

Ultimate Owners, Financial Constraints, and Capital Structure: Evidence from Thailand

J. Thomas Connelly (Ph.D. Candidate)

Faculty of Commerce and Accountancy
Chulalongkorn University, Bangkok, Thailand

Abstract

Using a multi-year sample of publicly traded non-financial firms in Thailand, this study finds that firms' ownership characteristics influence the observed capital structures. The results are from an emerging market, which features concentrated, family-dominated corporate ownership structures. This study uses a measure of financing constraint developed by Cleary (1999, 2005) from the work of Kaplan and Zingales (1997) to explain observed differences in leverage. The book debt and market debt ratios of widely-held firms, firms controlled by families, and corporate-controlled firms are negatively related to a measure of financing constraint. Concentrated ownership has a negative influence on the amount of debt used by family and corporate-controlled firms. The results show that capital structures are largely consistent across different types of controlling shareholders.

Keywords: capital structure, financing constraint, ultimate ownership structure

JEL Classification: G32, G34

Corresponding Author: J. Thomas Connelly, Faculty of Commerce and Accountancy, Chulalongkorn University, Phayathai Road, Bangkok 10330 Thailand.
Telephone: +66 (2) 218-5674; Fax: +66 (2) 218-5676; E-mail: fcomtcn@gmail.com.

Ultimate Owners, Financial Constraints, and Capital Structure: Evidence from Thailand

Abstract

Using a multi-year sample of publicly traded non-financial firms in Thailand, this study finds that firms' ownership characteristics influence the observed capital structures. The results are from an emerging market, which features concentrated, family-dominated corporate ownership structures. This study uses a measure of financing constraint developed by Cleary (1999, 2005) from the work of Kaplan and Zingales (1997) to explain observed differences in leverage. The book debt and market debt ratios of widely-held firms, firms controlled by families, and corporate-controlled firms are negatively related to a measure of financing constraint. Concentrated ownership has a negative influence on the amount of debt used by family and corporate-controlled firms. The results show that capital structures are largely consistent across different types of controlling shareholders.

I. Introduction and Motivation

The motivation for this study is to determine the extent that a controlling shareholder influences a firm's capital structure choice especially in the face of financial constraints.

Dominant owners have a significant amount of power. By virtue of a significant shareholding stake, the owners are in a position to shape the investment, funding, and payout policies of a firm. Earlier studies demonstrate that concentrated ownership is quite common, especially in Asia (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998; Claessens, Djankov, and Lang, 2000). The large owners are quite often family members who also work as managers. Other researchers examine the link between concentrated ownership and the capital structure of firms. Specific types of owners may influence the amount of debt used (Jensen, Solberg, and Zorn, 1992; Moh'd, Rimbey, and Perry, 1998; Wiwattanakantang, 1999; Chen and Steiner, 1999; Brailsford, Oliver, and Pua, 2002; and Du and Dai, 2005). Lastly, recent research shows that financing constraints can affect the investment decisions of firms (Fazzari, Hubbard and Petersen, 1988 and 2000; Kaplan and Zingales, 1997 and 2000; Cleary, 1999 and 2005). The research question for this study is whether the presence of financial constraints means managers change the portion of debt in the capital structure. Would the presence of a dominant owner mean the response to financial constraints would be different?

The confluence of ownership structure and capital structure is especially interesting to study an emerging market such as Thailand. Emerging markets offer many unique challenges. External governance and monitoring mechanisms and institutions can be nonexistent, ineffective, or even fraught with agency problems themselves. For example, in Thailand, corporate takeovers are extremely rare, meaning an active market for corporate control is not easily used as a device for disciplining managers. There is also a significant

question whether owners of large blocks of shares (for example, institutional investors like insurance companies, banks, or mutual funds) act as effective monitors of a firm's management team, as these large block holdings do not often change hands. The blockholders themselves may often be affiliated with the company itself. Creditor monitoring can also be haphazard or missing, as the 1997 Asian financial crisis demonstrated. The crisis exposed the poor lending practices at many banks, many of which suffered from poor corporate governance practices themselves (Zhuang, Edwards, and Capulong, 2000).

This study uses a unique dataset of non-financial public companies in Thailand covering 2002 - 2005, identifying the dominant owners or ultimate controllers of these firms. Three types of controllers—which together constitute a large majority of listed firms—are the subjects of this study. The three types of controllers are firms family-controlled, controlled by another widely-held corporation, and widely-held firms or companies with no ultimate controller. The results of a pooled cross-sectional regression show that a proxy for financing constraints is negatively related to the debt ratio. When firms are grouped according to controller type, the regression results show that the debt ratio is negatively related to a measure of financing constraints for all three types of firms.

The paper is organized as follows. Section 2 presents a brief theoretical background of the capital structure choice in light of concentrated or managerial ownership as well as financing constraints. Section 3 presents the methodology while Section 4 describes the sample and variables. The results appear in Section 5 and Section 6 offers a brief conclusion.

II. Background

A. Ownership characteristics and the connection to capital structure

There is a large and rich literature concerning the capital structure choice and the explanations for the observed differences in capital structure. For this study, I will highlight a small number of studies that concentrate agency theory-motivated reasons for observed capital structures, specifically the influences that different ownership structures have on the financing decision.

A paper by Jensen, Solberg, and Zorn (1992) uses a simultaneous equation framework to examine the interplay between firms' choices of debt policies, dividend policies, and inside ownership. The authors use cross-sectional data for US firms in 1982 and 1987. Jensen, Solberg, and Zorn (1992) find that levels of insider ownership are indeed different across firms. The evidence also suggests firm characteristics such as investment, growth opportunities, and firm profitability affect debt and dividend policies. This results supports a modified pecking order hypothesis whereby firms prefer internal financing, then external debt, then outside equity. Firms with higher levels of inside ownership were found to have lower levels of debt and pay lower dividends.

Chen and Steiner (1999) also use a simultaneous equations framework to examine managerial ownership, debt and dividend policies. Their model is nonlinear and incorporates risk taking. Using a single year cross-section of US firms in 1994, the authors find that ownership is positively related to risk while risk is positively related to managerial ownership. The authors conclude that increased managerial ownership lowers the agency conflict between inside owners (managers) and outside equityholders. However, the agency conflict between managers and creditors is increased as higher levels of managerial

ownership induce risk-taking. They also note the effect of substitution-monitoring between managerial ownership and debt as well as managerial ownership and dividends.

Moh'd, Perry, and Rimbey (1998) examine how ownership concentration affects the capital structure decision. Using a time series cross-sectional analysis of US firms over 18 years, the authors find the amount of debt used is inversely related to the amount of equity owned by insiders. Consistent with agency theory, managers can control the financial decisions of a firm for their own benefit.

