



CHAPTER 3

Sample Selection and Descriptive Statistics

3.1 Sample Selection

Almost all empirical evidences toward capital structure decisions were done among listed firms. However, the capital structure investigation among Thai firms had never studied toward the non-listed firms. In 2003, there are only 394 firms listed on the Stock Exchange of Thailand (SET) while there are 447,503 firms registering with the Ministry of Commerce in Thai economy⁴². The 270 listed firms studied by Wiwattanakantang (1999) or even the 100 largest publicly traded firms investigated by Booth et. al. (2001) may not represent the population of 447,503 registered Thai firms. Thus, most empirical efforts had been dedicated among the minority of Thai firms.

Listed and non-listed firms have different institutional features that may differently affect capital structure decisions. The different ownership structure may result in different extent of agency problems between the listed and non-listed firms. The information asymmetry may also be different between the listed and non-listed firms because, in general, the shareholders of non-listed firms are related persons with the managers while the shareholders of listed-firms generally have no relationship with the manager. Due to the different institutional factors between listed and non-listed firms, there should be the investigation of capital structure evidences of Thai firms both listed and non-listed.

⁴² There are totally 392111, 411096, 415427 and 427961 firms registered with the Ministry of Commerce in 1998, 1999, 2000 and 2001. Firms that registered with the Ministry of Commerce included all partnerships and corporations both private and public corporations. There are totally 151707, 156051, 162187 and 156995 corporations both public and private corporations that submitted financial statements to the Ministry of Commerce in 1998, 1999, 2000 and 2001 respectively. Among these corporations, 151114, 155478, 161622 and 156450 corporations are private firms in 1998, 1999, 2000 and 2001 respectively. The rest of public firms that listed on the SET in 1998, 1999, 2000 and 2001 are 419, 392, 383 and 389 respectively.

The sample in this study covers the period from 1997 through 2001 since we cannot collect the financial information of non-listed firms before 1996. This study uses accounting data, board ownership data and industry classification data for the SET listed and non-listed firms from Business Online Co., Ltd. (BOL)⁴³.

Firms are excluded from the sample if they are classified as financial institutions, do not have TSIC industry classification in the BOL database, have negative or zero equity, have negative or zero sales, do not have the leverage ratio of the previous two year and are classified as defaulted⁴⁴. With these criteria, the numbers of the SET-listed firms in the sample are 210, 217 and 209 non-defaulted firms in 1999, 2000 and 2001 respectively.

After the above exclusion criteria, there are a much greater number of non-listed firms relative to SET-listed firms. Since the financial statements of the listed firms have to be examined by the auditors permitted by the office of the Securities and Exchange Commission (SEC), this study investigates only private corporations which their financial statements were audited by auditors permitted by the office of the SEC. Therefore, the potential problems associated with the quality of the financial statements between listed and non-listed firms will be controlled.

⁴³ Business Online Co., Ltd. (BOL) receives patent from the Ministry of Commerce to publicize the data of the financial statements that firms submitted to the Ministry of Commerce at the fiscal-year end.

⁴⁴ Financial institutions are those with the first two digit of TSIC industry classification code as 81 and 82. The firms with negative or zero equity are dropped from the sample since these samples will mislead the interpretation of the leverage ratio. Only firms with positive sales are included in the sample to ensure that they are still operating their businesses. Since the methodology of dynamic capital structure investigation need the leverage ratio back to the previous two year of the firm, the firms incorporated in this study must have the two-year consecutive financial statements in the database. The defaulted firms designated as dissolved (no matter account unresolved or account resolved), bankrupt or absolute receivership will be deleted from the sample.

In the sample period, the SET has set the criteria of 100 million baht minimum paid-up capital after IPO for firms that would like to be listed⁴⁵. In order to compare the capital structure decisions between listed and non-listed firms, we exclude the non-listed firms having less than 100 million baht paid-up capital. At this point, in the before-matched sample, there are 638, 720 and 785 non-listed firms in 1999, 2000 and 2001 respectively. These non-listed firms have no different quality in the accounting information with the SET-listed firms and can be listed on the SET as well.

Finally, after controlling the industry classification, each non-listed firm to be matched with SET-listed firms must have the nearest amount of total assets. Selection criteria are set to match non-listed firms with listed firms one-by-one. The after-matched sample includes 631 SET listed observations (firms-year) and 631 non-listed matched observations (firms-year). Each subsample consists of 209, 213 and 209 firms in 1999, 2000 and 2001 respectively. Table A.4 in the appendix provides the detailed steps of the sample selection criteria.

Table 2 presents the sample size classified by industry. The industry distribution seems to be similar between SET-listed firms and non-listed firms. Nearly 60% of the samples are in manufacturing industry. The other approximately 10 % of the samples are in commerce industry. There are few observations classified as the mining, utility and construction industries. However, there is different percentage of SET-listed firms and non-listed firms in the agriculture industry. There are 39 SET-listed firms and 35 non-listed firms in the agriculture industry before the matching criteria. The proportions of firms in each industry are not different in different years.

