Determinants of capital structure of Companies Listed on the Vietnamese Stock Exchanges

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In this article, we want to examine determinants of capital structure of listed companies, especially ones in the HCMC Stock Exchange to identify differences between them and foreign companies in developed market economies.

The environment for Vietnamese listed companies is characterized by two facts: Vietnam is in transition from the centrally-planned to the market economy; and most listed companies are former state-owned companies and the State still hold large number of shares in these companies after their equitization. According to Modigliani and Miller, these facts lead to different determinants, for example, taxes in centrally-planned economies have no effect on the capital structure because the State is owner of companies and banks and beneficiary of taxes.

1. Data and models used for identify determinants of capital structure of the Vietnamese listed companies

I have gathered data of 45 non-finance companies listed in the HCMC Stock Exchange whose values are of the biggest up to July 2007 (not including to mutual funds and Saigon Thương Tín Commercial Bank). There data are from their financial statements publicized in websites of brokerage firms.

Both theories and practical studies show that determinants of their capital structure include tangibility, tax, size, growth opportunities, uniqueness, and liquidity, among others.

One of typical issues is whether we should use book or market value of liabilities and owners' capital (or both). Decisions on the capital structure by companies are related to optimal level of financial levers determined directly by relationship between cost and interests of borrowings. By borrowing, the company can benefit from tax savings, which affects positively the value of company. Changes in the market value of debts don't affect directly savings gained by tax shield of interest.

In addition, opinions that support the use of book values argue that the main cost of borrowings is the expected cost of financial distress when the firm goes bankrupt, and the value related to obligations of debtors is the book value of debts instead of the market value of borrowings. On the other hand, opinions supporting the use of the market value argue that the market value is the real value of the firm. It's worth noting that the book value of the owners' capital of a firm may be negative but its market value is still positive because the book value may reflect past debts while the market value shows expectation of future cash flow of the firm.

Just because of limited data I can only use book values of financial leverage as dependent variables. Other explanatory variables that are determinants of capital structure of a firm are as follows:

- Financial leverage: it is measured by book values of total debt/total asset; short-term debt/total assets; long-term debt/total assets.

- Return on assets (ROA): according to the pecking order theory, managers prefer to finance the project with internal funds before using external ones. This means that profit-making firms have low percentage of debts. Other model, however, argues that the profit-making firm had better finance with debt instead of equity when other factors don't change thereby enjoying tax benefits of debt.

- Tangibility: It is measured by tangible assets/total assets. Theories say that tangible assets are directly proportional to financial leverage because all creditors want to have something as a guarantee of debt repayment. In addition, the value of the firm is higher when it is sold, and losses will be smaller when it goes bankrupt, if it has big tangible assets.

- Tax: It is earnings before interest and taxes (EBIT) of the firm. Firms that high real tax payments tend to borrow more to enjoy benefits of debt, therefore taxes are in directly proportional to the financial leverage.

- Size of the firm: it is the logarithm value of the total assets. The static trade-off theory maintains that the firm's size is in directly proportional to debts because big firms have low risks of bankruptcy and low bankruptcy cost. In addition, big firms have lower agency cost of debt, lower cost of control, less asymmetric information, more stable cash flow, easier access to markets for credits, and better use of debts.

- Growth opportunities: They are usually

measured by Tobin's Q ratio (market value/asset value) but in this article the growth rate of asset is used because of shortage of data. Firms with good prospects are usually financed by owners' capital, instead of debt, in order to avoid the agency costs. Thus, the financial leverage is in inversely proportional to the growth opportunity.

- Uniqueness: The firm's uniqueness could be seen in the ratio of cost of goods sold to net total sales; of the ratio of R&D cost to the total sales. Firms with unique goods usually have low financial leverage because there is no market for the firm's unsold stock and facilities if the firm goes bankrupt. Thus the firm's uniqueness is in inversely proportional to the financial leverage. In this article the ratio of cost of goods sold to the net sales is used because data about R&D cost is limited.

- Liquidity: It is measured by the ratio of current assets to short-term debt. The liquidity may have positive or negative effects on the capital structure. The liquidity is in directly proportional to debt because firms of high liquidity tend to employ loan capital. And it is in inversely proportional to the financial leverage because these firms may finance projects with their own assets.