The next three papers address specific elements of agency costs that arise from concentrated ownership structures and controlling owners especially in family-dominated companies. Wiwattanakantang (1999) compiles a single-year cross-sectional analysis of the capital structures of firms in Thailand. The data are from 1996, one year before the start of the Asian financial crisis. In addition to other explanatory variables used in prior studies, Wiwattanakantang (1999) adds agency variables to measure the effect on firms' observed capital structures. The agency variables include the type of owner (family, conglomerate, foreign, or state owned) as well as board characteristics, managerial ownership, and ownership concentration. The results show ownership does affect financing policy; firms owned by a single family carry higher debt levels. Large shareholders appear to act in a monitoring capacity, lowering the debt ratio. Brailsford, Oliver, and Pua (2002) examine 500 of the largest listed firms in Australia from 1989 to 1995. They find a positive relation between outside blockholders and debt levels, implying large outside shareholders are active monitors.

Du and Dai (2005) evaluate listed companies in nine Asian economies (Hong Kong, Indonesia, Japan, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand) from 1994-1996. They examine the ultimate corporate control structure and the differences

in the cash flow rights and control rights of selected firms in these countries. Their analysis allows separation of three confounding effects influencing financing structures in these Asian nations. The results show that controlling shareholders use external debt financing as a way to secure additional capital yet not dilute their controlling ownership stakes.

B. Concentrated ownership structures in Asia

Claessens, Djankov, and Lang (2000) examine nearly 5,300 publicly traded firms across nine Asian countries including Thailand, recording both the cash flow and control rights for firms in their sample. They find that pyramid structures and cross-holdings are relatively rare for Thai firms (used by 13% and 0.8% of surveyed firms respectively) compared with other Asian countries in the sample. The ratio of cash flow rights to voting rights is also highest for Thai firms. Thai firms included in the sample are overwhelmingly owned by families: 61.6% of firms, at the 20% ownership cutoff level. Family groups own a significant portion of the publicly traded firms across Asia and Thailand is no exception

Claessens, Djankov, Fan, and Lang (2000) search for evidence of expropriation of minority shareholders. In this study, Thai firms have the highest ownership concentration in the hands of large blockholders, namely families, the state, widely-held financial institutions, and widely-held corporations. The authors find the concentration of cash flow rights in the hands of large blockholders is beneficial for company valuation, but the concentration of control rights is not, lending support to the expropriation hypothesis put forth in Shleifer and Vishny (1997).

Other researchers have investigated the ownership characteristics of Thai firms. Alba, Claessens, and Djankov (1998) conclude that firms that are more profitable will have concentrated ownership structures because firms that are more profitable will attract

concentrated owners and better monitoring, which leads to greater profitability. They also find that concentrated ownership is positively related to leverage.

Suehiro (2001) examines 448 listed Thai companies in 1996 and 2000 and concludes that family businesses were not the major cause of the Asian financial crisis and have not delayed the subsequent economic recovery.

A paper by Wiwattanakantang (2001) also examines the shareholding of Thai firms in 1996. The author confirms that ownership is highly concentrated, with the controlling shareholder being the largest shareholder in 82.6% of firms. Pyramid and cross-shareholding arrangements are relatively rare, used at only 21% of the 270 firms surveyed.

Lastly, a recent paper by Khanthavit, Polsiri, and Wiwattanakantang (2003) finds that both ownership and control appears to be more concentrated in the hands of controlling shareholders after the financial crisis, judging from 1996 and 2000 as sample periods.

To summarize, researchers generally agree that Asian firms have concentrated, family-dominated ownership structures. However, the authors do not all draw the same conclusions about performance whether searching for evidence of poor managerial performance.

C. *Financing Constraints*

The financial constraints measure used in this study has its origins in the study of firms' investment decisions. Fazzari, Hubbard, and Petersen (1988) find that financing factors affect firms' investment decisions. Kaplan and Zingales (1997) discover that firms appearing less financially constrained had higher investment-cash flow sensitivities, and conclude that sensitivities cannot be used to show financial constraints. A lively debate ensued (see Fazzari, Hubbard, and Petersen, 2000; and Kaplan and Zingales, 2000). Cleary (1999) strives to resolve the debate, finding that investment decisions are related to financial

factors, supporting the findings of Kaplan and Zingales (1997). Cleary (1999) selects several easily measured variables to classify firms based on the level of financing constraints.

In summary, there is evidence that agency costs are one explanation for the observed differences in firm leverage. The presence of a dominant owner or owner/manager can have a clear influence on the financing choice. Lastly, financing constraints can affect the investment decisions of firms but the effect on capital structure remains unknown.

III. Methodology

This paper examines the ways that financing constraints influence the capital structure choice, especially if when comparing between firms with different types of ultimate controllers.

Pooled cross-sectional regressions will be used with financial characteristics, firm performance measures, and a proxy for financial constraints as explanatory variables. I will also examine three subsamples of firms, divided by ultimate controller class, to estimate the relation for each of three types of firms (family controlled, corporate controlled, or widely-held). The regression models to be estimated are in the following form:

$$\text{Debt ratio} = f(\text{non-debt tax shields, growth opportunities, asset tangibility, size, profitability, ownership concentration, dividend payout, financing constraint}) \quad (1)$$

This model will be estimated for two different debt ratios: book-value and market-value based measures. This model will also be estimated for different classes of ultimate controller based on the 25% ownership cut-off level, using ownership and financial information from Thai public companies in 2002-2005. The 25% ownership cut-off level for the majority owner highlights the ability of ultimate controllers to influence the funding choice and the way capital structure responds to financing constraints.

IV. Description of Sample and Variables

A. Sample Description

The sample is taken from industrial companies traded on the Stock Exchange of Thailand (SET) for four years, 2002 to 2005. Company financial data and dividend payments are obtained from Datastream, published by Thomson Financial, and from the Stock Exchange of Thailand using the SETSMART data service. To be included in the sample, firms must have complete financial data available for the every full fiscal year from 2002 through 2005. Firms entering or leaving the stock market during a year are not included, as the financial data will not cover a complete fiscal year. Companies in the financial services sectors (banks, finance companies, and insurance firms) are not included in the sample as their financial characteristics are quite different from those of industrial firms. Table 1, Panel A shows a listing of the companies initially included in the sample for each year for a total of 1,120 firm-year observations over the four-year sample period. Companies with missing or incomplete data reduce the number of firms included in subsequent analyses. The variables used in this study will be discussed briefly in the following section.