Table 2: TSIC Industry Classification

This table shows the distribution of sample in each industry classified by using TSIC codes. Numbers in Panel A indicate numbers of listed firms and non-listed firms that can be listed on the SET but choose not to list on the SET. Numbers in Panel B indicate numbers of listed firms and non-listed matched firms

Industry	Non-listed Firms				Listed Firms			
	1999- 2001	1999	2000	2001	1999- 2001	1999	2000	2001
Panel A: Industry classification among listed firms and non-listed firms in the before-matched sample								
Agriculture	35	14	9	12	39	15	13	11
Mining	19	7	4	8	11	3	4	4
Manufacturing	1267	368	429	470	364	118	127	119
Utility	33	7	12	14	8	2	3	3
Construction	55	22	18	15	6	3	2	1
Commerce	351	93	121	137	75	25	25	25
Transportation	99	25	34	40	39	13	13	13
Property Development	182	64	58	60	49	15	16	18
Service	102	38	35	29	45	16	14	15
Total	2143	638	720	785	636	210	217	209
Panel B: Industry classification among listed firms and non-listed matched firms								
Agriculture	34	14	9	11	34	14	9	11
Mining	11	3	4	4	11	3	4	4
Manufacturing	364	118	127	119	364	118	127	119
Utility	8	2	3	3	8	2	3	3
Construction	6	3	2	1	6	3	2	1
Commerce	75	25	25	25	75	25	25	25
Transportation	39	13	13	13	39	13	13	13
Property Development	49	15	16	18	49	15	16	18
Service	45	16	14	15	45	16	14	15
Total	631	209	213	209	631	209	213	209

Table 3: Balance Sheet Comparison between Listed and Non-listed Firms

This table compares the balance sheet composition between non-listed and listed firms. The value of each item of balance sheet in the second and third columns is calculated as the mean value of its proportion to the book value of total assets of non-listed firms and listed firms respectively during 1999 and 2001. The numbers in the fourth column show the results of the paired t-test on the equality of the mean value of each balance sheet item to the book value of total assets. *, ** and *** significant at the 10, 5 and 1 percent level, respectively. Panel A compares the balance sheet composition between listed firms and non-listed firms that can be listed on the SET but choose not to be listed on the SET. Panel B compares the balance sheet composition between listed firms and non-listed matched firms.

Balance Sheet Items	Non-listed firms	Listed firms	t-statistics.
Panel A: Balance sheet composition among listed firms and non-listed firms in the before-matched sample			
Assets			
Cash and marketable securities	5.801	4.174	4.17***
Accounts receivable	12.611	11.287	2.13**
Inventories	12.605	11.914	1.13
Related short term investments ^a	1.426	0.866	2.12**
Other current assets	9.514	8.960	0.85
Current assets – total	41.957	37.201	4.26***
Related long term investments ^b	4.432	14.285	-14.73***
Plant, property and equipment	44.739	34.586	8.58***
Other assets	8.872	13.928	-6.55***
Assets – Total	100.000	100.000	
Liabilities and Shareholders' Equities			
Accounts payable	10.077	6.820	5.936***
Overdraft	8.686	8.404	0.42
Related short term liabilities ^c	2.986	0.276	6.04***
Other current liabilities	16.429	13.345	4.25***
Current liabilities – total	38.178	28.845	8.59***
Related long term liabilities ^d	1.004	0.134	3.78***
Long term liabilities – total	13.516	15.399	-2.06**
Other liabilities	0.336	0.943	-5.09***
Liabilities – total	52.030	45.187	5.93***
Shareholders' Equity	47.970	54.813	-5.87***
Liabilities and Equity – Total			

Panel B: Balance sheet composition among listed firms and non-listed matched firms

Balance Sheet Items	Non-listed firms	Listed firms	t- statistics.
Assets			
Cash and marketable securities	4.708	4.193	1.32
Accounts receivable	12.700	11.273	1.85*
Inventories	12.428	11.889	0.72
Related short term investments ^a	1.212	0.843	1.37
Other current assets	9.592	8.997	0.77
Current assets – total	40.640	37.195	2.59***
Related long term investments ^b	4.264	14.164	-10.52***
Plant, property and equipment	44.708	34.672	7.02***
Other assets	10.388	13.969	-3.35
Assets – Total	100.000	100.000	
Liabilities and Shareholders' Equities			
Accounts payable	10.981	6.836	6.29***
Overdraft	8.825	8.403	0.53
Related short term liabilities ^c	2.985	0.278	6.17***
Other current liabilities	17.739	13.383	4.95***
Current liabilities – total	40.530	28.900	8.82***
Related long term liabilities ^d	0.941	0.136	3.59***
Long term liabilities – total	15.922	15.403	0.44
Other liabilities	0.487	0.947	-2.24**
Liabilities – total	56.939	45.250	8.27***
Shareholders' Equity	43.061	54.750	-8.22***
Liabilities and Equity – Total	100.000	100.000	

- Related short term investments refer to short term loans to related persons, short term loans to related firms and short term investments in related firms.

^b Related long term investments refer to long term loans to related persons, long term loans to related firms and long term investments in related firms.

^c Related short term liabilities refer to short term loans from related persons and short term loans from related firms.

^d Related long term liabilities refer to long term loans from related persons and long term loans from related firms.

