liabilities of a company does not affect corporate investment behaviors in a perfect market. However, it is noted that liabilities can influence corporate behaviors of investments negatively. For example, as shown in Myers (1977), larger interest payment burdens resulting from higher debts reduce funds in hand, so debt has a negative impact on the investment activities of companies with promising investment opportunities. On the other hand, some studies, such as Jensen (1986), show that by reducing the cash flow, liabilities can help avoid overinvestment. It can be seen from these previous studies that whether liabilities restrain overinvestment depends largely on the opportunities available to each company.

In empirical studies, sample companies are classified based on whether or not they have investment opportunities in order to differentiate the positive effect of liabilities in restraining overinvestment from their negative effect of causing underinvestment. Previous studies, such as Arikawa et al. (2003), Lang et al. (1996), Aivazian et al. (2005) have used Tobin's Q or PER to classify companies as those with and without investment opportunities and they point out that there is a negative correlation between the debt ratio and the investment for companies with fewer investment opportunities. Recently, Ahn et al. (2006), have shown that diversified companies can overcome the constraints of debt ratios through the distribution of liabilities by corporate managers.

China has restructured its financial system as part of its market mechanism-driven economic reforms. Particularly important among these reforms was the enactment of the Commercial Bank Law ("Shang Ye Yin Hang Fa" in Chinese) in 1995, which allowed major state-owned banks to commercialize their lending operations. Until that time, Chinese banks were seen as institutions that provided funding to state-owned enterprises under administrative directives. Consequently, the problem of moral hazard due to soft budget constraints came into the open at state-owned companies that had received funding from state-owned banks, leaving many such loans as bad debt (Ke 2007). In addition, while China's state-owned banks are now engaged in the lending business as commercial operations, it has been pointed out by Shirai (2002) that they are not performing the role of financial intermediaries satisfactorily due to their lack of capacity to examine the creditworthiness of borrowers.

On the other hand, however, it has been argued that the function of financial intermediation among Chinese banks has been improving gradually as a consequence of financial system reforms, including the enactment of the Commercial Bank Law and interest rate liberalization. Yuan (2006) used the Panzar-Rosse H-statistic to measure the

degree of competition in the Chinese banking industry in 1996-2001, and found the competition of Chinese banking industry was near a state of perfect competition. Furthermore, Sakashita and Nakayama (2006) also found that in comparison with the 1992-1996 period Chinese banks in 2002-2004 paid greater attention to the financial situations and business activities of borrowing companies.

As mentioned above, there are both negative and positive perceptions of China's financial system reforms. However, it remains unclear which of the conflicting views most accurately reflects the reality of the state of affairs. Firth et al. (2008) focused on the effect of bank loan ratio on listed firms' investment by focusing ownership in China, while in this paper we grasp the lending behaviors of Chinese banks more clearly by comparing the impacts of total debt ratio and bank loan ratio on fixed investment. This paper attempts to contribute to the debate over the financial system reform in China by analyzing the relationship between debt ratio and fixed investment.

This paper is structured as follows. We explain our method of empirical analysis and data in Section 2. In Section 3, we attempt an interpretation of the estimation results, followed by some conclusions in Section 4.

2. Empirical Analysis and Data

The analysis in this paper uses debt ratio as key variables. Tobin's Q indicates whether company has ample business opportunities or not. Thus, with the addition of Tobin's Q to the investment equation, it is possible to verify the impact of the debt ratio on fixed investment while controlling companies' business opportunities (Arikawa et al. [2003]). The analysis in this paper adds the free cash flow ratio to the estimate equation as a control variable as previous research (Fazzari et al. [1988], Hoshi et al. [1991]) has indicated that corporate investments were influenced by the availability of internal funds. Equation (1) is the basic model used in this analysis and in order to find the different impact of leverage on firms with different opportunities, we also define high-growth companies and low-growth companies with the use of Tobin's Q. Therefore, we also estimate the following equation (2). Arikawa et al (2003) and McConnell and Servaes (1995) analyzed the impact of debt on corporate performance by using PER to distinguish the investment opportunities of companies. Accordingly, in order to ensure the robustness of results, the current analysis also uses PER[1] to distinguish investment opportunities of companies. Table 1 shows the definitions of the variables used for the models.