B. Ownership Categories

The method used in this study to classify firms is roughly the same as the methods used in prior studies¹ (see La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Claessens, Djankov, Fan, and Lang, 2002; and Goergen,

¹ La Porta, Lopez-de-Silanes, and Shleifer (1999) use six classifications of ownership: widely-held (no controller); family (members of the same family with the same last name); state (government ownership); widely-held financial institutions (financial institutions that do not have a single controlling large shareholder); widely-held corporations (corporations that do not have a single controlling large shareholder); and widely-held groups (other widely-held entities not fitting into the above categories; examples would be a voting trust or a cooperative).

Renneboog, and Correia da Silva, 2005). I use a 25% ownership cutoff to determine if a firm has an ultimate controller².

For each sample firm, the owner(s) of the voting rights determines the ownership classification. Though it is possible to have differences in voting rights and cash flow rights, Thai law requires one share, one vote. For each year, a firm is classified into one ownership category based on the shareholder record available that is closest to the end of the fiscal year. Of the six mutually exclusive ownership classifications used, three are of interest in this study: widely-held (no ultimate owner); family or individual owned; and widely-held corporation.

The list of the top ten shareholders shows who controls the shares, that is who owns 25% or more. In addition to company shareholding records and annual reports, it is often necessary to consult outside sources to trace ownership³. If no ultimate controller is present, the firm is classified as ‘widely-held’. If an ultimate owner of the shares can be determined, the company is classified into one of the other five categories.

As needed, ownership of the shares is traced upwards through a network of companies, both private and public. Individual family members and family-controlled firms are all grouped together as “family”. Shareholders with the same last name are counted as family, as are known familial relationships (relatives, spouses, children, etc.) even if the last names are different. Corporations that are part of a family-controlled network are classified

² The threshold for determining a controlling owner may be set by researchers or by law. Wiwattanakantang (2001) notes that 25% can be used to give practical control of Thai firms as Thai law states that rather than having an absolute majority of shares (greater than 50%), the ownership threshold for effective control is 25%. While 50% ownership is the cut-off for absolute control, other researchers have used 20% or even as low as 10% ownership of the voting rights to determine the extent of control that a firm’s owners have over the company. The lower level(s) are also important because prior research has shown that it is possible to control a firm by owning a significantly lower portion of the shares (see La Porta, Lopez-de-Silanes, and Shleifer (1998) who find that 80% of firms can be controlled by stockholders owning less than 20% of the shares).

³ Examples would be the Ministry of Commerce; an on-line database of company records provided by Business Online Co., Ltd.; and numerous business directories.

as ‘family’. Firms classified as ‘corporate controlled’ are companies that have another non-family company as the ultimate controller, whether public or private, domestic or foreign.

C. Description of Variables

The study focuses on the debt ratio and two different methods are used to measure firm leverage. The book debt ratio is the book value of total interest-bearing debt while the market debt ratio is the book value of total interest-bearing debt divided by the sum of the book value of total liabilities plus the market value of shareholders’ equity. Each of explanatory variables used are described briefly along with the expected signs.

Non-debt tax shield (NDTS) is the ratio of depreciation expense divided by total assets. Since interest paid is tax deductible, the use of debt carries an advantage of tax-savings. For firms that already have other ways to reduce their corporate tax liability (depreciation expense, amortization, or other tax credits), the tax advantages of debt would be lower. This argument is advanced by DeAngelo and Marsulis (1980) who state firms with higher non-debt tax shields would display lower leverage. Thus, the expected sign is negative.

Two measures of asset tangibility are used, the same as were used by Wiwattanakantang (1999). The first measure, the market to book ratio, is the market value of shareholders’ equity divided by the book value of shareholders’ equity. This variable captures growth opportunities as valued by equity investors. Firms with growth opportunities have fewer tangible assets as the potential investments are intangible assets. Managers may have an incentive to accept more risky projects if funded with debt or to underinvest (Jensen and Meckling, 1976; Myers 1977). Therefore, it is expected that firms with more investment opportunities will have a lower debt ratio.

The net fixed assets ratio is a second variable to measure the effect of asset tangibility. This ratio is net tangible assets (net plant, property, and equipment) divided by total assets. “Hard” assets can be used as collateral and this implies a positive relation with the debt ratio.

According to the pecking order theory of capital structure, firms prefer to use internal funding first before going outside the firm for additional capital. This implies that firms that are more profitable would have less need for external funds, of which debt is the first choice. The expected sign is thus negative: firms that are more profitable will have lower debt ratios because they do not need external funds. The net operating income ratio measures firm profitability and is calculated by dividing earnings before interest and taxes by total assets.

Wiwattanakang (1999) notes that there are conflicting arguments in the literature concerning the relation between debt ratio and size. On one hand, larger firms may be less likely to go bankrupt, have higher borrowing capacities, and thus could support higher levels of debt. Size is serving as a proxy for credit risk in this case and the relation with the debt ratio would be positive. Larger firms are also more capable of providing information to creditors (Fama and Jensen, 1983) which would reduce the cost of monitoring by creditors, again implying a positive relation. In contrast, Rajan and Zingales (1995) argue an inverse relation between size and the extent of information asymmetries between firm insiders and outside investors. As larger firms typically disclose more, larger firms may prefer equity financing and thus lower debt ratios. The measure of size is the natural logarithm of sales.

With a large number of shareholders, individual shareholders may have a difficult time monitoring managers and lack the voting power to influence managers. Larger shareholders, in contrast, do have the means and the power (Shleifer and Vishny, 1997) as well as the incentive to monitor managers. With concentrated ownership, debt may be less likely to be used as a monitoring device for managers. The measure of ownership

concentration used is the percentage of total outstanding shares owned by the five largest shareholders.

Jensen, Solberg, and Zorn (1992) make a connection between dividend payments and the use of debt. They argue that firms trade off dividend payments with fixed financial obligations. This implies a negative relation between dividend payout and the debt ratio. The dividend payout ratio (POR) is the amount of cash dividends paid to common shareholders divided by earnings before interest and taxes. Some subtleties of Thai company law limit firms' ability to pay dividends. Thai law stipulates that dividends must be paid out of profits. Firms with an accumulated loss may not distribute dividends⁴. A decision hierarchy⁵ is used to determine the ability to pay a dividend and then calculate the corresponding dividend payout⁶ ratio.

KZ Score is a proxy for the level of financial constraint, calculated by discriminant analysis. Calculated by discriminant analysis, the KZ Score is updated every fiscal year as firms' financial condition is continually changing. The discriminant analysis uses common financial indicators to produce a function to distinguish between the two groups. The function takes the form:

$$\begin{aligned} \text{KS Score} = & \beta_1 \text{CURRENT} + \beta_2 \text{TIE} + \beta_3 \text{ROE} + \beta_4 \text{NI_PCT} \\ & + \beta_5 \text{SLS_GROWTH} + \beta_6 \text{DEBT} \end{aligned} \quad (2)$$

⁴ Section 115 of the Thai Public Companies Act, BE 2535, states: "Dividends shall not be paid other than out of profits. If the company still has an accumulated loss, no dividends shall be distributed"; Sersansia and Nimmansomboon (1996).