3.2 Balance Sheet Composition

Table 3 provides the average balance sheet composition of Thai firms and shows a comparison of the average balance sheet composition between listed and non-listed firms before and after the industry and size matching process. The average balance sheet of Thai corporations have been invested in the current assets and fixed assets approximately 30% to 40% of total assets. The large portions of current assets are accounts receivable and inventories. Each of these two accounting items approximately accounts for 10% of total assets. Nearly half-half of the financing sources of Thai firms come from liabilities and shareholders' equity. Approximately 30% to 40% of total assets are funded from current liabilities. Non-trade current liabilities are raised from overdraft and short-term liabilities from related persons or related companies. Nearly 10% of total assets are raised by the overdraft.

The comparison of balance sheet compositions between listed and non-listed firms shows that non-listed firms seem to invest in the current assets more than listed firms. Listed firms have invested 37% of their assets in current assets. Non-listed firms have invested around 41% to 42% of their assets in current assets. However, the composition of current assets seems to be not statistically different at the 5% significant level between listed and non-listed matched firms.

On the other hand, there are large differences of long-term assets composition between SET-listed firms and non-listed firms both before and after the matching criteria. Non-listed firms invest the largest portion of fund in fixed assets as 45% of total assets while listed firms invest in fixed assets only 35% of total assets. On the other hand, listed firms invest 14% of total assets in related long term investments

⁴⁵ The minimum paid-up capital has been raised to be 200 million baht nowadays.

While non-listed firms invest only 4 % of total assets in related long term investments. We question whether the related long-term investments reflected the separation of ownership and control as suggested by Claessens, Djankov and Lang (2001). Therefore, there should be further investigation whether related long term investments, especially among listed firms, increase or decrease shareholders' wealth.

There are large differences of financing sources between listed and non-listed firms. Non-listed firms principally raise funds from liabilities while listed firms use equity as a major financing source. More than 50% of funds are raised from liabilities among non-listed firms while more than 50% of funds are raised from equity among listed firms. There are differences of current liabilities composition between listed and non-listed firms. Non-listed firms have current liabilities around 40% of total assets while listed firms have current liabilities nearly 30%. The higher portions of current liabilities among non-listed firms compared to listed firms are raised from the higher borrowing through accounts payable, related short term liabilities and other current assets.

The aggressive use of accounts payable among non-listed firms relative to listed firms may be due to financial constraints among non-listed firms. Petersen and Rajan (1997) suggested that small firms with less well-established banking relationships held significantly higher levels of accounts payable. The highly borrowings from suppliers were interpreted as the intense credit constraint by Nilsen (2002). Fisman and Love (2003) pointed out that, due to the advantages in information acquisition, the renegotiation/liquidation process and the enforcement, trade creditors may mitigate the weak creditor protection and imperfect information better than formal lenders.

The use of higher proportion of current liabilities by non-listed firms may indicate the limitation in issuing equity and the limitation of borrowing capacity from financial institutions among non-listed firms. The average current ratio of listed firms is found to be 1.29 times while the average current ratio of non-listed firms before the matching criteria is found to be 1.10 times. The current ratio of non-listed matched firms is found to be especially lower and equals to 1.00 times. Therefore, non-listed firms may be confronted with the liquidity problem while listed firms may not be affected by the liquidity problem.

In conclusion, there are significant differences in the balance sheet compositions between listed and non-listed firms in related long-term investments, fixed assets, current liabilities and shareholders' equity. Listed firms seem to have much more related long term investments and less fixed assets. Listed firms are better capitalized with a larger fraction of shareholders' equity as the sources of funds and have less current liabilities, partly due to less accounts payable and related short term liabilities. Listed firms are less levered and more liquid than non-listed firms. Therefore, it is interesting not only to investigate the capital structure determinants among listed and non-listed firms but also to answer why listed firms are less levered than non-listed firms.

3.3 Firm Characteristics

The characteristics of Thai corporations involving capital structure are shown in Table 4. The numbers shown in Table 4 are the average characteristics during 1999 and 2001. In this section, we will describe the characteristics involving leverage ratios, tax proxies, size of firms, asset uniqueness, firms' risk, asset utilization, asset tangibility, growth of total assets and profitability respectively.

Table 4: Descriptive Statistics of Firm Characteristics

This table shows the descriptive statistics of firm's characteristics and compares the descriptive statistics between non-listed and listed firms. The numbers in the second and third columns show the average characteristics of the sample during 1999 and 2001. The numbers in the fourth column show the results of the t-statistics of the two tails paired t-test during 1999 and 2001. *, ** and *** significant at the 10, 5 and 1 percent level, respectively. Panel A shows the comparison of firm characteristics between listed firms and non-listed firms that can be listed on the SET but choose not to be listed on the SET. Panel B shows the comparison of firm characteristics between listed firms and non-listed matched firms.