[1] PER=stock price/earnings per share

$$Investment_{i,t} = \alpha + \beta Q_{i,t-1} + \delta Debt_{i,t-1} + \eta Cashflow_{i,t-1} + \vartheta Yeardummy_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

$$Investment_{i,t} = \alpha + \beta Q_{i,t-1} + \delta Debt_{i,t-1} + \varsigma HQ_{i,t-1} * Debt_{i,t-1} + \xi LQ_{i,t-1} * Debt_{i,t-1} + \phi Cashflow_{i,t-1} + \vartheta Yeardummy_t + \mu_i + \varepsilon_{i,t} \quad (2)$$

$$Investment_{i,t} = \alpha + \beta Q_{i,t-1} + \delta Debt_{i,t-1} + \varsigma Hper_{i,t-1} * Debt_{i,t-1} + \xi Lper_{i,t-1} * Debt_{i,t-1} + \phi Cashflow_{i,t-1} + \vartheta Yeardummy_t + \mu_i + \varepsilon_{i,t} \quad (3)$$

[Table 1]

2001-2006 financial data of non-financial companies listed on the Shanghai and Shenzhen stock exchanges was used in the analysis. The data was retrieved from the China Stock Market Financial Database "Annual Report" and "China Listed Firm's Corporate Governance Research Database," both provided by GTA Information Technology Co., Ltd., and includes financial data for a total of 1,418 listed companies as of the end of 2006. However, due to outliers (99% above or below 1%) and missing information, unbalanced panel data was used (with a maximum of 6,949 samples and 1,366 companies). In 2006, nearly 70% of companies covered by this analysis were in the manufacturing sector.

This data base shows that the trends of total debt ratio and bank loan ratio are as follows. During the period of 1991-2006, the total debt ratio stood at around 60% in 1991 and declined to around 40% by 1994. After hovering between 40% and 50%, it rose above 50% in 2006 for the first time in 14 years. The bank loan ratio, meanwhile, has moved between 20% and 25% since 1994. These trends indicate that both the total debt ratio and bank loan ratio have tended to increase in recent years.

Table 2 details the descriptive statistics of these variables. The mean fixed investment ratio is 0.223 for all companies. The mean for high-growth companies is 0.248, higher than the mean of 0.197 for low-growth companies, and high-growth companies also have a higher standard deviation. For debt ratios, low-growth companies have higher ratios than high-growth companies in terms of both the total debt ratio and bank loan ratio. For both the entire sample and the breakdown between high-growth and low-growth companies, bank loans accounted for about 50% of total company liabilities, a confirmation of Chinese listed companies' heavy dependence on bank loans in financing during the sample period for the current analysis. The average value of Tobin's Q is 2.5 for all samples. The factors behind the high value of Tobin's Q for listed companies in China seem to include the market's high expectations for growth opportunities of Chinese companies due to the high growth of the Chinese economy in

recent years.[2] It is also shown that high-growth companies have a higher cash flow ratio than low-growth ones.

[Table 2]

3. Estimation Results[3]

3.1 Response of Investment to the Debt Ratio

Table 3 shows the estimation results of the impact of the total debt ratio on fixed investment using the basic model of the investment equation. This impact is significantly negative at the 1% level. The estimation results indicate that the level of debt does have a negative impact on fixed investment by Chinese listed companies. In addition, as Tobin's Q (an indication of available investment opportunities) is significantly positive at the 1% level, the estimation results show that companies with a high value of Q have easy market access to funds and make large investments. Since cash flow, the control variable, has a significantly positive correlation to fixed investment, companies with ample internal funds tend to make large amounts of investment. The estimation results shown in Table 3 confirm the strong negative impact of the total debt ratio and bank loan ratio on fixed investment.