⁵ If the total cash dividend paid by a firm in fiscal year t is greater than zero, the firm is assumed able to pay, as the company would be breaking the law otherwise. If the firm has an accumulated loss (retained earnings at the end of fiscal year $t-1$ are less than zero) and net income after tax is positive in period t , then the firm is judged able to pay. The ability to pay a dividend hinges on the net profit earned in year t , which may then be sufficient to erase the loss and leave enough profit to be distributed to shareholders as a dividend during year t . If retained earnings at the end of fiscal year $t-1$ are less than zero and net income after tax is negative in period t , then the firm is judged unable to pay a dividend. If a firm is unable to pay, the payout ratio is set as missing rather than zero the firm is not included in the sample. If a firm is able to pay but chooses not to pay a dividend, the payout ratio is equal to zero.

⁶ Observations where the raw payout ratio is less than zero are deleted from the sample.

where CURRENT is the current ratio, TIE is times interest earned, ROE is return on equity, NI_PCT is the net income margin, SLS_GROWTH is the percentage growth in sales compared with the previous year, and DEBT is the debt ratio. Descriptions of the variables and the method for calculation are shown in the Appendix.

In this study, the discriminant function, six financial variables, and methodology are much like the method outlined in Cleary (2005). However, the criterion used for the initial separation into categories is significantly different⁷. Stylized facts and anecdotal evidence about the dividend paying habits of Thai firms mean that the initial separation method used by Cleary (2005) will not be appropriate. Thai firms appear to follow more of a residual dividend policy, maintain a relatively constant payout ratio⁸ rather than a constant dividend payment per share. In addition, there restrictions on the payment of dividends that may mean dividend changes may be driven more by legal requirements and thus may not serve as a useful indicator of financial status. Based on these unusual features, I set different starting criteria to separate the firms into the initial categories before completing the discriminant analysis.

The initial determination of financial constraint status hinges on whether a firm is legally able to pay a dividend. I use a firm's ability to pay a dividend (described earlier) as a starting point to separated firms into two categories: likely constrained or likely unconstrained⁹. Once the firms are initially categorized, the financial measures are used to

⁷ Cleary (2005) splits his samples into three categories based on the dividend paying state of each firm in each year: Group 1 companies increased dividends and are unlikely to be financially constrained; Group 2 companies decreased dividends and are likely to face financial constraints; Group 3 firms did not change their dividend payments. Group 3 firms are assigned a financial status index value but are excluded from the discriminant analysis.

⁸ For example, companies often publicize their dividend policy, stating the expected payout ratio is some percentage of net profits, subject to investment and other needs.

⁹ Firms are judged "likely unconstrained" or "likely constrained" based on this decision hierarchy: 1) if cash dividends were paid in year t, the firm is likely unconstrained; 2) if a firm is able to pay a dividend and the sum

calculate the discriminant function. The discriminant function is evaluated for every year in the sample, assigning each firm to the category of likely constrained or likely unconstrained firms. Using the assigned category, the values for the six variables in Eqn. 2, and the correct assigning function from the discriminant analysis, a value of KZ Score can be calculated for each firm in each year. The value of KZ Score is a univariate statistic that serves as a proxy for the presence or absence of financial constraints. A low KZ Score means the firm is not facing financial constraints. The expected relation of KZ Score to the debt ratio is negative. It is expected that managers at firms that are financially constrained would be less likely to use debt financing and incur a fixed financial obligation. Managers would prefer to retain profits and build financial slack.

V. Discussion of Results

A. Descriptive Statistics

Table 1 shows the descriptive statistics for the initial sample. In Panel A, there are a total of 1,120 firm-year observations spread across 2002 to 2005. The mean values for the book debt ratio and the market debt ratio are very similar at 0.25 and 0.24 respectively. The median values are similar but each is slightly smaller than the respective mean. For the explanatory variables, the mean and median values are quite similar, with the exception of market to book ratio and dividend payout. The market to book ratio ranges from a low of 0.07 to a high of over 10. The median value of 1.13 is a better gauge than the mean value of 1.59, as the Thai market yielded world-leading returns in 2003. The mean value for 2003 (not shown) was significantly higher than the other years in the sample, which means the median value across the four-year sample is more representative. Also, the mean dividend

of net operating cash flow and net investing cash flow in year t is greater than zero, the firm is likely unconstrained; 3) a firm is likely constrained if the first two conditions do not apply. For example, if a firm is able to pay a dividend and the sum net operating cash flow and net investing cash flow is less or equal to than zero, the firm is likely financially constrained.

payout value is nearly just over 75% while the median value is 37%. There are several observations with very high payout ratios, skewing the sample. Also, the number of firms with a dividend payout ratio is smaller than the full sample, as some firms were not legally able to pay a dividend. Thus, the payout value was recorded as a missing value rather than a value of zero.

Panel C shows comparisons of descriptive statistics divided by type of ultimate controller. Some generalizations stand out. For example, the median debt ratios for widely-held firms are higher than for family- or corporate-controlled firms. The mean and median values of the market to book ratio are highest for family firms. Corporate-controlled firms have the highest values for ownership concentration, with a mean value of 68.2% of the outstanding shares controlled by the five largest stockholders. Family firms have an average value of 58.9%, while the mean value for widely-held firms is 38.7%. Family-controlled firms have the highest mean and median payout ratios, with corporate-controlled firms next followed by the payouts of widely-held firms. Lastly, corporate-controlled firms show the lowest average value for the KZ Score of 1.21, meaning these firms have the least financial constraints. Widely-held firms are the most constrained, with an average KZ Score of 1.996, while family-controlled firms are in the middle.

Table 2 presents the correlation coefficients for the full sample. Some explanatory variables show correlations with the book debt and market debt ratios that match the expected sign (non-debt tax shields, net fixed assets, profitability, ownership concentration, and dividend payout). The measure of financing constraint, KZ Score, is negatively correlated with many explanatory variables.