	Non-listed firms	Listed firms	t- statistics
Panel A: Comparison of firm characteristics between listed firms and non-listed firms before the matching criteria			
Total debt/Capital ^a	0.339	0.317	1.67*
NDTS ^b	0.004	0.005	-0.05
Total sales (Billion Baht)	2.150	3.800	-5.21***
Total assets (Billion Baht)	1.950	7.710	-12.24***
Shareholders' equity (Billion Baht)	0.809	2.800	-14.41***
SG&A/Total sales ^c	0.523	0.302	0.73
Z''PROB ^d	0.881	0.927	-0.29
Asset utilization ^e	1.049	0.768	7.38***
Asset tangibility ^f	0.447	0.346	8.58***
Growth of total assets ^g	0.096	0.024	1.85*
Profitability ^h	0.066	0.063	0.32
Panel B: Comparison of firm characteristics between listed firms and non-listed matched firms			
Total debt/Capital ^a	0.376	0.317	3.64***
NDTS ^b	0.013	0.004	1.50
Total sales (Billion Baht)	4.260	3.810	0.80
Total assets (Billion Baht)	3.770	7.760	-4.64***
Shareholders' equity (Billion Baht)	1.490	2.810	-5.39***
SG&A/Total sales ^c	0.443	0.304	0.51
Z''PROB ^d	0.574	0.928	-3.26***
Asset utilization ^e	1.099	0.764	7.18***
Asset tangibility ^f	0.447	0.347	7.02***
Growth of total assets ^g	0.110	0.023	2.15**
Profitability ^h	0.086	0.063	3.15***

^a Total debt to Capital is calculated as (Short term debt + Long term debt)/(Short term debt + Long term debt + Equity).

^b NDTS is the proxy for non-debt tax shields which is calculated as EBIT - Interest expenses - (Taxes paid/Tax rate) standardized by total assets.

^c SG&A/Total sales is the ratio between selling and administrative expenses and total sales.

^d Z''PROB is the modified Z-score adjusted from Altman (1995) which equals to $6.56X_1 + 3.26X_2 + 6.72X_3$ where $X_1 =$ working capital/total assets, $X_2 =$ retained earnings/total assets. $X_3 =$ earnings before interest and taxes/total assets.

^e Asset utilization is the proxy for the agency costs of equity which is calculated as total sales over total assets

^f Asset tangibility is the proxy for the agency costs of debt which is measured as the ratio of the plant, property and equipment to total assets.

^g Growth of total assets is the percentage changes in total assets from the previous year.

^h Profitability is calculated as the ratio of earnings before interest and tax to total assets.

In this study, we measure leverage as the ratio between total debt and total capital as suggested by Rajan and Zingales (1995) and Drobetz and Fix (2003). Total debt to total capital ratio is defined as the fraction of total debt to the sum of total debt and shareholders' equity. On average, Thai firms borrow more than 30% of total capital. Thai non-listed firms seem to borrow more aggressively than listed firms. On average, SET-listed firms borrow 32% of total capital during 1999 and 2001 while the general non-listed firms borrow 34% of total capital. The average ratio between total debt to equity is much higher among non-listed matched firms which equals to 38% of total capital. When we compare the median of total debt to total capital ratio between listed and non-listed firms, this difference is more obvious. The median ratio of total debt to total capital of listed firms is only 27% while the median ratio of total debt to total capital of non-listed firms before and after the matching criteria is 30% and 38% respectively. Regardless of the use of mean or median statistics, non-listed firms are found to have more aggressive capital structure policy than listed firms.

NDTS is the proxy for non-debt tax shields. In this paper, we measure non-debt tax shields following DeMiguel and Pindado (2001) as the earnings before taxes minus the ratio between the taxes paid and the tax rate. On average, non-debt tax shields amount approximately less than 1% of total assets. There is no statistically difference in the non-debt tax shields to total assets ratio between listed and non-listed firms.

Non-listed Thai firms are found to have smaller size than listed firms no matter what proxies are used to measure size. The average of annual total sales, total assets and shareholders' equity of non-listed Thai firms is 2.15, 1.95 and 0.81 Billion Baht respectively. On the other hand, the average of annual total sales, total assets and shareholders' equity of listed Thai firms is 3.80, 7.71 and 2.80 Billion Baht

respectively. Since total assets are used as one of the matching criteria, the difference in size between listed and non-listed matched firms is smaller and the difference in total sales between listed and non-listed matched firms is not statistically significant. However, non-listed Thai firms are still found to be smaller than listed Thai firms. The average of annual total sales, total assets and shareholders' equity of non-listed matched firms is 4.26, 3.77 and 1.49 Billion Baht respectively.

SG&A/Total sales is the ratio between selling expenses to total sales indicating the asset uniqueness of the firms as suggested by Titman and Wessels (1988). There is no statistical difference of selling expenses to total sales ratio between listed and non-listed firms. The lack of statistical difference may be resulted from the large dispersion of selling expenses to sales ratio across firms in different industries and different year. There is high variation in selling expenses to sales ratios.

Z''PROB is the modified Z-score adjusted from Altman, Hartzell and Peck (1995) which equals to $6.56X_1 + 3.26X_2 + 6.72X_3$, where X_1 is working capital to total assets ratio, X_2 is retained earnings to total assets ratio and X_3 is earnings before interest and taxes to total assets ratio. The higher Z-score indicate the better financial situation and the less probability of bankruptcy in the future. Listed firms seem to be financially healthier than non-listed firms. The average modified Z-score among listed firms is 0.93. Non-listed firms have the modified Z-score before and after the matching criteria of 0.89 and 0.57 respectively.

