Debt Ratio Analysis and Firm Investment: Evidence from Jordan

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ABSTRACT: This paper examines whether the total debt ratio and bank ratio of listed companies have any impact on their fixed investment during the years in 2004-2009, and whether this impact, if it existed, differed among companies with differing investment opportunities. The study has reveals the total debt ratio did have a negative impact on fixed investment among Jordanian listed companies. It has also been found that the bank ratio had a stronger impact on fixed investment than the total debt ratio.

1. INTRODUCTION

This paper attempts to contribute to the debt over the financial system reform in Jordan by analyzing the relationship between bank loans and firm investment on banking sector. I look at whether the total debt ratio has effect over Jordanian listed companies, and then focus on whether the impact of the total debt ratio on fixed investment is any different among listed companies with differing investment opportunities. I find first that the rise in the total debt ratio had the effect of causing underinvestment among high-growth companies with investment opportunities. Secondly, I find that through the investment-restraining effect of the total debt ratio, liabilities had the effect of restraining overinvestment, which allowed a reduction in overall liabilities and/or unprofitable operations of companies.

The method of analysis is described below. First, we add the total debt ratio to an investment equation to examine whether debt sensitivity exists in the fixed investment activities of Chinese listed companies. Then, similar to Lang et al. (1996), Ahn et al. (2006) and Arikawa et al. (2003), we use the ratio of the market value to the replacement cost of assets (Tobin's Q), to distinguish term between them and the debt ratio to the investment equation. Further, to ensure that the results are robust, we use the price-earnings ratio (PER) to distinguish between companies with high growth potential and those with low growth potential in line with McConnell and Servaes (1995). Since high-growth companies have promising investment opportunities, they are believed to be prone to underinvestment due to liabilities. On the other hand, as low-growth companies lack promising investment opportunities, their liabilities are believed to keep them from overinvestment.

Firms accumulate capital over time. However, investment can only be financed through internal resources or by borrowing in the international capital market. Domestic borrowing and equity issue are not important sources of funds for firms in underdeveloped countries, because of participation constraints and/or high transaction costs. Therefore, we abstract from these sources of financing. Foreign debt is denominated in units of the foreign good. In case of default, the foreign lender seizes the current value of firm' resources. The interest rate is firm specific, and equal to the exogenous risk free rate adjusted for a risk premium. Competition among lenders drives expected profits to zero.

Firms are heterogeneous in their productivity, capital stock, and foreign debt. Individual firms' productivity follows a first order Market process. In the aggregate, however, the only uncertainty is about the real exchange rate. Firms face an exogenous death (turnover) probability each period which,

together with firms defaulting on their loans, generates exit in our model. Entry is exogenous, as new firms replace those who exit. We focus on an invariant distribution of firms across states.

This study uses two terms in analysis the total debt ratio that referees to total liabilities/total assets but bank ratio refer to bank loans/total assets) of company. This study analysis covers the estimation that uses the bank loan ratio and debt ratio, in order to focus not only on the impact of debt on corporate fixed investment but also on the impact of bank loans on fixed investment. More specifically, one is the total debt ratio without any regard to the source of funds and the other is the bank loan ratio that involves only borrowings from banks.

This paper attempts to contribute to the debate over the financial system reform in Jordan by analyzing the relationship between bank loans and fixed investment with the use of latest financial data of listed companies. It analyses the relationship between the debt ratio of capital structure and firm investment value

First we look at whether the total ratio or the bank ratio has any effect over Jordanian listed companies and then focus on whether the impact of the total ratio and bank ratio on fixed investment is any different among listed companies with differing investment opportunities.

We seek to find first that the rise in the debt ratio (bank ratio) had the effect of causing under-investment among high growth companies with investment opportunities. Secondly we examine that through the investment-restraining effect of the total ratio (bank ratio) liabilities had the effect of restraining over-investment, which allowed a reduction in the overall liabilities and/or unprofitable operations of companies.

2. LITERATURE REVIEW

Generally, the financial indicators of a company, such as debt ratio and shareholder equity, are classified as being indicators of either market value or book value. Scholars generally measure capital structure using debt ratios. Titman and Wessels (1988) observed a significant correlation between the market and the book values of debt for identical periods therefore, whether the market value or the book value is used as the indicator of debt value is unimportant. Baskin (1989) believed that book value could reflect demand for accumulated financing. Moreover, Micheal and Wesley (1979) believed that the book value of debt ratio could reflect actual firm reliance on debt.