B. Regression Results

Tables 3 and 4 show the regression results with the debt ratios as the dependent variable. The results for book debt ratio are in Table 3 and results for market debt ratio in Table 4. Because of missing data, there a total of 799 firm-year observations used for the regression analyses. Four separate regressions are run: a pooled sample with all firms across all four years, and three individual regressions where firms in all years are grouped according to their ultimate controller. In both Table 3 and Table 4, models A1 and B1 show the results for the pooled samples. The overall regressions are significant at the one percent level, with adjusted R-squared values of 0.30 and 0.34 for the book debt and market debt ratio regressions respectively. For both pooled regressions, the results are nearly identical with the exception of the coefficients for the market to book ratio. The coefficient is positive and significant in the book debt ratio regression while the opposite relation is observed in the market debt ratio regression. Looking next at the book debt ratio regressions, the results for the subsample regressions (models A2, A3, and A4) are consistent with the pooled regression for many explanatory variables. Across all three subsamples, the coefficients for profitability, payout, and financing constraint are negative and significant. However, some differences are puzzling. For example, the coefficients for several variables are negative and significant for family- and corporate-controlled firms but not for widely-held companies. Non-debt tax shields and market to book are not significant in the widely-held subsample regression. In only the family-controlled subsample, the coefficient for net fixed assets ratio (tangibility) is positive and significant. In only the corporate-controlled subsample is the coefficient for ownership concentration negative and significant.

In Table 4, the results for market debt ratio are largely the same as Table 3. The coefficients for profitability, payout, and financing constraint are negative and significant, as

before. Size is positive and significant in only the widely-held and family subsamples. Ownership concentration is negative and significant in only the family and corporate subsamples. As with the book debt ratio regressions, the coefficient for net fixed assets is positive and significant for only the family-controlled firms. Lastly, the coefficients for market to book are negative and significant for widely-held and family firms, notably different that the positive and significant value for family and corporate firms observed in the book debt ratio results.

C. Discussion

On balance, the regressions reveal most of the expected signs, confirming prior work and the theoretical predictions. For example, in both the book debt and market debt sets of regressions, the coefficients for profitability are negative and significant for the pooled samples and all subsamples. This confirms the predictions of the pecking order theory and the earlier findings of Wiwattanakantang (1999). Likewise, the coefficients for dividend payout are negative and significant in all pooled and subsample regressions. This finding supports the contention of Jensen, Solberg, and Zorn (1992) that dividends may be a substitute for the use of debt. For the proxy of financing constraints, all coefficients are negative and significant in the pooled and subsample regressions. This result suggests that firms facing financing constraints, no matter whether widely held or held by dominant owners, are less likely to incur fixed financial obligations. Conversely, managers at firms with lower levels of financing constraints—that is more liquid—would increase their use of debt.

The coefficients for non-debt tax shields are negative and significant for pooled regressions and the family and corporate subsample regressions, using both book debt and market debt as the dependent variable. This result is the same as found by Wiwattanakantang

(1999) and confirms the argument of DeAngelo and Marsulis (1980) that firms with other ways to reduce their tax obligations would have lower debt ratios. However, the coefficients for both widely-held subsamples are not significant.

In both pooled regressions, the coefficient for net fixed assets ratio is positive and significant, implying that firms with more fixed assets use more debt as the assets can serve as collateral. Interestingly, the subsample of family-controlled firms is the only subsample where this relation holds. The coefficients for widely-held and corporate-controlled firms are not significant.

Confirming the findings of Wiwattanakantang (1999), the coefficients for size are significant in the both sets of pooled, widely-held, and family regressions. This result supports the idea that size may be proxy for unobserved credit risk. The finding also supports the contention of Fama and Jensen (1983) that size may imply lower monitoring costs by creditors.

The share of the firm owned by the largest five shareholders has a negative and significant coefficient in both pooled regressions, but only for the corporate-controlled subsample. In contrast, Wiwattanakantang (1999) found a negative and significant relation between top five ownership and both book and market debt ratios. The descriptive statistics (Table 1) show that corporate-controlled firms have the highest mean value of ownership concentration, so perhaps these firms dominate the pooled regression. The lack of a negative coefficient, the expected sign, shows that concentrated ownership may not be a substitute for the monitoring of managers by creditors, different from the earlier results by Wiwattanakantang (1999).

The results for the market to book ratio, a measure of asset tangibility through growth opportunities, are the most challenging to interpret. Wiwattanakantang (1999) finds negative

and significant coefficients. However, in this study, the results are mixed. The coefficient is positive and significant in the book debt ratio for the pooled sample and the family-controlled subsample. This result implies that family-controlled firms with greater investment opportunities (intangible assets) have higher debt ratios, the opposite of theoretical predictions of underinvestment or acceptance of more risky projects (Jensen and Meckling, 1976; Myers 1977). When the debt ratio is measured using market values, however, the coefficients for market to book ratio are negative and significant in the pooled regression and for the widely-held and family-controlled subsamples. This result is now consistent with theoretical predictions.

VI. Conclusion

The results of this study show that firms' ownership characteristics influence the observed capital structures. While the results show that capital structures are largely consistent across different types of controlling shareholders, there are some interesting differences between the pooled sample and results from subsample regressions. For example, the two debt ratios are negatively related to a measure of financing constraint in a pooled regression and the three subsamples for widely-held firms, firms controlled by families, and corporate-controlled firms. In addition, concentrated ownership has a negative influence on the amount of debt used by family and corporate-controlled firms. This study confirms several earlier findings examining the agency cost explanations for observed differences in capital structure choices.

VII. References

- Alba, P., S. Claessens, and S. Djankov, 1998. Thailand's corporate financing and governance structures: impact on firms' competitiveness, World Bank Conference on Thailand's Dynamic Economic Recovery and Competitiveness, 20-21 May 1998, Bangkok.
- Brailsford, T., B. Oliver, S. Pua, 2002. On the relation between ownership structure and capital structure, *Accounting and Finance* 42, 1-26.
- Claessens, S., S. Djankov, J. Fan, and L. Lang, 2002. Disentangling the incentive and entrenchment effects of large shareholdings, *Journal of Finance* 57, 2741-2771.
- Claessens, S., S. Djankov, and L. Lang, 2000. The separation of ownership and control in East Asian corporations, *Journal of Financial Economics* 58, 81-112.
- Cleary, S., 1999. The relationship between firm investment and financial status, *Journal of Finance* 54, 673-692.
- Cleary, S., 2005. Corporate investment and financial slack: International evidence, *International Journal of Managerial Finance* 1, 140-163.
- Chen, C. and T. Steiner, 1999. Managerial ownership and agency conflicts: a nonlinear simultaneous equation analysis of managerial ownership, risk taking, debt policy, and dividend policy, *Financial Review* 34, 119-136.
- DeAngelo, H., and R. Masulis, 1980. Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics* 8, 3-30.
- Du, J. and Y. Dai, 2002. Ultimate corporate ownership structures and capital structures: evidence from East Asian economies, *Corporate Governance* 13:1, 60-71.
- Fama, E., and M. Jensen, 1983. Agency problem and residual claims. *Journal of Law and Economics* 26, 327-349.
- Fazzari, S., R. G. Hubbard, and B. Petersen, 1988. Financing constraints and corporate investment, *Brookings Papers on Economic Activity*, 141-95.
- Fazzari, S., R. G. Hubbard, and B. Petersen, 2000. Investment-cash flow sensitivities are useful: a comment on Kaplan and Zingales, *Quarterly Journal of Economics* 115, 695-705.
- Goergen, M., L. Renneboog, and L. Correia da Silva, 2005. When do German firms change their dividends? *Journal of Corporate Finance* 11, 375-399.
- Jensen, M., and W. Meckling, 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 13, 305-360.