Asset utilization is defined as the ratio between total sales and total assets that indicate the efficiency in generating sale from the assets of firms. Ang et. al. (2000) suggested the asset utilization ratio as the proxy for the agency costs of equity. On average, listed Thai firms can generate total sales 93% of total assets during 1999 and 2001. The average asset utilization ratio of non-listed firms is found to be higher than

that of listed firms. Non-listed firms are found to be more efficient than listed firms. Non-listed firms can generate total sales larger than total assets. Non-listed firms may have higher asset utilization ratio compared to listed firms due to the less agency costs from less conflict of interest between manager and shareholders.

Asset tangibility is defined as the fractions of total assets that are fixed assets or plant, property and equipment. The higher asset tangibility yields higher collateral in borrowing funds. Non-listed firms are found to accumulate more fixed assets than listed firms do. Non-listed firms have 45% of total assets as fixed assets while listed firms have only 35% of total assets as fixed assets.

Growth of total assets is defined as the percentage change in total assets from the previous year. Growth of total assets may indicate the investment opportunities of the firm. Non-listed firms are found to grow much larger than listed firms do. Results do not differ when we observe the growth rate in each year or each industry. The average growth rate of total assets among listed firms is only 2% during 1999 and 2001 while the average growth rate of total assets among non-listed firms is approximately 10% during 1999 and 2001.

Profitability is defined as the ratio of earnings before interest and tax to total assets. The comparison of firm profitability between non-listed and listed firms shows that non-listed firms are more profitable than listed firms. However, the difference is statistically significant only when we compare the profitability between listed and non-listed matched firms. Non-listed matched firms can generate the average operating income as high as 9% of total assets while listed firms can only generate an average operating income only 6% of total assets.

In conclusion, listed firms are found to have greater leverage-related benefits due to their less efficiency, and less profitability relative to non-listed matched firms.

Furthermore, listed firms are found to have lower leverage-related costs due to their larger size, less bankruptcy probability and less growth relative to non-listed matched firms. These greater leverage-related benefits and lower leverage-related costs of listed firms relative to non-listed firms may induce listed firms to borrow debt more aggressively than non-listed firms. However, listed firms have the lower tangible assets compared to non-listed firms that may reduce listed firms' borrowing capacity and induce the less leverage by listed firms. The comparison of firm characteristics between listed and non-listed firms in this section cannot unambiguously explain the observed relatively less leverage by listed firms. We cast doubt whether there are alternative arguments rather than the less asset tangibility that can explain the financial conservatism by listed firms.

3.4 Correlations among Leverage and Capital Structure Determinants

Table 5 shows the correlation matrix between leverage and capital structure determinants. Leverage ratio measured as total debt to total capital is found to be highly correlated with non-debt tax shields proxy, size and profitability among listed Thai firms. However, there are high correlation coefficients between leverage ratio and probability of bankruptcy and asset utilization ratio among non-listed firms. Leverage ratio is also found to be highly correlated with size and asset tangibility among non-listed firms in the before-matched sample and highly correlated with non-debt tax shields proxy and profitability among non-listed matched firms.

The negative correlation between non-debt tax shields and leverage is consistent with the tax theory that firms having large non-debt tax shields do not need interest expenses to reduce tax base. There is negative correlation between leverage and asset utilization, which is consistent to the agency theory.

Table 5: Correlation Matrix of Leverage Ratios and Capital Structure Determinants

The numbers in this table show the correlation coefficients among leverage ratios and capital structure determinants during 1999 and 2001. Panel A and B show the correlation coefficients among leverage ratios and capital structure determinants among listed firms and non-listed firms that can be listed on the SET but choose not to be listed on the SET respectively. Panel C and D show the correlation coefficients among leverage ratios and capital structure determinants among listed firms and non-listed matched firms respectively.

Panel A: Correlation matrix of all listed firms before the matching criteria

	LEV	NDTS	LnTA	SGA/S ate	Z''PRO B	Sale/T A	TAN	GTA	BEP
LEV ^a	1.000								
NDTS ^b	-0.390	1.000							
LnTA ^c	0.289	-0.001	1.000						
SG&A/Sal ^{e,d}	0.058	-0.056	0.011	1.000					
Z''PROB ^e	-0.153	0.302	-0.115	0.090	1.000				
Sale/TA ^f	-0.145	0.183	-0.229	-0.237	0.097	1.000			
TAN ^g	0.109	-0.157	-0.146	-0.134	-0.299	0.009	1.000		
GTA ^h	-0.133	0.293	0.087	-0.006	0.092	0.079	-0.112	1.000	
BEP ⁱ	-0.410	0.891	-0.014	-0.089	0.280	0.265	-0.088	0.302	1.000

