สำนักวิทยบริการและเทคโนโลยีสารสนเทศ

# KEY FACTORS INFLUENCING CAPITAL STRUCTURE DECISION AND CAPITAL STRUCTURE DYNAMICS: EVIDENCE FROM LISTED COMPANIES IN SET

ลงทะเบียนวันที่ 3 ก.ย. 2556
เลขทะเบียน 131764
เลขหมู่ THE HF 5681.C25 S96
หัวเรื่อง Capital - Accounting

SUPA TONGKONG

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PHILOSOPHY PROGRAM IN BUSINESS ADMINISTRATION
FACULTY OF BUSINESS ADMINISTRATION
RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI
ACADEMIC YEAR 2012

| | |
|---|---|
| **Dissertation Title** | Key Factors Influencing Capital Structure Decision and Capital Structure Dynamics: Evidence from Listed Companies in SET |
| **Name Surname** | Mrs. Supa Tongkong |
| **Program** | Business Administration |
| **Dissertation Advisor** | Mr. Sittiporn Intuwonges, Ph.D. |
| **Dissertation Co-advisor** | Associate Professor Tatre Jantarakolica, Ph.D. |
| **Academic Year** | 2012 |

---

**DISSERTATION COMMITTEE**

.....Chairman
(Mr. Thanomsak Suwannoi, D.B.A.)

.....Committee
(Associate Professor Sudjai Tolpanichgit, Ph.D.)

.....Committee
(Assistant Professor Wanchai Prasertsri, Ph.D.)

.....Committee
(Associate Professor Tatre Jantarakolica, Ph.D.)

.....Committee
(Mr. Sittiporn Intuwonges, Ph.D.)

Approved by the Faculty of Business Administration, Rajamangala University of Technology Thanyaburi in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Business Administration

.....Dean of Faculty of Business Administration
(Associate Professor Chanongkorn Kuntonbutr, D.B.A.)
March 17, 2013

| | |
|---|---|
| **Dissertation Title** | Key Factors Influencing Capital Structure Decision and Capital Structure Dynamics: Evidence from Listed Companies in SET |
| **Name Surname** | Mrs.Supa Tongkong |
| **Program** | Business Administration |
| **Dissertation Advisor** | Mr.Sittiporn Intuwonges, Ph.D. |
| **Dissertation Co-advisor** | Associate Professor Tatre Jantarakolica, Ph.D. |
| **Academic Year** | 2012 |


## ABSTRACT

The purposes of this study are 1) to determine the four influential factors, namely, industry variable, firm-specific variables, stock market circumstance, macroeconomic conditions, and how these factors influence capital structure decisions, 2) to establish optimal capital structure decision models, and 3) to explore how firms adjust their current capital structure towards the target levels. This study uses balanced dynamic panel data covering nine consecutive years during 2002 to 2010 which contains 128 companies listed in the Stock Exchange of Thailand rooted in industrials, property and construction, and services industries. The analysis employs multiple linear regression models including FGLS regression, Fixed-effects (within) regression, and Random-effects GLS regression in examining factors influencing capital structure decision and estimating optimal capital structure decision models, and dynamic panel regression model comprising Fixed-effects (within) regression, Random-effects GLS regression, one-step and two-step Arellano and Bond GMM estimators in determining the speed of adjustment towards target capital structure.

The study indicates the following results. The average values of total book leverage and long-term book leverage are 40% and 13% respectively. The finding reveals that firms have optimal capital structure decision model. Industry leverage, firm size, growth opportunity, and asset tangibility have positive effect to leverage, where profitability, liquidity, and dividend payout are negatively related to leverage level. Both trade off and pecking order theories remain the explanation on optimal capital structure decision. Further, the findings indicate that firms partially adjust capital structure towards their target leverage over time and the speeds of adjustment vary across industries. Listed companies in SET adjust towards target total book leverage at the annual rate of 34% that suggest the half-life of 1.7 years, and move towards long-term book leverage at the speed of 69% which take 0.6 year to close their long-term book leverage back one-half the distance to the target leverage. The finding indicates that listed companies in SET pursue target capital structures during 2002 – 2010. The results of this study strongly support the dynamic trade-off theory.



**Keywords:** Capital Structure Dynamics, Dynamic Trade-off Theory, Dynamic Panel Data Model, Speed of Adjustment, Half-life

## DECLARATION

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and beliefs, contains on material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my dissertation, when deposited in the university library, being available for loan and photocopying.

Supa Tongkong

## ACKNOWLEDGEMENTS

Joining the Ph.D. Program at Rajamangala University of Technology Thanyaburi enables me to grow in so many directions, as an academic and a person. I have been blessed with friends and professors who have supported and provided guidance throughout the last several years.

I have benefited greatly from the guidance and advice of my committee members. I am indebted to Dr.Sittiporn Intuwonges who has been an outstanding advisor and Associate Professor Dr.Tatre Jantarakolica, the co-advisor an inspiration on how to conduct quality research. Other committee members, namely Dr.Thanomsak Suwannoi, Associate Professor Dr.Sudjai Tolpanichgit, and Assistant Professor Dr.Wanchai Prasertsri, have provided me tremendous suggestions and motivation to think carefully on the research ideas and methodology throughout the dissertation duration process. Furthermore, I thank Rajamangala University of Technology Tanyaburi for the tremendous financial supports and flexibility during my several previous years of my education.

I am most thankful for my family who always supports and encourages me in every endeavor in my life. Without their loves, patience and encouragement, I will not be who I am today.

Supa Tongkong

## TABLE OF CONTENTS

## LIST OF TABLES

## ABBREVIATIONS

| Abbreviation | Meaning |
|---|---|
| BLUE | Best linear unbiased estimator |
| $DIVP_{it}$ | Dividend payout ratio of firm i at year t |
| FE | The Fixed Effects (within) Regression |
| FGLS | Feasible Generalized Least Squares |
| GMM | The Generalized Method of Moments |
| GDP | Gross domestic product |
| $IL_{it}$ | Industry leverage of industry-sector i at year t |
| $INFLA_{it}$ | Expected inflation rate over the coming year at year t |
| $L^{*}_{it}$ | Optimal capital structure of firm i at year t |
| $L_{it}$ | Capital structure of firm i at year t |
| $L_{it-1}$ | Capital structure of firm i at year t-1 |
| $LIQ_{it}$ | Liquidity ratio of firm i at year t |
| LLBA | Total non-current liabilities to total book value of assets |
| LLBAA | The industry-sector mean of total non-current liabilities to total book value of assets |
| LLBAM | The industry-sector median of total non-current liabilities to total book value of assets |
| MAI | Market for Alternative Investment |
| $MTB_{it}$ | Market to book ratio of firm i at year t |
| $NDT_{it}$ | Non-debt tax shield of firm i at year t |
| $PROF_{it}$ | Profitability of firm i at year t |
| $R^2$ | The coefficients of determination |
| RE | The Random Effects GLS Regression |

| | |
|---|---|
| $RISK_{it}$ | Earnings volatility of firm i at year t |
| SET | The Stock Exchange of Thailand |
| $SETR_{it}$ | Annual SET index return at year t |
| $SIZE_{it}$ | Size of firm i at year t |
| SOA | Speed of adjustment |
| $TANG_{it}$ | Tangibility of firm i at year t |
| TLBA | Total liabilities to total book value of assets |
| TLBAA | The industry-sector mean of total liabilities to total book value of assets |
| TLBAM | The industry-sector median of total liabilities to total book value of assets |
| VIF | The variance inflation factor |

# CHAPTER 1

# INTRODUCTION

## Background and Statement of the Problem

For finance academic, optimal capital structure decision which is how firms are financed through a mix of debt and equity capital is one of the most important issues in corporate finance. Not only for maximization of shareholders' wealth, but the firms also had to create the advantages in a highly competitive market environment. Pursued wisely, proper capital structure decisions should increase value of firms in financial markets. "Scholarly research suggests that there is an optimal capital structure range. It is not yet possible to provide financial manager with a specific methodology for use in determining a firm's optimal capital structure" (Gitman, 2006, p. 555). According to several researches, the optimal capital structure is determined by a complex set of factors (Anderson, 2002; Bancel & Mittoo, 2004; Bevan & Danbolt, 2002; Frank & Goyal, 2004; Bhabra, Liu & Tirtiroglu, 2008; Mazur, 2007; Frank & Goyal, 2009). For example, Mazur (2007) found that liquidity, profitability, uniqueness, assets structure, and size are significant determinants of capital structure. In contrast, Bhabra et al. (2008) indicated that significant factors influencing capital structure decision are proportion of tangible assets, size, profitability, and growth opportunities. Moreover, Frank and Goyal (2009) discovered that the reliable factors for explaining market leverage are median industry leverage, market-to-book assets ratio, tangibility of assets, profits, log of assets and expected inflation. Hence, the influential determinants of optimal capital structure have been disagreed over decades of empirical studies.

According to the literatures, the current state of capital structure theories is to take for granted as trade-off among several components, for example, the tax shields, the financial distress cost, the agency cost of debt and equity, the equity market timing, the firm dynamics and macroeconomic conditions. The first two factors reflect the trade-off theory concept while the agency cost concentrate on the individual incentives of decision markers. The fourth component that was supported by the equity market timing draws the picture of market time periods that affects security issuance decision. Meanwhile the firm dynamics indicates the firm's ability to adjust their capital structure and investment choices over time. Moreover, business organizations might time their issuance option to correspond with durations of beneficial macroeconomic conditions.

In summary, factors that are relevant to capital structure decisions remain difficult to identify despite a huge of academic literatures and decades of empirical studies. This comes from the actuality that most of the empirical researches are proposed to advocate for a particular theory (Miguel & Pindado, 2001; Korajczyk & Levy, 2003; Frank & Goyal, 2004; Miao, 2005; Bhabra et al., 2008; John & Litov, 2009; Sibilkov, 2009). As a result, the overall understanding of capital structure decisions is problematic. The capital structure decision was explained with various models, but none of them give a complete description of the factors that are significant determinants and have reliable signs to capital structure decision. Moreover, the research results had some differences, both the relevant factors and the signs of the factors. Despite decades of studies, capital structure decision continues to be one of the most arguable issues in contemporary corporate finance. As a result, the question "What are the key influential factors that resolve capital structure decisions?" still stays behind inquiry. Consequently, there still has a need to explore key factors influencing

capital structure decisions that helps the decision-makers to adjust the appropriate leverage level for their firms. In addition, this study will fill the gap in the literature with regards to the signs and relevant factors that are influencing capital structure decisions. Furthermore, if firms' current capital structures differ from their optimal capital structures or target capital structures, how do they adjust their capital structures and what are the speed of adjustment (SOA)? According to this question, most of previous studies explored based on firms' in developed countries, rarely are founded on companies rooted in developing countries, especially in Thailand. Therefore, this study will assist in describing the SOA towards target capital structures for listed companies in the Stock Exchange of Thailand (SET).

## Purpose of the Study

The aim of this research consists of three main purposes. The first objective is to investigate the key influential factors and how they influence capital structure decisions of listed companies in SET. More specifically, how industry variable, firm-specific variables, stock market conditions and macroeconomic conditions become significantly involvement in determining capital structure decisions. Additionally, optimal capital structure decision models are also determined as well as the investigation of how do firms listed in SET, which have leverage ratio differ from optimal capital structure, adjust their capital structure towards the target level.

## Research Questions and Hypotheses

In relation to the purposes of this study, research questions in this study include:

1. What are the factors considered as reliable signs and significant determinants of capital structure decisions for listed companies in SET?
2. For listed companies in SET, what are their optimal capital structure models?
3. How do firms that are listed in SET adjust their capital structure towards their target capital structure?

According to the above research questions, the suggested hypotheses of capital structure decision are:

1. Capital structure decision is a function of industry variable, firm-specific variables, stock market conditions and macroeconomic conditions.

*Capital structure decision = f (industry variable, firm-specific variables, stock market conditions, macroeconomic conditions)*

2. Firms partially adjust their capital structure towards their target capital structure.

## Theoretical Perspectives

To formulate a theoretical perspective for examining the keys factors in influencing capital structures decisions and how do firms adjust their capital structure

towards the target level, the static trade-off theory, the dynamic trade-off theory, the agency theory, the pecking order theory, and the market timing theory contribute a useful model. Firstly, the static trade-off theory which was introduced by Kraus and Litzenberger in 1973, it was employed to clarify the fact that firms are regularly financed partially with debt and partly with owner equity. This theory indicates that keeping the firm's investment plans and assets constant, a firm's optimal leverage ratio is resolved by trading off between the tax benefit and the disadvantages of debt. The costs of debt consist of bankruptcy costs, while the benefit is tax deductibility if the firm has a taxable profit. The firm maximizes its value by replacing debt for equity or equity for debt until the firm's value is maximized. More specifically, the marginal advantage of additional increases in debt falls, even as the marginal cost of increasing in debt boosts up. As a result, there are advantages to leverage within a capital structure until the optimal capital structure is achieved. As applied to my study if this theory holds, using debt as a means of financing is attractive since the benefits of tax saving from debt payments shields a number of costs from debt financing. More profitable firms could have higher benefits from debt financing and have lower level of financial distress costs. That is, soaring profit firms should have higher level of leverage.

The second relevant conjecture is the dynamic trade-off theory which was developed by Fischer, Heinkle and Zechner (1989). The theory grants the firm's optimal dynamic capital structure policy relies on the benefits and costs of debt financing underlying the riskless interest rate, asset variability, and the costs of recapitalizing. The theory implies that each firm has a target capital structure and gradually moving towards it by issuance or repurchase of equity or debt. Firms whose capital structures differ from their target level would adjust their capital structure when

the advantages prevail over the costs of adjustment. Therefore, the adjustment process relies on the benefits and costs of equity and debt financing. This implies that corporate capital structures may not always concur with their target leverage. As applied to my study if this theory holds, firms will partially move towards their target capital structure.

Apart from the idea of the dynamic trade-off theory, current literatures include the agency theory which explains the relationship between principals and agents, for example, the association between shareholders and corporate executives as well as the connection between bondholders and shareholders. This theory was suggested by Jensen and Meckling in 1976, and it was use to explain how firms renovate a decision whether to finance their investment with debt or with equity instruments. The theory stems from the specific problems caused by different goals of principals and agents with supposed conflicts of interest or agency conflicts between shareholders and managers, and between debt holders and stockholders. When the conflicts of interest occur, it has a propensity to give respond to agency costs, which are the costs of resolving conflicts between the principals and agents and aligning interests of the two groups. This theory implies that the appropriate combination of debt and equity capital could help solving the conflicts of interest and reduce the agency costs. Firms that are stiff controlled by major shareholders will have less agency costs and will have more efficient managed. Hence, debt is less valuable as a control means and firms with higher equity to debt ratio are more restricted and expected to have smaller amount of agency problems.

Fourthly, the pecking order theory of capital structure, this theory was developed by Myers (1984), Myers and Majluf (1984), and it was used to describe the sequence of firms' financing decisions, where retained earnings have a preference over debt, and debt is favored over equity. Moreover, the firms prefer internal financing over external financing. If the firms issue securities, the firms favor debt over equity. The theory was clarified by securities' issuing costs and transaction costs. Retained earnings require few transaction costs while issuing debt involves debt issuance costs but still lower than equity issuance costs. On top of that, debt financing includes tax benefits if a firm has a taxable profit. In summary, the interpretation of the pecking order theory implies that equity is never issued if debt is feasible. As applied to my study if this theory holds, profitability would be expected to explain the firm's leverage level and more profitable firms will have less leverage.

Recently, the idea of market timing has become more popular due to the fact that firms financial situation changes through time. This theory was suggested by Baker and Wurgler in 2002, and it was use to explain how firms decide whether to finance their investment with debt or with equity instruments. This theory indicates that corporate executives are able to time the equity market and issue equity when firms' equity market value is high and repurchase the shares when the market value is low. In other words, security issuance decisions are affected by managers' ability to time the equity market. In summary, firms prefer equity when the relative cost of equity is low, and prefer debt otherwise. As applied to my study if this theory holds, stock markets conditions would be expected to explain the firm's leverage level. That is, during bullish equity market, firms prefer equity issuance over debt financing.

## Definition of Terms

In the application of the trade-off theory both static and dynamic, the agency theory, the pecking order theory, and the market timing theory to study the significant factors influencing capital structure decisions of listed companies in SET and its SOA, the six classes of variables will be defined in the following manner.

1. The listed companies in SET are firms that are registered and traded at the Stock Exchange of Thailand during 2002-2010.
2. Capital structure decisions are the financing decisions dealing with a mix of debt and equity which the firm plans to finance its investments. Two alternative definitions of capital structure decisions are used in this study:
   (1) Total liabilities to total book value of assets (*TLBA*)
   (2) Total non-current liabilities to total book value of assets *(LLBA)*
3. The industry variables consist of four alternative proxies of the median and the mean of industry-sector leverage which are:
   (1) The industry-sector median of total liabilities to total book value of assets (*TLBAM*)
   (2) The industry-sector median of total non-current liabilities to total book value of assets (*LLBAM*)
   (3) The industry-sector mean of total liabilities to total book value of assets (*TLBAA*)
   (4) The industry-sector mean of total non-current liabilities to total book value of assets (*LLBAA*)

4. The firm-specific variables include profitability, firm size, growth opportunity, nature of assets, non-debt tax shield, liquidity, dividend payout, and earnings volatility.
5. Stock market conditions are measured with annual SET index return.
6. Macroeconomic conditions refer to the expected inflation rate over the coming year.

## Delimitations and Limitations of the Study

This research starts with already well established factors that are reliable signs and important determinants of the capital structure decisions from the literatures. In order to develop the optimal capital structure decision model, the well indentified firm-specific variables together with industry leverage, stock market conditions, and macroeconomics indicators were applied to the study. The quantitative research method of multiple regressions and dynamic multiple regression models were applied for the research analysis. Later on, empirical study will be acquainted to investigate reliably empirical patterns and to explore the relation between the evidence and the theories. In summary, this research will pursue a deductive approach.

All companies that are listed in SET during the year 2002 – 2010 are population for this study. The samples include all companies which have continuous and completed data for nine consecutive years during the period 2002 - 2010 from the three main industries: industrials, property and construction, and services industry. However, the companies under rehabilitation were ruled out from the study since capital structure decisions of these companies have to follow the Bankruptcy Act. The secondary panel

data was collected from the Stock Exchange of Thailand, Business Online Public Company Limited and the Bank of Thailand.

## Significance of the Study

This study represents an attempt to offer the expected contributions in two folds. Firstly, on the theoretical side, this dissertation will identify reliable factors and signs for capital structure determinants, assist the understanding of how financing mix was influenced by industry leverage, firm-specific variables, stock market condition, and the economic condition. Moreover, the study also contributed the optimal capital structure decisions model for the listed companies in SET, and to fulfill the gap of the literature on capital structure's determinants which are arguable over decades of empirical studies. Furthermore, the study would assist the understanding on how firms adjust their capital structure towards their optimal capital structure. Turning to the practical side, the results from this dissertation might assist practitioners in both designing the appropriate capital structure and predicting the demand for fund. Furthermore, a better understanding of the optimal capital structure decision is essential in improving firm competitive capabilities which will lead to firm value maximization. Additionally, the findings could be applied to formulate loan strategies for policy makers in both private and public sectors.

## Organization of the Dissertation

This dissertation is organized into five chapters. The second chapter provides a review of the capital structure theories, the relevant literature on existing capital structure determination, and capital structure dynamics. Chapter three discusses the research methodology, including theoretical framework, research design, data processing, and data analysis. Chapter four presents and discusses the hypotheses testing and the research results. Chapter five concludes the research finding and provides some discussions, limitations of the study, some implications for practice and future research. Further robustness tests are taken in the appendix.

# CHAPTER 2

# REVIEW OF THE LITERATURE

This chapter provides a review of the literatures related to the firm's capital structure which refers to the mix of debt and owner equity a company funding its capital needed to organize and enlarge its business activities. The review includes definition of capital structure and leverage, capital structure theories, and the related evidence of major factors influencing capital structure decisions.

The remainder of this chapter is organized as follows: section A considers definition of capital structure; section B provides a brief overview of capital structure theories; and section C reflects on capital structure determinants.

## A. Definition of Capital Structure

Capital structure is identified as the funds a business used to finance its operations through a definite combination of liability and owner equity. Generally, the ratio of debt to total financing is referred to as the firm's leverage or leverage ratio. Practically, numerous substitute meanings of capital structure decisions have been applied in the literatures. Nearly all studies examine some alternatives of leverage ratio. Capital structure determinants materialize to alter significantly based on which constituent of debt is being studied (Rajan & Zingales, 1995; Bevan & Danbolt, 2002). Abor (2008) considered capital structure decisions through long-term debt to total assets and short-term debt to total assets, whereas Faulkender and Petersen (2006) investigated capital structure decisions rooted in the definitions of total debt to book

value of total assets and total debt to total book value of assets minus book value of owner equity plus equity's market value. Frank and Goyal (2009) studied capital structure decisions through total debt to total book value of assets, total debt to total market value of assets, long-term debt to total book value of assets and long-term debt to total market value of assets. These differ in whether only short-term debt or long term debt or total debt is considered. They also vary in accordance with whether market values or book values of assets are examined.

Recently, Welch (2010) suggested that financial debt to asset ratio[1] is flawed as a measure of leverage. The ratio increases with the rising in financial debt which is correct, but it falls with the extension in non-financial liabilities which is incorrect. Hence, future research should avoid financial debt to asset ratio. To overwhelm this problem, the balance sheet leverage, total liabilities to total assets, is introduced for better reasonably common alternative measure of leverage. Total liabilities to total assets correctly specify more leverage when either the firm's financial or non-financial liabilities are higher. Moreover, when the creditors analyze their customers in order to offer the loan to them, they normally consider firms leverage as total liability. Therefore, corporate debt capacity is influenced not only by long-term debt but also by other liabilities as well. Additionally, trade credit which is the most important part of current liabilities is a vital source of short-term debt. Therefore, account payable should be included in leverage measures. Hence, total liability to total asset is considered to be an appropriate proxy of capital structure decision.

[1] The balance sheet of a firm consists of three components; those are total assets equal financial debt, non-financial liabilities, and equity. The financial debt to asset ratio, FD/A, is the sum of long-term debt and debt in current liabilities divided by assets. The assets are normally quoted in book value, but they are sometimes translated into market value.

In case of explicitly interested in financial leverage, the financial debt to capital ratio which is the ratio of financial debt divided by financial debt plus equity should be used. Additionally, it is considered to use book values as leverage should be explicated from a specific point in time. Since, the application of market value approach, total liabilities to total market value of assets and financial debt to total market value of capital, might create the bias from future expectation. Additionally, capital structure decisions for financial executives are generally book value rather than market value (Toy et al., 1974 as cited in Huang & Song, 2006). Therefore, two alternatives definitions of leverage ratio are considered as capital structure proxies in this study: total liabilities to total book value of assets (*TLBA*), and total non-current liabilities to total book value of assets (*LLBA*).

## B. Capital Structure Theories

Practically, capital structure decisions might be decidedly complicated. Five important theories which are the static trade-off theory, the dynamic trade-off theory, the agency theory, the pecking order theory, and the market timing theory could be employed to describe the capital structure decisions. These theories are based upon tax benefits of debt financing, bankruptcy cost, agency cost, asymmetric information, and issuance cost. Five different theories of capital structure are reviewed in the following section.

### *The Static Trade-Off Theory*

Since Modigliani and Miller (1958) developed original MM propositions, the basis for contemporary approach of capital structure was established. They introduced the MM proposition I which states that in an efficient market with no taxes, no

bankruptcy costs, and symmetric information on the firm's prospects between corporate insiders and outside investors, the firm's capital structure is irrelevant to its value. As a result, the value of levered and un-levered firm is the same. Furthermore, it was suggested in the basic MM proposition II that the cost of equity capital is a linear increasing function of the firm's debt to equity ratio. The advance in debt would raise the required return on equity. The increase in risk resulting from financial leverage is precisely compensated by the raise in required return. Thus, the weighted average cost of capital is constant for a given firm irrespective of its capital structure. Moreover, they also introduced proposition III which suggests that cost of capital would be exercised as the cut-off point for firm's investment decision and it will be unaffected by the source of financing. The practical implications and how well this theory describes facts are not considered.

Later on, Modigliani and Miller (1963) developed "Corporate Income Taxes and the Cost of Capital: A correction" that was published in The American Economic Review. They illustrated that under MM with corporate taxes, firm's value raise continuously as more debt is used since the tax deductibility of interest expenses is greater than the increase in risks. Corporate taxes support debt financing as firms can withhold interest as expense in computing taxable profits. Moreover, they also suggested that the appropriate cost of capital for investment decisions would be the weighted average of the costs of debt and equity in the target capital structure.

The tax advantages of debt financing were re-examined by Miller (1977). In a world with both corporate and personal income taxes, the personal taxes diminished the advantages of corporate debt. Corporate taxes prefer debt financing given that interest payments can generate tax benefits, but personal taxes support equity financing while

no capital gain is accounted until stock is sold and long-term capital returns are excised at a lesser rate. In summary, the use of debt financing in the real world with both corporate and personal income taxes remains advantages, but the benefits are less than the conditions under corporate taxes only.

The trade-off theory refers to the concept that firms' observed capital structures are the effects of individual trading off between the benefits and costs of increasing debt financing. Revisited to the traditional hypothesis that was suggested by Kraus and Litzenberger (1973). They introduced that dead-weight costs of bankruptcy and the tax savings are the key factors in determining firms' leverage level. The drawbacks of debt are bankruptcy costs, while the benefit is tax deductibility if the firm has a taxable profit. Additionally, Myers (1984) suggested that by holding the firm's assets and investment plans constant, a firm's optimal debt ratio will be established by trading-off between tax advantages and the financial distress costs. At low debt levels, tax benefits are superior over bankruptcy costs, but at high debt levels, bankruptcy costs are more important than tax benefits. Therefore, firm could maximize its value by replace debt for equity or equity for debt. This theory implies that, in order to maximize value of firm, each firm regulates its capital structure gradually toward an optimal debt ratio. The marginal benefit of additional enlarged in debt declines as debt increase, whereas the marginal cost is raised as debt enhances. The trade-off theory assumes that there are advantages to leverage within a capital structure until the optimal capital structure is achieved.

Conversely, the empirical evidences of the trade-off theory are frequently questionable. Shyam-Sunder and Myers (1999) suggested that there is no well-defined optimal debt ratio. Debt ratio changes with an unbalance of internal cash flow,

dividends and investment opportunities. Moreover, Chirinko and Singha (2000) found that empirical evidence could not appraise the trade-off model. Frank and Goyal (2008) also questioned the empirical relevance of the trade off theory. They found that direct transaction costs and indirect bankruptcy costs seem to have influential functions in leverage decision. Private firms appear to use retained profits and bank borrowing tremendously; small public companies tend to draw on equity financing. While large public companies primitively employ retained earnings and corporate bonds.

The most important prediction of this theory is the positive association between firm's leverage and its profitability. More profitable firms benefit more from the tax savings as well as a decrease in bankruptcy costs. Additionally for firms with more tangible assets that could be used as collateral, bankruptcy costs are supposed to be lesser. Moreover, depreciation expenses that are resulted in tax advantages or the non-debt tax shield would help to explain less leverage.