[Table 3]

A comparison between the impact of the total debt ratio on fixed investment (-0.21) and the impact of the bank loan ratio on fixed investment (-0.35) indicates that the bank loan ratio has a stronger negative impact on fixed investment.[4] This means that the effect of the bank loan ratio is larger than that of the total debt ratio. However, the negative impact of the total debt ratio (bank loan ratio) on fixed investment does not differentiate between underinvestment due to the high total debt ratio (bank loan ratio) and the restraint of overinvestment due to the disciplinary effect of the total debt ratio (bank loan ratio). This will be examined in further detail in the next section.

3.2 Differences in Response of Investment to Debt between High-growth and Low-growth Companies

To examine differences in the impact of debt on investment of high- and low-growth companies, we analyze the estimate equations (2) and (3). Table 4 shows the estimation results of the differences in the impact of the debt ratios on investment between high- and low-growth companies. It is again confirmed that the debt ratio (total debt ratio and

[2] Chen et al. (2009) also analyze Tobin's Q for listed companies and come up with a high value of over 2.
[3] This analysis uses both the fixed-effects model and the random-effects model to estimate the disciplinary effect of debt. The results of the Hausman test support the fixed-effects model.
[4] In the one-sided t-test, the impacts differ at the 1% significance level.

bank loan ratio) has a significantly negative impact at the 1% level. It is also reaffirmed that the value of Tobin's Q is significantly positive for investment. The cross term of the high-growth company dummy and the total debt ratio is not significant, but still tends to be positive. On the other hand, the cross term of the low-growth company dummy and debt ratio is significantly negative at the 1% level in almost all cases. For example, we find that the sensitivity of low-growth companies to the bank loan ratio (-0.32-0.097) is higher than that of average companies (-0.32) [5]. The estimation results suggest that low-growth companies, which do not have highly profitable investment opportunities, tend to respond more strongly to the disciplinary effect of debt and restrain overinvestment. These estimation results are consistent with the results on U.S. companies of Lang, Ofek and Stulz (1996) as well as the estimation results concerning Japanese companies of Arikawa et al. (2003). For control variables, it is again evident that cash flow has a significantly positive impact on investment by companies.

[Table 4]

Although the bank loan ratio used in our analysis is based on figures in the prior accounting year, it is thought that Chinese companies set the level of investment in the current year on the basis of the composition of capital at the beginning of the year. Thus, using the investment equation, we find that Chinese banks are restraining overinvestment by companies through their lending operations. Furthermore, we find the interesting result that the bank loan ratio's effect in restraining overinvestment is stronger than that of the total debt ratio.[6] From these findings, it may be assumed that in China, banks are supervising the investment activities of companies more strongly than other creditors.

4. Conclusions

The key results of the estimation in this paper are summarized below. Firstly, the effect of the total debt ratio (bank loan ratio) does exist in China. Secondly, with greater investment opportunities tend to invest more than firms with little investment opportunities. Thirdly, the effect of the total debt ratio (bank loan ratio) works more strongly on low-growth companies than on high-growth companies. A comparison of the overinvestment-restraining effect between the total debt ratio and the bank loan ratio revealed that the bank loan ratio has a stronger effect. This result suggests that in China, banks have a greater effect than other creditors in supervising investment activities by companies. If we are to make an assessment of what has been achieved in financial

[5] Here, the absolute value of coefficient is defined as the sensitivity.
[6] In the one-side t-test, the impacts differ at the 1% level of significance.

reforms carried out by the Chinese government since the 1980s on the strength of the estimation results of the current analysis, it may be possible to say that the ability of Chinese banks to financially intermediate has been gradually improving and that they are beginning to show business behaviors driven more by market principles.