- State-owned share: The value of this variable is set at 1 when the state-owned share in a firm is 51% or higher, and at 0 if this figure is lower. This is a characteristic of Vietnamese listed companies, and there is no theory that discusses relationship between the state-owned share and the capital structure. In my opinion, the state-owned share is in directly proportional to the financial leverage because: (1) creditors are usually ready to supply loans to these firms based on long-established relations; and (2) the management of firms with big state-owned share tend to deviate from the purpose of maximizing the firm's value (that is, they usually employ the firm's resources for their interests), therefore the high degree of debt in these firms could be used as a tool for supervising them. According to Jean J. Chen and Yen Xue (2004) the state-owned share is in inversely proportional to the financial leverage but this has no statistical meaning.

Determinants of capital structure of Vietnamese listed companies are examined in the following models:

STD = f(ROA; Tang; Tax; Size; Growth; Unique; Liq; State)

LTD = f(ROA; Tang; Tax; Size; Growth; Unique; Liq; State)

TD = f(ROA; Tang; Tax; Size; Growth; Unique; Liq; State)

where STD is ratio of short-term debt to total asset; LTD, ratio of long-term debt to total asset; and TD, total debt to total asset.

2. Statistical descriptions of explanatory variables and leverage

The Table 2 shows data about explanatory and dependent variables of 45 biggest firms listed in the HCMC Stock Exchange in July 2007 and allows us to see the following facts:

- The average ratio of total debt to total asset of these firms was 41.6% (the highest is 78.89% and the lowest 3.99%). The average figure in state-owned firms was 51.15%, higher than the average of 38.54% in other firms. This figure is not much different from the Chinese one (48.17% according to Chen, 2004) and the average of 51% found in other developing countries (Booth, 2001).

- The average ratio of short-term debt to total asset was 30.74% (the highest was 65.38% and the lowest 3.19%). This figure among state-owned firms was 31.98% compared with 30.34% among other firms.

- The average ratio of long-term debt to total asset was 10.89%. This figure among state-owned firms was 19.17% compared with 8.21% among other firms. This figure in China was 6.31% (Chen, 2004); 41% in G-7 (Rajan and Zingales, 1995) and 22% in developing countries (Booth, 2001). The low average in Vietnam comes from the fact that the market for corporate bonds is not developed and banks represent the only external source of finance for firms. And as result, the firms should rely on owners' capital and short-term loans.

- The average growth rate of firm's asset was 25.86% (12.81% among state-owned firms and 12.81% among others).

- The average liquidity index was 3: 2.63 among state-owned

Table 1: Summary of determinants of capital structure

Explanatory variables	Theoretical effects	Results of practical studies
ROA	+/-	-
Tangibility	+	+
Tax	+	+
Firm's size	+	+
Growth opportunity	-	-
Uniqueness	-	-
Liquidity	+/-	+/-
State-owned share	?	?

Table 2: Summary of statistical descriptions of variables

	TD	STD	LTD	GROWTH	LIQ	ROA	STATE	SIZE	TANG	TAX	UNIQUE
Mean	0.4163	0.3074	0.1089	0.2586	3.0038	12.2222	0.2444	26.8940	0.2042	0.1095	0.7352
Median	0.4452	0.2767	0.0477	0.2214	1.7972	11.5000	0.0000	26.9030	0.1774	0.1004	0.7828
Maximum	0.7889	0.6538	0.6493	0.8784	21.0654	39.3000	1.0000	28.9018	0.9228	0.2809	0.9704
Minimum	0.0399	0.0319	0.0000	-0.8472	0.0897	3.7000	0.0000	23.8794	0.0031	0.0000	0.0027
Std. Dev.	0.1867	0.1663	0.1380	0.3297	3.6482	7.5668	0.4346	1.0529	0.1964	0.0978	0.2002
State-owned firms											
Mean	0.5115	0.3198	0.1917	0.1281	2.6388	12.6364	0.0909	27.0323	0.2639	0.0954	0.7294
Median	0.5175	0.2729	0.1723	0.1167	1.4580	11.5000	0.0000	26.9544	0.1680	0.0157	0.8614
Maximum	0.7889	0.6029	0.6493	0.4643	13.0000	39.3000	1.0000	28.3011	0.9228	0.2807	0.9142
Minimum	0.2128	0.0432	0.0007	-0.1144	0.1812	4.8000	0.0000	25.7460	0.0063	0.0000	0.3389
Std. Dev.	0.1820	0.1793	0.1975	0.1684	3.5362	9.4476	0.3015	0.7198	0.2762	0.1118	0.2033
faautoOthers											
Mean	0.3854	0.3034	0.0821	0.3008	3.1219	12.0882	0.0000	26.8492	0.1849	0.1141	0.7370
Median	0.3924	0.2815	0.0417	0.2984	1.8679	11.3000	0.0000	26.8426	0.1780	0.1006	0.7826
Maximum	0.7002	0.6538	0.4489	0.8784	21.0654	34.0000	0.0000	28.9018	0.8176	0.2809	0.9704
Minimum	0.0399	0.0319	0.0000	-0.8472	0.0897	3.7000	0.0000	23.8794	0.0031	0.0000	0.0027
Std. Dev.	0.1801	0.1646	0.1026	0.3589	3.7279	7.0156	0.0000	1.1457	0.1635	0.0942	0.2022