*The Dynamic Trade-Off Theory*

In 1984, Myers indicated that firms that pursue the trade-off theory set their target capital structures and steadily move towards their target leverage. Later on, the dynamic trade-off theory was developed by Fischer et al. (1989). This theory grants the firm's optimal dynamic capital structure policy relies on the benefits and costs of debt financing underlying the riskless interest rate, asset variability, and the costs of recapitalizing. This theory implies that actual leverage ratio might differ from the optimal level, and the firm will rebalance its financing activities to lead the leverage ratio back to the optimal level when the advantages prevail over the costs of adjustment. The adjustment process relies on the benefits and costs of equity and debt

financing. Hence, corporate leverage may not always harmonize with their target capital structure and firms partially converge to their target capital structures (Flannery & Rangan, 2006). In perfect market with no transaction cost, firms would never diverge from their optimal capital structure. On the contrary at the other extreme with unlimited adjustment costs, firms not at all move towards their optimal leverage. According to Flannery and Hankins (2007), the SOA relies on the adjustment costs and the costs of deviation from the target. Rebalancing costs consist of the transaction costs, cost of financial constraints, and stock price movements, whereas the advantages of attaining the target capital structure vary with factors such the potential costs of distress and the value of tax shields. The process of capital structure adjustment is a tradeoff between the costs of adjustment and the benefits of maintaining the target leverage. As a result, the speed of capital structure adjustment evaluates adjustment costs against the costs of differing from the target. However, it was suggested by Leary and Roberts (2005) that the observed persistent effect of shocks on leverage is probable owing to adjustment costs rather than indifference toward target leverage. Moreover, SOA varies across firms and analytically with the costs and advantages of adjustment. It was widely known that firms rebalancing their capital structure by means of four major options. When firms are over-levered, debt retirement or equity issuance is considered to be capital structure adjustment option. On the contrary, share repurchase or debt issuance is judged to be appropriate when firm is under-leveraged. In an economy with transaction costs, firm's capital structure is likely to differ from the optimal level at most time. Firms adjust their capital structure by issuances or repurchases of debt or equity occasionally at the refinancing points (Strabulaev, 2007).

In order to perceive noticeably meaning of the SOA, half-life was introduced as the measurement for the SOA toward target capital structure. Where perfect non-

readjustment, the SOA is 0 and the SOA is 1 when the perfect instant readjustment happening. Where ($1$- $\lambda$) stands for the expected percentage by which the gap between the past leverage and the target closes in one period, half-life is the time a firm exploits to adjust its capital structure back one-half the distance to its target leverage after a one unit shock to the error term ($u_{it}$) (Lliev & Welch, 2010). Hence, half-life is log (0.5) / log ($\lambda$). According to Lliev and Welch (2010), the half-lives of around 3 years are in line with the limited trade-off based view of capital structure in Flannery and Rangan (2006), Lemon, Roberts and Zender (2008), and Huang and Ritter (2009). Wherever, the half-lives of 6 years are corresponding to the glacial readjustment view of Fama and French (2002). Likewise, the half-lives of greater than 13.5 years are along the lines of practically no-readjustment view of Myers (1984) and Welch (2004).

Many empirical studies have been conducted to estimate whether firms converge to their target capital structure focusing on the estimation of SOA. Several researchers investigated based on American companies. Firstly, Flannery and Rangan (2006) estimated a panel model for American firms during 1965 and 2001 and discovered that firms do have long-run target capital structures and adjust their capital structure towards the target book leverage and target market leverage at an annual rate of about 34% and 35.5%, respectively. Hence, the finding suggests that American companies take 1.7 - 1.6 years to adjust their capital structure back one-half the distance to their target leverage. In 2008, Lemon et al. found that the annual SOA toward book leverage founded on US companies during 1965 and 2003 was 25% which was approximated to a half-life of 2.4 years. Moreover, Huang and Ritter (2009) noticed that the adjustment speed toward target book leverage rooted in publicly traded American firms during 1963 – 2001 was about 17% and 23% for the SOA toward the market leverage. Presently, Elsas and Florysiak (2010) investigated the SOA toward market leverage for

American firms during 1965 – 2008 in the context of unbalanced dynamic panel data and realized the rebalancing speed of 26% which takes 2.5 years to adjust their capital structure back one-half the distance to the target market leverage after a one unit shock to the error term.

In addition, several investigators estimated SOA founded on companies from various developing countries such as Getzmann, Lang, and Spremann (2010) explored using homogeneous panel data from listed companies in Asian stock markets during 1995 to 2009 and found that Asian companies track target capital structures and converge towards the target book leverage at the speed of 27% - 39%. Besides, Asian companies take 2.2 – 1.4 years in order to adjust their capital structure back one-half the distance to their target book leverage after a one unit shock to the error term. Moreover, Kim, Heshmati and Aoun (2006) estimated the capital structure adjustment speed based on book leverage for listed Korean non-finance companies during 1985 – 2002 with unbalanced panel data and indicated that the firms adjusted at the speed of 18% before the crisis in 1997 and 15% in the post-crisis period which was indicating that debt financing after the crisis period might have more costly and more difficult as well. Later on, it was found that Indian manufacturing companies during the period 1993 to 2007 adjust toward the target leverage at the rate between 12 – 39% across several proxies of market leverage (Mukherjee & Mahakud, 2010). Recently, Tayo (2012) was suggested that manufacturing Nigerian listed companies covering 2000 – 2009 moves toward target book capital structure at the moderate speed with the half-life of 3.9 years or the convergence speed of 16%.

In 2001, Miguel and Pindado initiated that listed non-financial Spanish companies during 1990 – 1997 move toward their target market leverage at the speed of 21% that is corresponding to half-lives of 2.5 years, whereas listed Swiss companies

during 1991 to 2000 rebalanced their capital structure towards target market leverage at the annual rate of 16% - 29% (Gaud, Jani, Hoesli, & Bender, 2005). In addition, the rebalancing behaviors of capital structure decisions were also investigated in Swedish micro and small firms during 1994 – 1997 by Heshmati (2002). The study explored the dynamics of capital structure based on book leverage and indicated that the determinants of the SOA towards the optimal capital structure is firm specific as well as time specific variables. The annual adjustment rate towards the target book leverage is only 12%, concluding the half-life of 5.4 years. Recently, Antao and Bonfim (2012) found that all firms operating in Portugal during 1990 to 2007 which have various firms' size, move toward long-term book leverage at the rate ranging from 53% to 63%. Moreover, it was discovered by Titman and Tsyplakov (2007) which estimated based on simulating data that the adjustment speed towards book leverage reveals a comparatively slow as well as earnings volatility and stock returns have a strong effect to capital structure dynamics.

In summary, several empirical studies have been conducted to estimate whether firms converge to their target capital structure focusing on the estimation of the SOA. However, the SOA has been evaluated in several papers, Frank and Goyal (2008) detected in their survey research and suggested that "the speed at which corporate leverage is mean-reverting is not a settled issue".

*The Agency Theory*

In 1976, Jensen and Meckling suggested the agency theory in order to describe the relationship between principals and agents, for example, the association between shareholders and corporate executives as well as the connection between bondholders

and shareholders. The theory stems from the specific problems caused by different goals of principals and agents with supposed conflicts of interest or agency conflicts between shareholders and managers, and between debt holders and stockholders. When managers would not act in the best interests of its existing shareholders, that are executives' interests are imperfectly aligned with those of the shareholders, managers tend to waste free cash flow and bad investments. When the conflicts of interest occur, it has a propensity to give respond to agency costs, which are the costs of resolving conflicts between the principals and agents and aligning interests of the two groups. The principal be able to limit the discrepancies by creating proper motivations for the agent as well as incurring monitoring costs to control the anomalous actions of the agent. Occasionally, principal might compensate to expend resources, which are the bonding costs, to ensure that the agent will not harm the principal by taking aberrant activities. Moreover, the residual loss that is a decrease in welfare faced by the principal owing to this divergence is also a cost of the agency relationship as well. In summary, the major components of the agency costs consist of the principal's monitoring costs, the bonding costs by the agent, and the residual loss (Jensen & Meckling, 1976).

The agency theory was used to describe how firms renovate a decision whether to finance their investment with debt or with equity instruments. This theory implies that the appropriate combination of debt and equity capital could help solving the conflicts of interest and reduce the agency costs. Three major types of agency problems are involved: asset substitution, the underinvestment problem, and the free cash flow hypothesis. Firstly, the asset substitution or risk shifting problem occurs due to a firm replaces low-risk assets for high-risk investments. This substitution leads more risk to the bondholders without additional returns by shifting wealth from debt holders to shareholders. Greater returns would obtain from higher risk investments; while more

risk was achieved by the firm. As the bondholders receive a fixed return, the incremental profit might only be the shareholders' advantage. Hence, the added risk does affect the bondholders. As a result, the firm enlarges its probability of defaulting on its debt. Secondly, the underinvestment problem which is incurred by shareholders rejecting the low-risk investment to maximized stockholders' wealth at the cost of the bondholders seeing as the steady cash flow stream does not produce an excess profit for the shareholders. The safe cash flow generated by the low-risk investments would benefit bondholders, whereas high-risk investment on higher profit assets would increase shareholders advantage from additional income since debt holders involve a fixed portion of cash flow. Consequently, the firm rejects the low-risk projects even though it enhance the firm's value; stockholders under invest in capital by refusing to participate in low-risk projects. The problem occurs for the reason that bondholders are not reimbursed for the added risk. The last problem is the free cash flow hypothesis indicated by Jensen (1986) that managers are more likely to invest in negative NPV projects with the extensive free cash flow rather than pay it out to stockholders. This problem stems from firms wasting resources on low-return projects due to excess cash flow available to executives. This problem can be resolved by using debt and payout of free cash flow to shareholders that would diminish management power and subject them to concentrate on capital market security. Firms with more profitable assets tend to make the most of their earnings for debt payments in order to control the agency cost arise from free cash flow (Jensen & Meckling, 1976). Additionally, the testing of share repurchases as a means to lessen the agency costs of excessive free cash flow was supported by Wang, Strong, Tung and Lin (2009).

Firms that are stiff controlled by major shareholders will have less agency costs and more efficient managed. Hence, debt is less valuable as a control means and firms

with higher equity to debt ratio are more restricted and expected to have smaller amount of agency problems.

*The Pecking Order Theory*

Pecking order theory is the capital structure theory which was proposed by Myers (1984) and Myers and Majluf (1984). Myers and Majluf presented the concept of capital structure theory that was based on asymmetric information to describe the firms' sequence of financing decisions. The asymmetric information occurs since managers who act at the interests of present shareholders recognize more about the risks and the values of firms than outside investors. Incidentally, managers may give up a positive-NPV project if new equity issuance is needed, meanwhile this would allocate some of the project's value to new owners at the cost of existing shareholders. Myers (1984) proposed the pecking order hypothesis that firms have a preference of internal financing over external financing where retained earnings are preferred over debt, and debt is favored over owner equity. If the firms issue securities, the firms prefer debt over equity. The theory was explained by transaction costs and issuance costs of securities. Retained earnings involve few transaction costs while issuing debt engages issuance cost but still lower than equities' issuance cost. On top of that, debt financing includes tax benefits if a firm has a taxable profit. Therefore, firm's capital structure can be clarified in terms of tax advantages from debt financing. Additionally, Green, Murinde and Suppakitjarak (2002) supported that capital structure decisions were influenced by tax policy. In summary, the interpretation of the pecking order theory implies that equity is never issued if debt is feasible. In fact, business operations are more complicated than the regular pecking order illustration; tax advantages and agency costs can construct pecking order behavior. Subsequently, at what debt level should

equity be introduced? This leads to the conclusion that tax advantages and agency cost are the pecking order limitations for firm's debt capacity. The pecking order theory foretells that debt usually increases when investment exceeds internal funds and decreases when investment is lower than internal funds. In other words, equity issuance would be the last financing option for firms.

In summary, the pecking order theory helps describing that high profitable firms tend to have less debt since they do not need external fund. Wherever, low profitable firms are likely to borrow more because their internal funds are insufficient as well as the flotation costs and information costs of debt financing are lower than equity issuance. Debt is the first source of external financing, whereas equity is issued even as the debt capacity is totally limited. As a result, when investment opportunities and internal funds are imbalanced, the firms change their leverage ratio.

The empirical relation of the pecking order theory is still suspicious. For instance, Chirinko and Singha (2000) investigated that empirical evidence can evaluate neither the pecking order nor trade-off models. Frank and Goyal (2008) showed that the pecking order theory fails for small firms where information asymmetry is supposed to be a crucial problem. On the contrary, Fama and French (2002) tested the pecking order predictions of how financing decisions response to short-term variation in earnings and investments. They found that more profitable firms are less levered, and more investment firms have less market leverage together with lower long-term dividend payouts. The findings validated the pecking order but disagreed with the trade-off model.

*The Market Timing Theory*

Recently, the idea of market timing has become more popular as a result of the actuality that a firm's financial condition changes through time. This theory was suggested by Baker and Wurgler in 2002, and it was employed to explicate how firms settle on whether to finance their outlays with debt or with equity instruments. This theory specified that the existing capital structure is the collective effect of precedent exertions to time the equity market. Additionally, it also proposes that corporate executives are rational managers who are able to time the present situations in both debt markets and equity markets. Moreover, the executives also consider that investors are irrational. Hence, they issue equity while the cost of equity is curiously low. As a result, when they require financing, they will occupy a more encouraging market. For example, they issue equity when share price is high and repurchase equity when the stock price is low. Meanwhile, the fund-raising may be deferred if either debt markets or equity markets appears unfavorable. In summary, security issuance decisions are influenced by the managers' ability to time the equity market. Firms prefer equity when the relative cost of equity is low, and prefer debt otherwise.

According to the above capital structure theories, the relationship between capital structure decision and its determinants are distinction. The predicted relationships of capital structure determinants and firms leverage under different theories are summarized in table 2.1.

Table 2.1 Theoretical predictions between firm's leverage and capital structure determinants under significant theories of capital structure

| Determinants | Predicted signs by theories | | |
|---|---|---|---|
| | Trade-off | Pecking order | Market timing |
| Industry leverage | + | | |
| **Firm-specific variables** | | | |
| Profitability | + | - | |
| Size | + | - | |
| Growth opportunities | - | + | - |
| Tangibility | + | - | |
| Non-debt tax shield | - | - | |
| Liquidity | + | - | |
| Dividend payout | | - | |
| Operating risk | - | - | |
| **Stock market conditions** | | | |
| Stock market return | | | - |
| **Macroeconomic conditions** | | | |
| Expected inflation | + | | |

The positive sign "+" specifies a positive relationship between the variable and firms' leverage, while a negative sign "-" indicates a negative relationship between the variable and leverage, as well as the blank means the theories have no suggestion about the relationships.

C. Determinants of Capital Structure

Subsequent to the above theoretical standpoints, numerous empirical studies categorize that capital structure decisions are relevant to both the micro-level or firm-

level characteristics and the macro-level characteristics. Industry conditions, firm specific variables, macroeconomic conditions, and stock market conditions are all included as capital structure determinants.

*Industry Conditions*

It is generally acknowledged that capital structure expose crucial discrepancy across industries (Sinha, 1993; Talberg, Winge, Frydenberg, & Westgaard, 2008). Textbooks in corporate finance such as Copeland, Weston, and Shastri (2005) reveal that industries have extensively different capital structures. The debt ratio sensitivities to the explanatory variables vary significantly across industries (Talberg et al., 2008). The industry effect is important in explaining the capital structure of SMEs and there are distinctions in capital structure across the various industries (Abor, 2008). Hovakimian A., Hovakimian G. and Tehranian (2004) found evidence that firms are enthusiastically regulated their leverage ratio towards the industry leverage. According to the fact that firms in the same industry obtain ordinary forces that involve their financing choices similarly. As a result, executives occasionally exercise industry leverage ratio as a benchmark for their own firm's leverage.

From the previous literatures, industry median leverage, industry average leverage, and industry median growth are generally exercised as a proxy for industry conditions in determining target capital structure (Frank & Goyal, 2003; Frank & Goyal, 2009). However, only median industry leverage was indicated as a positive significant industry factor in determining capital structure decision (Frank & Goyal, 2009). Therefore, median industry leverage was applied as a proxy for industry leverage.

*Firm-specific Variables*

According to the recent empirical studies, firms' capital structure decision was determined by a complex set of firms' specific characteristics. However, the influential determinants of capital structure have been disagreed over decades of empirical researches.

In support of this, Harris and Raviv summarized several characteristics of firms and industries that establish capital structure in their article, *The Theory of Capital Structure* (1991).

> Several studies shed light on the specific characteristics of firms and industries that determine leverage ratios (Bradley, et al. (1984), Castanias (1983), Long and Malitz (1985), Kester (1986), Marsh (1982), and Titman and Wessels (1988)). These studies generally agree that leverage increases with fixed assets, non-debt tax shields, growth opportunities, and firm size and decreases with volatility, advertising expenditures, research and development expenditures, bankruptcy probability, profitability and uniqueness of the product. (Harris & Raviv, 1991, p. 334)

Most preliminary studies investigated the case of U.S. companies. In 1988, Titman and Wessels presented that determinants of capital structure decision is negatively related to profitability and current level of debt to market value of equity, while the findings also suggested that capital structure choice is insignificant to non-debt tax shields, volatility, collateral, and growth opportunity. Afterwards, Rajan and Zingales (1995) endeavored to examine the financing decisions of public firms in the major industrialized G7 countries[2], and specified that size and tangibility are positively correlated with leverage, while growth and profitability performed negative correlation to leverage. Later, Bevan and Danbolt (2000) suggested that the UK companies' debt

[2] The united States, Japan, Germany, France, Italy, the United Kingdom, and Canada

has changed essentially through time. Gearing (debt level) in the UK significantly positive correlated with tangibility and firm size (logarithm of sales), and negatively correlated with growth opportunities (market-to-book ratio) and profitability. Subsequently, in the year 2001, Chen and Jiang explored the determinants of capital structure decision for Dutch firms over the period of 1992 through 1997 by applying the structural equation modeling (SEM) and found that tangibility performed positive relation to long-term leverage, but negatively related to short-term leverage; size and long-term leverage are positively correlated, but they are no correlation with short-term debt; flexibility[3] and leverage are negative correlation; growth, profitability, and volatility are insignificant correlation to leverage. Additionally, in the predictions about dividends and leverage by Fama and French (2002) indicated that more profitable firm have less book leverage, book leverage is positively related to investment opportunity, and firms with more non-debt tax shields have less leverage.

Appropriate to the AFA 2004 San Diego Meetings, Frank and Goyal presented that according to the investigations of 39 important factors in publicly traded U.S. firms, median industry average, firm size, intangibles, and collateral are the most positive influencing factors to capital structure decisions, while the major negative effects are bankruptcy risk, dividend paying, and market-to-book ratio. Moreover they also found that change in total corporate assets (positive effect), top corporate income tax rate (positive effect), and Treasury bill rate (positive effect) are minor reliable factors.

Moreover, capital structure determinants of listed companies in the Swiss Stock Exchange for the period 1991 – 2000 was investigated and found that size, tangible

[3] The ratio of cash and marketable securities over current assets

assets, and business risk are positively associated with leverage, while growth and profitability are negatively related to leverage (Gaud et al., 2005). Additionally, capital structure decisions for listed Polish companies are negatively related to liquidity, profitability, tangibility, and asset size whereas debt level is insignificant to non-debt tax shield (Mazur, 2007). The findings are partially supports a dynamic model of investment and finance that profitability and liquidity (cash flows) vary negatively with leverage (Hennessy, 2005).

According to the investigation on capital structure determinants of Greek, French, Italian and Portuguese SMEs, the findings suggest that capital structure decisions related to firm-specific variables (Psillaki & Daskalakis, 2009). Specifically, leverage is positively related to firm's size and negatively related to tangibility, profitability, and risk. Additionally, Frank and Goyal (2009) examined major reliable factors in determining capital structure decisions of publicly traded American firms from 1950 to 2003, and suggested that market leverage are positively related to median industry leverage, tangibility, company size, and expected inflation whereas market to book and profitability are negatively related to leverage. The findings was supported by Sibilkov (2009) that capital structure determinants of American public companies is positively related to firm size, tangibility, and negatively related to market to book, and profitability.

In keeping with listed Chinese firms, Chen (2004) specified that leverage increase with growth opportunity, tangibility, and decrease with profitability, and firm's size. Furthermore, Tong and Green (2005) studied corporate financing decisions of largest Chinese listed companies and found that leverage is negatively related to profitability and positively related to growth, whereas insignificant to firm size and

lagged dividends. While the findings of Huang and Song (2006) indicated that leverage is positively related to firm size, tangibility, industry leverage, and negatively related to profitability, non-debt tax shields, and growth opportunity. Afterward, in the year 2008 capital structure determinants of listed Chinese companies were also investigated by Shen. The findings postulated that leverage is positively related to growth, corporate tax rate, and negatively related to profitability and size, while tangibility and risk are insignificant to leverage. Furthermore, capital structure decision in a nascent market: evidence from listed firms in China between 1992 and 2001 was explored by Bhabra et al. (2008). They discovered that the proportion of tangible assets and firm size are positively correlated with long-term debt ratio. Furthermore, profitability and growth opportunities have negative correlation with long-term debt. It is considered that the findings on influential factors in determining listed Chinese capital structure decision are still controversial.

Recently, capital structure decisions for firms in developing countries were examined. The findings on influential capital structure determinants are still arguable. Pandey (2001) explored the effect of firm specific variables on capital structure decision of Malaysian companies and found that profitability and tangibility are consistently negative association to book leverage, whereas growth, size and volatility are positively related to book leverage. Additionally, Bas, Muradoglu and Phylaktis (2009) studied capital structure determinants of listed companies in 25 developing countries covering all regions, and indicated that tangibility of assets is negatively related to leverage, demonstrating that firms with more collateral have lesser leverage. Moreover, leverage might be increased with growth opportunity, while profitability and inflation are insignificant impact on capital structure decision. Moreover, Getzmann et

al. (2010) investigated capital structure determinants and the adjustment speed towards the target capital structures in Asian capital markets and found the relationship between leverage and tangibility of assets, firm size, and non-debt tax shield performs as predicted by the trade-off theory, while retain earnings is insignificant determinant of leverage. More specifically, leverage is positively related to firm size and tangibility of assets, but it has negative relation to non-debt tax shield. Moreover, they also discovered the predictions of profitability and market expectations as suggested by the pecking order theory. According to the pecking order theory, due to transaction costs, profitable firms finance themselves internally with retained earnings, hence they have less leveraged. Along with growth opportunities which is proxies by market expectation often need funding in excess of profits. As a result, leverage should increase consistently with pecking order theory. Lately, the capital structure determinants of automobile industry in Pakistan was studied and found that leverage decrease with profitability and liquidity, while size, tangibility, and non-debt tax shield are insignificant (Afza & Hussian, 2011).

Along with corporate capital structure decision in the context of Thai listed companies, Wiwattanakantang (1999) explored an empirical study on capital structure determinants of non-financial firms in 1996, and found that book leverage increase with size and decrease with non-debt tax shield, growth opportunity, and profitability. Later, Booth, Aivazian, Demirguc-Kunt and Maksimovic (2001) indicated that leverage is negatively related to profitability, tangibility, average tax rate, and positively associated to firm size and growth opportunity. On the contrary, Deesomsak, Paudyal and Pescetto (2004) found the insignificant association of leverage to tangibility, profitability, and earning volatility, as well as the positive effect of firm size to

leverage, and the significant negative relationship between leverage to growth opportunity, non-debt tax shield, liquidity, and share price performance. It was clarified the insignificant finding of tangibility by the tight family held and intentional ownership as well as the close up connection between firms and their lenders, therefore the lesser need for collateral so as to borrow. In addition, Bancel and Mitto (2004) investigated the managers in sixteen European countries relating to debt policy and indicated that the crucial capital structure determinants including financial flexibility, credit rating, interest tax savings, earnings volatility, while timing of debt or equity issuances is moderate important of capital structure determinant. It is considered that leverage decisions in practice are relevant to capital structure determinants that are suggested by the literature.

In relation to the above literatures, factors that are relevant to capital structure decision remains problematic to identify despite decades of empirical studies. The relation between the influential factors and capital structure is inconsistent, the empirical results vary, and occasionally oppose in various studies. These firm-specific variables and the signs of changes in firms' leverage level are summarized in table 2.2.

Table 2.2 Summary of previous investigations of influential firm-specific variables on capital structure decisions

| Firm-specific variables | Estimated result | Study |
|---|---|---|
| Profitability | - | Titman and Wessels (1988), Harris and Raviv (1991), Rajan and Zingales (1995), Wiwattanakantang (1999), Bevan and Danbolt (2000), Booth et al. (2001), Pandey (2001), Fama and French (2002), Chen (2004), Gaud et al. (2005), Hennessy (2005), Tong and Green (2005), Huang and Song (2006), Mazur (2007), Bhabra et al. (2008), Shen (2008), Frank and Goyal (2009), Psillaki and Daskalakis (2009), Sibikov (2009), Getzmann et al. (2010), Afza and Hussain (2011) |
| | insignificant | Chen and Jiang (2001), Deesomsak et al. (2004), Bas et al. (2009) |
| Size | + | Harris and Raviv (1991), Rajan and Zingales (1995), Wiwattanakantang (1999), Bevan and Danbolt (2000), Booth et al. (2001), Chen and Jiang (2001), Pandey (2001), Chen (2004), Deesomsak et al. (2004), Frank and Goyal (2004), Gaud et al. (2005), Huang and Song (2006), Bhabra et al. (2008), Bas et al. (2009), Psillaki and Daskalakis (2009), Frank and Goyal (2009), Sibikov (2009), Getzmann et al. (2010) |
| | - | Chen (2004), Mazur (2007), Shen (2008), |
| | insignificant | Titman and Wessels (1988), Chen and Jiang (2001), Tong and Green (2005), Afza and Hussain (2011) |
| Growth opportunities | + | Harris and Raviv (1991), Booth et al. (2001), Pandey (2001), Fama and French (2002), Chen (2004), Tong and Green (2005), Shen (2008), Bas et al. (2009), Getzmann et al. (2010) |
| | - | Rajan and Zingales (1995), Wiwattanakantang (1999), Bevan and Danbolt (2000), Deesomsak et al. (2004),Frank and Goyal (2004), Gaud et al. (2005), Huang and Song (2006), Bhabra et al. (2008), Frank and Goyal (2009), Sibikov (2009) |
| | insignificant | Titman and Wessels (1988), Chen and Jiang (2001), Deesomsak et al. (2004), Psillaki and Daskalakis (2009) |
| Tangibility | + | Harris and Raviv (1991), Rajan and Zingales (1995), Bevan and Danbolt (2000), Chen and Jiang (2001), Chen (2004), Frank and Goyal (2004), Gaud et al. (2005), Huang and Song (2006), Mazur (2007), Bhabra et al. (2008), Frank and Goyal (2009), Sibikov (2009), Getzmann et al. (2010) |
| | - | Booth et al. (2001), Chen and Jiang (2001), Pandey (2001), Bas et al. (2009), Psillaki and Daskalakis (2009) |
| | insignificant | Titman and Wessels (1988), Deesomsak et al. (2004), Shen (2008), Afza and Hussain (2011) |
| Non-debt tax shield | + | Harris and Raviv (1991), Frank and Goyal (2004), Shen (2008) |
| | - | Wiwattanakantang (1999), Booth et al. (2001), Fama and French (2002), Deesomsak et al. (2004), Huang and Song (2006), Getzmann et al. (2010) |
| | insignificant | Titman and Wessels (1988), Mazur (2007), Afza and Hussain (2011) |
| Liquidity | - | Chen and Jiang (2001), Deesomsak et al. (2004), Hennessy (2005), Mazur (2007), Afza and Hussain (2011) |
| Dividend payout | - | Frank and Goyal (2004) |
| | Insignificant | Tong and Green (2005), Getzmann et al. (2010) |
| Volatility/Risk | + | Pandey (2001), Gaud et al. (2005), Huang and Song (2006), |
| | - | Harris and Raviv (1991), Frank and Goyal (2004), Psillaki and Daskalakis (2009) |
| | Insignificant | Titman and Wessels (1988), Chen and Jiang (2001), Deesomsak et al. (2004), Shen (2008) |

*Macroeconomic Conditions*

It is considered that macroeconomic conditions might affect corporate capital structure decision. Along with substantial enlargement of influential factors in determining capital structure decisions were explored, a few considerations have been focus on the effects of macroeconomic conditions on capital structure choices. The advantages from tax shield rely on the level of cash flows which is based on expansion or recession of macroeconomic conditions. Moreover, the probability of default that lead to bankruptcy costs also depend on the current state of economy. Therefore, optimal capital structure might be affected by macroeconomic conditions.