- Jensen, G., D. Solberg, and T. Zorn, 1992. Simultaneous determination of insider ownership, debt, and dividend policies. *Journal of Financial and Quantitative Analysis* 27, 247-263.
- Khantavit, A., Y. Wiwattanakantang, and P. Polsiri, 2003. "Did families lose or gain control after the East Asian financial crisis? Evidence from Thailand," in *Designing Financial Systems in East Asia and Japan: Toward a Twenty-First Century Paradigm* (J. Fan and M. Hanazaki, and J. Teranishi, eds.), Routledge, 2003.
- Kaplan, S. N. and L. Zingales, 1997. Do financing constraints explain why investment is correlated with cash flow? *Quarterly Journal of Economics* 112, 169-215.
- Kaplan, S.N. and L. Zingales, 2000. Investment-cash flow sensitivities are not valid measures of financing constraints, *Quarterly Journal of Economics* 115, pp. 707-12.
- La Porta, R., F. Lopez-de-Silanes, and A. Shleifer, 1999. Corporate ownership around the world, *Journal of Finance* 54, 471-517.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1998. Law and finance. *Journal of Political Economy* 106, 1113-1155.
- Moh'd, M., L. Perry, and J. Rimbey, 1998. The impact of ownership structure on corporate debt policy: a time-series cross-sectional analysis. *Financial Review* 33, 85-98.
- Myers, S., 1977. Determinants of corporate borrowing, *Journal of Financial Economics* 5, 147-175.
- Rajan, R., and L. Zingales, 1995. What do we know about capital structure? Some evidence from international data, *Journal of Finance* 50, 1421-1460.
- Sersansia, S. and W. Nimmansomboon, 1996. *Public Limited Companies Act BE 2535*, Nititham Publishing House, Bangkok, Thailand.
- Shleifer, A. and R. Vishny, 1997. A survey of corporate governance, *Journal of Finance* 52, 737-783.
- Suehiro, A., 2001. Family business gone wrong? Ownership patterns and corporate performance in Thailand, Working Paper 19, Asian Development Bank Institute.
- Wiwattanakantang, Y., 1999. An empirical study on the determinants of the capital structure of Thai firms. *Pacific-Basin Finance Journal* 7, 371-403.
- Wiwattanakantang, Y., 2001. The ownership structure of Thai firms, Center for Economic Institutions, Institute of Economic Research, Hitotsubashi University, Working Paper 8, 2001.
- Zhuang, J., D. Edwards, and M. Capulong, 2000. Corporate governance and finance in East Asia, Asian Development Bank.

Table 1 – Descriptive Statistics

This table presents descriptive statistics for two debt ratios, a measure of financial constraint (KZ Score), and other variables. The sample is drawn from publicly traded industrial firms listed on the Stock Exchange of Thailand (SET) during 2002–2005. Data is from Datastream, published by Thomson Financial. Firms in the financial services sectors are excluded from the sample. Book Debt Ratio (BOOK_DEBT) is the book value of total interest-bearing debt while Market Debt Ratio (MKT_DEBT) is the book value of total interest-bearing debt divided by the sum of the book value of total liabilities plus the market value of shareholders' equity. Non-debt tax shield (NDTS) is the ratio of depreciation expense divided by total assets. Market to Book ratio (TANG1) is the market value of shareholders' equity divided by the book value of shareholders' equity. Net Fixed Assets ratio (TANG2) is net tangible assets (net plant, property, and equipment) divided by total assets. Net operating income ratio (PROFIT) is earnings before interest and taxes divided by total assets. The measure of SIZE is the natural logarithm of sales. Ownership Concentration (TOP_FIVE) is the percentage of total outstanding shares owned by the five largest shareholders. The Dividend Payout ratio (POR) is the amount of cash dividends paid to common shareholders divided by earnings before interest and taxes. KZ Score is a proxy for the level of financial constraint, calculated by discriminant analysis.

Panel A: Initial Sample Size

YEAR	2002	2003	2004	2005	TOTAL
Number of firms	249	253	290	328	1,120

Panel B: Full Sample

Variable	N	Mean	Std Dev	Median	Maximum	Minimum
Book Debt Ratio (BOOK_DEBT)	1,119	0.250	0.206	0.220	0.857	0.00
Market Debt Ratio (MKT_DEBT)	1,113	0.237	0.210	0.199	0.883	0.00
Non-debt tax shield (NDTS)	1,119	0.047	0.036	0.039	0.318	0.001
Market to Book ratio (TANG1)	1,120	1.588	1.356	1.133	10.090	0.069
Net Fixed Assets ratio (TANG2)	1,120	0.415	0.229	0.398	0.964	0.001
Net operating income ratio (PROFIT)	1,096	0.079	0.125	0.085	0.477	-2.318
Ln of Sales (SIZE)	1,120	14.475	1.355	14.507	19.047	9.990
Ownership Concentration (TOP_FIVE)	1,106	56.318	16.878	56.305	98.850	2.980
Dividend Payout ratio (POR)	878	0.752	2.737	0.369	53.812	0.00
KZ Score	1,063	1.623	1.906	1.123	10.951	-1.780