Source: calculations from Eview program

firms and 3.12 among others.

- The average ROA was 12.22% (the highest was 39.3% and the lowest 3.7%).

- Regarding size, state-owned firms are rather bigger than others.

- The average ratio of tangible assets to total asset was 20.42%. This figure was 26.39% among state-owned firms and 18.49% among others.

- The average tax payment among state-owned firms was lower than the one among others: 9.54% compared with 11.54%.

- As for uniqueness (cost of goods sold/ net sales), the average figure among both state-owned firms and others was 73%.

The Table 3 shows the relation between explanatory and dependent variables. Growth rate of asset and the firm's size are in inversely proportional to ROA while the ratio of tangible assets to total assets is in directly proportional to it. This means that the growth of profit in big firms is slower than the growth of their assets while firms with high profit employ more tangible assets.

The fact that the ratio of tangible assets to total asset is in directly proportional to long-term debt and in inversely proportional to short-term debt means that firms whose this ratio is high tend to employ long-term debts to finance their projects. The fact that the growth rate is in directly proportional to short-term debt and in inversely proportional to

Table 3: Matrix of explanatory variables and leverage

Variable	TD	STD	LTD	State	Growth	Liq	ROA	Size	Tang	Tax	Unique
TD	1.00										
STD	0.70	1.00									
LTD	0.51	-0.26	1.00								
State	0.29	0.04	0.35	1.00							
Growth	-0.06	0.10	-0.20	-0.23	1.00						
Liq	-0.60	-0.54	-0.15	-0.06	0.15	1.00					
ROA	-0.60	-0.39	-0.35	0.03	-0.07	0.25	1.00				
Size	0.45	0.17	0.40	0.08	0.20	-0.27	-0.34	1.00			
Tang	0.04	-0.34	0.46	0.17	-0.35	-0.06	0.04	-0.06	1.00		
Tax	-0.17	-0.12	-0.08	-0.08	0.17	0.18	-0.09	-0.16	-0.13	1.00	
Unique	0.06	0.38	-0.38	-0.02	0.04	0.00	-0.23	0.00	-0.19	-0.02	1.00

Source: calculations from Eview program

Table 4: Effects of explanatory variables on debt-to-asset ratio

Dependent Variable: TD				
Included observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH	0.009200	0.058044	0.158504	0.8749
LIQ	-0.021053	0.005010	-4.202115	0.0002*
ROA	-0.011951	0.002357	-5.069587	0.0000*
SIZE	0.024513	0.003238	7.569434	0.0000*
STATE	0.117602	0.040713	2.888551	0.0064*
TANG	-0.023914	0.094948	-0.251859	0.8025
TAX	-0.185223	0.179571	-1.031475	0.3090
UNIQUE	-0.053977	0.087262	-0.618564	0.5400
R-squared	0.690719	Durbin-Watson stat		2.068685
Adjusted R-squared	0.632206	F-statistic		11.80461
		Prob (F-statistic)		0.000000

Source: calculations from Eview program
* of statistical meaning up to 1%

long-term one means that firm with high growth rate tend to employ short-term debts. The fact that the liquidity and ROA are in directly proportional to short- and long-term debts means that firms with high tax payments, profit and liquidity are reluctant to employ debts while large-size firms tend to employ debts because the firm's size is in directly proportional to short- and long-term debts. The uniqueness directly proportional to short-term debt and inversely proportional to long-term one means that firms with a high ratio of cost of goods sold to net sales prefer short-term debt to the long-term one.