According to Korajczyk and Levy (2003), the effect of macroeconomic conditions and firm-specific variables on capital structure decisions was investigated and suggested that unconstrained firms time their capital structure choices to correspond with periods of encouraging macroeconomic conditions. Specifically, when economic prospects are favoring that push the bullish stock market condition, firms tend to issue equity. Hence, capital structure choices are counter-cyclical and lead to negatively association to macroeconomic conditions. Then, Hackbarth, Miao and Morellec (2006) developed a contingent model to analyze the effect of macroeconomic conditions on capital structure decisions and predict that firms tend to modify their capital structure faster in expansions than in contractions. Later, the prediction of a contingent model, firms adjust to target leverage faster in booms than in recessions, was supported by the empirical research of Cook and Tang (2010). Additionally, firms' debt capacity is influenced by current economic conditions and borrowing capability is normally higher in an expansion period as well. The findings was supported by Levy and Hennessy (2007) who suggested that firms tend to substitute equity for debt during

expansions, and substitute debt for equity in recession period. It is considered that leverage is negatively related to macroeconomic conditions. However, Chen (2010) described that during recession period cash flows are expected to develop slower with greater volatility, assets liquidation might be more costly, greater default probabilities and default losses are raised as well. Optimal capital structure decisions are more conservative during recession states and capital structure decision is pro-cyclical (Bhamra, Kuehn and Strebulaev, 2010). Hence, firms tend to have lower leverage during recession and greater leverage in expansion period. Therefore, leverage is positively related to macroeconomic conditions.

Regarding to the application of macroeconomic conditions as a determinant of capital structure decisions, Frank and Goyal (2009) investigated key factors in influencing capital structure decision of listed U.S. firms from 1950 - 2003 and specified that expected inflation, which is macroeconomic proxy, is one of the most reliable factors for describing capital structure decision. More specifically, firms tend to have more leverage during expansion period and have a tendency to ensure less debt during the recession period. Therefore, macroeconomic condition is positively related to firm leverage. Furthermore, Bas et al. (2009) examined capital structure determinants of firms in developing countries based on two proxies of macroeconomic conditions: inflation (GDP deflator) and GDP per capita, and indicate that inflation do not affect leverage decisions, whereas GDP per capita is positively related to capital structure decision of listed firms. In conclusion, the empirical findings on the effect of macroeconomic conditions on capital structure decisions is still arguable, whereas the theoretical perspective indicates robustly that leverage is positively related to

macroeconomic conditions. Firms are likely to have lower leverage during recession and have a tendency to increase leverage during expansion period.

In relation to proxy for macroeconomic conditions, various variables were introduced as macroeconomic proxies in literature such as profit growth, equity market return, commercial paper spread (Korajczyk & Levy, 2003), GDP change and change in unemployment rate (Campello, 2003), investment growth and output growth (Levy & Hennessy, 2007), GDP deflator and GDP per capita (Bas et al., 2009), and expected inflation rate, growth in after tax profit, GDP growth rate (Frank & Goyal, 2009). However, in previous studies only expected inflation and GDP per capita are significant proxies for macroeconomic conditions. Therefore, the expected inflation was chosen and applied as proxy for macroeconomic conditions.

*Stock Market Conditions*

According to the market timing theory, the decision dealing security issuances derived from costs of equity and debt issuances. Specifically, firms are more likely to issue debt when the comparative debt issuance cost is low, and have a preference of equity otherwise (Huang & Ritter, 2005, Frieder & Martell, 2006). It is considered that the market timing concept of corporate financing decision is different from pecking order theory which posits that firms financing decision prefer retained earnings, debt, and equity, respectively. In line with preceding literature, when investors are quite too passionate about earnings outlooks, firms are likely to issue equity. Baker and Wurgler (2002) trace the executives' allegations of equity market timing and discovered that fluctuations in market valuations, which was perceived by market to book ratio, have outsized effects on capital structure that carry on for one decade or longer.

Additionally, high levered firms are likely to raise funds when their valuations are low. Conversely, when firms' valuations are high, low levered firms have a tendency to raise funds. Moreover, Frank and Goyal (2004) examined capital structure adjustment as a result of market conditions. The findings indicate that there is a long-run leverage ratio wherein the system reverts. Firms execute debt adjustments en route for their long-run leverage ratio, but not equity adjustments. Particularly, a soaring market to book ratio is correlated to consequent debt lessening, while a high market to book ratio is insignificantly predict equity market adjustments. In addition, Welch (2004) discovered that leverage ratio of U.S. firms vary closely with their stock price changes. They slightly adjust their leverage level against the effects caused by stock returns. The stock price effects remain for a long time and noticeably more significant in describing capital structure decisions than other prior notorious proxies. Thus, stock returns are the first order determinant of capital structure and capital structure adjustments. In relation to determine the effect of market timing on capital structure decisions, Alti (2006) indicated that market timing is a significant determinant of short-term financing decision, whereas the long-run capital structure decisions are mostly reliable to the trade-off theory which implies that firms normally have target capital structure.

Lately, Dittmar and Thakor (2007) postulated a managerial investment autonomy theory of security issuance. The theory states that firms will issue equity to finance their investment projects when investors have a high tendency to coincide with administrative decisions. As a result, firms' stock prices will be increased. Hence, a crucial driver for equity issuance is shareholders approval of executives' decision.

According to the literatures and theories which explain and suggest the negative correlation between firm leverage and stock market conditions, the relevant empirical researches are rare and the findings are still arguable. Frank and Goyal (2009)

examined determinants of capital structure decisions based on listed U.S. companies and specify that stock price performance is statistically insignificant negative relation to capital structure decision. On the contrary, the statistically negative relationships between leverage decision and stock market conditions are found by Deesomsak et al. (2004) from the study of the determinants of capital structure: evidence from the Asia Pacific Region including Thailand, Malaysia, Singapore, and Australia. Therefore, stock market condition was introduced as one of the influential factors in determining capital structure decision in order to close this gap. The annual stock market index return was chosen as the proxy of stock market condition and was applied for this study.

# CHAPTER 3

# RESEARCH METHODOLOGY

## Model / Theoretical Framework

This research begins with four categories of previous significant factors that are influencing corporate capital structure decisions. The four groups of independent variables include industry variable, firm-specific variables, stock market conditions, and macroeconomic condition. According to the previous studies of capital structure determinants, they are both from developing and developed countries, but mostly are from developed countries. Since four groups of factors that are influencing capital structure decisions were explored in the previous studies, but most of them took account of only firm-specific variables in their studies. Rarely are included together two or three groups of variables. It is reasonable to include all factors in the model rather than separate them because capital structure decision was influenced by all factors together. Appropriate capital structure was considered to be described based on various theories. No specific theory can totally explain corporate capital structure. Therefore, the multiple regression models was employed as the first model (M1) to support the hypothesis that capital structure decision was influenced by industry variable, firm-specific variables, stock market conditions, and macroeconomic conditions. The M1 model is shown as follows:

Capital structure decision = f (industry variable, firm-specific variables, stock market conditions, macroeconomic conditions) (M1)

According to the first suggested model, a set of independent variables that are summarized in table 3.1 were introduced to the model. As a result, the more specific model takes the following form:

Capital structure decision = f (industry leverage, profitability, firm size, growth opportunity, asset structure, non-debt tax shield, liquidity, dividend payout, earnings volatility, equity market return, expected inflation)

As applying the variables' proxies that are summarized in table 3.1 into the proposed model, the capital structure decision model (M1) is specified as equation (1)

$$(L)^*_{it} = \beta_0 + \beta_1(IL)_{it} + \beta_2(PROF)_{it} + \beta_3(SIZE)_{it} + \beta_4(MTB)_{it} + \beta_5(TANG)_{it} + \beta_6(NDT)_{it} + \beta_7(LIQ)_{it} + \beta_8(DIVP)_{it} + \beta_9(RISK)_{it} + \beta_{10}(SETR)_{it} + \beta_{11}(INFLA)_{it} + \varepsilon_{it} \quad (1)$$

Where, $L^*_{it}$ is firm i's optimal capital structure at year t, $IL_{it}$ is industry leverage at year t, $PROF_{it}$ is firm i's profitability at year t, $SIZE_{it}$ is firm i's size at year t, $MTB_{it}$ is firm i's market to book ratio at year t, $TANG_{it}$ is firm i's tangibility at year t, $NDT_{it}$ is firm i's non-debt tax shield at year t, $LIQ_{it}$ is firm i's liquidity ratio at year t, $DIVP_{it}$ is firm i's dividend payout ratio at year t, $RISK_{it}$ is firm i's earnings volatility at year t, $SETR_{it}$ is annual SET index return at year t, $INFLA_{it}$ is expected inflation rate over the coming year at year t, and $\varepsilon_{it}$ is an error term.

Table 3.1 Summary of variables, proxies, and expected results

| Variable | Proxy | Expected results |
|---|---|---|
| **Dependent variable** | | |
| Capital structure decision (*L*) | - Total liabilities to total book value of asset (*TLBA*)<br>- Total non-current liabilities to total book value of asset (*LLBA*) | |
| **Independent variables** | | |
| *1. Industry variable* | | |
| Industry leverage (*IL*) | - The industry-sector median of total liabilities to total book value of assets (*TLBAM*)<br>- The industry-sector median of total non-current liabilities to total book value of assets (*LLBAM*)<br>- The industry-sector mean of total liabilities to total book value of assets (*TLBAA*)<br>- The industry-sector mean of total non-current liabilities to total book value of assets (*LLBAA*) | + |
| *2. Firm-specific variables* | | |
| Profitability | - Earnings before interest and tax to total assets (*PROF*) | - |
| Size | - Log of total assets (*SIZE*) | + |
| Growth opportunity | - The ratio of market value of assets to total book value of asset (*MTB*). Market value of assets is obtained as the sum of total liabilities and market value of equity. | - |
| Tangibility | - The ratio of net property, plant and equipment to total asset (*TANG*) | + |
| Non-debt tax shield | - The ratio of depreciation expense to total asset (*NDT*) | - |
| Liquidity | - The ratio of current asset to current liabilities (*LIQ*) | - |
| Dividend payout | - Dividend to earnings ratio (*DIVP*) | - |
| Risk | - Earnings volatility (*RISK*) | - |
| *3. Stock market condition* | | |
| Stock market return | - Annual SET index return (*SETR*) | - |
| *4. Macroeconomic condition* | | |
| Expected inflation | - The expected change in the consumer price index over the coming year (*INFLA*) | + |

The expected results "+" indicates a positive relationship between the independent variable and firm's leverage, whereas "-" denotes a negative association between the independent variable and leverage.

In order to answer the question that how do firms adjust their capital structure toward their target capital structure, a dynamic panel data model (partial adjustment model) was employed in this study. In view of the fact that firms would partially adjust their capital structure toward their target capital structure within each time period since the adjustment costs possibly will prevent instantaneous adjustment. Firms have to trade off between the adjustment costs and the costs of operating with suboptimal capital structure (Flannery & Rangan, 2006). Therefore, a standard partial adjustment model as used by Flannery and Rangan (2006) was applied as the second proposed model (M2) which supports the hypothesis that firms partially move their capital structure towards their target capital structure. M2 model was suggested as follow:

$$L_{it} - L_{it-1} = \delta (L^{*}_{it} - L_{it-1}) + \alpha_{it} \quad \text{(M2)}$$

Where δ is partial adjustment parameter ($0 \leq \delta \leq 1$) which captures the actual change in leverage ($L_{it} - L_{it-1}$) corresponding to the firm's distance from its target leverage ($L^{*}_{it} - L_{it-1}$), $L^{*}_{it}$ stands for firm i's optimal (target) capital structure at time t. $L_{it}$ and $L_{it-1}$ represent capital structure for firm i in period t and t-1, whereas $\alpha_{it}$ denotes an error term. By year, the firm closes a fraction of the gap ($\delta$) concerning its target and its actual capital structure. Substituting equation (1) into M2 model and rearranging, then the model was obtained as shown in equation (2).

$$\begin{aligned}(L)_{it} = {} & (1-\delta)\, L_{it-1} + \delta\beta_0 + \delta\beta_1(IL)_{it} + \delta\beta_2(PROF)_{it} + \delta\beta_3(SIZE)_{it} + \delta\beta_4(MTB)_{it} \\ & + \delta\beta_5(TANG)_{it} + \delta\beta_6(NDT)_{it} + \delta\beta_7(LIQ)_{it} + \delta\beta_8(DIVP)_{it} + \delta\beta_9(RISK)_{it} \\ & + \delta\beta_{10}(SETR)_{it} + \delta\beta_{11}(INFLA)_{it} + \delta\varepsilon_{it} + \alpha_{it}\end{aligned} \quad (2)$$

By substituting $\lambda$ for ($1$- $\delta$), $\alpha_1$ represents $\delta\beta_1$, $\alpha_2$ represents $\delta\beta_2$, $\alpha_3$ represents $\delta\beta_3$, $\alpha_4$ represents $\delta\beta_4$, $\alpha_5$ represents $\delta\beta_5$, $\alpha_6$ represents $\delta\beta_6$, $\alpha_7$ represents $\delta\beta_7$, $\alpha_8$ represents $\delta\beta_8$, $\alpha_9$ represents $\delta\beta_9$, $\alpha_{10}$ represents $\delta\beta_{10}$, $\alpha_{11}$ represents $\delta\beta_{11}$, and $u_{it}$ denotes ($\delta\varepsilon_{it}$ + $\alpha_{it}$), the estimated model was achieved as shown in equation (3).

$$(L)_{it} = \lambda L_{it-1} + \alpha_0 + \alpha_1(IL)_{it} + \alpha_2(PROF)_{it} + \alpha_3(SIZE)_{it} + \alpha_4(MTB)_{it} + \alpha_5(TANG)_{it} + \alpha_6(NDT)_{it} + \alpha_7(LIQ)_{it} + \alpha_8(DIVP)_{it} + \alpha_9(RISK)_{it} + \alpha_{10}(SETR)_{it} + \alpha_{11}(INFLA)_{it} + u_{it} \quad (3)$$

Where, ($1$- $\lambda$) stands for the SOA.

## Research Design

In order to answer the research questions, the research based on a quantitative research design was established. Three major topics that are dealing with the design are initiated: selection of the subjects, variables in the study, and data collection.

### *Selection of the Subjects*

The study on key factors influencing capital structure decisions and capital structure dynamics was based on the companies listed in the Stock Exchange of Thailand (SET). In order to have a balanced panel for nine consecutive years, the selected samples include all companies that are not under rehabilitation from the three major industries: industrials, property and construction (exclude property fund whose capital structure decisions are highly regulated and have to comply with very strict legal requirements affecting to their financing), and services industry which have continuous and complete data for the period 2002-2010. Since capital structure decision is one of

the major concerns for manufacturing, real estate, and construction companies, the study has emphasized on that specific companies which are from industrials and property & construction industries. Since the nature of services business need lower investment in total assets, capital structure decision might be less significant issues comparative to that of manufacturing, real estate, and construction companies. Hence, the study has also included the services industry in order to investigate whether factors influencing capital structure decision and its SOA among these three industries are different. Moreover, these three industries were selected because the number of companies in each industry is sufficient and not too far different. Therefore, this exploration was rooted in 128 companies that met these criterions which are 36 companies from industrials industry, 39 firms from property and construction industry, and 53 companies from the services industry.

*Variables in the Study*

Two types of variable were employed in this research. The first category is dependent variables of capital structure decision. It is considered to use book values of leverage since capital structure should be explicated from a specific point in time. Both total liabilities and non-current liabilities which were proxies by total liabilities to total book value of assets (*TLBA*), and total non-current liabilities to total book value of assets (*LLBA*) were employed to stand for capital structure decision. Since stock market price including the expectation of company's future performance, therefore the application of market value approach might create bias from the future expectation. Hence, the book value approach for leverage proxy was employed to this study.

The second category is the independent variables influencing capital structure decisions that are comprised of four groups: industry variable, firm-specific variables,

stock market condition, and macroeconomic condition. For the industry variable, four alternative proxies of industry-sector leverage were introduced to this study: total liabilities to total book value of assets for industry-sector median (*TLBAM*), total non-current liabilities to total book value of assets for industry-sector median (*LLBAM*), total liabilities to total book value of assets for industry-sector average (*TLBAA*), and total non-current liabilities to total book value of assets for industry-sector average (*LLBAA*). The expected association between firm's leverage and industry-sector leverage is positive. The second group of independent variable is the firm-specific variables. A set of firm-specific variables including profitability (*PROF*), firm's size (*SIZE*), growth opportunity (*MTB*), assets structure' tangibility (*TANG*), non-debt tax shield (*NDT*), liquidity (*LIQ*), dividend payout (*DIVP*), and earnings volatility (*RISK*) were employed to the study. Profitability and firm's size are expected to have a positive relation to firm's leverage, where profitability, growth opportunity, non-debt tax shield, liquidity, dividend payout, and operating risk are negatively related to firm's leverage. In order to explore empirical result for the effect of market timing on capital structure decision, the stock market condition which is proxies by annual SET index return (*SETR*) was employed as the third group of independent variable. The last faction of independent variable is macroeconomic condition. In this study, the expected change in the consumer price index over the next year (*INFLA*) was used as the proxy for macroeconomic condition. The negative relationship between leverage and the stock market return is expected, whereas leverage is supposed to have positive association to expected inflation. All variables both dependent and independent variables, proxies, and their expected sign based on this study are summarized in table 3.1

*Data Collection*

The secondary panel data was collected from SET, Business Online Public Company Limited, and the Bank of Thailand (BOT). The data employed to this study based on yearly basis which was defined as annual observations on the basis of fiscal years. Annual separate financial statements including balance sheets, income statements and cash flow statements of the samples were obtained from Business Online Public Company Limited, whereas stock market conditions and market value of individual stock were achieved from SET. Additionally, the information about macroeconomic conditions was obtained from BOT as well as the researcher self-calculation to get hold of the industry variable.

*Capital structure decision (Firm leverage)*

The proxies for capital structure decision including *TLBA* and *LLBA* were obtained from calculations. Both variables were computed based on company's balance sheet. Firstly, *TLBA* for individual company was figured out by dividing total liabilities with total assets. Secondly, *LLBA* was also determined from the data in the balance sheet by dividing total non-current liabilities to total assets.

*Industry variable*

As applied to this research and to reassure that the companies are in the same business type, two alternative proxies for industry variable are the median and the mean of industry-sector leverage. The categorizations of industry sector are parallel to that of classification by SET. For each proxy for industry-sector leverage, four alternative definitions of median and mean for industry-sector leverage, industry-sector median of total liabilities to total book value of assets (*TLBAM*), industry-sector median of total

non-current liabilities to total book value of assets (*LLBAM*), industry-sector mean of total liabilities to total book value of assets (*TLBAA*), and industry-sector mean of total non-current liabilities to total book value of assets (*LLBAA*), which are corresponding to firm leverage, were computed.

*Firm-specific variables*

According to firm-specific variables, all proxies are computed based on data provided on company balance sheet, income statement, cash flow statement, and company market data. Profitability (*PROF*) was computed from earnings before interest and tax divided by total assets, whereas log of total assets represented firm size (*SIZE*). The ratio of market value of assets to book value of asset was worked out as a proxy for growth opportunity (*MTB*), where the market value of assets was obtained by the sum of total liabilities and market value of equity. The ratio of net property, plant and equipment to total asset was determined as a proxy for tangibility (*TANG*) which represents the nature of asset. Moreover, the ratio of depreciation expense to total asset (*NDT*), the current ratio (*LIQ*), dividend payout ratio (*DIVP*), and the square difference between the firm's profitability and the industry-sector mean (*RISK*) are also computed as proxies for non-debt tax shield, liquidity, dividend policy, and earnings volatility.

*Stock market conditions*

The stock market index return normally corresponds to the stock market condition. Therefore, the statistics of SET index from 2002 to 2010 was acquired from the Stock Exchange of Thailand. In this study, annual SET index return (*SETR*) was instigated as the proxy for stock market condition. *SETR* was computed as the yearly percentage change in SET index.

*Macroeconomic conditions*

According to this study, expected inflation (*INFLA*) was introduced as a proxy for macroeconomic condition. *INFLA* stands for expected change in the consumer price index over the coming year. In order to compute expected inflation, the statistics of consumer price index for the period 2003-2011 was obtained from the Bank of Thailand. Subsequently, expected inflation rate was figured out. The expected inflation rate at period t is the percentage change in consumer price index in the period t+1.

## Data Processing and Analysis

This study employs panel data analysis for the reasons that it can be included time effects as well as to control for the heterogeneity of firms by embracing firm-specific effects, which may be fixed or random. In order to answer the three main research questions as mentioned in chapter 1, the quantitative research method of both static and dynamic multiple regressions will be applied in the research analysis. Firstly, the multiple linear regressions were applied to determine significant factors influencing capital structure decisions as well as to investigate the optimal capital structure models for listed companies in SET. Secondly, the partial adjustment model (dynamic regression model) was employed to explore how firms adjust their capital structure towards the target (optimal) capital structure and what are their speeds of adjustment.

### *Estimation of Optimal Capital Structure*

In order to determine key factors influencing capital structure decisions and to establish optimal capital structure decision model, the empirical study based on multiple

regression models was employed to investigate reliable empirical patterns and to explore the association between the evidence and the theories. Therefore, a set of capital structure determinants that was suggested in table 3.1 were regressed against firms' leverage (*L*). The equation to be estimated was showed as follow.

$$(L)^*_{it} = \beta_0 + \beta_1(IL)_{it} + \beta_2(PROF)_{it} + \beta_3(SIZE)_{it} + \beta_4(MTB)_{it} + \beta_5(TANG)_{it} + \beta_6(NDT)_{it} + \beta_7(LIQ)_{it} + \beta_8(DIVP)_{it} + \beta_9(RISK)_{it} + \beta_{10}(SETR)_{it} + \beta_{11}(INFLA)_{it} + \varepsilon_{it} \quad (1)$$

For all of the three industries, the three alternative estimators for panel data analysis were applied for the assessment tools. The first estimator that was employed is Feasible Generalized Least Squares (FGLS). FGLS is an Ordinary Least Square estimator of a transformed isomorphic model that provides the best linear unbiased estimator (BLUE) under heteroskedasticity. Then, the Fixed Effects (within) Regression (FE) as well as the Random Effects GLS Regression (RE) were also conducted as the estimators in this study as long as the fixed effects model is costly in degree of freedom because it is corresponding to the use of dummy variable for every firm, while the random effects model assumes the independence between explanatory variables and error terms (Greene, 2003). The Huasman test of random effects was performed for the test of whether the random-effects estimator is biased in the context of panel models with unobserved unit-specific effects (Schreiber, 2008). Therefore, the fixed effect model would be retained if the null hypothesis is rejected. In addition, the testing of the joint significance of dummy variables for time was also applied. The finding is that neither of time dummy variables is significant, hence year dummy variables were excluded for the estimations. The variation in estimation methods

endorses a better understanding of the robustness of significant factors influencing capital structure decisions and optimal capital structure decision model. These procedures will alleviate the similarity and will demonstrate the impact of the explanatory variables across the different estimation techniques. Consequently, a set of independent variables as shown in table 3.1 were regressed against firms' leverage which was constructed as total liabilities to total book value of assets, and total non-current liabilities to total book value of assets.

*Estimation of Partial Adjustment Model*

According to dynamic trade-off theory, corporate capital structure responses not only to the current values of its determinants but it also react to earlier period capital structure decision as well. Additionally, the benefit of a dynamic panel data allows lagged values of the capital structure to take account of capital structure that persist over time. Therefore, the partial adjustment model (dynamic multiple regression model) was employed to test the hypotheses whether firms partially adjust their capital structure towards the target (optimal) capital structure and the speed of their adjustment. The estimation of partial adjustment model consists of two steps (Getzmann et al., 2010). The first step is to estimate the optimal capital structure decision model which is represented as equation (1), where the second step is to evaluate the annual change of the difference between the actual capital structure and the target capital structure. The proposed dynamic multiple regression models of this study were represented in equation (3) which is the M2 model that was mentioned in the former section.

$$(L)_{it} = \lambda L_{it-1} + \alpha_0 + \alpha_1(IL)_{it} + \alpha_2(PROF)_{it} + \alpha_3(SIZE)_{it} + \alpha_4(MTB)_{it} + \alpha_5(TANG)_{it} + \alpha_6(NDT)_{it} + \alpha_7(LIQ)_{it} + \alpha_8(DIVP)_{it} + \alpha_9(RISK)_{it} + \alpha_{10}(SETR)_{it} + \alpha_{11}(INFLA)_{it} + u_{it} \quad (3)$$

In order to determine how firms adjust their capital structure towards the target capital structure, three estimation techniques were employed for this study. The first two model are the Fixed-effects (within) regression and the Random-effects GLS regression. However, the fixed-effects or random-effects models might give inconsistent and biased estimators since the error term might be correlated with the lagged variable. Additionally, the Hausman test was introduced in order to certify the exogeneity of the firm specific effect with dependent variables. Therefore, Arellano-Bond dynamic panel-data estimation including both one step Generalized Method of Moments (GMM) and two-step GMM estimators is employed as the last estimation. For econometric methods for dynamic panel data models, GMM estimator was widely used in the context of a large number of firms were observed for a small number of time periods as well as single equation models with autoregressive dynamics and explanatory variables that are not strictly exogenous (Bond, 2002). Hence, the findings from GMM estimation for how firms move toward their target capital structure are expected to be the better alternative. However, Arellano and Bond (1991) indicated that two-step GMM estimator might be biased for small samples; hence the one-step estimator was expected to be the best findings. Additionally, the Sargan test of the null hypothesis that model and overidentifying conditions are correct specified was established to support the findings. The results using these four estimators are reported in this study.

# CHAPTER 4

# RESERCH RESULT

## Descriptive Statistics

The descriptive statistics including means, median, standard deviations, maximum and minimum values of all variables as well as number of all firms, number of firms by industry and observations for the entire period 2002-2010 are presented in Table I. For the whole sample in total period from 2002 to 2010, the average value of leverage defined as *TLBA* and standard deviations are around 40% and 23%, whereas long-term leverage (*LLBA*) mean is 13% and 15% for the standard deviations. The leverage ratios of property and construction industry measuring by *TLBA* and *LLBA* are 48% and 21%, which is higher than industrials industry and services industry. The average value of *TLBA* and *LLBA* for the companies from the services industry is about 35% and 12%, correspondingly. According to the firms in industrials industry, the average value of *TLBA* is about 37% where *LLBA* mean is around 7%.

Table II reports the yearly descriptive statistics including mean and median of each variable for all firms from the three industries and the mean and median by industry over the nine consecutive year for the period 2002-2010. The variability in the leverage mean for whole firms, which was measured by both *TLBA* and *LLBA*, is slightly differing from 37% - 42%, and 11% - 16% as well as the diversity of 37% - 41% and 5% - 9% for the leverage median. Moreover, the leverage mean for each industry is also slightly diversity as well. In addition, Table 2 contains the stable mean values of leverage during the subprime crisis period mainly in 2009, by which it can be easily confirm no extensive effects to the samples from the three industries listed in

SET. Furthermore, this is corresponding to the testing results that year dummy variables are insignificant in the models estimations.