Panel B: Correlation matrix of all non-listed firms before the matching criteria

	LEV	NDTS	LnTA	SGA/S ate	Z''PRO B	Sale/T A	TAN	GTA	BEP
LEV ^a	1.000								
NDTS ^b	-0.086	1.000							
LnTA ^c	0.211	0.127	1.000						
SG&A/Sal ^{e,d}	0.033	-0.088	0.010	1.000					
Z''PROB ^e	-0.203	-0.516	-0.139	-0.021	1.000				
Sale/TA ^f	-0.164	0.026	0.095	-0.061	0.173	1.000			
TAN ^g	0.142	0.050	-0.016	-0.004	-0.225	-0.311	1.000		
GTA ^h	-0.036	0.036	0.011	-0.013	-0.035	-0.019	-0.083	1.000	
BEP ⁱ	-0.107	0.873	0.177	-0.081	-0.396	0.111	-0.021	0.021	1.000

Panel C: Correlation matrix of listed firms after the matching criteria

	LEV	NDTS	LnTA	SGA/S ate	Z''PRO B	Sale/T A	TAN	GTA	BEP
LEV ^a	1.000								
NDTS ^b	-0.389	1.000							
LnTA ^c	0.290	-0.001	1.000						
SG&A/Sal ^{e,d}	0.058	-0.055	0.010	1.000					
Z''PROB ^e	-0.154	0.303	-0.114	0.090	1.000				
Sale/TA ^f	-0.147	0.182	-0.228	-0.237	0.094	1.000			
TAN ^g	0.106	-0.156	-0.146	-0.135	-0.303	0.012	1.000		
GTA ^h	-0.136	0.292	0.090	-0.005	0.092	0.076	-0.115	1.000	
BEP ⁱ	-0.410	0.892	-0.013	-0.089	0.280	0.264	-0.087	0.303	1.000

Panel D: Correlation matrix of non-listed matched firms

	LEV	NDTS	LnTA	SG&A/Sale	Z''PROB	Sale/TA	TAN	GTA	BEP
LEV ^a	1.000								
NDTS ^b	-0.244	1.000							
LnTA ^c	0.107	-0.015	1.000						
SG&A/Sale ^d	0.044	-0.053	0.045	1.000					
Z''PROB ^e	-0.274	0.298	-0.012	-0.045	1.000				
Sale/TA ^f	-0.175	0.166	0.067	-0.056	0.187	1.000			
TAN ^g	0.073	-0.033	-0.098	0.024	-0.334	-0.306	1.000		
GTA ^h	-0.074	0.023	0.049	0.000	-0.028	-0.054	-0.117	1.000	
BEP ⁱ	-0.258	0.387	0.022	-0.033	0.552	0.262	-0.142	0.008	1.000

^a LEV is the ratio of total debt to capital which is calculated as $\frac{(\text{Short term debt} + \text{Long term debt})}{(\text{Short term debt} + \text{Long term debt} + \text{Equity})}$.

^b NDTS is the proxy for non-debt tax shields which is calculated as $\frac{\text{EBIT} - \text{Interest expenses} - (\text{Taxes paid}/\text{Tax rate})}{\text{total assets}}$.

^c LnTA is the natural logarithm of total assets.

^d SG&A/Sale is the ratio between selling and administrative expenses and total sales.

^e Z''PROB is the modified Z-score adjusted from *Altman (1995)* which equals to $6.56X_1 + 3.26X_2 + 6.72X_3$ where $X_1 = \text{working capital}/\text{total assets}$, $X_2 = \text{retained earnings}/\text{total assets}$, $X_3 = \text{earnings before interest and taxes}/\text{total assets}$.

^f Sale/TA is the proxy for the agency costs of equity which is calculated as total sales over total assets

^g TAN is the proxy for the agency costs of debt which is measured as the ratio of the plant, property and equipment to total assets.

^h GTA of total assets is the percentage changes in total assets from the previous year.

ⁱ BEP is calculated as the ratio of earnings before interest and tax to total assets

There are positive correlations between leverage and size and asset tangibility. The positive correlations between leverage ratios and size and asset tangibility are consistent with the capital structure theories. Larger firms are less prone to bankrupt and larger tangible assets yield larger collateral value. Larger firms and firms with larger tangible assets should have higher leverage because of the smaller bankruptcy costs and smaller agency costs of debt.

There is negative correlation between leverage and modified Z"-score which contradicts to the bankruptcy costs explanation. The negative correlation between leverage and modified Z"-score may be resulted from the endogeneity problem. The high correlation between modified Z"-score and profitability may induce the negative correlation between leverage and modified Z"-score as well. There is the positive correlation between leverage and asset uniqueness that contradicts the capital structure theories. However, the correlation between leverage and asset uniqueness is quite low.

3.5 Leverage Comparison between Listed and Non-listed firms

In this section, we will compare leverage ratios between listed and non-listed firms among the whole sample. We investigate whether the findings are different in different years or different industries. Results are shown in Table 6 and 7.

Panel A in Table 6 shows that during 1999 to 2001, non-listed firms are borrowing more aggressively than listed firms do. Results do not change whether we observe the average leverage ratio or the median leverage ratio. Non-listed firms are found to have higher total debt to total capital ratio, total liabilities to total assets ratio, and non-debt liabilities to total assets ratio. Non-listed matched firms have the average (median) total debt to total capital ratio of 38% (38%) compared to that of 32% (27%) among listed firms.