3. Regression results

The Tables 4, 5 and 6 present results of examinations of relations between explanatory variables and the debt- to-assets ratio; ratios of short-term debt to assets and of long-term debt to asset. Variables LIQ, ROA, SIZE, STATE, TANG, and UNIQUE have a statistical meaning of 1% and 5%.

The liquidity is in inversely proportional to the debt- to- asset ratio and the ratio of short-term debt to asset. Although the liquidity is in directly proportional to the long-term debt it has no statistical meaning, therefore, the liquidity in general is in inversely proportional to the debt-to asset ratio. This result shows that firms with high liquidity are reluctant to employ debt and they usually use their assets of high liquidity instead.

The ROA in inversely proportional to the debt- to- asset ratio; long-term debt- to- asset ratio; and short-term debt- to- asset ratio (with no statistical meaning) means that profit- making firms usually use their retained profit to finance their projects and use less debt.

The firm's size is in directly proportional to ratios of debt to asset; of long-term debt to assets and short-term debt to asset. This is suited to the static theory of capital structure, that is, the bigger the firm is, the easier it secures loans.

The state-owned share is in directly proportional to ratios of debt to asset; short-term debt to asset and long-term debt to asset. Firms with big state-owned share can secure long-term loan easier due to good relations with bank before privatization.

The ratio of tangible asset to total asset is in inversely proportional to the ratio of short-term debt to asset

Table 5: Effects of explanatory variables on ratio of short-term debt to total assets

Dependent Variable: STD				
Included observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH	0.036688	0.061300	0.598492	0.5532
LIQ	-0.022538	0.005291	-4.259524	0.0001*
ROA	-0.003436	0.002490	-1.380083	0.1758
SIZE	0.010331	0.003420	3.020771	0.0046*
STATE	0.032710	0.042997	0.760744	0.4516
TANG	-0.251575	0.100275	-2.508853	0.0166**
TAX	-0.107878	0.189646	-0.568838	0.5729
UNIQUE	0.250436	0.092158	2.717477	0.0099*
R-squared	0.565183	Durbin-Watson stat		2.082407
Adjusted R-squared	0.482920	F-statistic		6.870462
		Prob (F-statistic)		0.000030

Source: calculations from Eview program
* of statistical meaning up to 1%
** of statistical meaning up to 5%

Table 6: Effects of explanatory variables on ratio of long-term debt to total assets

Dependent Variable: LTD				
Included observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH	-0.027490	0.046623	-0.589617	0.5590
LIQ	0.001485	0.004024	0.369077	0.7142
ROA	-0.008515	0.001893	-4.496971	0.0001*
SIZE	0.014182	0.002601	5.451913	0.0000*
STATE	0.084893	0.032702	2.595945	0.0134**
TANG	0.227659	0.076266	2.985065	0.0050*
TAX	-0.077345	0.144238	-0.536230	0.5950
UNIQUE	-0.304412	0.070092	-4.343033	0.0001*
R-squared	0.634495	Durbin-Watson stat		1.909381
Adjusted R-squared	0.565345	F-statistic		9.175687
		Prob (F-statistic)		0.000002

Source: calculations from Eview program
* of statistical meaning up to 1%
** of statistical meaning up to 5%

and in directly proportional to the ratio of long-term debt to asset and has statistical meaning of 1% and 5% respectively. This means that firms with big ratios of tangible asset to total asset usually employ less short-term debt because they can mortgage their tangible assets to banks for long-term loans.

The fact that the uniqueness, or the ratio of cost of goods sold to net sales is in directly proportional to the ratio of short-term debt to asset and in inversely proportional to the ratio of long-term debt to asset means that firms with uniqueness employ less long-term debts because they can hardly handle their unsold stock or machines in case of bankruptcy. On the other hand, firms with high ratios of cost of good sold to net sales are more dependent on short-term loans from banks.

With F and Prob (F-statistic) value equaling zero we can see that coefficients of variables are not equal to zero simultaneously.

4. Conclusion

Although Vietnam is in the transition from a centrally-planned economy to a market one and the State still holds large shares in listed firms, these firms are affected by determinants of capital structure like ones in foreign countries as demonstrated by the static trade-off and pecking order theories.

Research results, however, show that the capital structure of firms listed on the HCMC Stock Exchange has its own characteristics: (1) Vietnamese firms employ less long-term debt and more short-term ones and owners' capital than foreign firms; and (2) the state-owned share play an important role in determining the capital structure. In other words, the capital structure of firms is affected by characteristics of the firms and the legal climate in which the firms operate.■

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