For the total period as reported in Table I, services industry contains the highest growth opportunity (1.5) as well as the greatest in dividend payout ratio (50%). Property and construction industry employs the lowest dividend payout (40%), and has the growth opportunity of 1.4. The industrials industry reports the slowest growth opportunity (1.0), while employs 46% of dividend payout. According to the average values of profitability as well as the operating risk, service industry has got the highest values following by property and construction industry and industrials industry, respectively.

In relation to the statistics as reported in Table II over the nine consecutive years, companies on average have grown in size where other variables vary. Additionally, the correlation coefficients between variables and VIF coefficients for the collinearity testing are presented in Table III. The findings reveal that the correlations are generally low with the maximum value of only 0.389, which is the association between profitability and market to book ratio. In order to test whether the collinearity problem exists, VIF test was employed. In this research, the VIF coefficients are considerably lower than 10. Hence, the collinearity problem should not exist.

## Static Multiple Regression Results

### *Optimal Capital Structure Model*

The section presents the results of the static panel data model, namely, optimal capital structure decision model (M1) that was proposed as equation (1) in the previous chapter:

$$(L)^*_{it} = \beta_0 + \beta_1(IL)_{it} + \beta_2(PROF)_{it} + \beta_3(SIZE)_{it} + \beta_4(MTB)_{it} + \beta_5(TANG)_{it} + \beta_6(NDT)_{it} + \beta_7(LIQ)_{it} + \beta_8(DIVP)_{it} + \beta_9(RISK)_{it} + \beta_{10}(SETR)_{it} + \beta_{11}(INFLA)_{it} + \varepsilon_{it} \quad (1)$$

This model was estimated with FGLS regression, Fixed-effects (within) regression, and random-effects GLS regression. The results based on overall 128 companies that lead to 1,152 observations from the three industries are presented in Table IV in the appendix. Panel A presents the estimations of both capital structure proxies with the median of industry sector leverage, where the estimations with the average values of industry sector leverage are reported in panel B. According to the fixed-effects test and the Hausman test of random-effects that lead to reject the null hypotheses, therefore optimal capital structure decision models are the estimations from Fixed-effects (within) regression which are shown in column two and five in Table IV.

The coefficients of determination ($R^2$) that provide the judgment on whether the models fit the data well which are achieved from Fixed-effects (within) regression estimation lie in between 0.341 and 0.353 when leverage refers to *TLBA*. For *LLBA* as leverage measured, the coefficients of determination ($R^2$) are 0.264 and 0.337. The coefficients of determination obtained from the Fixed-effects regression estimations based on *TLBA* are higher than those are from *LLBA* as leverage measured.

Moreover, the static results by industry were also estimated and report in Table V in the appendix. Applying the fixed-effects test and the Hausman test of random-effects, the optimal capital structure decision models for each industry vary between Fixed-effects (within) regression estimation and Random-effects GLS regression estimation. In accordance with the values of the coefficients of determination ($R^2$), the models could describe capital structure decision in the context of *TLBA* better than *LLBA*. Furthermore, the coefficients of determination for both proxies of capital structure decision are summarized in table 4.1. Since the coefficients of determination are greatest for industrial industry followed by services industry and property and construction industry, respectively. Therefore, the models explain capital structure decision for industrials industry better than the services industry, and clarify less in property and construction industry.

Table 4.1 Summary of coefficients of determination by industry, leverage, and industry leverage proxies

| | *TLBA* | | *LLBA* | |
|---|---|---|---|---|
| | *TLBAM* | *TLBAA* | *LLBAM* | *LLBAA* |
| The entire samples | 0.341 | 0.353 | 0.264 | 0.337 |
| Industrials industry | 0.515 | 0.510 | 0.304 | 0.396 |
| Property and construction industry | 0.191 | 0.258 | 0.039 | 0.057 |
| Services industry | 0.331 | 0.329 | 0.315 | 0.351 |

*Factors Influencing Capital Structure Decision*

The significance of factors influencing capital structure decisions are high with mostly 1% and 5% levels among all four Fixed-effects (within) regression models. According to the static results presents in Table IV which based on the whole samples in the appendix, various factors are significantly related to leverage. Firstly, industry leverage (*IL*), which is measured by either mean or median of industry leverage, is positively correlated to firm leverage (*L*) except in property and construction industry when *TLBA* is concerned. Therefore, firm leverage increases when industry leverage rises and decreases otherwise.

For the second group of firm-specific variable, profitability, firm size, and tangibility of assets have highly statistically significant results at the 99% confidence level, while growth opportunity, liquidity, and dividend payout have statistically significant at 95% confidence level. For the profitability variable (*PROF*), a negative relationship with leverage was found and all the coefficients are significant at the 1% level except the insignificant coefficient for industrials industry when *LLBA* is concerned. *SIZE* has a positive impact and the coefficients are highly significant for all estimations. The growth opportunity that was measured by *MTB* variable is positively related to leverage in all cases with 5% significant level except when *LLBA* is considered. Tangibility of assets (*TANG*) has positively impact on the leverage and is highly significant at 1% and 5% level for all estimations based on all samples and by industry except property and construction industry. Furthermore, the study indicates that the liquidity variable (*LIQ*) is negatively associated to leverage when *TLBA* is considered except the insignificant for the services industry. The dividend payout (*DIVP*) was found to have negative relationship with leverage and most coefficients are

significant at the 5% level and some are significant at 10% level. Specifically, the results indicates the 5% significant level of negative relationship between *DIVP* and *LLBA* as leverage measured in industrials industry, and significant negative correlation to *TLBA* in property and construction industry as well as insignificant in the services industry. Furthermore, earning volatility (*RISK*) which indicates company operating risk has positive correlation to total book leverage at 1% significant level for industrial industry, where others are insignificant.

The third group of independent variable is the stock market condition that was measured by *SETR*. The findings are indecisive because the results indicate positive correlation with *LLBA* at the 1% significant level for the estimations with all samples, and positively association to *LLBA* at the 5% significant level for industrials industry and services industry. The stock market condition is insignificant to capital structure decision in the context of *TLBA*. Moreover, the findings also indicate capital structure decisions for companies in property and construction industry are insignificant to stock market condition.

The last group of variable is macroeconomic proxy, which refers to the expected change in the consumer price index over the coming year (*INFLA*). For the entire samples, it was found that the relationships between macroeconomic proxy and leverage are negatively insignificant. While the findings are inconclusive with negatively related to *LLBA* for industrials industry, whereas the others two industries are insignificant.

In conclusion, significant factors influencing capital structure decision in the context of *TLBA* for all samples from the three industries consist of industry leverage, profitability, firm size, growth opportunity, tangibility of assets, liquidity as well as

dividend payout ratio. More specifically, profitability, liquidity, and dividend payout have negative impact on leverage, whereas industry leverage, size, growth opportunity, and tangibility of assets are positively related to firm leverage. Moreover, the study also indicates that industry leverage, profitability, firm size, tangibility of assets, dividend payout, and stock market condition are key factors affecting capital structure decision when *LLBA* is concerned. Profitability, and dividend payout are negatively related to firm leverage, while industry leverage, firm size, tangibility of assets, stock market condition have positive impact on leverage. The findings on significant factors influencing capital structure decision for the entire samples at 5% level are summarized in table 4.2. Furthermore, the results on 5% significant level of factors influencing capital structure decision for individual industry based on static results by industry presented in the appendix as Table V are concluded in table 4.3

Factors influencing capital structure decision for companies in industrials industry, property and construction industry, and services industry as shown in table 4.3 indicate that industry leverage and firm size have positive correlation to firm leverage. Profitability specifies a negative association all estimations except for industrials industry when *LLBA* is concerned. Growth opportunity is positively significant in both leverage proxies for industrial industry and when *TLBA* is concerned for property and construction industry. The determinant tangibility of assets confirms positive impact on leverage for companies in industrials and services industries. Non-debt tax shield indicates positive correlation only in property and construction for both measurements of leverage. The factor liquidity does negative influence when *TLBA* is concerned for industrials and property and construction industries. The dividend payout indicates negative effect for industrials industry with the definition of *LLBA* and for property and

construction when *TLBA* is concerned. The operating risk does positive correlation to leverage only for industrials industry when *TLBA* is concerned. Moreover, stock market return illustrates positive effect to *LLBA* for firms in the industrials and the services industries. Additionally, the factor macroeconomic condition does only negative influence to *LLBA* for the industrials industry and to *TLBA* for the services industry.

Table 4.2 Factors influencing capital structure decision based on the entire samples

| Significant factors | Capital structure decision | |
|---|---|---|
| | *TLBA* | *LLBA* |
| Industry leverage | + | + |
| Profitability | - | - |
| Firm size | + | + |
| Growth opportunity | + | |
| Tangibility of assets | + | + |
| Non-debt tax shield | | |
| Liquidity | - | |
| Dividend payout | - | - |
| Operating risk | | +† |
| Stock market return | | +†† |
| Macroeconomic condition | | |

"+" indicates a positive relationship between factor and leverage, "-" denotes a negative association between factor and leverage, and blank refers to the insignificant relationship. † denotes when average value of industry leverage is concerned, and †† specifies the consideration of industry median leverage.

Table 4.3 Factors influencing capital structure decision separated by industry

| Significant Factors | Capital structure decision | | | | | |
|---|---|---|---|---|---|---|
| | Industrials | | Property & construction | | Services | |
| | *TLBA* | *LLBA* | *TLBA* | *LLBA* | *TLBA* | *LLBA* |
| Industry leverage | + | + | +† | + | + | + |
| Profitability | - | | - | - | - | - |
| Firm size | + | + | + | + | + | + |
| Growth opportunity | + | +† | + | | | |
| Tangibility of assets | + | + | | | +†† | + |
| Non-debt tax shield | | | +† | +†† | | |
| Liquidity | - | | -† | | | |
| Dividend payout | | - | -† | | | |
| Operating risk | + | | | | | |
| Stock market return | | +†† | | | | +† |
| Macroeconomic condition | | -†† | | | -† | |

"+" indicates a positive relationship between factor and leverage, "-" denotes a negative association between factor and leverage, and blank refers to the insignificant relationship. † denotes when average value of industry leverage is concerned, and †† specifies the consideration of industry median leverage.

Consequently, the findings indicate that capital structure decision is a trade-off decision affected by various factors. All significant factors influencing capital structure decision have consistent sign in all estimations among these industries.

Dynamic Multiple Regression Results

*Speed of Adjustment*

This section reports the results of dynamic panel data analysis. The dynamic analysis allows the study of firms' financing behavior over time, namely, the SOA. The lagged leverage was added as an explanatory variable into optimal capital structure decision model as mention above as equation (1). Therefore, the partial adjustment model was achieved as follow:

$$(L)_{it} = \lambda L_{it-1} + \alpha_0 + \alpha_1(IL)_{it} + \alpha_2(PROF)_{it} + \alpha_3(SIZE)_{it} + \alpha_4(MTB)_{it} + \alpha_5(TANG)_{it} + \alpha_6(NDT)_{it} + \alpha_7(LIQ)_{it} + \alpha_8(DIVP)_{it} + \alpha_9(RISK)_{it} + \alpha_{10}(SETR)_{it} + \alpha_{11}(INFLA)_{it} + u_{it} \quad (3)$$

Where, $(1-\lambda)$ stands for the SOA. The detailed results from all samples are presented in Table VI and the findings by industry are reported in Table VII.

Panel A of Table VI indicates the results based on *IL* median, and *IL* mean is concerned in panel B. Findings in Table VI reveal highly significant level at 99% confidence interval and positive effect of one period lagged leverage on the firms' leverage in all cases. The coefficients are between one and zero. Therefore, the incidence of capital structure dynamics is achieved. Firms partially adjust their capital structure to their optimal level over time as well as certify the enclosure of lagged leverage in the model. In order to support the inclusion of lagged leverage in the model, the explanatory power between the static model and the dynamic model would be discussed based on the coefficients of determination ($R^2$) that are presented in Table IV and Table VI. The static model has the $R^2$ range of 0.264 – 0.353 compared with the $R^2$ for dynamic model range 0.621 – 0.859. The dynamic model with lag dependent variable has higher $R^2$ indicates a better fit for modeling capital structure decision.

Therefore, including the SOA parameter would allow the dynamic model to embrace more explanatory power on capital structure decision than the static model.

In Table VI, the detailed results of equation (3) for the whole samples are reported. Fixed-effects regression and Random-effects GLS regression with a lag of one period leverage as a dynamic instrument are estimated. The next two estimators include Arellano-Bond GMM one step estimator and two step GMM estimator. The Hausman test and the Sargan test of over-identifying restrictions are employed to specify the validity of the instrument. The results are congruence with the literatures that Arellano-Bond one-step GMM estimation is the most appropriate estimation.

In addition, the dynamic panel data models by industry are also estimated and the findings are shown in Table VII. The results specify highly significant mostly at 1% level and one period lagged leverages ($L_{it-1}$) have positive effect on leverage for all cases. The coefficients are between one and zero. Hence, the findings certify the enclosure of lagged leverage in the model and support the presence of dynamism in capital structure decision. Firms partially convert their capital structure to the target level over time. The finding on the SOA that are presented by ($1-\lambda$) and half-lives for the whole samples and separated by industry are summarized in table 4.4

Table 4.4 Summary of the speed of adjustment and half-life separated by industry, leverage and industry leverage proxies

| | SOA (One-step GMM), % (Half-life, years) | | | |
|---|---|---|---|---|
| | *TLBA* | | *LLBA* | |
| | *TLBAM* | *TLBAA* | *LLBAM* | *LLBAA* |
| Whole samples | 38 (1.5) | 34 (1.7) | 69 (0.6) | 77 (0.5) |
| Industrial industry | 70 (0.6) | 69 (0.6) | 54 (0.9) | 64 (0.7) |
| Property and construction industry | 49 (1.0) | 52 (0.9) | 72 (0.5) | 73 (0.5) |
| Services industry | 28 (2.1) | 27 (2.2) | 57 (0.8) | 57 (0.8) |

The findings indicate the speeds of adjustment (*1-λ*) are sensitive to the definition of leverage. For the whole samples in the context of *TLBA* as leverage measured, the reported coefficients in panel A and panel B on Table VI is 0.62 and 0.66, which denote that firms close the gap between current and target leverage by 38 and 34 percent within one year. The SOA of 38% suggests a half-life for the influence of a shock of about 1.5 years [log (0.5) / log (0.62)], while SOA 34% advocates a half-life for the influence of a shock of around 1.7 years. Therefore, the firms might take around 1.5 – 1.7 years to adjust back one-half the distance between current and target book leverage after a one unit shock to the error term. At these SOA imply a reasonably active managerial intervention (Lliev & Welch, 2010). For the alternative definition of leverage proxy (*LLBA*), the estimated speeds are 69% in panel A and 77% in panel B. For these rates of adjustment, half-lives of 0.6 and 0.5 years are proposed.

These results reflect the highly active managerial intervention in order to close the gap between its current long-term book leverage and its target leverage.

The findings reported in Table VII indicate evidence on target capital structure behaviors vary among the three industries. In the context of *TLBA*, the highest SOA was found in industrials industry at the rate around 70% followed by property and construction at the approximate rate of 50%, and about 27% for the services industry. Particularly, industrials companies might take around 0.6 years to close back one-half the distance between their current and target leverage, while property and construction companies would need the longer period of 1 year to achieve back one-half the distance to their target capital structure. Furthermore, the services companies may take the longest period of about 2.2 years to reach back one-half the distance to the target leverage. As leverage refers to *LLBA*, property & construction industry indicates the highest adjustment speed of about 72%, while the speed for the services industry is 57% and the speed between 54% and 64% for industrials industry. Moreover, the speeds of adjustments toward target *LLBA* for all estimations except industrials industry are higher than those of *TLBA*. Specifically, property and construction companies might take only half-year to close back one-half the distance between current and target *LLBA*, while services companies would require the longer period around 0.8 year to get back one-half the distance to target capital structure. Besides, the industrials companies may take 0.9 and 0.7 year to reach back one-half the distance to the target leverage.

# CHAPTER 5

# CONCLUSIONS AND RECOMMENDATIONS

## Summary of the Findings and Discussions

### *Descriptive Statistics*

The average value of total liability to book value of leverage (*TLBA*) of 128 firms rooted in industrials, property and construction, and services industries for the entire period 2002 – 2010 was around 40%, whereas the average value of long-term liability to book value of leverage (*LLBA*) was about 13%. Industry leverage tends to differ across industries. The average value of *TLBA* for property and construction industry is about 48% followed by 37% for industrials industry and 35% for services industry, while the average value of *LLBA* for property and construction is 21% followed by 12% for services industry and around 7% for industrials industries. The findings support the results of Copeland, Weston and Shastri (2005) which indicated that different industries have extensively diverse in leverage levels. This study also reveals that the average values of *TLBA* and *LLBA* over the nine consecutive years for every single industry are volatile within each industry.

### *Optimal capital structure decision Model*

The optimal capital structure decision model was estimated with FGLS regression, Fixed-effects (within) regression, and random-effects GLS regression as well as the application of the fixed-effects test and Hausman test of random-effects.

For the entire samples with balanced panel data, the estimations with Fixed-effects (within) regression are found to be optimal capital structure decision models. The coefficients of determination ($R^2$) which reflect whether the models fit the data lie between 0.264 and 0.353. The estimations indicated that optimal capital structure decisions model for individual industry varied between Fixed-effects (within) regression and random-effects GLS regression. The optimal capital structure decision models can explain the capital structure in the context of *TLBA* better than *LLBA*. Furthermore, the estimation models used to explain capital structure decision for industrials industry are better than that of the services industry, and clarify less in property and construction industry. In conclusion, the findings indicate that listed companies in SET do have optimal capital structure decision model.

*Factors Influencing Capital Structure Decision*

According to the entire samples, factors that are statistically significant influencing capital structure decision in the context of *TLBA* consist of seven factors: industry leverage, profitability, firm size, growth opportunity, tangibility of assets, liquidity, and dividend payout ratio. Specifically, profitability, liquidity, and dividend payout are negatively related to leverage whereas industry leverage, size, growth opportunity, and tangibility of assets have positive correlation to leverage level. When *LLBA* is concerned as leverage proxy, the study indicates that industry leverage, profitability, firm size, tangibility of assets, dividend payout, and stock market condition are key factors affecting capital structure decision. Profitability, and dividend payout are negatively related to firm leverage while industry leverage, firm size, tangibility of assets, and stock market condition have positive impact on leverage.

Therefore, the findings indicate that capital structure decision is a trade-off decision affected by various factors. Moreover, all significant factors influencing capital structure decision have consistent sign in all estimations among these three industries: industrials, property and construction, and services industries.

In relation to the finding, the industry leverage has positively association to both proxies of book leverage at 1% significant level is somewhat consistent with the results of Frank and Goyal (2009) who found that industry median leverage is a positively significant factor in determining market leverage. As a result, it might be concluded that industry leverage has a positive effect to leverage decision. Firms' leverage levels are in line with the level of industry leverage. This implies that financial executives are likely to choose their capital structure resembling to their competitors.

In all models for both capital structure definitions, profitability indicates negative relationship to leverage at 1% significant level. The finding might be the result of transaction costs that retained earnings do not create the transaction cost, while external financing with either debt financing or equity issuances has to face with the transaction costs. Moreover, the negative relation between leverage and profitability is consistent with previous works such as Myers (1984), Titman and Wessels (1998), Gaud et al. (2005), Frank and Goyal (2009), and Getzmann et al., (2010). In addition, the negative correlation between profitability and leverage is similar to the evidence from the study of Leary and Roberts (2005) that firms are less liable to use external funds when they have adequate internal supports, but are more likely when they have large investment needs. Furthermore, the result also supports the proposed hypothesis that profitability is one of the firm-specific factors with negative relationship to capital structure decision. Target leverage ratio for high profitable firm is typically low, as it

would prefer internal financing to external borrowings. This finding reflects the evidence for the pecking order theory. It could not support the prediction of positive correlation by the trade-off theory that more profitable firms benefit more on the tax savings and lessen the bankruptcy costs. Hence, more profitable companies should have more leverage.

The positive relationship between firm's size and leverage are found for all estimations. The findings imply that large companies tend to have high leverage. This results support the explanation by the trade-off theory. Large companies have the ability to diversify their investments; therefore the cash flows volatility would be diminished. The probability of bankruptcy would be reduced and they can issue more debt to enhance the tax saving benefits. The findings lead to accept the proposed hypothesis that size has positive correlation to leverage. Moreover, the study is incongruent with the pecking order theory that information asymmetry for large firm is lowered by extensive disclosure duties, and the intimately monitor by the analysts. Additionally, positively correlation between size and leverage are also supporting the result suggested by Frank and Goyal (2008) that small public companies tend to draw on equity financing, while large public companies primitively employ retained earnings and corporate bonds. Furthermore, the positive effect of size on leverage agrees with various empirical studies (Rajan and Zingales, 1995; Booth et al., 2001; Gaud et al., 2005; Frank & Goyal, 2009; Getzmann et al., 2010).

The study also revealed that growth opportunity has positive correlation to total book leverage. Therefore, higher growth firms are likely to have greater total book leverage. It is considered that the existing activities of these companies create inadequacy of cash to maintain their business such as restoring assets. Thus, they

require external financing by issuing more debts that lead to higher leverage. This finding reflects the evidence for the pecking order theory that firms have a preference of retained earnings over debt and debt is favored over equity. The results also consistent to various studies such as Booth et al. (2001), Pandy (2001), Bas et al. (2009), and Getzmann et al. (2010). The findings on the effect of growth opportunities to capital structure decision is incoherent with the explanation by the trade-off theory which suggests a negative association that growth opportunity reduces the free cash flow that leads to the reduction in the ability to borrow.

Tangibility of assets has a positive impact on the leverage and has highly significant at 1% and 5% level for all estimations. The positive correlation is consistent for all significant estimations that support the suggestion by the trade-off theory. As tangible assets can be used as collateral that has less financial distress costs, fewer debt-related agency problems, and lower asymmetric information, the firm enables to have more leverage. Furthermore, the findings are congruent to the hypothesis and similar to several previous studies, for example, Rajan and Zingales (1995), Bevan and Danbolt (2000), Frank and Goyal (2009), and Getzmann et al. (2010).

The insignificant relationship between leverage and non-debt tax shield is consistent to Mazur (2007) and Afza and Hussain (2011). It is considered that the study rejects the proposed hypothesis, which states that leverage and non-debt tax shield have negative correlation. Moreover, the findings are incongruent to the explanation by the trade-off theory that the non-debt tax shield, which measures the reduction in earnings due to depreciation expenses, are resulted in tax advantages. Therefore, the presence of non-debt tax shield would lessen leverage level that lead to negative correlation. In addition, the empirical evidence on positive correlation between non-debt tax shield and

leverage is also realized by Frank and Goyal (2004) and Shen (2008), while several studies reveal negatively correlation (Booth et al., 2001; Huang & Song, 2006; Getzmann et al., 2010). Therefore, the influence of non-debt tax shield to capital structure decision might claim for advance study.

According to liquidity, the findings discover highly negative significant relationship to capital structure decision in the context of *TLBA* for all estimations including entire samples, industrial industry, and property and construction industry except the insignificance effect in the services industry. The results of negative relationship between liquidity and leverage is reliable to the suggestion by pecking order theory and various previous studies such as Chen and Jiang (2001), Deesomsak et al. (2004), Hennessy (2005), Mazur (2007), Afza and Hussain (2011).

Particularly, the results indicate negative relationship between dividend payout ratio and leverage which implies that higher dividend payout companies tend to have lower leverage. This finding supports the pecking order theory which states that firms favor internal financing over external financing where retained earnings are preferred over debt, and debt is favored over owner equity. The proposition implies that firm finances its financial needs with retained earnings; when its financial needs are lower than retained earnings, firm employs higher dividend payout policy. Therefore, debt financing is unnecessary that lead to lower leverage. Moreover, the negative relationship is similar to previous work of Frank and Goyal (2004). However, it is incongruent to the insignificant correlation which was found by Tong and Green (2005) and Getzmann et al. (2010).

Lastly, the empirical results specify insignificant relationship between operating risk and leverage level which incongruent to the proposed hypothesis that operating risk

is negatively related to leverage. The greater in earning volatility create the higher operating risk; therefore firms that have high operating risk would lessen their leverage with the intention of diminishing profit volatility. Hence, the higher operating risk might lead to lower leverage. However, the findings are parallel to that are found from previous studies such as Chen and Jiang (2001), Deesomsak et al. (2004), and Shen (2008). Since the arguable relationship between operating risk and leverage level among insignificant, positive and negative correlation, future research should include this issue as well.

The study found the insignificant negative relationship between expected inflation and leverage level which is similar to Bas et al. (2009). This finding implies that capital structure decision and the states of economy are independent. The finding is incongruent to economic intuition which suggests that the stage of economy and business cycle are considered to be significant determination of default risk and financing decision. Leverage level is counter-cyclical. Consequently, macroeconomic variables and leverage should have negative correlation. The insignificant counteract effect of economic condition to leverage level is considered to be from the reason that Thailand economy during the study periods is quite stable even if the world economy was distressed by global economic crisis, both Subprime and Euro Crisis. Moreover, the result opposed to that was found by Frank and Goyal (2009) which indicated that macroeconomic condition is positively related to firm leverage. Hence, firms tend to have more leverage during expansion period and have a tendency to ensure less debt during the recession period.

In conclusion, this study discovers that industry leverage, profitability, and firm size have similar effects to capital structure decisions across these three industries.

However, several crucial differences in capital structure decisions among these industries are also determined. Factors influencing capital structure decision of industrials companies when *TLBA* is concerned are industry leverage, profitability, size, growth opportunity, tangibility, liquidity, and operating risk, whereas industry leverage, size, growth opportunity, tangibility, dividend payout, stock market return, and expected inflation are capital structure determinant when the proxy for leverage measured is *LLBA*. Based on property and construction companies, determinants of the decision on *TLBA* comprise industry leverage, profitability, size, growth opportunity, non-debt tax shield, liquidity, and dividend payout, where factors influencing the decision on *LLBA* consist of industry leverage, profitability, size, and non-debt tax shield. On the side of services companies, industry leverage, profitability, size, tangibility of assets and macroeconomic condition are influential factors in determining *TLBA* as capital structure decision, while industry leverage, profitability, size, tangibility, and stock market condition are capital structure determinant based on *LLBA*.

*Speed of Adjustment*

For all estimations, the empirical results specify the dynamic of capital structure decisions. The dynamic model with lagged leverage granted higher coefficient of determination which indicates a better fit for modeling capital structure decision. The findings are consistent to the proposed hypothesis that firms partially adjust capital structure to their optimal level over time. The findings strongly supported the dynamic trade-off theory. The actual capital structure might differ from its optimal level, and the

firm will rebalance its financing activities to direct its capital structure back to the optimal level when the benefits overcome the costs of adjustment.

Additionally, the empirical results indicate that the speed of adjustment (SOA) varies across industries and leverage measured. For *TLBA* as leverage proxy, the whole samples have the annual SOA 34% -38%, and the adjustment speeds were around 69% - 77% for *LLBA*. According to the adjustment speeds by industry in the context of *TLBA*, the industrials industry has the adjustment speed of about 70% per year, where property and construction industry has the speed 49% - 52%, and the services industry claims for the lowest adjustment speed of about 28%. When *LLBA* was considered as leverage proxy, the adjustment speeds for the industrials industry were 54% - 64%, and 72% for property and construction industry, as well as 57% for the services industry.