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Table 1 Definition of Variables

$Investment_{it}$	Fixed investment ratio for Company i at time t-1	Cash paid to acquire fixed assets, etc. /fixed assets
$Debt_{it-1}$	Total debt ratio for Company i at time t-1	Total debt/total assets
	Bank loan ratio for Company i at time t-1	(Long-term bank loan + short-term bank loan)/total assets
$Cashflow_{it-1}$	Cash flow for Company i at time t-1	(Net profit + depreciation of fixed assets)/fixed assets
Q_{it-1}	Tobin's Q for Company i at time t-1	(Number of shares × average stock price +book value of total debt)/total assets
$HQ(Hper)_{it-1}$	Dummy for Tobin's Q (PER) for Company i at time t-1 being in the upper one-third	Dummy for high-growth companies
$LQ(Lper)_{it-1}$	Dummy for Tobin's Q (PER) for Company i at time t-1 being in the lower one-third	Dummy for low-growth companies
Yeardummy	Yeardummy	

Table 2 Descriptive Statistics

	Overall			LQ (Low Q) Firms			HQ (High Q) Firms		
Variables	Obs	Mean	Std. dev.	Obs	Mean	Std. dev.	Obs	Mean	Std. dev.
Investment	6598	0.223	0.254	2289	0.197	0.218	2112	0.248	0.289
Debt (bank loan ratio)	6598	0.242	0.138	2289	0.268	0.134	2112	0.218	0.135
Debt (total debt ratio)	6598	0.484	0.181	2289	0.535	0.158	2112	0.433	0.191
Q	6596	2.537	1.573	2289	1.331	0.216	2112	4.251	1.709
Cashflow	6597	0.324	2.528	2289	0.284	1.498	2111	0.473	3.991

Table 3 Basic Results of Estimation

	Total debt ratio		Bank loan ratio	
	1	2	3	4
$Debt_{it-1}$	**-0.213*** **	**-0.208*** **	**-0.355*** **	**-0.351*** **
	0.03	0.03	0.037	0.037
Q_{it-1}	0.008***	0.008***	0.014***	0.014***
	0.003	0.003	0.003	0.003
$Cashflow_{it-1}$		0.002*		0.003*
		0.001		0.002
Constant	0.345***	0.278***	0.248***	0.247***
	0.019	0.018	0.013	0.013
Yeardummy	Yes	Yes	Yes	Yes
Obs.	6949	6948	6620	6618
R^2Adj.	0.04	0.04	0.05	0.05

Note: The upper columns of the table show coefficients, while the lower columns show standard deviation. ***, **, * indicate statistical significance at the level of 1%, 5% and 10%, respectively.

Table 4 Differences between High-growth Companies and Low-growth Companies

	Total debt ratio				Bank loan ratio			
	Q		per		Q		per	
	1	2	3	4	5	6	7	8
$Debt_{i,t-1}$	**-0.201*** **	**-0.196*** **	**-0.191*** **	**-0.187*** **	**-0.324*** **	**-0.320*** **	**-0.322*** **	**-0.320*** **
	0.031	0.031	0.033	0.033	0.041	0.041	0.044	0.044
$Q_{i,t-1}$	0.007**	0.007**	0.008***	0.009***	0.013***	0.013***	0.014***	0.014***
	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.003
$LQ(Lper) * Debt_{i,t-1}$	**-0.051*** **	**-0.051*** **	**-0.025**	**-0.023**	**-0.097*** **	**-0.097*** **	**-0.058***	**-0.055***
	0.017	0.017	0.016	0.016	0.03	0.03	0.03	0.03
$HQ(Hper) * Debt_{i,t-1}$	**0.025**	**0.024**	**-0.006**	**-0.007**	**0.033**	**0.034**	**0.003**	**0.002**
	0.02	0.02	0.016	0.016	0.035	0.035	0.03	0.03
$Cashflow_{i,t-1}$		0.002*		0.002*		0.003*		0.003
		0.001		0.001		0.002		0.002
Constant	0.337***	0.294***	0.277***	0.274***	0.262***	0.261***	0.248***	0.246***
	0.019	0.019	0.018	0.018	0.014	0.014	0.013	0.013
Yeardummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	6949	6948	6948	6948	6620	6618	6619	6618
Adj. R^2	0.05	0.05	0.04	0.04	0.05	0.06	0.05	0.05

Note: The upper columns of the table show coefficients, while the lower columns show standard deviation. ***, **, * indicate statistical significance at the level of 1%, 5% and 10%, respectively.