In the area of corporate finance, the impact of liabilities on investment decisions by companies has drawn keen attention. According to the Modigliani-Miller Theorem (MM Theorem), the level of liabilities does not affect corporate investment behaviour in a perfect market. In other words, given simple assumptions, it is noted that there is no connection between fund procurement and the debt ratio. Regarding the negative effects of liabilities on corporate management, however, it is noted that liabilities can influence corporate behaviour through the following three channels. Firstly, as increased liabilities raise bankruptcy risks corporate managers who fret over the possibility of shareholders, holding them accountable tend to move to curb borrowings and/or reduce investments, potentially raising the prospect of underinvestment. Secondly, as larger interest payment burdens, resulting from higher debts reduce funds in hand, debt has a negative impact on the investment activities of companies with promising investment opportunities.

Yuan (2006) used the Panzar-Rosse H-statistic to measure the degree of competition in the Chinese banking industry from 1996 to 2001, and found the competition to be much higher than in other countries, finding in particular that joint-stock commercial banks were in a state of perfect competition. Furthermore, Yuan and Gunji (2007) found that the entry of foreign banks into the Chinese banking market helped improve the efficiency of Chinese banks. Sakashita and Nakayama (2006) also pointed out that compared with the 1992 to 1996 period Chinese banks 2002 to 2004 were paying greater attention to the financial indicators and business activities of borrowing companies.

Aivazian et al. (2005) analyze the impact of liabilities on fixed investment using Canadian corporate-level data, and demonstrate that companies with fewer investment opportunities are more vulnerable to the impact of liabilities than companies with many investment opportunities. Further, according to Ahn et al. (2006), tend to have higher debt ratios than focused counterparts and also diversified companies make larger investments (net cost of capital/sales) than theirs. They also point out that debt ratios influence management decisions on investment and that diversified companies can overcome the constraints of debt ratios through the distribution of liabilities by corporate managers.

There are numerous previous studies on Japan as well. For example, Arikawa et al. (2003) adopt the method of estimation used by Lang et al. (1996) and point out that the main bank system in Japan helped to amplify the disciplinary function of liabilities, particularly for low-growth companies. Meanwhile, Muramatsu (2002), based on the theory of Jensen (1986), assumes that overinvestment occurred in Japan during the bubble period and argues that the disciplinary role of liabilities or monitoring by main banks was not significant. Thus, the previous studies have verified the impact of liabilities on investment in industrial countries as well as the effects of liabilities in restraining over-investment and facilitating under-investment. These studies suggest that liabilities restrain over-investment but likely cause underinvestment. However, there are few studies on corporate liabilities in developing countries.

Thus, in this paper, we attempt to more clearly grasp the lending behaviors of Jordanian banks by examining the impacts of banks on fixed investment by companies with different growth potentials.

3. RESEARCH METHODOLOGY

As with previous studies Lang, Ofek and Stulz (1996), Aivazian et al. (2005) and Arikawa et al. (2003), the analysis in this paper uses Tobin's Q as a key explanatory variable of the investment equation and we conduct estimation by adding the debt ratio to it. A high Tobin's Q indicates a high market value relative to total assets, suggesting that a company has ample business opportunities. 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). As corporate investments are found to be influenced by the availability of internal funds in Fazzari et al. (1988) and Hoshi et al. (1991), the analysis in this paper adds the free cash flow ratio to the estimate equation as a control variable.

$Investment_{i\,t} = \alpha + \beta1\,Q_{i,t-1} + \beta1Debt_{i,t-1} + \beta1Cash\,flow_{i,t-1} + \beta1Year\,dummy_{i,t-1} + \mu_i + \varepsilon_{i\,t} - - - (1)$

$Investment_{i\,t}$: Fixed investment ratio (fixed investment/fixed assets) of Company i at time t
$Q_{i,t-1}$: Tobin's Q3 of Company i at time t-1
Debt : Total debt ratio (total liabilities/total assets or bank loans/total assets) of Company i at time t-1
$Cash\,flow_{i,t-1}$: Cash flow of Company i at time t-1

In previous studies, the debt ratio was found to influence investment by companies with a high value of Q and investment by companies with a low value of Q differently, apparently because the value of Q represents the extent of easiness toward access to funds on the capital market. In other words, since companies with greater investment opportunities (a high Tobin's Q) find it relatively easy to finance on the capital market, their investments are less sensitive to the level of debt. On the other hand, since companies with few investment opportunities find it relatively difficult to raise funds on the market, they appear to be more sensitive to the level of debt in their investment decisions. Lang et al. (1996), Aivazian et al. (2005) and Arikawa et al. (2003) differentiate the investment opportunities of companies with the value of Tobin's Q and demonstrate that companies with few investment opportunities respond more strongly to the level of debt than companies with greater investment opportunities.