The findings on capital structure dynamics and SOA are congruent with several studies, but SOA vary across countries, industries, and leverage proxies which are summarized and demonstrated in table 5.1. Concerning the absolute values, the adjustment speed for listed companies in the Stock Exchange of Thailand (SET) in the context of *TLBA* is around 34% with a half-life of 1.7 years which are the same as the findings of Flannery and Rangan (2006). Besides, the finding is also similar to the study of Getzmann et al. (2010) that listed companies in Asian stock markets converge toward target book leverage at the speed of 27% - 39% or the half-lives of 2.2 years and 1.4 years. According to Lliev and Welch (2010), the findings on these SOA imply a reasonably active managerial intervention to close the gap between its current total book leverage and its target level. Moreover, the findings also indicate that the SOA toward long-term target book leverage is around 69% - 77% that suggest the half-lives of 0.6 years and 0.5 years, respectively. Consequently, SOA toward long-term book

leverage are faster than the convergence speeds toward total book value of leverage. The findings imply that listed companies in SET take just about half-year to adjust its current long-term book leverage back one-half the distance to their target *LLBA*, while they take 1.7 years to close their total book leverage back one-half the distance to their target *TLBA*. These results reflect the highly active managerial intervention in order to close the gap between its current long-term book leverage and its target long-term book leverage. Additionally, the results are also consistent to the results of Antao and Bonfim (2012) that Portugese SMEs move toward long-term book leverage at the annual rate of 53% - 63% which take 0.9 – 0.7 years for adjusting one-half of capital structure back to their long-term target book leverage. In summary, the results are obviously in favor of an adjustment toward the target capital structure and presenting evidence supporting the dynamic trade-off theory.

## Limitations of Study

This research was done within several limitations. Firstly, the study employed balance dynamic panel data obtained from the nine consecutive years of listed companies in SET including all companies that are not under rehabilitation that have continuous and complete data from three major industries: industrials, property and construction, and services industry for the period during 2002 to 2010. Therefore, only three main industries out of seven non-financial related industrials were selected for this study. Besides, only 128 out of 254 companies in total or about 50% companies were achieved the research criterion and were employed as samples for this study. Secondly,

Table 5.1 Comparison of the speeds of adjustment towards target capital structure

| Country (Samples' period) | Researchers | Annual SOA (%) (Half-lives, years) | |
|---|---|---|---|
| | | Book leverage | Market leverage |
| Listed companies in SET (2002-2010) | This paper | 34% - 38%† (1.7 – 1.5)<br>69% - 77%†† (0.6 – 0.5) | |
| Portuguese SMEs (1990-2007) | Antao and Bonfim (2012) | 53% - 63% †† (0.9 – 0.7) | N.A. |
| Listed companies in Asian stock exchanges (1995-2009) | Getzmann et al. (2010) | 27% - 39% (2.2 – 1.4) | N.A. |
| Korean listed non-financial companies (1985-2002) | Kim et al. (2006) | 15% - 18% (4.3 – 3.5) | N.A. |
| Indian manufacturing companies (1993-2007) | Mukherjee and Mahakud (2010) | N.A. | 12% - 39% (5.4 – 1.4) |
| American companies (1965-2001) | Flannery and Rangan (2006) | 34% (1.7) | 35.5% (1.6) |
| American companies (1965-2003) | Lemmon et al., (2008) | 25% (2.4) | N.A. |
| Listed American companies (1963-2001) | Huang and Ritter (2009) | 17% (3.7) | 23% (2.7) |
| American companies (1965-2008) | Elsas and Florysiak (2010) | N.A. | 26% (2.5) |
| Listed non-financial Spanish companies (1990-1997) | Miguel and Pindado (2001) | N.A. | 21%††† (2.9) |
| Listed Swiss companies (1991-2000) | Guad et al., (2005) | N.A. | 16% - 29% (4.0 – 2.0) |
| Swedish SMEs (1994-1997) | Heshmati (2002) | 12% (5.4) | N.A. |
| Manufacturing Nigerian listed companies (2000-2009) | Tayo (2012) | 16% (4.0) | N.A. |

† denotes *TLBA* as leverage proxy, †† indicates long-term book leverage, ††† specifies long-term market leverage

Thailand economy during the study periods is considered to be stable even if the world economy was distressed by global economic crisis such as Subprime Crisis and Euro Crisis. Moreover, the study indicates the relationship between leverage and macroeconomic proxy is insignificant. Hence, future study should expand the period of study covering various stages of economic cycle in order to examine the effect of economic cycle on financing decisions. In addition, this study focuses on listed companies in SET. Further research should extend to listed companies in the Market for Alternative Investment (MAI) and unlisted companies. Finally, the capital structure decision in this study concentrates only on book leverage which refer to total book leverage and long-term book leverage. Additionally, the findings demonstrate that SOA varies with leverage proxies. Hence, different proxies of market leverage such as total market leverage and long-term market leverage might claim for further study as well.

## Research Contribution and Future Research

### *Research Contribution*

This study creates several contributions which are categorized into two folds, the theoretical side and the practical side. According to the theoretical side, there are three main contributions. The first contribution is to close the gap concerning the argument of previous empirical studies on keys factors influencing capital structure decision. This study indicates that industry leverage and firm-specific variables are significant capital structure determinants for listed companies in SET. Core factors influencing capital structure decision include industry sector leverage (+), firm size (+),

growth opportunity (+), tangibility (+), profitability (-), liquidity (-), and dividend payout (-). The explanation for factors influencing capital structure decision relies on both pecking order theory and trade-off theory. Secondly, this study contributes that listed companies in SET do have optimal capital structure. Lastly, when firm's current capital structure differs from the target level, firms partially adjust their capital structure towards the optimal level, but the speeds of adjustment vary across industries, and leverage proxy. Firms concentrate more on adjusting long-term leverage than total leverage. On behalf of listed companies in SET, managerial intervention in adjusting capital structure towards total leverage is reasonably active, and highly active managerial intervention incurs in adjusting towards long-term leverage. Capital structure decision is a significant managerial decision since it affects shareholders' return and risk. This study supports the suggestion of dynamic trade-off theory which proposes that firms have optimal capital structure and partially adjust its current capital structure toward target capital structure.

In relation to the practical side, there are three major implications for practice. Firstly, the results of this study will provide useful optimal capital structure decision models that can assist the practitioners in designing the appropriate capital structure for their companies. Secondly, the findings contribute to management understanding on capital structure behavior which is decisive to financial executives in planning and controlling capital structure as well as to estimate the demand for fund. Finally, the findings can be applied to estimate the demand for fund, capital structure policy recommendation, and to formulate loan strategies for policy makers in both private and public sectors.

*Future Research*

There are two major aspects that remain interesting for future research. The first aspect should concentrate on the investigation on factors determining optimal capital structure, while the second issue might focus on factors influencing the speed of adjustment toward target capital structure. There are three main issues in accordance with the first aspect. Firstly, the findings reveal positively insignificant relationship between leverage and non-debt tax shield, while negative correlation was suggested by both trade-off theory and pecking order theory. Hence, the empirical evidences are still ambiguous among insignificant, positive, and negative correlation. Secondly, the study reveals inconclusive result that macroeconomic proxy and leverage has negatively insignificant relationship, and has statistically negative correlation in the context of long-term leverage in industrials industry, whereas the others two industries are insignificant. Moreover, the direction of the relationship is considered to be negative which oppose to the predicted sign by the trade-off theory. Thirdly, the finding indicates insignificant association between earning volatility and leverage level, but both trade-off and pecking order theories suggest negatively correlation. Therefore, the influencing of non-debt tax shield and operating risk to capital structure decision and the impact of macroeconomic condition on capital structure choice might claim for further study.

In accordance with the second aspect, this study found that listed companies in SET are gradually move toward their optimal capital structure and the SOA vary across industries. However, why SOA differ across industries and what factors are considered as the SOA determinants are still not examined. Furthermore, it is questionable that the rate of adjustment might come from the divergence between the current level of

leverage relative to the target, and to the industry level. Consequently, future research should focus on factors determining the speed of adjustment to target capital structure in order to describe the adjustment behavior toward target leverage.

# LIST OF REFERENCES


Abor, J. (2008). *Determinants of the capital structure of Ghanaian firms.* Working paper, African Economic Research Consortium, Nairobi.

Afza, T., & Hussain, A. (2011). Determinants of capital structure: A case study of automobile sector of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business, 2(10),* 219-230.

Alan, A. B., & Jo D. (2000). *The dynamics in the determinants of capital structure in the UK*. Working paper, University of Glasgow.

Alti, A. (2006). How persistent is the impact of market timing on capital structure? *The Journal of Finance, 61(4),* 1681-1710.

Anand, M. (2004). *A review of research on the practices of corporate finance*. Working paper, Indian Institute of Management Lucknow.

Antao, P. & Bonfim, D. (2004). *The dynamic of capital structure decisions*. Working paper, Banco de Portugal, Economics and Research Department.

Anderson, R.W. (2002). *Capital structure, firm liquidity and growth.* Working paper, London School of Economics and Political Science.

Arellano, M. & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies, 58,* 277-297.

Bas, T., Muradoglu, G., & Phylaktis, K. (2009). *Determinants of capital structure in developing countries.* Working paper, Cass Business School.

Bancel, F., & Mitto, U.R. (2004). Cross-country determinants of capital structure choice: A survey of European firms. *Financial Management, 33(4),* 103-132.

Baker,M., & Wurgler, J. (2002). Market timing and capital structure. *Journal of Finance, 52(1),* 1-32.

Bevan, A.A., & Danbolt, J. (2000). *The dynamics in the determinants of capital structure in the UK*. Working paper, University of Glasgow.

Bevan, A.A., & Danbolt, J. (2002). Capital structure and Its Determinants in the UK – A decompositional analysis. *Applied Financial Economics, 12(3),* 159-170.

Bhabra, H.S., Lui, T., & Tirtiroglu, D. (2008). Capital structure choice in a nascent market: Evidence from listed firms in China. *Journal of Financial Management, 37(2),* 341-364.

Bhamra, H.S., Kuehn, L.A., & Strebulaev, I. S. (2010) The aggregate dynamics of capital structure and macroeconomic risk. *Review of Financial Studies, 23(12),* 4187-4241.

Bond, S.R. (2002). Dynamic panel data models: A guide to micro data methods and practice. *Portuguese Economic Journal, 1,* 141-162.

Booth, L., Aivazian,V., Demirguc-Kunt, A., & Maksimovic, V. (2001). Capital structure in developing countries. *Journal of Finance, 56(1),* 87-130.

Byoun, S. (2008). How and when do firms adjust their capital structures toward targets?. *Journal of Finance, 63(6),* 3069-3096.

Campello, M. (2003). Capital structure and product markets interactions: Evidence from business cycles. *Journal of Financial Economics, 68,* 353-378.

Chen, H. (2010). Macroeconomic conditions and the puzzles of credit spreads and capital structure. *The Journal of Finance, 65(6),* 2171-2212.

Chen, J.J. (2004). Determinants of capital structure of Chinese-listed companies. *Journal of Business Research, 57,* 1341-1351.

Chirinko, R.S., & Singha, A.R. (2000). Testing static tradeoff against pecking order models of capital structure: a critical comment. *Journal of Financial Economics, 58(3),* 417-425.

Cook, D.O., & Tang, T. (2010). Macroeconomic conditions and capital structure adjustment speed. *Journal of Corporate Finance, 16(1),* 73-87.

Copeland, T.E., Weston, J.F., & Shastri, K. (2005). *Financial theory and corporate policy* (4th ed.). Boston: Pearson Addison Wesley.

Deesomsak, R., Paudyal, K. & Pescetto, G. (2004). The determinants of capital structure: evidence from the Asia Pacific region. *Journal of multinational financial management, 14 (4-5),* 387-405.

Dittmar, A.K., & Thakor, A.V. (2007). Why do firms issue equity? *Journal of finance, 62 (1),* 1-54.

Elsas, R., & Florysiak, D. (2010). *Dynamic capital structure adjustment and the impact of fractional dependent variables*. Working paper, Institute for Finance & Banking, University of Munich.

Fama, E.F., & French, K.R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *The Review of Financial Studies, 15(1),* 1-33.

Fisher, E.O., Heinkel, R. & Zechner, J. (1989). Dynamic capital structure choice: Theory and tests. *The Journal of Finance, 44(1),* 19-40.

Flannery, M.J., & Hankins, K.W. (2007). *A theory of capital structure adjustment speed.* Working paper, University of Florida.

Flannery, M.J., & Rangan, K.P. (2006). Partial adjustment toward target capital structures. *Journal of Financial Economics, 79,* 469-506.

Frank, M.Z., & Goyal, V.K. (2003). *Capital structure decisions.* Working paper, University of Minnesota and Hong Kong University of Science & Technology.

Frank, M.Z., & Goyal, V.K. (2003). Testing the pecking order theory of capital structure. *Journal of Financial Economics, 67,* 217-248.

Frank, M.Z., & Goyal, V.K. (2004). The effect of market conditions on capital structure adjustment. *Finance Research Letters, 1,* 47-55.

Frank, M.Z., & Goyal, V.K. (2008). Trade-off and pecking order theories of debt. In B. Espen Eckbo (Ed.), *Handbooks of corporate finance: Empirical corporate finance* (Vol. 2). North-Holland: Elsevier.

Frank, M.Z., & Goyal, V.K. (2009). Capital structure decisions: Which factors are reliably important? *Financial Management, 38(1),* 1-37.

Frieder, L., & Martell, R. (2006). *Capital structure and equity liquidity: A bi-directional relationship*. Working paper, Purdue University.

Frydenberg, S. (2008). *Theory of capital structure – A review*. Working paper, Norwegian University of Science and Technology.

Gaud, P., Jani, E., Hoesli, M. & Bender, A. (2005). The capital structure of Swiss companies: An empirical analysis using dynamic panel data. *European Financial Management, 11(1),* 51-69

Getzmann, A., Lang, S., & Spremann, K. (2010). Determinants of the target capital structure and adjustment speed – evidence from Asian capital markets. *In European Financial Management Symposium.* Beijing.

Gitman, L. J. (2006). *Principles of managerial finance* (11th ed.). Boston, MA: Pearson Education, Inc.

Green, C.J., Murinde, V., & Suppakitjarak, J. (2002). *Corporate financial structures in India.* Working paper, Loughborough University Institutional Repository.

Green, W.H. (2003). *Econometric analysis* (5th ed.). Upper Saddle River, New Jersey: Prentice-Hall.

Hackbarth, D., Miao, J., & Morellec, E. (2006). Capital structure, credit risk, and macroeconomic conditions. *Journal of Financial Economicse, 82,* 519-550.

Harris, M., & Raviv, A. (1991). The theory of capital structure. *Journal of Finance, 46(1),* 297-355.

Hennessy, C.A. (2005). Debt dynamics. *The Journal of Finance Article Abstract, 60(3),* 1129-1165.

Hovakimian, A., Hovakimian, G., & Tehranian, H. (2004). Determinants of target capital structure: the case of dual debt and equity issues. *Journal of Financial Economics, 71,* 517-540.

Heshmati, A. (2002). The dynamics of capital structure: Evidence from Swedish micro and small firms. *Research in Banking and Finance, 2,* 199-241.

Huang, G., & Song, F.M. (2006). The determinants of capital structure: Evidence from China. *China Economic Review, 17(1),* 14-36.

Huang, R., & Ritter, J.R. (2005). *Testing the market timing theory of capital structure.* Working paper, University of Florida.

Huang, R., & Ritter, J.R. (2009). Testing theories of capital structure and estimating the speed of adjustment. *Journal of Financial and Quantitative Analysis, 44(2),* 237-271.

John, K., & Litov, L.P. (2009). Corporate governance and financing policy: new evidence. In *AFA 2006 Boston Meetings.* CELS 2009 4th Annual Conference on Empirical Legal Studies Paper.

Jensen, M.C. (1986). Agency cost of free cash flow, Corporate Finance, and takeovers. *American Economic Review, 76(2),* 323-329.

Jensen, M.C., & Meckling, W.H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3(4),* 305-360.

Kim, H., Heshmati, A., & Aoun, D. (2006). Dynamics of capital structure: The case of Korean listed manufacturing companies. *Asian Economic Journal, 20(3),* 275-302.

Korajczyk, R.A. & Levy, A. (2003). Capital structure choice: Macroeconomic conditions and financial constraints. *Journal of Financial Economics, 68,* 75-109.

Kraus, A. & Litzenberger, R. (1973). A state preference model of optimal financial leverage. *Journal of Finance, 28(4),* 911-922.

Laura Xiaolei Liu, (2005). *Do firms have target leverage ratios? Evidence from historical market-to-book and past returns,* Working paper, Hong Kong University of Science & Technology.

Leary, M.T. & Roberts, M.R. (2005). Do firms rebalance their capital structure?. *The Journal of Finance, 60(6),* 2575-2619.

Leland, H. & Pyle, D. (1977). Information asymmetries, Financial structure and financial intermediation. *The Journal of Finance, 32(2),* 371-387.

Lemmon, M.L., Roberts, M.R., & Zender, J.F. (2008). Back to the beginning: Persistence and the cross-section of corporate capital structure. *Journal of Finance, 63(4),* 1575-1608.

Lemmon, M.L. & Zender, J.F. (2008). *Debt capacity and tests of capital structure theories.* Working paper, University of Utah and University of Colorado at Boulder.

Levy, A. & Hennessy, C. (2007). Why does capital structure choice vary with macroeconomic conditions? *Journal of Monetary Economics, 54,* 1545-1564.

Lliev, P. & Welch, I. (2010). *Reconciling estimates of the speed of adjustment of leverageratios*, Working paper, Pennsylvania State University and Brown University.

Mazur, K. (2007). The determinants of capital structure choice: Evidence from Polish companies. *International Advances in Economic Research, 13(4),* 495-514.

Miao, J. (2005). Optimal capital structure and industry dynamics. *Journal of Finance, 60(6),* 2621-2659.

Migual, A. & Pindado, J. (2001). Determinants of capital structure: new evidence from Spanish panel data. *Journal of Corporate Finance, 7*, 77-99.

Miller, M. (1977). Debt and taxes. *Journal of Finance, 32(2),* 261-275.

Miller, M. & Modigliani, F. (1958b). The cost of capital, Corporate finance, and the theory of investment. *American Economic Review, 48(3),* 261-297.

Miller, M. & Modigliani, F. (1963). Corporate income taxes and the cost of capital: A correction. *American Economic Review, 53(3),* 433-443.

Myers, S.C. (1984). The capital structure puzzle. *The Journal of Finance, 39(3),* 575-592.

Myers, S.C. & Majluf, N.S. (1984) Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13(2),* 187-221.

Mukherjee, S. & Mahakud, J. (2010) Growth opportunity and capital structure dynamics: Evidence from Indian Manufacturing Companies. *Journal of Management Research, 10(3),* 180-192.

Pandey, I.M. (2001). *Capital structure and the firm characteristics: Evidence from an emerging market.* Working paper, Indian Institute of Management Ahmedabad.

Psillaki, M. & Daskalakis, N. (2009). Are the determinants of capital structure country or firm specific? *Small Business Economics. 33(3),* 319-333.

Rajan, R.G. & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance. 50(5),* 1421-1460.

Schreiber, S. (2008). The Hausman test statistic can be negative even asymptotically. *Journal of Economics and Statistics*. 228(4), 394-405.

Shen, G. (2008). *The determinant of capital structure in Chinese listed companies.* Unpublished doctoral dissertation, University of Ballarat. Australia.

Shyam-Sunder, L. & Myers, S.C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics. 51,* 219-244.

Sibikov, V. (2009). Asset liquidity and capital structure. *Journal of Financial and Quantitative Analysis. 44(5),* 1173-1196.

Sinha, S. (1993). Inter-industry variations in capital structure. *Economic and Political Weekly. 28(35),* 91-94.

Strebulaev, I.A. (2007). Do tests of capital structure theory mean what they say?. *The Journal of Finance, 62,* 1747-1787.

Talberg, M., Winge, C., Frydenberg, S. & Westgaard, S. (2008). Capital structure across industries. *International Journal of the Economics of Business, 15(2),* 181-200.

Tayo, A.G. (2012). Speed of adjustment towards the target capital structure by Nigerian listed firms. *Journal of Emerging Trends in Economics and Management Sciences, 3(5),* 491-494.

Titman, S. & Tysplakov, S. (2007). A dynamic model of optimal capital structure. *Review of Finance, 11(3),* 401-451.

Tong, G. & Green, C.J. (2005). Pecking order or trade-off hypothesis? Evidence on the capital structure of Chinese companies. *Applied Economics, 37(19),* 2179-2189.

Wang, C.S., Strong, N., Tung, S. & Lin, S. (2009). Share repurchases, the clustering problem, and the free cash flow hypothesis. *Financial Management, Autumn,* 487-505.

Welch, I. (2004). Capital structure and stock returns. *Journal of Political Economy, 112(1),* 106-131.

Welch, I. (2010). *A bad measure of leverage: The financial-debt-to-asset ratio.* Working paper, Brown University.

Wiwattanakantang, Y. (1999). An empirical study on the determinants of the capital structure of Thai firms. *Pacific-Basin Finance Journal, 7,* 371-403.

http://www2.bot.or.th/statistics/ReportPage.aspx?reportID=409&language=Eng

http://www.set.or.th/th/market/market_statistics.html

Table I
Descriptive statistics

This table presents descriptive statistics for the variables used in these estimations. The data are mainly from BOL Corpus and the sample contains nine consecutive years for the period 2002 – 2010 from 128 firms established in three industries: industrials, property & construction, and services which are listed on the Stock Exchange of Thailand (SET). TLBA is the ratio of total liabilities to total book value of total assets. LLBA is the ratio of total non-current liabilities to total book value of total assets. PROF is the ratio of earnings before interest and tax to total assets. SIZE is the natural logarithm of total assets. MTB is the ratio of market value of assets (total liability plus market value of equity) to total book value of assets. TANG is the ratio of net property, plant and equipment to total assets. NDT is the ratio of depreciation expense to total assets. LIQ is the ratio of current assets to current liabilities. DIVP is the dividend payout ratio. RISK is the squared difference between the firm's profitability (PROF) and the cross-sectional mean of industry profitability. SETR is the annual set index return, and INFLA is the expected change in the consumer price index over the coming year. The statistics include mean, median, standard deviation, maximum, and minimum value for the total period 2002 – 2010.

Year 2002 - 2010

| Variables | Observations | Mean | Median | S.D. | Min | Max |
|---|---|---|---|---|---|---|
| All Firms (128 companies) | | | | | | |
| TLBA | 1152 | 0.397 | 0.395 | 0.230 | 0.002 | 1.742 |
| LLBA | 1152 | 0.134 | 0.072 | 0.154 | 0.000 | 0.740 |
| PROF | 1152 | 0.092 | 0.085 | 0.104 | -0.968 | 0.678 |
| SIZE | 1152 | 9.523 | 9.525 | 0.610 | 8.164 | 11.466 |
| MTB | 1152 | 1.339 | 1.070 | 1.157 | 0.054 | 18.700 |
| TANG | 1152 | 0.311 | 0.262 | 0.247 | 0.000 | 0.975 |
| NDT | 1152 | 0.334 | 0.026 | 0.031 | 0.000 | 0.217 |
| LIQ | 1152 | 2.699 | 1.433 | 5.007 | 0.009 | 80.100 |
| DIVP | 1152 | 0.492 | 0.437 | 0.708 | 0.000 | 17.214 |
| RISK | 1152 | 0.010 | 0.002 | 0.042 | 0.000 | 1.043 |
| SETR | 1152 | 0.228 | 0.173 | 0.475 | -0.476 | 1.166 |
| INFLA | 1152 | 0.031 | 0.033 | 0.019 | -0.008 | 0.054 |
| Industrials (36 companies) | | | | | | |
| TLBA | 324 | 0.372 | 0.319 | 0.248 | 0.024 | 1.742 |
| LLBA | 324 | 0.072 | 0.022 | 0.109 | 0.000 | 0.694 |
| PROF | 324 | 0.089 | 0.092 | 0.088 | -0.589 | 0.344 |
| SIZE | 324 | 9.325 | 9.324 | 0.492 | 8.183 | 10.696 |
| MTB | 324 | 1.035 | 0.949 | 0.551 | 0.054 | 4.803 |
| TANG | 324 | 0.347 | 0.350 | 0.175 | 0.004 | 0.776 |
| NDT | 324 | 0.041 | 0.036 | 0.025 | 0.006 | 0.148 |
| LIQ | 324 | 2.698 | 1.701 | 2.936 | 0.190 | 31.650 |
| DIVP | 324 | 0.461 | 0.332 | 1.155 | 0.000 | 17.214 |
| RISK | 324 | 0.006 | 0.002 | 0.018 | 0.000 | 0.248 |
| SETR | 324 | 0.228 | 0.173 | 0.475 | -0.476 | 1.166 |
| INFLA | 324 | 0.031 | 0.033 | 0.019 | -0.009 | 0.054 |
| Property and Construction (39 companies) | | | | | | |
| TLBA | 351 | 0.477 | 0.483 | 0.178 | 0.014 | 1.078 |
| LLBA | 351 | 0.210 | 0.211 | 0.147 | 0.000 | 0.628 |
| PROF | 351 | 0.091 | 0.078 | 0.093 | -0.290 | 0.540 |
| SIZE | 351 | 9.830 | 9.819 | 0.552 | 8.850 | 11.308 |
| MTB | 351 | 1.393 | 1.085 | 1.005 | 0.308 | 10.922 |
| TANG | 351 | 0.172 | 0.101 | 0.197 | 0.001 | 0.850 |
| NDT | 351 | 0.017 | 0.009 | 0.019 | 0.0001 | 0.161 |
| LIQ | 351 | 2.996 | 1.649 | 7.562 | 0.020 | 43.251 |
| DIVP | 351 | 0.405 | 0.379 | 0.443 | 0.000 | 4.129 |
| RISK | 351 | 0.008 | 0.003 | 0.019 | 0.000 | 0.166 |
| SETR | 351 | 0.228 | 0.173 | 0.475 | -0.476 | 1.166 |
| INFLA | 351 | 0.031 | 0.033 | 0.019 | -0.009 | 0.054 |
| Services (53 companies) | | | | | | |
| TLBA | 477 | 0.354 | 0.315 | 0.235 | 0.002 | 1.113 |
| LLBA | 477 | 0.121 | 0.037 | 0.162 | 0.000 | 0.740 |
| PROF | 477 | 0.095 | 0.085 | 0.122 | -0.968 | 0.678 |
| SIZE | 477 | 9.432 | 9.362 | 0.637 | 8.164 | 11.466 |
| MTB | 477 | 1.506 | 1.123 | 1.481 | 0.093 | 18.700 |
| TANG | 477 | 0.388 | 0.364 | 0.278 | 0.000 | 0.975 |
| NDT | 477 | 0.040 | 0.034 | 0.036 | 0.000 | 0.217 |
| LIQ | 477 | 2.728 | 1.100 | 6.461 | 0.009 | 80.100 |
| DIVP | 477 | 0.502 | 0.526 | 0.688 | 0.000 | 2.541 |
| RISK | 477 | 0.014 | 0.002 | 0.062 | 0.000 | 1.043 |
| SETR | 477 | 0.228 | 0.173 | 0.475 | -0.476 | 1.166 |
| INFLA | 477 | 0.031 | 0.033 | 0.019 | -0.009 | 0.054 |