Panel C: Full Sample, Divided by Ownership Class at the 25 Percent Level

Widely-Held	N	Mean	Std Dev	Median	Maximum	Minimum
Book Debt Ratio (BOOK_DEBT)	246	0.284	0.212	0.258	0.857	0.00
Market Debt Ratio (MKT_DEBT)	245	0.284	0.226	0.242	0.883	0.00
Non-debt tax shield (NDTS)	246	0.038	0.025	0.038	0.124	0.002
Market to Book ratio (TANG1)	246	1.435	1.340	0.979	8.988	0.094
Net Fixed Assets ratio (TANG2)	246	0.415	0.245	0.391	0.964	0.004
Net operating income ratio (PROFIT)	243	0.038	0.187	0.066	0.333	-2.318
Ln of Sales (SIZE)	246	14.108	1.355	14.134	17.202	9.990
Ownership Concentration (TOP_FIVE)	244	38.749	13.066	37.305	95.28	2.98
Dividend Payout ratio (POR)	169	0.466	0.769	0.320	6.707	0.00
KZ Score	233	1.996	2.325	1.322	10.951	-1.361
Family	N	Mean	Std Dev	Median	Maximum	Minimum
Book Debt Ratio (BOOK_DEBT)	654	0.251	0.208	0.219	0.837	0.00
Market Debt Ratio (MKT_DEBT)	650	0.230	0.206	0.190	0.830	0.00
Non-debt tax shield (NDTS)	654	0.047	0.036	0.039	0.239	0.001
Market to Book ratio (TANG1)	655	1.730	1.474	1.219	10.090	0.069
Net Fixed Assets ratio (TANG2)	655	0.411	0.230	0.397	0.959	0.001
Net operating income ratio (PROFIT)	634	0.095	0.094	0.086	0.477	-0.717
Ln of Sales (SIZE)	655	14.485	1.361	14.489	19.047	10.580
Ownership Concentration (TOP_FIVE)	645	58.956	13.629	58.47	98.85	23.16
Dividend Payout ratio (POR)	549	0.851	3.271	0.392	53.812	0.00
KZ Score	623	1.622	1.814	1.141	10.573	-1.780
Corporation	N	Mean	Std Dev	Median	Maximum	Minimum
Book Debt Ratio (BOOK_DEBT)	219	0.212	0.190	0.203	0.812	0.00
Market Debt Ratio (MKT_DEBT)	218	0.206	0.191	0.190	0.802	0.00
Non-debt tax shield (NDTS)	219	0.054	0.044	0.044	0.319	0.001
Market to Book ratio (TANG1)	219	1.333	0.866	1.168	5.210	0.135
Net Fixed Assets ratio (TANG2)	219	0.426	0.207	0.427	0.946	0.025
Net operating income ratio (PROFIT)	219	0.080	0.105	0.089	0.324	-0.642
Ln of Sales (SIZE)	219	14.858	1.230	14.858	17.885	10.653
Ownership Concentration (TOP_FIVE)	217	68.232	14.102	69.34	97.74	38.43
Dividend Payout ratio (POR)	160	0.712	1.920	0.352	21.327	0.00
KZ Score	207	1.210	1.542	0.770	8.616	-1.347

Table 2 – Correlation Coefficients

This table presents correlation coefficients for two debt ratios, a measure of financial constraint (KZ Score), and other variables used in the subsequent regression analyses. The sample is drawn from publicly traded industrial firms listed on the Stock Exchange of Thailand (SET) during 2002–2005. Data is from Datastream, published by Thomson Financial. Firms in the financial services sectors are excluded from the sample. Book Debt Ratio (BOOK_DEBT) is the book value of total interest-bearing debt while Market Debt Ratio (MKT_DEBT) is the book value of total interest-bearing debt divided by the sum of the book value of total liabilities plus the market value of shareholders' equity. Non-debt tax shield (NDTS) is the ratio of depreciation expense divided by total assets. Market to Book ratio (TANG1) is the market value of shareholders' equity divided by the book value of shareholders' equity. Net Fixed Assets ratio (TANG2) is net tangible assets (net plant, property, and equipment) divided by total assets. Net operating income ratio (PROFIT) is earnings before interest and taxes divided by total assets. The measure of SIZE is the natural logarithm of sales. Ownership Concentration (TOP_FIVE) is the percentage of total outstanding shares owned by the five largest shareholders. The Dividend Payout ratio (POR) is the amount of cash dividends paid to common shareholders divided by earnings before interest and taxes. KZ Score is a proxy for the level of financial constraint, calculated by discriminant analysis. Statistically significant correlations at the 10, 5, and 1 percent levels are marked with *, **, and *** respectively.

	BOOK DEBT	MKT DEBT	NDTS	TANG1	TANG2	PROFIT	SIZE	TOP FIVE	POR	KZ Score
Book Debt Ratio (BOOK_DEBT)	1.00									
Market Debt Ratio (MKT_DEBT)	0.910***	1.00								
Non-debt tax shield (NDTS)	-0.128**	-0.150***	1.00							
Market to Book ratio (TANG1)	0.034	-0.265***	0.153***	1.00						
Net Fixed Assets ratio (TANG2)	0.134***	0.089***	0.221**	0.004	1.00					
Net operating income ratio (PROFIT)	-0.162***	-0.241***	-0.036	0.166***	-0.012	1.00				
Ln of Sales (SIZE)	0.155***	0.075**	0.038	0.116***	-0.138***	0.256***	1.00			
Ownership Conc. (TOP_FIVE)	-0.129***	-0.116***	0.165***	-0.016	0.014	0.066**	0.005	1.00		
Dividend Payout ratio (POR)	-0.085**	-0.069**	0.025	-0.021	-0.070**	-0.081**	0.030	0.021	1.00	
KZ Score	-0.282***	-0.306***	-0.062**	0.024	-0.088***	-0.046	-0.242***	-0.095***	-0.009	1.00

Table 3 – Regression Results for Book Debt Ratio, based on Ownership Class at the 25 Percent Ownership Level

This table presents regression results using the book debt ratio as the dependent variable. The sample is drawn from publicly traded industrial firms listed on the Stock Exchange of Thailand (SET) during 2002–2005. Data is from Datastream, published by Thomson Financial, using values from the end of the respective fiscal year for each firm. Firms in the financial services sectors are excluded from the sample. The dependent variable, BOOK_DEBT, is the book value of total interest-bearing debt divided by total assets. Non-debt tax shield (NDTS) is the ratio of depreciation expense divided by total assets. Market to Book ratio (TANG1) is the market value of shareholders' equity divided by the book value of shareholders' equity. Net Fixed Assets ratio (TANG2) is net tangible assets (net plant, property, and equipment) divided by total assets. Net operating income ratio (PROFIT) is earnings before interest and taxes divided by total assets. The measure of SIZE is the natural logarithm of sales. Ownership Concentration (TOP_FIVE) is the percentage of total outstanding shares owned by the five largest shareholders. The Dividend Payout ratio (POR) is the amount of cash dividends paid to common shareholders divided by earnings before interest and taxes. KZ Score is a proxy for the level of financial constraint, calculated by discriminant analysis. The pooled regression uses data from all three ownership categories. Regressions for three subsamples are also shown. The three subsamples are divided based on type of controlling owner at the 25 percent level of ownership: no controlling owner (WIDELY-HELD), family (FAMILY), or corporation (CORP). Statistically significant coefficients at the 10, 5, and 1 percent levels are marked with *, **, and *** respectively.