4. DATA AND EMPIRICAL RESULTS

In this study, I use a data from 2004 to 2009, financial data of banking sector listed in Amman Stock Exchange. Table 1 shows the correlations between the variables used in the analysis in this paper. The total debt ratio and bank loan ratio, the two focal points of this paper, are both negatively correlated with fixed investment. The table also shows a low correlation among explanatory variables

Table 2 shows the basic estimation results. The first and second columns of Table 2 show the estimation results of the impact of the total ratio on fixed investment using the basic model of the investment equation. The impact of the total ratio on investment is significantly negative at the 1% level. Since the addition of the control variable, there is no significant change in the impact of the total ratio on fixed investment; the sensitivity of fixed investment to the total ratio is around (-0.2). The estimation results indicate that the level of debt does have a negative impact on fixed investment by Jordanian 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.

Table 1. Correlation between Variables

year	Index	Investment	Debt (total ratio)	Debt (bank ratio)	Q	Cash Flow
2004	Investment	1				
TO	Debt (total ratio)	-.150	1			
2009	Debt (bank ratio)	-.130	0.871	1		
	Q	0.045	-0.170	-0.122	1	
	Cash Flow	0.097	-0.032	-0.055	0.050	1

These findings are similar to those of previous studies. 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 the first and second columns of Table 2 confirm the strong negative impact of the total debt ratio (total liabilities/total assets) on fixed investment. The third and the fourth columns of Table 2 present the results of our analysis of the impact on fixed investment of bank loans, the most important means of financing for Jordanian companies. Since the impact of the on investment is significantly negative at the 1% level, the bank loan ratio is found to have a similar impact on fixed investment by companies.

Table 2. Basic Results of Estimation

Year	Variable	Total ratio		Bank ratio	
2004	$Debt_{i,t-1}$	-0.220***	-0.214***	-0.400***	-0.390***
		0.04	0.04	0.032	.032
To	$Q_{i,t-1}$	0.0005***	0.0005***	0.017***	0.017***
		0.003	0.003	0.003	0.003
2009	$Cash\ flow_{i,t-1}$		.004*		0.002*
		.	.002		0.001
	Constant	0.443***	0.327***	0.250***	0.255***
		0.012	0.011	0.011	0.011
	Year dummy	yes	yes	yes	yes
	$R2$ Adj	0.05	0.05	0.04	0.04

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.

The result is similar even when the control variable is added to the equation. Tobin's Q, which controls investment opportunities for companies, is significantly positive at the 1% level. Regarding the cash flow, the control variable, the estimation results of columns third and forth are consistent with the first and second columns. A comparison between the impact of the total ratio on fixed investment (-0.22) and the impact of the bank ratio on fixed investment (-0.40) indicates that the bank ratio has a stronger negative impact on fixed investment. This means that the effect of the bank ratio is larger than that of the total ratio. The estimation results in this section confirm that the total ratio (bank ratio) has a negative impact on fixed investment and that the bank ratio has a stronger negative impact than the total ratio on fixed investment. However, the negative impact of the total ratio (bank ratio) on fixed investment does not differentiate between underinvestment due to the high total ratio (bank ratio) and the restraint of over-investment due to the disciplinary effect of the total debt ratio (bank ratio).

5. CONCLUSION

In this paper examined whether the effect of debt on fixed investment exists in Jordan. Then focused our attention on whether the impact of the total ratio (bank ratio) on fixed investment differs among listed companies with differing investment opportunities.

The key estimation results are summarized below. Firstly, I found that the total ratio (bank ratio) does have a negative impact on fixed investment by companies, an indication that the effect of debt on fixed investment exists for Jordanian listed companies as well. Also found that companies with a higher Tobin's Q and a larger cash flow make larger amounts of investment.

These results are consistent with those on U.S. companies from Lang et al. (1996) as well as the results about Japanese companies from Arikawa et al. (2003). The results of our analysis suggest that in Jordan, the total ratio (bank ratio) works as a factor that restrains excessive fixed investment by companies. Thirdly, as the most important finding in our analysis, I found that the restraining effect of the bank ratio on overinvestment is larger than that of the total debt ratio. This difference in the impact suggests that banks, which are large-lot creditors of listed companies in Jordan, supervise the investment activities of companies more strongly than other creditors.

If we are to make an assessment of what has been achieved in the financial reforms carried out by the Jordanian government on the strength of the estimation results of this study, we can perhaps point out that the banks' financial intermediation function has been gradually improving and that the banks in Jordan are beginning to show business behaviour driven largely market principles

The important lesson to be learnt from this study is that the effects of uncertainty on investment projects may be sensitive to the model variable specification. Given that the managers facing capital investments decisions may use different methods to predict uncertainty of investments.

Based upon the above-mentioned findings, we suggest that the investors should consider debt ratios and financial leverages while assessing the usefulness of investment decision. It can be concluded that financial ratios and cash flow from the operating activities should be considered on the firm's measurement. We suggest that the relationship between the firm's debt ratios and its agency theory can be taken for future resources

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