Table II

Descriptive Statistics by Year

This table presents descriptive statistics for the variables used in these estimations. The statistics include mean and median of the data for the period 2002 – 2010 from 128 firms established in three industries: industrials, property and construction, and services which are listed on the Stock Exchange of Thailand (SET). TLBA is the ratio of total liabilities to total book value of total assets. LLBA is the ratio of total non-current liabilities to total book value of total assets. PROF is the ratio of earnings before interest and tax to total assets. SIZE is the natural logarithm of total assets. MTB is the ratio of market value of assets (total liability plus market value of equity) to total book value of assets. TANG is the ratio of net property, plant and equipment to total assets. NDT is the ratio of depreciation expense to total assets. LIQ is the ratio of current assets to current liabilities. DIVP is the dividend payout ratio. RISK is the squared difference between the firm's profitability (PROF) and the cross-sectional mean of industry profitability.

| Variables | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Firms (128 companies) | | | | | | | | | | |
| TLBA | Mean | 0.420 | 0.396 | 0.391 | 0.373 | 0.387 | 0.391 | 0.407 | 0.404 | 0.394 |
| | Median | 0.388 | 0.402 | 0.402 | 0.373 | 0.403 | 0.374 | 0.414 | 0.387 | 0.400 |
| LLBA | Mean | 0.163 | 0.150 | 0.134 | 0.131 | 0.122 | 0.115 | 0.123 | 0.137 | 0.133 |
| | Median | 0.087 | 0.070 | 0.047 | 0.089 | 0.067 | 0.071 | 0.060 | 0.092 | 0.056 |
| PROF | Mean | 0.094 | 0.108 | 0.105 | 0.096 | 0.090 | 0.086 | 0.071 | 0.073 | 0.102 |
| | Median | 0.091 | 0.094 | 0.094 | 0.088 | 0.084 | 0.077 | 0.076 | 0.074 | 0.090 |
| SIZE | Mean | 9.384 | 9.447 | 9.433 | 9.469 | 9.535 | 9.544 | 9.569 | 9.574 | 9.600 |
| | Median | 9.331 | 9.452 | 9.499 | 9.597 | 9.597 | 9.554 | 9.579 | 9.558 | 9.600 |
| MTB | Mean | 1.246 | 1.709 | 1.312 | 1.183 | 1.360 | 1.495 | 1.049 | 1.198 | 1.485 |
| | Median | 0.985 | 1.419 | 1.136 | 1.040 | 1.103 | 1.107 | 0.879 | 0.993 | 1.176 |
| TANG | Mean | 0.331 | 0.320 | 0.300 | 0.300 | 0.319 | 0.314 | 0.312 | 0.310 | 0.286 |
| | Median | 0.327 | 0.285 | 0.253 | 0.247 | 0.265 | 0.255 | 0.242 | 0.251 | 0.227 |
| NDT | Mean | 0.034 | 0.032 | 0.030 | 0.031 | 0.033 | 0.034 | 0.034 | 0.035 | 0.035 |
| | Median | 0.030 | 0.028 | 0.025 | 0.026 | 0.027 | 0.026 | 0.027 | 0.026 | 0.026 |
| LIQ | Mean | 2.543 | 3.362 | 3.054 | 3.065 | 3.767 | 2.806 | 2.922 | 2.704 | 2.632 |
| | Median | 1.552 | 1.490 | 1.553 | 1.477 | 1.489 | 1.360 | 1.335 | 1.375 | 1.415 |
| DIVP | Mean | 0.417 | 0.470 | 0.407 | 0.436 | 0.440 | 0.508 | 0.657 | 0.396 | 0.410 |
| | Median | 0.365 | 0.471 | 0.399 | 0.419 | 0.465 | 0.510 | 0.421 | 0.391 | 0.352 |
| RISK | Mean | 0.007 | 0.006 | 0.008 | 0.008 | 0.011 | 0.013 | 0.018 | 0.010 | 0.009 |
| | Median | 0.002 | 0.002 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| Industrials | | | | | | | | | | |
| TLBA | Mean | 0.402 | 0.368 | 0.373 | 0.370 | 0.363 | 0.374 | 0.368 | 0.368 | 0.362 |
| | Median | 0.352 | 0.366 | 0.313 | 0.296 | 0.326 | 0.337 | 0.297 | 0.262 | 0.285 |
| LLBA | Mean | 0.131 | 0.105 | 0.086 | 0.067 | 0.061 | 0.053 | 0.047 | 0.055 | 0.046 |
| | Median | 0.039 | 0.025 | 0.037 | 0.034 | 0.032 | 0.020 | 0.017 | 0.019 | 0.011 |
| PROF | Mean | 0.107 | 0.111 | 0.103 | 0.089 | 0.082 | 0.083 | 0.054 | 0.058 | 0.114 |
| | Median | 0.102 | 0.109 | 0.104 | 0.101 | 0.075 | 0.077 | 0.054 | 0.076 | 0.106 |
| SIZE | Mean | 9.225 | 9.272 | 9.317 | 9.357 | 9.349 | 9.343 | 9.356 | 9.337 | 9.372 |
| | Median | 9.203 | 9.309 | 9.357 | 9.379 | 9.349 | 9.322 | 9.371 | 9.319 | 9.330 |
| MTB | Mean | 1.008 | 1.457 | 1.130 | 0.960 | 0.942 | 0.917 | 0.746 | 0.917 | 1.238 |
| | Median | 0.976 | 1.313 | 1.112 | 0.948 | 0.934 | 0.908 | 0.766 | 0.872 | 1.036 |
| TANG | Mean | 0.383 | 0.367 | 0.338 | 0.335 | 0.360 | 0.346 | 0.347 | 0.353 | 0.299 |
| | Median | 0.388 | 0.396 | 0.344 | 0.297 | 0.373 | 0.327 | 0.332 | 0.370 | 0.295 |
| NDT | Mean | 0.046 | 0.043 | 0.037 | 0.037 | 0.039 | 0.041 | 0.041 | 0.043 | 0.039 |
| | Median | 0.038 | 0.037 | 0.036 | 0.034 | 0.033 | 0.038 | 0.038 | 0.032 | 0.034 |
| LIQ | Mean | 2.355 | 2.784 | 2.468 | 2.422 | 2.641 | 2.523 | 3.419 | 2.960 | 2.711 |
| | Median | 1.544 | 1.500 | 1.455 | 1.744 | 1.621 | 1.705 | 1.865 | 1.780 | 2.000 |
| DIVP | Mean | 0.312 | 0.390 | 0.360 | 0.342 | 0.509 | 0.507 | 1.156 | 0.169 | 0.400 |
| | Median | 0.276 | 0.354 | 0.304 | 0.334 | 0.352 | 0.453 | 0.337 | 0.301 | 0.412 |
| RISK | Mean | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.009 | 0.010 | 0.017 | 0.006 |
| | Median | 0.001 | 0.001 | 0.002 | 0.001 | 0.001 | 0.002 | 0.003 | 0.002 | 0.002 |

Table II (continued)

Descriptive Statistics by Year

| Variables | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Property and Construction | | | | | |
| TLBA | Mean | 0.491 | 0.467 | 0.492 | 0.464 | 0.464 | 0.472 | 0.496 | 0.477 | 0.469 |
| | Median | 0.441 | 0.457 | 0.479 | 0.461 | 0.469 | 0.470 | 0.515 | 0.497 | 0.497 |
| LLBA | Mean | 0.207 | 0.211 | 0.229 | 0.212 | 0.188 | 0.186 | 0.211 | 0.214 | 0.229 |
| | Median | 0.210 | 0.234 | 0.236 | 0.230 | 0.197 | 0.169 | 0.227 | 0.192 | 0.224 |
| PROF | Mean | 0.085 | 0.108 | 0.096 | 0.098 | 0.088 | 0.079 | 0.070 | 0.086 | 0.106 |
| | Median | 0.078 | 0.092 | 0.071 | 0.086 | 0.078 | 0.068 | 0.069 | 0.069 | 0.086 |
| SIZE | Mean | 9.640 | 9.730 | 9.794 | 9.861 | 9.856 | 9.861 | 9.894 | 9.902 | 9.930 |
| | Median | 9.572 | 9.662 | 9.717 | 9.820 | 9.864 | 9.849 | 9.895 | 9.902 | 9.913 |
| MTB | Mean | 1.530 | 1.967 | 1.439 | 1.265 | 1.291 | 1.365 | 0.970 | 1.199 | 1.515 |
| | Median | 1.212 | 1.865 | 1.183 | 1.013 | 1.074 | 1.127 | 0.842 | 1.041 | 1.223 |
| TANG | Mean | 0.200 | 0.183 | 0.179 | 0.172 | 0.172 | 0.167 | 0.164 | 0.161 | 0.151 |
| | Median | 0.106 | 0.071 | 0.081 | 0.095 | 0.137 | 0.108 | 0.117 | 0.097 | 0.071 |
| NDT | Mean | 0.018 | 0.016 | 0.014 | 0.016 | 0.017 | 0.017 | 0.017 | 0.017 | 0.019 |
| | Median | 0.009 | 0.012 | 0.008 | 0.010 | 0.009 | 0.009 | 0.009 | 0.008 | 0.008 |
| LIQ | Mean | 2.363 | 5.265 | 3.354 | 2.629 | 1.927 | 2.782 | 3.136 | 2.864 | 2.644 |
| | Median | 1.555 | 1.807 | 1.605 | 1.822 | 1.673 | 1.440 | 1.420 | 1.700 | 1.790 |
| DIVP | Mean | 0.320 | 0.340 | 0.375 | 0.360 | 0.357 | 0.466 | 0.448 | 0.618 | 0.359 |
| | Median | 0.147 | 0.347 | 0.404 | 0.369 | 0.393 | 0.512 | 0.410 | 0.442 | 0.236 |
| RISK | Mean | 0.012 | 0.008 | 0.007 | 0.007 | 0.006 | 0.009 | 0.006 | 0.009 | 0.012 |
| | Median | 0.004 | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 |
| | | | | | Services | | | | | |
| TLBA | Mean | 0.379 | 0.363 | 0.332 | 0.320 | 0.348 | 0.344 | 0.368 | 0.374 | 0.360 |
| | Median | 0.327 | 0.304 | 0.292 | 0.266 | 0.330 | 0.308 | 0.327 | 0.321 | 0.353 |
| LLBA | Mean | 0.154 | 0.135 | 0.093 | 0.120 | 0.116 | 0.105 | 0.109 | 0.137 | 0.121 |
| | Median | 0.051 | 0.045 | 0.025 | 0.037 | 0.0383 | 0.034 | 0.035 | 0.087 | 0.039 |
| PROF | Mean | 0.093 | 0.106 | 0.115 | 0.099 | 0.097 | 0.093 | 0.084 | 0.075 | 0.091 |
| | Median | 0.088 | 0.083 | 0.098 | 0.086 | 0.092 | 0.080 | 0.085 | 0.073 | 0.082 |
| SIZE | Mean | 9.328 | 9.357 | 9.409 | 9.441 | 9.425 | 9.447 | 9.475 | 9.492 | 9.511 |
| | Median | 9.325 | 9.368 | 9.369 | 9.387 | 9.379 | 9.384 | 9.355 | 9.349 | 9.337 |
| MTB | Mean | 1.206 | 1.691 | 1.358 | 1.289 | 1.696 | 1.983 | 1.312 | 1.387 | 1.631 |
| | Median | 0.946 | 1.315 | 1.134 | 1.100 | 1.353 | 1.318 | 0.984 | 1.081 | 1.213 |
| TANG | Mean | 0.394 | 0.389 | 0.373 | 0.371 | 0.399 | 0.401 | 0.397 | 0.390 | 0.376 |
| | Median | 0.406 | 0.409 | 0.360 | 0.359 | 0.382 | 0.384 | 0.361 | 0.358 | 0.336 |
| NDT | Mean | 0.038 | 0.036 | 0.038 | 0.038 | 0.042 | 0.042 | 0.042 | 0.044 | 0.044 |
| | Median | 0.029 | 0.031 | 0.032 | 0.029 | 0.038 | 0.039 | 0.039 | 0.037 | 0.034 |
| LIQ | Mean | 2.803 | 2.355 | 3.246 | 3.863 | 5.886 | 3.015 | 2.427 | 2.412 | 2.569 |
| | Median | 1.443 | 1.160 | 1.176 | 1.418 | 1.143 | 1.010 | 1.040 | 1.100 | 1.030 |
| DIVP | Mean | 0.565 | 0.619 | 0.470 | 0.555 | 0.455 | 0.540 | 0.471 | 0.386 | 0.455 |
| | Median | 0.539 | 0.568 | 0.460 | 0.587 | 0.586 | 0.601 | 0.498 | 0.411 | 0.446 |
| RISK | Mean | 0.007 | 0.006 | 0.012 | 0.012 | 0.020 | 0.019 | 0.033 | 0.007 | 0.008 |
| | Median | 0.002 | 0.001 | 0.003 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 |

Table III
Pearson correlation coefficients between variables and VIF coefficients

This table presents the Pearson correlation coefficients for the variables used in these estimations and the collinearity statistics (VIF). The data are mainly from BOL Corpus. The samples contain nine consecutive years of data for the period 2002 – 2010 from 128 firms established in three industries: industrials, property and construction, and services which are listed on the Stock Exchange of Thailand (SET). TLBAM is the industry median of the ratio of total liabilities to total book value of total assets for year t. LLBAM is the industry median of the ratio of total non-current liabilities to total book value of total assets for year t. PROF is the ratio of earnings before interest and tax to total assets. SIZE is the natural logarithm of total assets. MTB is the ratio of market value of assets (total liability plus market value of equity) to total book value of assets. TANG is the ratio of net property, plant and equipment to total assets. NDT is the ratio of depreciation expense to total assets. LIQ is the ratio of current assets to current liabilities. DIVP is the dividend payout ratio, while RISK is the squared difference between the firm's profitability (PROF) and the cross-sectional mean of industry profitability. SETR is the annual set index return, and INFLA is the expected change in the consumer price index over the coming year.

| | TLBA | LLBA | TLBAM | LLBAM | PROF | SIZE | MTB | TANG | NDT | LIQ | DIVP | RISK | SETR | VIF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TLBAM | 0.413 | | | | | | | | | | | | | 1.61 |
| LLBAM | | 0.440 | | | | | | | | | | | | 1.82 |
| PROF | -0.234 | -0.097 | -0.040 | -0.001 | | | | | | | | | | 1.52 |
| SIZE | 0.389 | 0.416 | 0.362 | 0.328 | 0.127 | | | | | | | | | 1.46 |
| MTB | 0.023 | -0.017 | -0.048 | -0.027 | 0.389 | 0.099 | | | | | | | | 1.65 |
| TANG | 0.011 | -0.024 | -0.216 | -0.195 | -0.043 | -0.189 | -0.086 | | | | | | | 1.53 |
| NDT | -0.081 | -0.164 | -0.262 | -0.338 | 0.176 | -0.211 | 0.237 | 0.497 | | | | | | 1.68 |
| LIQ | -0.389 | -0.154 | -0.098 | -0.068 | 0.008 | -0.178 | -0.013 | -0.197 | -0.081 | | | | | 1.11 |
| DIVP | -0.098 | -0.102 | -0.050 | -0.094 | 0.135 | -0.001 | 0.099 | -0.021 | 0.082 | -0.006 | | | | 1.05 |
| RISK | 0.043 | -0.079 | -0.058 | -0.063 | -0.220 | -0.068 | 0.337 | -0.090 | 0.096 | 0.080 | -0.039 | | | 1.43 |
| SETR | 0.003 | 0.047 | 0.005 | 0.006 | 0.042 | -0.027 | 0.118 | 0.005 | 0.003 | -0.021 | -0.049 | -0.052 | | 1.14 |
| INFLA | -0.030 | -0.011 | -0.045 | -0.009 | 0.047 | 0.008 | 0.065 | -0.017 | -0.019 | 0.016 | -0.076 | -0.042 | 0.315 | 1.13 |

Table IV
Static Results

This table presents static estimations of capital structure determinants with panel data covering nine consecutive years for the period 2002-2010 of 128 firms from industrials, property and construction, and services industries.

$L_{it} = \beta_0 + \beta_1 (IL)_{it} + \beta_2(PROF)_{it} + \beta_3(SIZE)_{it} + \beta_4(MTB)_{it} + \beta_5(TANG)_{it} + \beta_6(NDT)_{it} + \beta_7(LIQ)_{it} + \beta_8(DIVP)_{it} + \beta_9(RISK)_{it} + \beta_{10}(SETR)_{it} + \beta_{11}(INFLA)_{it} + \varepsilon_{it}$

Factors influencing capital structure decision was estimated using FGLS, fixed effect regression, and random effect GLS regression. Coefficient estimates are reported with t-statistics in parentheses, where $^{***}$, $^{**}$, and $^{*}$ indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. The dependent variable ($L_{it}$) is leverage of firm i at the end of year t. $L_{it}$ is defined as total liabilities divided by total book assets and total non-current liabilities divided by total book assets. Independent variables include industry leverage, firm characteristics, stock market condition, and macroeconomics factor. IL is the industry sector leverage. PROF is the earnings before interest and tax to total assets. SIZE is the natural logarithm of total assets. MTB is the market value of assets, which is the sum of total book liability and the market value of equity, divided by total book value of assets. TANG is the net property, plant and equipment to total assets. NDT is the depreciation and amortization expenses to total assets. LIQ is current assets divided by current liabilities. DIVP is the dividend payout ratio, and RISK is the squared difference between the firm's profitability (PROF) and the industry sector mean. SETR is the annual set index return. INFLA is the expected change in the consumer price index over the coming year. Panel A presents results for IL is the median of industry sector leverage, and panel B presents results for IL is the mean of industry sector leverage.

| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
|---|---|---|---|---|---|---|
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel A: IL is the median of industry sector leverage | | | | | | |
| TLBAM | 0.526$^{***}$ | 0.359$^{***}$ | 0.406$^{***}$ | | | |
| | (11.97) | (6.59) | (8.20) | | | |
| LLBAM | | | | 0.577$^{***}$ | 0.418$^{***}$ | 0.488$^{***}$ |
| | | | | (12.27) | (6.03) | (8.20) |
| PROF | -0.674$^{***}$ | -0.431$^{***}$ | -0.449$^{***}$ | -0.246$^{***}$ | -0.130$^{***}$ | -0.147$^{***}$ |
| | (-10.87) | (-9.03) | (-9.59) | (-5.68) | (-3.30) | (-3.86) |
| SIZE | 0.114$^{***}$ | 0.107$^{***}$ | 0.121$^{***}$ | 0.084$^{***}$ | 0.086$^{***}$ | 0.090$^{***}$ |
| | (11.66) | (4.40) | (7.17) | (12.43) | (4.26) | (7.42) |
| MTB | 0.027$^{***}$ | 0.010$^{**}$ | 0.011$^{***}$ | 0.008$^{**}$ | 0.002 | 0.003 |
| | (4.65) | (2.32) | (2.73) | (2.05) | (0.54) | (0.79) |
| TANG | 0.081$^{***}$ | 0.145$^{***}$ | 0.128$^{***}$ | 0.058$^{***}$ | 0.162$^{***}$ | 0.116$^{***}$ |
| | (3.07) | (3.64) | (3.72) | (3.14 | (4.93) | (4.41) |
| NDT | 0.176 | 0.225 | 0.189 | -0.064 | 0.049 | -0.039 |
| | (0.80) | (0.83) | (0.77) | (-0.41) | (0.22) | (-0.20) |
| LIQ | -0.005$^{***}$ | -0.001$^{**}$ | -0.002$^{***}$ | -0.001 | 0.0003 | 0.0002 |
| | (-8.26) | (-2.46) | (-3.30) | (-1.47) | (0.81) | (0.54) |
| DIVP | -0.014$^{**}$ | -0.009$^{**}$ | -0.009$^{**}$ | -0.009$^{*}$ | -0.009$^{**}$ | -0.009$^{***}$ |
| | (-2.10) | (-2.05) | (-2.18) | (-1.85) | (-2.49) | (-2.59) |
| RISK | -0.112 | 0.122 | 0.114 | -0.295$^{***}$ | -0.109 | -0.128 |
| | (-0.75) | (1.26) | (1.18) | (-2.83) | (-1.36) | (-1.61) |
| SETR | 0.002 | 0.007 | 0.007 | 0.017$^{*}$ | 0.019$^{***}$ | 0.019$^{***}$ |
| | (0.18) | (0.95) | (0.96) | (1.94) | (3.10) | (3.13) |
| INFLA | -0.235 | -0.257 | -0.258 | -0.284 | -0.257$^{*}$ | -0.274$^{*}$ |
| | (-0.74) | (-1.39) | (-1.39) | (-1.27) | (-1.69) | (-1.80) |
| Constant | -0.870$^{***}$ | -0.772$^{***}$ | -0.916$^{***}$ | -0.717$^{***}$ | -0.759$^{***}$ | -0.787$^{***}$ |
| | (-9.50) | (-3.27) | (-5.63) | (-11.10) | (-3.91) | (-6.73) |
| rss | | 10.847 | | | 7.382 | |
| ll | 332.15 | 1052.65 | | 742.33 | 1274.29 | |
| $R^2$ | | 0.341 | 0.350 | | 0.264 | 0.299 |
| F | | 19.34$^{***}$ | | | 10.73$^{***}$ | |
| ρ | | 0.712 | 0.667 | | 0.602 | 0.546 |
| $\chi^2$ | 693.30$^{***}$ | | 296.11$^{***}$ | 531.27$^{***}$ | | 196.35$^{***}$ |
| FE test | | 19.89$^{***}$ | | | 12.11$^{***}$ | |
| Hausman RE test | | | 31.88$^{***}$ | | | 35.46$^{***}$ |
| N | 128 | 128 | 128 | 128 | 128 | 128 |
| Obs | 1,152 | 1,152 | 1,152 | 1,152 | 1,152 | 1,152 |

Table IV (continued)
Static Results

| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
|---|---|---|---|---|---|---|
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel B: IL is the mean of industry sector leverage | | | | | | |
| TLBAA | 0.745*** | 0.828*** | 0.813*** | | | |
| | (12.97) | (9.49) | (10.86) | | | |
| LLBAA | | | | 0.816*** | 0.985*** | 0.925*** |
| | | | | (15.39) | (11.62) | (13.19) |
| PROF | -0.658*** | -0.382*** | -0.405*** | -0.275*** | -0.133*** | -0.157*** |
| | (-10.72) | (-8.10 | (-8.80) | (-6.55) | (-3.54) | (-4.32) |
| SIZE | 0.111*** | 0.114*** | 0.115*** | 0.081*** | 0.109*** | 0.089*** |
| | (11.46) | (4.80) | (6.90) | (12.49) | (5.65) | (7.62) |
| MTB | 0.026*** | 0.010** | 0.011*** | 0.009** | 0.004 | 0.004 |
| | (4.49) | (2.28) | (2.62) | (2.24) | (1.15) | (1.17) |
| TANG | 0.072*** | 0.124*** | 0.116*** | 0.027 | 0.122*** | 0.087*** |
| | (2.74) | (3.17) | (3.43) | (1.49) | (3.86) | (3.38) |
| NDT | 0.243 | 0.213 | 0.221 | 0.098 | 0.031 | 0.040 |
| | (1.11) | (0.81) | (0.91) | (0.64) | (0.14) | (0.21) |
| LIQ | -0.005*** | -0.001** | -0.001*** | -0.0006 | 0.0003 | 0.0002 |
| | (-8.20) | (-2.27) | (-3.06) | (-1.39) | (0.82) | (0.66) |
| DIVP | -0.013** | -0.008)* | -0.008** | -0.007 | -0.007** | -0.008** |
| | (-1.97) | (-1.89) | (-1.98) | (-1.54) | (-2.18) | (-2.24) |
| RISK | -0.149 | 0.114 | 0.098 | -0.352*** | -0.125 | 0.155** |
| | (-1.01) | (1.20) | (1.03) | (-3.49) | (-1.63) | (-2.05) |
| SETR | 0.002 | 0.006 | 0.006 | 0.004 | 0.003 | 0.004 |
| | (0.12) | (0.82) | (0.80) | (0.48) | (0.54) | (0.62) |
| INFLA | -0.140 | -0.092 | -0.010 | -0.103 | -0.064 | -0.071 |
| | (-0.44) | (-0.50) | (-0.55) | (-0.48) | (-0.44) | (-0.49) |
| Constant | -0.938*** | -1.035*** | -1.028*** | -0.737*** | -1.063*** | -0.854*** |
| | (-10.39) | (-4.43) | (-6.40) | (-11.86) | (-5.65) | (-7.51) |
| rss | | 10.388 | | | 6.748 | |
| ll | 343.14 | 1077.53 | | 779.26 | 1326.02 | |
| $R^2$ | | 0.353 | 0.359 | | 0.337 | 0.346 |
| F | | 24.26*** | | | 20.40*** | |
| ρ | | 0.712 | 0.674 | | 0.609 | 0.564 |
| $\chi^2$ | 728.84*** | | 355.36*** | 642.73*** | | 311.85*** |
| FE test | | 20.57*** | | | 12.63*** | |
| Hausman RE test | | | 26.76*** | | | 21.71** |
| N | 128 | 128 | 128 | 128 | 128 | 128 |
| Obs | 1,152 | 1,152 | 1,152 | 1,152 | 1,152 | 1,152 |

Table V
Static Results by Industry

This table presents static estimations of capital structure determinants with panel data covering nine consecutive years for the period 2002-2010 of 128 firms from industrials, property and construction, and services industries.

$$L_{it} = \beta_0 + \beta_1 (IL)_{it} + \beta_2(PROF)_{it} + \beta_3(SIZE)_{it} + \beta_4(MTB)_{it} + \beta_5(TANG)_{it} + \beta_6(NDT)_{it} + \beta_7(LIQ)_{it} + \beta_8(DIVP)_{it} + \beta_9(RISK)_{it} + \beta_{10}(SETR)_{it} + \beta_{11}(INFLA)_{it} + \varepsilon_{it}$$

regression. Coefficient estimates are reported with t-statistics in parentheses, where $^{***}$, $^{**}$, and $^{*}$ indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. The dependent variable ($L_{it}$) is leverage of firm i at the end of year t. $L_{it}$ is defined as total liabilities divided by total book assets and total non-current liabilities divided by total book assets. Independent variables include industry leverage, firm characteristics, stock market condition, and macroeconomics factor. IL is the industry sector leverage. PROF is the earnings before interest and tax to total assets. SIZE is the natural logarithm of total assets. MTB is the market value of assets, which is the sum of total book liability and the market value of equity, divided by total book value of assets. TANG is the net property, plant and equipment to total assets. NDT is the depreciation and amortization expenses to total assets. LIQ is current assets divided by current liabilities. DIVP is the dividend payout ratio, and RISK is the squared difference between the firm's profitability (PROF) and the industry sector mean. SETR is the annual set index return. INFLA is the expected change in the consumer price index over the coming year. Panel A presents results for industrials industry, panel B presents results for property & construction industry, and panel C presents results for services industry.