The findings are quite similar when we consider the subsample separately in 1998, 1999, 2000 and 2001 as shown in Table 6 in panel B, C, D and E respectively. There is the downward tendency of leverage among Thai firms both listed and non-listed firms. In 1999, 2000 and 2001, the average (median) total debt to total capital ratio among non-listed matched firms is 0.40 (0.41), 0.58 (0.62) and 0.29 (0.26) respectively. The average (median) total debt to total capital ratio among listed firms is 0.35 (0.30), 0.49 (0.45) and 0.22 (0.17) respectively.

After controlling for the differences in industry classification, Table 7 shows that non-listed firms are found to use higher leverage than listed firms in most industries no matter the mean or the median of leverage ratios is used. However, the larger leverage used by non-listed matched firms relative to listed firms is statistically significant among agriculture, manufacturing, utility and commerce industry. On the other hand, non-listed firms are found to have less leverage ratios compared to listed firms among construction, transportation and property development industry. The differences in leverage ratios between listed and non-listed firms among these industries are not statistically significant.

In conclusion, non-listed firms are found to have more aggressive capital structure than listed firms. The relatively \square underleverage by listed firms compared to non-listed firms is confirmed when we measure leverage as total debt to total capital, total liabilities to total assets and non-debt liabilities to total assets. The untabulated results show that the one-tail pair t-test yield the similar results with the two-tails pair t-test. Results remain the same for the mean and median leverage ratio. Non-listed firms are found to have higher leverage than listed firms in each year during 1999 and 2001. Non-listed firms are not found to have statistically lower leverage than listed

firms in any specific industry. Therefore, there should be additional investigations to study the differences in leverage ratio between listed and non-listed firms.

Table 6: Comparison of Leverage Ratios among Different Years

This table presents the comparison of the mean leverage ratios between listed and non-listed firms. The first column of this table defines the leverage measures. Leverage measures are shown as total debt to total capital ratio, total liabilities to total assets ratio and non-debt liabilities to total assets ratio. The number in the second, third, fifth and sixth columns show the mean leverage ratios. Numbers in the parenthesis show the median leverage ratios. The fourth and seventh columns describe t-statistics of the paired t-test. Panel A shows results for the whole sample. Panel B, C and D show results for the sample in 1999, 2000 and 2001 respectively. *, ** and *** significant at the 10, 5 and 1 percent level, respectively.

Leverage measures	Before Matching Criteria			After Matching Criteria		
	Non-listed firms	Listed firms	t-stat.	Non-listed firms	Listed firms	t-stat.
Panel A: 1999 – 2001						
Total debt/Total capital	0.339 (0.300)	0.317 (0.270)	1.67*	0.376 (0.380)	0.317 (0.270)	3.64* **
Total liabilities/Total assets	0.520 (0.540)	0.452 (0.420)	5.93* **	0.569 (0.610)	0.452 (0.420)	8.27* **
Non-debt liabilities/Total assets ^a	0.262 (0.220)	0.198 (0.160)	7.24* **	0.284 (0.240)	0.199 (0.160)	7.95* **
Panel B: 1999						
Total debt/Total capital	0.352 (0.320)	0.346 (0.300)	0.230	0.399 (0.410)	0.347 (0.300)	1.81*
Total liabilities/Total assets	0.530 (0.560)	0.486 (0.450)	2.10* *	0.581 (0.620)	0.487 (0.450)	3.73* **
Non-debt liabilities/Total assets ^a	0.271 (0.215)	0.224 (0.170)	2.83* **	0.291 (0.260)	0.224 (0.170)	3.40* **
Panel C: 2000						
Total debt/Total capital	0.353 (0.315)	0.327 (0.280)	1.17	0.393 (0.390)	0.327 (0.280)	2.38* *
Total liabilities/Total assets	0.533 (0.550)	0.457 (0.430)	3.88* **	0.576 (0.600)	0.458 (0.430)	4.85* **
Non-debt liabilities/Total assets ^a	0.264 (0.220)	0.199 (0.150)	4.27* **	0.282 (0.230)	0.200 (0.15)	4.40* **
Panel D: 2001						
Total debt/Total capital	0.315 (0.270)	0.277 (0.220)	1.72*	0.337 (0.270)	0.277 (0.220)	2.13* *
Total liabilities/Total assets	0.500 (0.510)	0.413 (0.380)	4.56* **	0.551 (0.590)	0.413 (0.380)	5.87* **
Non-debt liabilities/Total assets ^a	0.253 (0.220)	0.172 (0.150)	5.80* **	0.278 (0.230)	0.172 (0.150)	6.24* **

^aNon-debt liabilities are classified as liabilities that are not debt-like. The example of non-debt liabilities are accounts payable, wages, taxes payable, etc.

Table 7: Comparison of Leverage Ratios among Different Industries

This table presents the comparison of the mean leverage ratios between listed and non-listed firms during 1999 and 2001. The first column of this table defines the leverage measure. Leverage measures are shown as total debt to total capital ratio, total liabilities to total assets ratio and non-debt liabilities to total assets ratio. The second, third, fifth and sixth columns show the mean leverage ratios of the sample. The fourth and seventh columns describe t-statistics of the paired t-test. *, ** and *** significant at the 10, 5 and 1 percent level, respectively. Numbers in the parenthesis show the median leverage ratios. Panel A, B, C, D, E, F, G, H and I show results for the firms in the industry of Agriculture, Mining, Manufacturing, Utility, Construction, Commerce, Transportation, Property Development and Service respectively.