Variable	(A1) POOLED	(A2) WIDELY- HELD	(A3) FAMILY	(A4) CORP
Intercept	-0.106 (-1.28)	-0.838 *** (-4.61)	-0.031 (-0.28)	0.397 ** (2.07)
Non-debt tax shield (NDTS)	-0.971 *** (-5.60)	-0.660 (-1.01)	-1.021 *** (-4.38)	-0.658 *** (-2.70)
Market to Book ratio (TANG1)	0.031 *** (5.97)	0.003 (0.25)	0.031 *** (5.17)	0.046 *** (3.47)
Net Fixed Assets ratio (TANG2)	0.141 *** (4.74)	0.117 * (1.75)	0.169 *** (4.43)	-0.048 (-0.78)
Net operating income ratio (PROFIT)	-0.806 *** (-7.27)	-0.682 ** (-2.39)	-0.803 *** (-6.16)	-0.730 *** (-3.24)
Ln of Sales (SIZE)	0.034 *** (6.63)	0.086 *** (7.31)	0.027 *** (4.11)	0.008 (0.71)
Ownership Conc. (TOP_FIVE)	-0.001 *** (-3.68)	-0.001 (-0.72)	-0.001 (-1.42)	-0.002 ** (-2.52)
Dividend Payout ratio (POR)	-0.007 *** (-3.20)	-0.055 *** (-3.38)	-0.005 ** (-2.44)	-0.012 ** (-2.07)
KZ Score	-0.032 *** (-7.59)	-0.025 *** (-2.77)	-0.030 *** (-5.64)	-0.080 *** (-8.86)
Adj. R-Squared	0.302	0.340	0.287	0.555
F-statistic	44.13 ***	10.96 ***	25.74 ***	24.70 ***
N	799	156	494	153

Table 4 – Regression Results for Market Debt Ratio, based on Ownership Class at the 25 Percent Ownership Level

This table presents regression results using the market debt ratio as the dependent variable. The sample is drawn from publicly traded industrial firms listed on the Stock Exchange of Thailand (SET) during 2002–2005. Data is from Datastream, published by Thomson Financial, using values from the end of the respective fiscal year for each firm. Firms in the financial services sectors are excluded from the sample. The dependent variable, MKT_DEBT, is the book value of total interest-bearing debt divided by the sum of the book value of total liabilities plus the market value of shareholders' equity. Non-debt tax shield (NDTS) is the ratio of depreciation expense divided by total assets. Market to Book ratio (TANG1) is the market value of shareholders' equity divided by the book value of shareholders' equity. Net Fixed Assets ratio (TANG2) is net tangible assets (net plant, property, and equipment) divided by total assets. Net operating income ratio (PROFIT) is earnings before interest and taxes divided by total assets. The measure of SIZE is the natural logarithm of sales. Ownership Concentration (TOP_FIVE) is the percentage of total outstanding shares owned by the five largest shareholders. The Dividend Payout ratio (POR) is the amount of cash dividends paid to common shareholders divided by earnings before interest and taxes. KZ Score is a proxy for the level of financial constraint, calculated by discriminant analysis. The pooled regression uses data from all three ownership categories. Regressions for three subsamples are also shown. The three subsamples are divided based on type of controlling owner at the 25 percent level of ownership: no controlling owner (WIDELY-HELD), family (FAMILY), or corporation (CORP). Statistically significant coefficients at the 10, 5, and 1 percent levels are marked with *, **, and *** respectively.

Variable	(B1)	(B2)	(B3)	(B4)
	POOLED	WIDELY-HELD	FAMILY	CORP
Intercept	0.081 (1.01)	-0.616 *** (-3.44)	0.155 (1.47)	0.515 *** (2.80)
Non-debt tax shield (NDTS)	-0.723 *** (-4.35)	-0.581 (-0.90)	-0.652 ** (-2.96)	-0.606 ** (-2.59)
Market to Book ratio (TANG1)	-0.018 *** (-3.55)	-0.053 *** (-3.88)	-0.016 *** (-2.72)	-0.006 (-0.46)
Net Fixed Assets ratio (TANG2)	0.089 *** (3.11)	0.075 (1.15)	0.104 *** (2.89)	-0.080 (-1.34)
Net operating income ratio (PROFIT)	-0.825 *** (-7.76)	-0.895 *** (-3.19)	-0.896 *** (-6.70)	-0.607 *** (-2.80)
Ln of Sales (SIZE)	0.027 *** (5.39)	0.076 *** (6.59)	0.019 *** (3.10)	-0.005 (0.44)
Ownership Conc. (TOP_FIVE)	-0.001 *** (-3.88)	0.0002 (0.22)	-0.001 (-1.64)	-0.002 *** (-2.76)
Dividend Payout ratio (POR)	-0.006 *** (-3.15)	-0.060 *** (-3.77)	-0.005 ** (-2.20)	-0.012 ** (-2.25)
KZ Score	-0.034 *** (-8.51)	-0.029 *** (-3.29)	-0.031 *** (-6.25)	-0.082 *** (-9.35)
Adj. R-Squared	0.338	0.413	0.318	0.537
F-statistic	51.88 ***	14.65 ***	29.75 ***	23.05 ***
N	799	156	494	153

APPENDIX
Variables Used to Calculate the KZ Score

The six variables used for the discriminant analysis, and the corresponding Worldscope data codes, are as follows:

- 1) CURRENT = Current ratio, $\frac{\text{Current Assets (WC02201)}}{\text{Current Liabilities (WC03101)}}$
- 2) TIE = Times interest earned, $\frac{\text{Earnings before interest and taxes (WC18191)}}{\text{Interest Expense on debt (WC01251)}}$
- 3) ROE = Return on equity, $\frac{\text{Return}}{\text{Common equity (WC03501)}}$
- 4) NI_PCT = Net income margin, $\frac{\text{Return}}{\text{Net Sales (WC01001)}}$

For ROE and NI_PCT, Return = Net income before extraordinary (XO) items minus or plus any extraordinary charges: WC01551 – WC01254 + WC01253

- 5) SLS_GROWTH = Percentage growth in sales compared with the previous year using

Net Sales (WC01001), $\frac{\text{Sales in year } t - \text{Sales in year } t - 1}{\text{Sales in year } t - 1}$

- 6) DEBT = Debt ratio, $\frac{\text{Long - term debt due in more than one year (WC03251)}}{\text{Total assets (WC02999)}}$

Before running the discriminant analysis, some of the preceding variables are winsorized or adjusted as below:

- If CURRENT \geq 6.08 then CURRENT = 6.08; (winsorized at the 95% level)
- If CURRENT $<$ 0 then the observation is deleted; missing values deleted.
- If TIE \leq 0 then TIE = -0.1; if TIE \geq 100 then TIE = 100; missing values deleted.
- If ROE \leq -1 then ROE = -1; if ROE \geq 1 then ROE = 1; missing values deleted.
- If SLS_GROWTH \leq -1 then SLS_GROWTH = -1; if SLS_GROWTH \geq 1 then SLS_GROWTH = 1; missing values deleted.
- If DEBT \geq 1 then DEBT = 1; missing values deleted.
- If NI_PCT \leq -1 then NI_PCT = -1; if NI_PCT \geq 1 then NI_PCT = 1; missing values deleted.