| | **Industrials** | | | | | |
|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel A-1: IL is the median of industry sector leverage | | | | | | |
| TLBAM | 0.510$^{***}$ | 0.394$^{***}$ | 0.435$^{***}$ | | | |
| | (8.62) | (4.42) | (5.56) | | | |
| LLBAM | | | | 0.602$^{***}$ | 0.508$^{***}$ | 0.533$^{***}$ |
| | | | | (6.26) | (4.72) | (8.20) |
| PROF | -0.655$^{***}$ | -0.364$^{***}$ | -0.415$^{***}$ | -0.080 | 0.065 | 0.022 |
| | (-5.37) | (-3.80) | (-4.26) | (-1.12) | (0.91) | (-3.86) |
| SIZE | 0.043$^{**}$ | 0.128$^{**}$ | 0.102$^{***}$ | 0.051$^{***}$ | 0.090$^{**}$ | 0.065$^{***}$ |
| | (2.12) | (2.14) | (3.04) | (4.44) | (2.00) | (7.42) |
| MTB | 0.105$^{***}$ | 0.055$^{***}$ | 0.061$^{***}$ | 0.033$^{***}$ | 0.012 | 0.016 |
| | (5.37) | (3.22) | (3.65) | (2.86) | (0.92) | (0.79) |
| TANG | 0.269$^{***}$ | 0.178$^{***}$ | 0.195$^{***}$ | 0.137$^{***}$ | 0.125$^{**}$ | 0.126$^{***}$ |
| | (4.43) | (2.65) | (3.17) | (3.81) | (2.46) | (4.41) |
| NDT | -1.622$^{***}$ | -0.498 | -0.679 | -0.776$^{***}$ | -0.501 | -0.591$^{*}$ |
| | (-3.93) | (-0.94) | (-1.43) | (-3.21) | (-1.26) | (-0.20) |
| LIQ | -0.033$^{***}$ | -0.009$^{***}$ | -0.013$^{***}$ | -0.003$^{*}$ | 0.002 | 0.00003 |
| | (-10.13) | (-2.99) | (-4.45) | (-1.84) | (0.89) | (0.54) |
| DIVP | -0.001 | -0.004 | -0.004 | -0.006 | -0.011$^{***}$ | -0.010$^{**}$ |
| | (-0.19) | (-0.73) | (-0.67) | (-1.38) | (-2.80) | (-2.59) |
| RISK | 1.946$^{***}$ | 2.161$^{***}$ | 2.119$^{***}$ | -0.450 | -0.115 | -0.204 |
| | (3.56) | (5.57) | (5.33) | (-1.41) | (-0.39) | (-1.61) |
| SETR | -0.022 | -0.012 | -0.014 | 0.021$^{*}$ | 0.023$^{**}$ | 0.023$^{**}$ |
| | (-1.05) | (-0.87) | (-0.95) | (1.73) | (2.22) | (3.13) |
| INFLA | -0.168 | 0.029 | 0.011 | -0.685$^{**}$ | -0.644$^{**}$ | -0.653$^{**}$ |
| | (-0.33) | (0.08) | (0.03) | (-2.25) | (-2.50) | (-1.80) |
| Constant | -0.206 | -1.023$^{*}$ | -0.781$^{**}$ | -0.717$^{***}$ | -0.814$^{*}$ | -0.577$^{***}$ |
| | (-1.14) | (-1.77) | (-2.46) | (-4.21) | (-1.89) | (-6.73) |
| rss | | 2.679 | | | 1.489 | |
| ll | 149.67 | 317.12 | | 323.52 | 412.27 | |
| $R^2$ | | 0.515 | 0.563 | | 0.272 | 0.304 |
| F | | 13.14$^{***}$ | | | 4.87$^{***}$ | |
| ρ | | 0.711 | 0.547 | | 0.438 | 0.333 |
| $\chi^2$ | 530.64$^{***}$ | | 204.36$^{***}$ | 157.40$^{***}$ | | 79.93$^{***}$ |
| FE test | | 14.33$^{***}$ | | | 5.77$^{***}$ | |
| Hausman RE test | | | 157.63$^{***}$ | | | 9.83 |
| N | 36 | 36 | 36 | 36 | 36 | 36 |
| Obs | 324 | 324 | 324 | 324 | 324 | 324 |

Table V (continued)
Static Results by Industry

| | **Industrials** | | | | | |
|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel A-2: IL is the mean of industry sector leverage | | | | | | |
| TLBAA | 0.718*** | 0.724*** | 0.721*** | | | |
| | (12.97) | (6.34) | (7.11) | | | |
| LLBAA | | | | 1.044*** | 1.040*** | 1.018*** |
| | | | | (10.06) | (9.26) | (9.60) |
| PROF | -0.588*** | -0.296*** | -0.344*** | -0.114* | 0.027 | -0.018 |
| | (-10.72) | (-3.17) | (-3.63) | (-1.72) | (0.41) | (-0.28) |
| SIZE | 0.041** | 0.130** | 0.098*** | 0.064*** | 0.140*** | 0.084*** |
| | (11.46) | (2.23) | (2.96) | (5.97) | (3.40) | (4.91) |
| MTB | 0.109*** | 0.059*** | 0.065*** | 0.044*** | 0.023** | 0.026** |
| | (4.49) | (3.55) | (3.96) | (4.14) | (1.98) | (2.45) |
| TANG | 0.269*** | 0.192*** | 0.205*** | 0.082** | 0.077* | 0.071* |
| | (2.74) | (2.95) | (3.43) | (2.41) | (1.65) | (1.82) |
| NDT | -1.765*** | -0.577 | -0.777* | -0.597*** | -0.350 | -0.438 |
| | (1.11) | (-1.12) | (-1.68) | (-2.66) | (-0.97) | (-1.54) |
| LIQ | -0.033*** | -0.008*** | -0.012*** | -0.003* | 0.004* | 0.001 |
| | (-8.20) | (-2.81) | (-4.32) | (-1.67) | (1.90) | (0.80) |
| DIVP | -0.002 | -0.004 | -0.004 | -0.004 | -0.008** | -0.007** |
| | (-1.97) | (-0.76) | (-0.74) | (-0.97) | (-2.28) | (-2.05) |
| RISK | 1.657*** | 1.831*** | 1.782*** | -0.457 | -0.057 | 0.187 |
| | (-1.01) | (4.85) | (4.59) | (-1.55) | (-0.22) | (-0.72) |
| SETR | -0.016 | -0.007 | -0.009 | -0.007 | -0.002 | -0.003 |
| | (0.12) | (-0.54) | (-0.63) | (-0.65) | (-0.24) | (-0.39) |
| INFLA | -0.391 | -0.129 | -0.163 | -0.154 | -0.155 | -0.146 |
| | (-0.44) | (-0.39) | (-0.48) | (-0.55) | (-0.67) | (-0.62) |
| Constant | -0.266 | -1.165** | -0.853*** | -0.620*** | -1.351*** | -0.814*** |
| | (-10.39) | (-2.09) | (-2.73) | (-6.24) | (-3.40) | (-5.00) |
| rss | | 2.504 | | | 1.228 | |
| ll | 153.97 | 328.05 | | 349.01 | 443.41 | |
| $R^2$ | | 0.510 | 0.562 | | 0.345 | 0.396 |
| F | | 15.82*** | | | 11.23*** | |
| ρ | | 0.724 | 0.556 | | 0.516 | 0.335 |
| $\chi^2$ | 553.63*** | | 232.79*** | 239.42*** | | 153.41*** |
| FE test | | 15.26*** | | | 6.26*** | |
| Hausman RE test | | | 287.79*** | | | 12.92 |
| N | 36 | 36 | 36 | 36 | 36 | 36 |
| Obs | 324 | 324 | 324 | 324 | 324 | 324 |

Table V (continued)
Static Results by Industry

| | **Property and Construction** | | | | | |
|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel B-1: IL is the median of industry sector leverage | | | | | | |
| TLBAM | 0.327 | 0.045 | 0.110 | | | |
| | (1.46) | (0.27) | (0.67) | | | |
| LLBAM | | | | 0.361 | 0.376** | 0.374** |
| | | | | (1.60) | (2.53) | (2.40) |
| PROF | -0.571*** | -0.523*** | -0.534*** | -0.202** | -0.230*** | -0.245*** |
| | (-5.29) | (-5.47) | (-5.77) | (-2.04) | (-2.67) | (-2.88) |
| SIZE | 0.105*** | 0.151*** | 0.122*** | 0.068*** | 0.052 | 0.063*** |
| | (6.72) | (3.86) | (4.53) | (4.76) | (1.51) | (2.74) |
| MTB | 0.032*** | 0.021*** | 0.023*** | 0.016* | 0.006 | 0.009 |
| | (3.05) | (2.61) | (2.84) | (1.65) | (0.77) | (1.16) |
| TANG | -0.185*** | -0.008 | -0.033 | -0.165*** | 0.243*** | 0.044 |
| | (-3.31) | (-0.09) | (-0.46) | (-3.27) | (2.95) | (0.68) |
| NDT | 2.662*** | 0.555 | 0.979* | 1.618*** | 1.343** | 1.142** |
| | (4.46) | (0.91) | (1.69) | (2.96) | (2.45) | (2.15) |
| LIQ | -0.007*** | -0.002* | -0.003*** | -0.002* | 0.001 | 0.001 |
| | (-6.73) | (-1.91) | (-2.71) | (-1.71) | (1.31) | (0.83) |
| DIVP | -0.044** | -0.029* | -0.029* | -0.002 | -0.003 | -0.003 |
| | (-2.22) | (-1.80) | (-1.81) | (-0.11) | (-0.23) | (-0.21) |
| RISK | -0.808* | -0.217 | -0.263 | -1.810*** | 0.220 | -0.070 |
| | (-1.65) | (-0.58) | (-0.70) | (-4.03) | (0.65) | (-0.20) |
| SETR | 0.005 | -0.001 | -0.001 | 0.005 | 0.00001 | 0.002 |
| | (0.26) | (-0.06) | (-0.08) | (0.30) | (0.00) | (0.13) |
| INFLA | -0.198 | -0.308 | -0.258 | 0.091 | 0.171 | 0.132 |
| | (-0.41) | (-0.95) | (-0.79) | (0.21) | (0.59) | (0.44) |
| Constant | -0.664*** | -0.989*** | -0.740*** | -0.518*** | -0.439 | -0.512** |
| | (-3.65) | (-2.60) | (-2.77) | (-3.45) | (-1.28) | (-2.21) |
| rss | | 2.962 | | | 2.386 | |
| ll | 171.14 | 339.98 | | 201.86 | 377.94 | |
| $R^2$ | | 0.191 | 0.237 | | 0.0003 | 0.039 |
| F | | 5.20*** | | | 3.48*** | |
| ρ | | 0.645 | 0.565 | | 0.717 | 0.495 |
| $\chi^2$ | 153.62*** | | 70.32*** | 58.60*** | | 26.65** |
| FE test | | 12.81*** | | | 13.68*** | |
| Hausman RE test | | | 36.17*** | | | 7.14 |
| N | 39 | 39 | 39 | 39 | 39 | 39 |
| Obs | 351 | 351 | 351 | 351 | 351 | 351 |

Table V (continued)
Static Results by Industry

| | **Property and Construction** | | | | | |
|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel B-2: IL is the mean of industry sector leverage | | | | | | |
| TLBAA | 1.252*** | 1.144*** | 1.144*** | | | |
| | (3.37) | (2.99) | (3.23) | | | |
| LLBAA | | | | 1.302*** | 1.071*** | 1.085*** |
| | | | | (3.46) | (4.32) | (4.20) |
| PROF | -0.579*** | -0.506*** | -0.528*** | -0.212** | -0.231*** | -0.250*** |
| | (-5.43) | (-5.37) | (-5.81) | (-2.17) | (-2.75) | (-2.99) |
| SIZE | 0.107*** | 0.162*** | 0.129*** | 0.068*** | 0.069** | 0.069*** |
| | (6.99) | (4.30) | (4.89) | (4.86) | (2.05) | (3.03) |
| MTB | 0.026** | 0.022*** | 0.022*** | 0.016* | 0.007 | 0.009 |
| | (2.47) | (2.78) | (2.85) | (1.68) | (0.91) | (1.24) |
| TANG | -0.263*** | -0.021 | -0.086 | -0.175*** | 0.256*** | 0.050 |
| | (-4.33) | (-0.24) | (-1.15) | (-3.53) | (3.17) | (0.78) |
| NDT | 2.614*** | 0.932 | 1.209** | 1.537*** | 1.201** | 1.010* |
| | (4.43) | (1.52) | (2.10) | (2.85) | (2.25) | (1.94) |
| LIQ | -0.007*** | -0.002** | -0.003*** | -0.002* | 0.001 | 0.001 |
| | (-6.83) | (-2.02) | (-2.74) | (-1.81) | (1.19) | (0.75) |
| DIVP | -0.044** | -0.031* | -0.031** | -0.003 | -0.006 | -0.005 |
| | (-2.29) | (-1.94) | (-1.98) | (-0.15) | (-0.39) | (-0.35) |
| RISK | -0.607* | -0.228 | -0.234 | -1.892*** | 0.086 | -0.176 |
| | (-1.25) | (-0.62) | (-0.64) | (-4.26) | (0.26) | (-0.52) |
| SETR | 0.016 | 0.011 | 0.010 | 0.005 | 0.001 | 0.002 |
| | (0.85) | (0.81) | (0.75) | (0.29) | (0.09) | (0.17) |
| INFLA | -0.003 | -0.045 | -0.017 | -0.022 | 0.038 | 0.112 |
| | (-0.01) | (-0.14) | (-0.05) | (-0.05) | (0.14) | (0.04) |
| Constant | -1.115*** | -1.640*** | -1.303*** | -0.711*** | -0.749** | -0.714*** |
| | (-4.80) | (-3.79) | (-4.09) | (-4.43) | (-2.17) | (-3.01) |
| rss | | 2.877 | | | 2.294 | |
| ll | 175.68 | 345.09 | | 206.49 | 384.82 | |
| $R^2$ | | 0.215 | 0.258 | | 0.006 | 0.057 |
| F | | 6.16*** | | | 4.71*** | |
| ρ | | 0.645 | 0.572 | | 0.724 | 0.506 |
| $\chi^2$ | 166.84*** | | 82.17*** | 69.53*** | | 39.40** |
| FE test | | 12.88*** | | | 13.96*** | |
| Hausman RE test | | | 19.03 | | | 3.91 |
| N | 39 | 39 | 39 | 39 | 39 | 39 |
| Obs | 351 | 351 | 351 | 351 | 351 | 351 |

Table V (continued)
Static Results by Industry

| | **Services** | | | | | |
|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel C-1: IL is the median of industry sector leverage | | | | | | |
| TLBAM | 0.417*** | 0.388*** | 0.406*** | | | |
| | (5.59) | (5.11) | (5.74) | | | |
| LLBAM | | | | 0.703*** | 0.421*** | 0.461*** |
| | | | | (6.68) | (3.71) | (4.38) |
| PROF | -0.549*** | -0.357*** | -0.364*** | -0.295*** | -0.184*** | -0.197*** |
| | (-6.05) | (-5.13) | (-5.40) | (-4.60) | (-3.08) | (-3.47) |
| SIZE | 0.139*** | 0.110*** | 0.128*** | 0.103*** | 0.116*** | 0.111*** |
| | (9.05) | (2.97) | (4.90) | (10.13) | (3.70) | (5.84) |
| MTB | 0.014* | -0.001 | 0.0002 | 0.005 | 0.001 | 0.001 |
| | (1.77) | (-0.14) | (0.05) | (1.01) | (0.20) | (0.25) |
| TANG | 0.087** | 0.112* | 0.106** | 0.077*** | 0.145*** | 0.127*** |
| | (2.35) | (1.92) | (2.11) | (2.84) | (2.91) | (3.24) |
| NDT | 0.351 | 0.697* | 0.630* | -0.008 | -0.135 | -0.152 |
| | (1.19) | (1.87) | (1.87) | (-0.04) | (-0.42) | (-0.56) |
| LIQ | -0.003*** | -0.001 | -0.001 | -0.000 | 0.000 | 0.000 |
| | (-4.00) | (-1.17) | (-1.53) | (-0.01) | (0.17) | (0.20) |
| DIVP | -0.028** | -0.010 | -0.011 | -0.019** | -0.004 | -0.006 |
| | (-2.15) | (-1.22) | (-1.40) | (-2.07) | (-0.63) | (-0.90) |
| RISK | -0.108 | 0.038 | 0.040 | -0.219* | -0.133 | -0.139 |
| | (-0.62) | (0.34) | (0.36) | (-1.79) | (-1.40) | (-1.50) |
| SETR | -0.010 | 0.016 | 0.016 | 0.020 | 0.024** | 0.024** |
| | (0.47) | (1.37) | (1.36) | (1.39) | (2.48) | (2.43) |
| INFLA | -0.603 | -0.588** | -0.591** | -0.346 | -0.381 | -0.375 |
| | (-1.16) | (-2.05) | (-2.07) | (-0.96) | (-1.56) | (-1.54) |
| Constant | -1.062*** | -0.820** | -0.993*** | -0.889*** | -1.028*** | -0.971*** |
| | (-7.49) | (-2.31) | (-3.96) | (-9.05) | (-3.44) | (-5.32) |
| rss | | 4.408 | | | 3.229 | |
| ll | 117.50 | 440.34 | | 289.22 | 514.53 | |
| $R^2$ | | 0.324 | 0.331 | | 0.306 | 0.315 |
| F | | 9.50*** | | | 6.37*** | |
| ρ | | 0.733 | 0.719 | | 0.596 | 0.580 |
| $\chi^2$ | 260.37*** | | 133.04*** | 236.38*** | | 101.93** |
| FE test | | 22.81*** | | | 12.49*** | |
| Hausman RE test | | | 12.11 | | | 6.71 |
| N | 53 | 53 | 53 | 53 | 53 | 53 |
| Obs | 477 | 477 | 477 | 477 | 477 | 477 |

Table V (continued)
Static Results by Industry

| | **Services** | | | | | |
|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | Total non-current liabilities to total book assets (LLBA) | | |
| | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression | FGLS Regression | Fixed-effects Regression | Random-effects GLS Regression |
| Panel C-2: IL is the mean of industry sector leverage | | | | | | |
| TLBAA | 0.658*** | 0.831*** | 0.807*** | | | |
| | (6.26) | (5.48) | (6.15) | | | |
| LLBAA | | | | 0.837*** | 0.989*** | 0.903*** |
| | | | | (8.47) | (7.25) | (7.61) |
| PROF | -0.570*** | -0.330*** | -0.346*** | -0.347*** | -0.168*** | -0.205*** |
| | (-6.32) | (-4.73) | (-5.13) | (-5.47) | (-2.94) | (-3.77) |
| SIZE | 0.134*** | 0.105*** | 0.117*** | 0.098*** | 0.146*** | 0.113*** |
| | (8.82) | (2.87) | (4.52) | (9.87) | (4.83) | (6.09) |
| MTB | 0.015* | -0.001 | 0.0004 | 0.008 | 0.002 | 0.002 |
| | (1.95) | (-0.14) | (0.09) | (1.50) | (0.53) | (0.56) |
| TANG | 0.076** | 0.075 | 0.078 | 0.052* | 0.098** | 0.085** |
| | (2.06) | (1.28) | (1.55) | (1.90) | (2.04) | (2.19) |
| NDT | 0.409 | 0.621* | 0.630* | 0.131 | -0.144 | -0.086 |
| | (1.40) | (1.66) | (1.77) | (0.64) | (-0.47) | (-0.33) |
| LIQ | -0.003*** | -0.001 | 0.593 | 0.000 | -0.000 | 0.000 |
| | (-3.94) | (-1.03) | (-1.38) | (0.04) | (-0.06) | (0.12) |
| DIVP | -0.025* | -0.008 | -0.001 | -0.016* | -0.004 | -0.005 |
| | (-1.92) | (-1.03) | (-1.15) | (-1.76) | (-0.60) | (-0.73 ) |
| RISK | -0.160 | 0.030 | -0.009 | -0.298** | -0.142 | -0.169 |
| | (-0.92) | (0.27) | (0.22) | (-2.47) | (-1.57) | (-1.91) |
| SETR | 0.004 | 0.006 | 0.024 | 0.002 | 0.001 | 0.002 |
| | (0.18) | (0.48) | (0.52) | (0.12) | (0.12) | (0.23) |
| INFLA | -0.295 | -0.146 | -0.170 | -0.136 | -0.081 | -0.099 |
| | (-0.57) | (-0.48) | (-0.57) | (-0.38) | (-0.34) | (-0.42) |
| Constant | -1.127*** | -0.942*** | -1.048*** | -0.894*** | -1.028*** | -1.060*** |
| | (-8.11) | (-2.64) | (-4.21) | (-9.37) | (-4.79) | (-5.93) |
| rss | | 4.368 | | | 2.960 | |
| ll | 121.17 | 442.51 | | 301.33 | 535.28 | |
| $R^2$ | | 0.329 | 0.336 | | 0.339 | 0.351 |
| F | | 9.93*** | | | 10.36*** | |
| ρ | | 0.730 | 0.714 | | 0.633 | 0.599 |
| $\chi^2$ | 271.79*** | | 139.30*** | 273.56*** | | 145.98** |
| FE test | | 22.61*** | | | 13.24*** | |
| Hausman RE test | | | 28.34*** | | | 8.38 |
| N | 53 | 53 | 53 | 53 | 53 | 53 |
| Obs | 477 | 477 | 477 | 477 | 477 | 477 |

Table VI
Dynamic Results

This table presents the estimation of the partial adjustment model with panel data covering nine consecutive years for the period 2002-2010 of 128 firms from industrials, property and construction, and services industries.

$L_{it} = \lambda L_{it-1} + \alpha_0 + \alpha_1(IL)_{it} + \alpha_2(PROF)_{it} + \alpha_3(SIZE)_{it} + \alpha_4(MTB)_{it} + \alpha_5(TANG)_{it} + \alpha_6(NDT)_{it} + \alpha_7(LIQ)_{it} + \alpha_8(DIVP)_{it} + \alpha_9(RISK)_{it} + \alpha_{10}(SETR)_{it} + \alpha_{11}(INFLA)_{it} + u_{it}$

The speed of adjustment toward target leverage was estimated using fixed effect regression, random effect GLS regression, and one-step and two-step Arellano-Bond estimators. Coefficient estimates are reported with t-statistics in parentheses, where $^{***}$, $^{**}$, and $^{*}$ indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. The dependent variable ($L_{it}$) is leverage of firm i at the end of year t. $L_{it}$ is defined as total liabilities divided by total book assets and total non-current liabilities divided by total book assets. Independent variables include industry leverage, firm characteristics, stock market condition, and macroeconomics factor. IL is the industry sector leverage. PROF is the earnings before interest and tax to total assets. SIZE is the natural logarithm of total assets. MTB is the market value of assets, which is the sum of total book liability and the market value of equity, divided by total book value of assets. TANG is the net property, plant and equipment to total assets. NDT is the depreciation and amortization expenses to total assets. LIQ is current assets divided by current liabilities. DIVP is the dividend payout ratio, and RISK is the squared difference between the firm's profitability (PROF) and the industry sector mean. SETR is the annual set index return. INFLA is the expected change in the consumer price index over the coming year. Panel A presents results for IL is the median of industry sector leverage, and panel B presents results for IL is the mean of industry sector leverage.

| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
|---|---|---|---|---|---|---|---|---|
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | |
| | | | One-step | Two-step | | | One-step | Two-step |
| Panel A: IL is the median of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.540$^{***}$ | 0.806$^{***}$ | 0.619$^{***}$ | 0.571$^{***}$ | | | | |
| | (23.57) | (56.52) | (7.59) | (4.49) | | | | |
| $LLBA_{t-1}$ | | | | | 0.392$^{***}$ | 0.727$^{***}$ | 0.314$^{***}$ | 0.452$^{***}$ |
| | | | | | (15.07) | (39.91) | (4.87) | (5.54) |
| TLBAM | 0.268$^{***}$ | 0.132$^{***}$ | 0.347$^{***}$ | 0.311$^{***}$ | | | | |
| | (5.59) | (5.46) | (5.27) | (4.40) | | | | |
| LLBAM | | | | | 0.290$^{***}$ | 0.212$^{***}$ | 0.366$^{***}$ | 0.325$^{***}$ |
| | | | | | (4.51) | (6.78) | (4.15) | (3.45) |
| PROF | -0.366$^{***}$ | -0.299$^{***}$ | -0.299$^{***}$ | -0.368$^{***}$ | -0.089$^{***}$ | -0.096$^{***}$ | -0.053 | -0.023 |
| | (-9.82) | (-9.43) | (-5.97) | (-4.25) | (-2.62) | (-3.50) | (-1.22) | (-0.58) |
| SIZE | 0.095$^{***}$ | 0.022$^{***}$ | 0.084$^{**}$ | 0.072$^{*}$ | 0.075$^{***}$ | 0.022$^{***}$ | 0.079$^{**}$ | 0.106$^{***}$ |
| | (4.50) | (4.05) | (2.38) | (1.84) | (3.86) | (4.80) | (2.29) | (3.44) |
| MTB | 0.009$^{***}$ | 0.010$^{***}$ | 0.011$^{***}$ | 0.013$^{**}$ | 0.001 | 0.004 | 0.002 | -0.001 |
| | (2.80) | (3.20) | (2.71) | (2.37) | (0.39) | (1.38) | (0.63) | (-0.15) |
| TANG | 0.107$^{***}$ | 0.005 | 0.070 | 0.065 | 0.069$^{**}$ | 0.006 | 0.066 | 0.056 |
| | (3.34) | (0.35) | (1.40) | (1.14) | (2.35) | (0.53) | (1.53) | (1.34) |
| NDT | -0.069 | 0.085 | -0.322 | -0.524 | -0.043 | 0.029 | -0.283 | 0.008 |
| | (-0.32) | (0.75) | (-1.06) | (-1.56) | (-0.22) | (0.29) | (-1.06) | (0.04) |
| LIQ | -0.001$^{***}$ | -0.002$^{***}$ | -0.001 | -0.001 | -0.0003 | -0.0002 | 0.0004 | 0.0002 |
| | (-2.61) | (-5.59) | (-1.01) | (-0.65) | (0.99) | (-0.74) | (1.05) | (0.44) |
| DIVP | -0.004 | -0.002 | -0.001 | -0.003 | -0.003 | 0.001 | -0.004 | -0.003 |
| | (-1.16) | (0.54) | (-0.10) | (-0.85) | (-1.05) | (0.17) | (-1.22) | (-0.83) |
| RISK | 0.290$^{***}$ | 0.149$^{**}$ | 0.422$^{***}$ | 0.374$^{***}$ | -0.055 | -0.132$^{**}$ | -0.056 | -0.023 |
| | (4.02) | (2.09) | (4.81) | (2.96) | (-0.84) | (-2.07) | (-0.80) | (-0.41) |
| SETR | -0.005 | -0.013$^{**}$ | -0.006 | -0.010$^{*}$ | 0.012$^{**}$ | 0.004 | 0.008 | 0.007 |
| | (-0.89) | (-2.20) | (-1.07) | (-1.90) | (2.52) | (0.80) | (0.78) | (1.52) |
| INFLA | -0.060 | -0.092 | -0.092 | -0.033 | -0.128 | -0.164 | -0.065 | -0.101 |
| | (-0.44) | (-0.60) | (-0.67) | (-0.24) | (-1.04) | (-1.19) | (-0.37) | (-1.03) |
| Constant | -0.837$^{***}$ | -0.165$^{***}$ | -0.781$^{**}$ | -0.623$^{*}$ | -0.674$^{***}$ | -0.191$^{***}$ | -0.712$^{**}$ | -0.992$^{***}$ |
| | (-4.10) | (-3.34) | (-2.20) | (-1.68) | (-3.62) | (-4.42) | (-2.12) | (-3.35) |
| rss | 4.838 | | 9.280 | 8.912 | 4.021 | | 5.159 | 7.722 |
| ll | 1288.7 | | | | 1383.4 | | | |
| $R^2$ | 0.789 | 0.859 | | | 0.653 | 0.742 | | |
| F | 72.63$^{***}$ | | | | 28.51$^{***}$ | | | |
| ρ | 0.537 | 0.016 | | | 0.472 | 0.000 | | |
| $\chi^2$ | | 5660.6$^{***}$ | 143.21$^{***}$ | 140.41$^{***}$ | | 2900.8$^{***}$ | 62.41$^{***}$ | 83.00$^{***}$ |
| FE test | 3.60$^{***}$ | | | | 3.16$^{***}$ | | | |
| Hausman test | | 346.00$^{***}$ | | | | 338.53$^{***}$ | | |
| Sargen test | | | 29.04 | | | | 37.52 | |
| N | 128 | 128 | 128 | 128 | 128 | 128 | 128 | 128 |
| Obs | 1,024 | 1,024 | 896 | 896 | 1,024 | 1,024 | 896 | 896 |