Leverage measures	Before Matching Criteria			After Matching Criteria		
	Non-listed firms	Listed firms	t-stat.	Non-listed firms	Listed firms	t-stat.
Panel A: Agriculture						
Industry						
Total debt/Total capital	0.378 (0.430)	0.246 (0.200)	2.09* *	0.387 (0.440)	0.241 (0.215)	2.20* *
Total liabilities/Total assets	0.465 (0.500)	0.340 (0.260)	2.05* *	0.467 (0.500)	0.335 (0.290)	2.03* *
Non-debt liabilities/Total assets ^a	0.161 (0.120)	0.141 (0.110)	0.70	0.156 (0.120)	0.143 (0.095)	0.42
Panel B: Mining Industry						
Total debt/Total capital	0.245 (0.200)	0.219 (0.120)	0.28	0.284 (0.280)	0.219 (0.120)	0.67
Total liabilities/Total assets	0.481 (0.570)	0.328 (0.200)	1.53	0.581 (0.650)	0.328 (0.200)	2.42* *
Non-debt liabilities/Total assets ^a	0.317 (0.170)	0.146 (0.090)	1.97* *	0.418 (0.340)	0.146 (0.090)	2.87* **
Panel C: Manufacturing Industry						
Total debt/Total capital	0.331 (0.300)	0.318 (0.250)	0.80	0.352 (0.330)	0.318 (0.250)	1.60*
Total liabilities/Total assets	0.523 (0.550)	0.465 (0.430)	3.96* **	0.563 (0.595)	0.465 (0.430)	5.47* **
Non-debt liabilities/Total assets ^a	0.277 (0.230)	0.218 (0.175)	5.54* **	0.305 (0.280)	0.218 (0.175)	6.75* **
Panel D: Utility Industry						
Total debt/Total capital	0.526 (0.650)	0.492 (0.510)	0.32	0.659 (0.660)	0.492 (0.510)	1.75*
Total liabilities/Total assets	0.577 (0.680)	0.611 (0.605)	-0.35	0.689 (0.690)	0.611 (0.605)	1.17
Non-debt liabilities/Total assets ^a	0.117 (0.100)	0.186 (0.215)	- 1.74*	0.081 (0.070)	0.186 (0.215)	- 3.06* **

Panel E: Construction Industry

Total debt/Total capital	0.319 (0.200)	0.722 (0.725)	- 3.31* **	0.512 (0.655)	0.722 (0.725)	-1.64
Total liabilities/Total assets	0.522 (0.540)	0.765 (0.725)	- 2.17* *	0.653 (0.730)	0.765 (0.725)	-1.35
Non-debt liabilities/Total assets ^a	0.298 (0.260)	0.163 (0.110)	1.28	0.238 (0.220)	0.163 (0.110)	0.77

Panel F: Commerce Industry

Total debt/Total capital	0.332 (0.300)	0.248 (0.160)	2.29* *	0.400 (0.460)	0.248 (0.160)	3.33* **
Total liabilities/Total assets	0.559 (0.590)	0.404 (0.400)	4.99* **	0.646 (0.670)	0.404 (0.400)	6.30* **
Non-debt liabilities/Total assets ^a	0.315 (0.280)	0.195 (0.160)	4.23* **	0.385 (0.370)	0.195 (0.160)	5.49* **

Panel G: Transportation Industry

Total debt/Total capital	0.307 (0.280)	0.364 (0.280)	-1.05	0.380 (0.330)	0.364 (0.280)	0.23
Total liabilities/Total assets	0.458 (0.470)	0.495 (0.450)	-0.72	0.575 (0.560)	0.495 (0.450)	1.31
Non-debt liabilities/Total assets ^a	0.201 (0.120)	0.204 (0.160)	-0.10	0.252 (0.240)	0.204 (0.160)	0.97

Panel H: Property Development Industry

Total debt/Total capital	0.386 (0.360)	0.409 (0.390)	-0.45	0.481 (0.480)	0.409 (0.390)	1.18
Total liabilities/Total assets	0.481 (0.480)	0.491 (0.540)	-0.21	0.573 (0.580)	0.491 (0.540)	1.47
Non-debt liabilities/Total assets ^a	0.142 (0.060)	0.138 (0.090)	0.16	0.120 (0.060)	0.138 (0.090)	-0.51

Panel I: Service Industry

Total debt/Total capital	0.354 (0.320)	0.284 (0.270)	1.42	0.366 (0.280)	0.284 (0.270)	1.37
Total liabilities/Total assets	0.483 (0.505)	0.399 (0.390)	1.70* *	0.525 (0.520)	0.399 (0.390)	2.14* *
Non-debt liabilities/Total assets ^a	0.214 (0.160)	0.175 (0.140)	1.10	0.256 (0.150)	0.175 (0.140)	1.76* *

^a Non-debt liabilities are classified as liabilities that are not debt-like. The example of non-debt liabilities are accounts payable, wages, taxes payable, etc.