Table VI (continued)
Dynamic Results

| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
|---|---|---|---|---|---|---|---|---|
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | |
| | | | One-step | Two-step | | | One-step | Two-step |
| Panel B: IL is the mean of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.521*** | 0.801*** | 0.658*** | 0.566*** | | | | |
| | (22.69) | (55.31) | (8.04) | (4.66) | | | | |
| $LLBA_{t-1}$ | | | | | 0.367*** | 0.710*** | 0.232*** | 0.412*** |
| | | | | | (14.45) | (38.65) | (3.94) | (4.46) |
| TLBAA | 0.502*** | 0.178*** | 0.902*** | 0.768*** | | | | |
| | (6.92) | (5.49) | (8.00) | (4.55) | | | | |
| LLBAA | | | | | 0.766*** | 0.305*** | 1.006*** | 0.737*** |
| | | | | | (8.78) | (8.23) | (8.99) | (4.22) |
| PROF | -0.337*** | -0.299*** | -0.288*** | -0.353*** | -0.090*** | -0.109*** | -0.049 | -0.024 |
| | (-9.05) | (-9.43) | (-5.73) | (-4.32) | (-2.73) | (-4.00) | (-1.23) | (-0.60) |
| SIZE | 0.097*** | 0.022*** | 0.085** | 0.096** | 0.078*** | 0.022*** | 0.090*** | 0.107*** |
| | (4.60) | (4.14) | (2.41) | (2.31) | (4.20) | (4.81) | (2.82) | (3.41) |
| MTB | 0.009*** | 0.010*** | 0.012*** | 0.013** | 0.002 | 0.004 | 0.003 | 0.002 |
| | (2.84) | (3.23) | (2.89) | (2.28) | (0.63) | (1.48) | (0.89) | (0.46) |
| TANG | 0.098*** | 0.003 | 0.066 | 0.081 | 0.048* | -0.004 | 0.057 | 0.079* |
| | (3.09) | (0.20) | (1.32) | (1.45) | (1.67) | (-0.30) | (1.44) | (1.90) |
| NDT | -0.097 | 0.091 | -0.376 | -0.540 | -0.092 | 0.080 | -0.150 | -0.005 |
| | (-0.46) | (0.80) | (-1.23) | (-1.32) | (-0.49) | (0.81) | (-0.61) | (-0.03) |
| LIQ | -0.001** | -0.002*** | -0.001 | -0.001 | -0.0003 | -0.0002 | 0.0004 | 0.0003 |
| | (-2.45) | (-5.58) | (-0.91) | (-0.34) | (0.88) | (-0.75) | (0.96) | (0.65) |
| DIVP | -0.003 | 0.002 | -0.001 | -0.001 | -0.002 | 0.001 | -0.003 | -0.002 |
| | (-1.05) | (0.56) | (0.33) | (-0.29) | (-0.86) | (0.31) | (-1.09) | (-0.62) |
| RISK | 0.272*** | 0.137* | 0.410*** | 0.339*** | -0.076 | -0.158** | -0.064 | -0.026 |
| | (3.81) | (1.92) | (4.64) | (2.85) | (-1.19) | (-2.50) | (-0.98) | (-0.49) |
| SETR | -0.005 | -0.013** | -0.008 | -0.010* | 0.0005** | -0.0002 | -0.014 | -0.003 |
| | (-0.89) | (-2.16) | (-1.37) | (-1.87) | (0.10) | (-0.03) | (1.54) | (-0.68) |
| INFLA | -0.017 | -0.085 | 0.017 | 0.010 | -0.063 | -0.134 | -0.155 | -0.036 |
| | (-0.13) | (-0.55) | (0.13) | (0.07) | (-0.53) | (-0.98) | (0.97) | (-0.33) |
| Constant | -0.937*** | -0.189*** | -1.032*** | -1.038*** | -0.770*** | -0.202*** | -0.902*** | -1.073*** |
| | (-4.61) | (-3.79) | (-2.89) | (-2.62) | (-4.25) | (-4.73) | (-2.90) | (-3.49) |
| rss | 4.75 | | 9.276 | 8.505 | 3.784 | | 4.407 | 6.917 |
| ll | 1297.9 | | | | 1414.6 | | | |
| $R^2$ | 0.772 | 0.859 | | | 0.621 | 0.747 | | |
| F | 75.28*** | | | | 34.92*** | | | |
| ρ | 0.568 | 0.019 | | | 0.528 | 0.000 | | |
| $\chi^2$ | | 5570.9*** | 182.49*** | 151.99*** | | 2981.0*** | 122.95*** | 96.15*** |
| FE test | 3.79*** | | | | 3.58*** | | | |
| Hausman test | | 400.05*** | | | | 420.30*** | | |
| Sargen test | | | 28.06 | | | | 34.05 | |
| N | 128 | 128 | 128 | 128 | 128 | 128 | 128 | 128 |
| Obs | 1,024 | 1,024 | 896 | 896 | 1,024 | 1,024 | 896 | 896 |

Table VII
Dynamic Results by Industry

This table presents the estimation of the partial adjustment model with panel data covering nine consecutive years for the period 2002-2010 of 128 firms from industrials, property and construction, and services industries.

$L_{it} = \lambda L_{it-1} + \alpha_0 + \alpha_1(IL)_{it} + \alpha_2(PROF)_{it} + \alpha_3(SIZE)_{it} + \alpha_4(MTB)_{it} + \alpha_5(TANG)_{it} + \alpha_6(NDT)_{it} + \alpha_7(LIQ)_{it} + \alpha_8(DIVP)_{it} + \alpha_9(RISK)_{it} + \alpha_{10}(SETR)_{it} + \alpha_{11}(INFLA)_{it} + u_{it}$

The speed of adjustment toward target leverage was estimated using fixed effect regression, random effect GLS regression, and one-step and two-step Arellano-Bond estimators. Coefficient estimates are reported with t-statistics in parentheses, where $^{***}$, $^{**}$, and $^{*}$ indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. The dependent variable ($L_{it}$) is leverage of firm i at the end of year t. $L_{it}$ is defined as total liabilities divided by total book assets and total non-current liabilities divided by total book assets. Independent variables include industry leverage, firm characteristics, stock market condition, and macroeconomics factor. IL is the industry sector leverage. PROF is the earnings before interest and tax to total assets. SIZE is the natural logarithm of total assets. MTB is the market value of assets, which is the sum of total book liability and the market value of equity, divided by total book value of assets. TANG is the net property, plant and equipment to total assets. NDT is the depreciation and amortization expenses to total assets. LIQ is current assets divided by current liabilities. DIVP is the dividend payout ratio, and RISK is the squared difference between the firm's profitability (PROF) and the industry sector mean. SETR is the annual set index return. INFLA is the expected change in the consumer price index over the coming year. Panel A presents results for industrials industry, panel B presents results for property & construction industry, and panel C presents results for services industry. $^{***}$

**Industrials**

| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
|---|---|---|---|---|---|---|---|---|
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators One-step | Arellano-Bond Estimators Two-step | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators One-step | Arellano-Bond Estimators Two-step |
| Panel A-1 Industrials industry which IL is the median of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.547$^{***}$ | 0.752$^{***}$ | 0.304$^{***}$ | 0.246 | | | | |
| | (13.19) | (26.89) | (2.76) | (0.24) | | | | |
| $LLBA_{t-1}$ | | | | | 0.362$^{***}$ | 0.532$^{***}$ | 0.463$^{***}$ | 0.467$^{***}$ |
| | | | | | (9.00) | (15.06) | (9.22) | (3.20) |
| TLBAM | 0.321$^{***}$ | 0.182$^{***}$ | 0.324$^{***}$ | 0.318$^{**}$ | | | | |
| | (4.11) | (4.91) | (3.60) | (2.20) | | | | |
| LLBAM | | | | | 0.341$^{***}$ | 0.248$^{***}$ | 0.179$^{*}$ | 0.169 |
| | | | | | (4.60) | (3.69) | (1.79) | (0.89) |
| PROF | -0.269$^{***}$ | -0.295$^{***}$ | -0.065 | -0.059 | 0.021 | -0.046 | 0.013 | 0.010 |
| | (-3.57) | (-4.41) | (-0.75) | (-0.27) | (0.43) | (-1.04) | (0.22) | (0.11) |
| SIZE | 0.105$^{*}$ | 0.002 | 0.040 | 0.052 | 0.075$^{**}$ | 0.017$^{**}$ | 0.003 | 0.006 |
| | (1.91) | (0.13) | (0.49) | (0.23) | (2.11) | (2.04) | (0.06) | (0.05) |
| MTB | 0.028$^{**}$ | 0.029$^{***}$ | 0.034$^{**}$ | 0.035 | 0.001 | 0.006 | 0.002 | 0.004 |
| | (2.15) | (2.68) | (2.24) | (0.78) | (0.15) | (0.87) | (0.15) | (0.21) |
| TANG | 0.057 | 0.041 | 0.100 | 0.086 | 0.040 | 0.045$^{*}$ | 0.069 | 0.070 |
| | (1.04) | (1.11) | (1.41) | (0.72) | (1.11) | (1.79) | (1.44) | (1.07) |
| NDT | -0.296 | 0.353 | -0.212 | -0.118 | -0.497$^{*}$ | 0.197 | -0.239 | -0.222 |
| | (-0.70) | (-1.44) | (-0.39) | (-0.19) | (-1.82) | (-1.16) | (-0.63) | (-0.97) |
| LIQ | -0.007$^{***}$ | -0.008$^{***}$ | -0.010$^{***}$ | -0.008 | 0.0022 | -0.0003 | 0.0013 | 0.0014 |
| | (-3.13) | (-4.40) | (-3.37) | (-1.11) | (1.50) | (-0.26) | (0.66) | (0.61) |
| DIVP | 0.001 | -0.0003 | 0.0001 | 0.0001 | -0.007$^{***}$ | -0.004$^{*}$ | -0.008$^{***}$ | -0.008$^{**}$ |
| | (-0.34) | (-0.07) | (0.02) | (0.02) | (-2.62) | (-1.68) | (-3.03) | (-2.38) |
| RISK | 2.163$^{***}$ | 1.098$^{***}$ | 1.988$^{***}$ | 1.892 | 0.110 | -0.054 | 0.170 | 0.146 |
| | (7.34) | (6.68) | (5.57) | (0.99) | (0.58) | (-0.28) | (0.75) | (0.34) |
| SETR | -0.016 | -0.022$^{**}$ | -0.015 | -0.013 | 0.017$^{**}$ | 0.009 | 0.009 | 0.008 |
| | (-1.51) | (-2.08) | (-1.41) | (-0.63) | (2.53) | (1.28) | (1.24) | (0.59) |
| INFLA | 0.357 | 0.416 | 0.203 | 0.278 | -0.266 | -0.198 | -0.198 | -0.171 |
| | (1.40) | (1.53) | (0.84) | (0.63) | (-1.57) | (-1.10) | (-1.14) | (-1.35) |
| Constant | -0.949$^{*}$ | 0.006 | -0.275 | -0.391 | -0.674$^{**}$ | -0.150$^{*}$ | -0.021 | -0.052 |
| | (-1.81) | (0.05) | (-0.35) | (-0.18) | (-1.98) | (-1.92) | (-0.04) | (-0.05) |
| rss | 1.241 | | 1.973 | 1.912 | 0.517 | | 0.918 | 0.922 |
| ll | 375.66 | | | | 501.94 | | | |
| $R^2$ | 0.841 | 0.903 | | | 0.561 | 0.687 | | |
| F | 33.32$^{***}$ | | | | 15.67$^{***}$ | | | |
| ρ | 0.520 | 0.020 | | | 0.481 | 0.059 | | |
| $\chi^2$ | | 2286.35$^{***}$ | 86.36$^{***}$ | 280.04$^{***}$ | | 481.53$^{***}$ | 201.94$^{***}$ | 128.08$^{***}$ |
| FE test | 2.54$^{***}$ | | | | 3.22$^{***}$ | | | |
| Hausman test | | 71.32$^{***}$ | | | | 98.99$^{***}$ | | |
| Sargen test | | | 31.38 | | | | 43.71 | |
| N | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| Obs | 288 | 288 | 252 | 252 | 288 | 288 | 252 | 252 |

Table VII (continued)
Dynamic Results by Industry

| | **Industrials** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | |
| | | | One-step | Two-step | | | One-step | Two-step |
| Panel A-2 Industrials industry which IL is the mean of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.511*** | 0.748*** | 0.311*** | 0.205 | | | | |
| | (11.90) | (25.85) | (2.89) | (0.57) | | | | |
| $LLBA_{t-1}$ | | | | | 0.323*** | 0.486*** | 0.356*** | 0.362** |
| | | | | | (8.21) | (13.54) | (6.83) | (2.54) |
| TLBAA | 0.395*** | 0.218*** | 0.746*** | 0.663 | | | | |
| | (3.87) | (4.34) | (5.44) | (1.57) | | | | |
| LLBAA | | | | | 0.715*** | 0.511*** | 0.685*** | 0.659*** |
| | | | | | (6.74) | (5.49) | (4.31) | (2.80) |
| PROF | -0.242*** | -0.280*** | -0.076 | -0.119 | 0.004 | -0.051 | 0.005 | -0.003 |
| | (-3.17) | (-4.13) | (-0.89) | (-0.86) | (0.08) | (-1.18) | (0.09) | (-0.04) |
| SIZE | 0.109** | 0.005 | 0.025 | 0.024 | 0.083** | 0.025*** | 0.019 | 0.016 |
| | (1.98) | (0.38) | (0.31) | (0.08) | (2.43) | (2.85) | (0.37) | (0.15) |
| MTB | 0.031** | 0.030*** | 0.041*** | 0.046 | 0.007 | 0.011 | 0.006 | 0.005 |
| | (2.33) | (2.67) | (2.7 4) | (0.80) | (0.85) | (1.57) | (0.64) | (0.42) |
| TANG | 0.076 | 0.037 | 0.097 | 0.105 | 0.018 | 0.030 | 0.058 | 0.053 |
| | (1.38) | (0.98) | (1.39) | (1.18) | (0.53) | (1.21) | (1.34) | (0.61) |
| NDT | -0.355 | 0.395 | -0.472 | -0.373 | -0.454* | -0.186 | -0.169 | -0.078 |
| | (-0.83) | (-1.59) | (-0.88) | (-0.26) | (-1.74) | (-1.10) | (-0.49) | (-0.35) |
| LIQ | -0.007*** | -0.009*** | -0.010*** | -0.003 | 0.0026* | -0.0003 | 0.0012 | 0.0014 |
| | (-3.11) | (-4.50) | (-3.26) | (-0.41) | (1.83) | (-0.29) | (0.63) | (0.83) |
| DIVP | 0.002 | -0.0002 | 0.0023 | 0.0017 | -0.006** | -0.004 | -0.007*** | -0.007** |
| | (-0.42) | (-0.05) | (0.59) | (0.27) | (-2.45) | (-1.62) | (-2.87) | (-2.08) |
| RISK | 1.953*** | 1.836*** | 1.604*** | 1.220 | 0.055 | -0.089 | 0.062 | 0.039 |
| | (6.56) | (6.32) | (4.54) | (1.64) | (0.30) | (-0.48) | (0.30) | (0.11) |
| SETR | -0.012 | -0.020* | -0.008 | -0.004 | 0.001 | 0.003 | 0.001 | 0.0004 |
| | (-1.16) | (-1.85) | (-0.81) | (-0.59) | (0.12) | (-0.37) | (0.09) | (0.06) |
| INFLA | 0.234 | 0.347 | 0.054 | 0.121 | -0.115 | -0.098 | -0.098 | -0.098 |
| | (0.91) | (1.26) | (0.23) | (0.47) | (-0.73) | (-0.57) | (-0.65) | (-0.46) |
| Constant | -1.006* | -0.032 | -0.289 | -0.251 | -0.776** | -0.238*** | -0.202 | -0.173 |
| | (-1.91) | (-0.29) | (-0.38) | (-0.10) | (-2.38) | (-2.96) | (-0.41) | (-0.18) |
| rss | 1.251 | | 1.915 | 1.881 | 0.473 | | 0.762 | 0.768 |
| ll | 374.58 | | | | 514.74 | | | |
| $R^2$ | 0.831 | 0.901 | | | 0.577 | 0.699 | | |
| F | 32.92*** | | | | 18.99*** | | | |
| ρ | 0.544 | 0.023 | | | 0.509 | 0.075 | | |
| $\chi^2$ | | 2204.80*** | 107.56*** | 132.25*** | | 498.55*** | 254.11*** | 191.46*** |
| FE test | 2.63*** | | | | 3.67*** | | | |
| Hausman test | | 77.59*** | | | | 164.18*** | | |
| Sargen test | | | 32.88 | | | | 45.74 | |
| N | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| Obs | 288 | 288 | 252 | 252 | 288 | 288 | 252 | 252 |

Table VII (continued)
Dynamic Results by Industry

| | **Property and Construction** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | |
| | | | One-step | Two-step | | | One-step | Two-step |
| Panel B-1 Property&construction industry which IL is the median of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.439*** | 0.731*** | 0.510*** | 0.419* | | | | |
| | (10.34) | (25.59) | (4.84) | (1.86) | | | | |
| $LLBA_{t-1}$ | | | | | 0.392*** | 0.775*** | 0.281** | 0.178 |
| | | | | | (7.67) | (22.00) | (2.40) | (1.13) |
| TLBAM | 0.366** | 0.442*** | 0.369** | 0.396** | | | | |
| | (2.31) | (2.93) | (2.11) | (2.28) | | | | |
| LLBAM | | | | | 0.342** | 0.347* | 0.518*** | 0.536* |
| | | | | | (1.98) | (1.82) | (2.65) | (1.81) |
| PROF | -0.564*** | -0.456*** | -0.626*** | -0.587*** | -0.197** | -0.173** | -0.171* | -0.084 |
| | (-7.14) | (-6.81) | (-6.53) | (-3.90) | (-2.32) | (-2.48) | (-1.75) | (-1.01) |
| SIZE | 0.121*** | 0.017* | 0.057 | 0.052 | 0.053 | 0.021** | 0.081 | 0.079** |
| | (3.50) | (1.78) | (1.22) | (1.35) | (1.46) | (2.19) | (1.64) | (2.54) |
| MTB | 0.029*** | 0.032*** | 0.016* | 0.019 | 0.003 | 0.012 | -0.003 | -0.006 |
| | (3.83) | (4.66) | (1.82) | (1.34) | (0.37) | (1.58) | (-0.31) | (-0.44) |
| TANG | 0.053 | -0.093*** | 0.005 | -0.001 | 0.146* | -0.011 | 0.055 | 0.062 |
| | (0.68) | (-2.72) | (0.04) | (-0.00) | (1.72) | (-0.33) | (0.42) | (0.53) |
| NDT | -0.333 | 0.251 | -1.135* | -0.981 | 0.566 | 0.275 | -0.413 | -1.162 |
| | (-0.75) | (0.71) | (-2.07) | (-1.18) | (1.18) | (0.76) | (-0.72) | (-0.77) |
| LIQ | -0.002*** | -0.004*** | -0.002** | -0.002** | 0.001 | -0.0006 | 0.003*** | 0.001 |
| | (-2.75) | (-6.70) | (-2.27) | (-2.12) | (1.14) | (-0.91) | (2.72) | (0.53) |
| DIVP | -0.005 | 0.016 | 0.005 | 0.007 | 0.014 | 0.024** | 0.023* | 0.024 |
| | (-0.39) | (1.41) | (-0.38) | (-0.72) | (1.07) | (2.07) | (1.66) | (1.49) |
| RISK | -0.648** | -0.538* | -0.515*** | 0.511 | 0.019 | -0.439 | 0.237 | 0.386 |
| | (-2.11) | (-1.78) | (-1.43) | (-1.23) | (0.06) | (-1.34) | (0.64) | (1.17) |
| SETR | -0.008 | -0.018* | -0.008 | -0.006 | 0.001 | -0.002 | 0.003 | 0.009 |
| | (-0.88) | (-1.72) | (-0.82) | (-0.48) | (0.11) | (-0.19) | (0.36) | (1.13) |
| INFLA | 0.100 | 0.142 | 0.115 | 0.077 | 0.085 | -0.048 | 0.203 | 0.129 |
| | (0.41) | (0.52) | (0.49) | (0.36) | (0.33) | (-0.17) | (0.81) | (0.43) |
| Constant | -1.084*** | -0.241 | -0.446 | -0.372 | -0.494 | -0.241** | -0.768 | -0.736*** |
| | (-3.17) | (-2.04) | (-0.92) | (-0.93) | (-1.35) | (-2.25) | (-1.52) | (-2.70) |
| rss | 1.239 | | 2.143 | 1.959 | 1.426 | | 2.30 | 2.17 |
| ll | 419.81 | | | | 397.89 | | | |
| $R^2$ | 0.608 | 0.796 | | | 0.561 | 0.684 | | |
| F | 16.71*** | | | | 7.78*** | | | |
| ρ | 0.620 | 0.009 | | | 0.563 | 0.000 | | |
| $\chi^2$ | | 1107.62*** | 65.35*** | 39.72*** | | 648.07*** | 33.66*** | 64.75*** |
| FE test | 3.52*** | | | | 3.07*** | | | |
| Hausman test | | 732.78*** | | | | 119.65*** | | |
| Sargen test | | | 21.94 | | | | 32.53 | |
| N | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 |
| Obs | 312 | 312 | 273 | 273 | 312 | 312 | 273 | 273 |

Table VII (continued)
Dynamic Results by Industry

| | **Property and Construction** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators One-step | Arellano-Bond Estimators Two-step | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators One-step | Arellano-Bond Estimators Two-step |
| Panel B-2 Property&construction industry which IL is the mean of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.431*** | 0.725*** | 0.475*** | 0.367* | | | | |
| | (10.20) | (25.22) | (4.64) | (1.79) | | | | |
| $LLBA_{t-1}$ | | | | | 0.378*** | 0.766*** | 0.265** | 0.122 |
| | | | | | (7.53) | (21.90) | (2.40) | (0.59) |
| TLBAA | 0.870*** | 0.665*** | 0.811** | 0.811*** | | | | |
| | (2.99) | (2.97) | (2.50) | (2.89) | | | | |
| LLBAA | | | | | 0.943*** | 0.829*** | 0.977*** | 1.007*** |
| | | | | | (3.96) | (3.16) | (4.23) | (3.67) |
| PROF | -0.552*** | -0.456*** | -0.592*** | -0.546*** | -0.202** | -0.175** | -0.189** | -0.117 |
| | (-7.02) | (-6.81) | (-6.31) | (-3.80) | (-2.44) | (-2.55) | (-1.99) | (-1.28) |
| SIZE | 0.135*** | 0.020** | 0.080* | 0.066 | 0.056 | 0.021** | 0.054 | 0.075 |
| | (3.97) | (1.98) | (1.73) | (1.14) | (1.60) | (2.21) | (1.12) | (1.50) |
| MTB | 0.030*** | 0.030*** | 0.016* | 0.019 | 0.003 | 0.011 | 0.001 | -0.010 |
| | (3.93) | (4.33) | (1.91) | (1.25) | (0.41) | (1.59) | (0.13) | (-0.69) |
| TANG | 0.051 | -0.111*** | -0.005 | -0.034 | 0.171** | -0.021 | 0.076 | 0.093 |
| | (0.66) | (-3.02) | (-0.04) | (-0.33) | (2.07) | (-0.61) | (0.60) | (0.65) |
| NDT | -0.149 | 0.262 | -0.939* | -0.906 | 0.438 | 0.201 | -0.109 | -0.082 |
| | (-0.33) | (0.74) | (-1.73) | (-1.11) | (0.94) | (0.57) | (-0.20) | (-0.19) |
| LIQ | -0.002*** | -0.004*** | -0.002** | -0.002** | 0.001 | -0.001 | 0.002*** | 0.001 |
| | (-2.81) | (-6.75) | (-2.29) | (-2.05) | (1.01) | (-1.06) | (2.65) | (0.88) |
| DIVP | -0.005 | 0.016 | -0.006 | -0.010 | 0.010 | 0.022** | 0.015 | 0.019 |
| | (-0.46) | (1.39) | (-0.47) | (-0.98) | (0.82) | (1.92) | (1.13) | (1.51) |
| RISK | -0.617** | -0.442 | -0.461 | -0.508 | -0.078 | -0.495 | 0.093 | 0.215 |
| | (-2.03) | (-1.46) | (-1.31) | (-1.42) | (-0.24) | (-1.53) | (0.26) | (0.68) |
| SETR | -0.003 | -0.016 | -0.0024 | -0.0005 | 0.002 | -0.001 | 0.004 | 0.009 |
| | (-0.33) | (-1.47) | (-0.25) | (-0.04) | (0.11) | (-0.12) | (0.39) | (0.99) |
| INFLA | 0.050 | 0.010 | 0.052 | -0.051 | -0.063 | -0.198 | -0.045 | 0.053 |
| | (0.22) | (0.04) | (0.24) | (-0.27) | (-0.26) | (-0.73) | (-0.20) | (0.18) |
| Constant | -1.460*** | -0.353** | -0.867* | -0.662 | -0.649* | -0.329*** | -0.591 | -0.789 |
| | (-3.93) | (-2.46) | (-1.66) | (-1.10) | (-1.81) | (-3.00) | (-1.22) | (-1.56) |
| rss | 1.222 | | 2.062 | 1.865 | 1.365 | | 2.17 | 1.98 |
| ll | 421.90 | | | | 404.67 | | | |
| $R^2$ | 0.588 | 0.796 | | | 0.448 | 0.691 | | |
| F | 17.23*** | | | | 9.10*** | | | |
| ρ | 0.643 | 0.010 | | | 0.596 | 0.000 | | |
| $\chi^2$ | | 1097.58*** | 70.44*** | 45.57*** | | 668.97*** | 44.05*** | 44.31*** |
| FE test | 3.66*** | | | | 3.29*** | | | |
| Hausman test | | 94.62*** | | | | 130.00*** | | |
| Sargen test | | | 20.05 | | | | 29.04 | |
| N | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 |
| Obs | 312 | 312 | 273 | 273 | 312 | 312 | 273 | 273 |

Table VII (continued)
Dynamic Results by Industry

| | **Services** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators | |
| | | | One-step | Two-step | | | One-step | Two-step |
| Panel C-1 Services industry which IL is the median of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.586*** | 0.826*** | 0.722*** | 0.720*** | | | | |
| | (17.33) | (41.13) | (7.44) | (5.43) | | | | |
| $LLBA_{t-1}$ | | | | | 0.371*** | 0.718*** | 0.428*** | 0.451*** |
| | | | | | (8.56) | (24.82) | (5.92) | (2.94) |
| TLBAM | 0.211*** | 0.075** | 0.216** | 0.213** | | | | |
| | (3.33) | (1.97) | (2.35) | (2.34) | | | | |
| LLBAM | | | | | 0.273** | 0.312*** | 0.328** | 0.415*** |
| | | | | | (2.30) | (4.23) | (2.19) | (2.94) |
| PROF | -0.264*** | -0.229*** | -0.260*** | -0.305*** | -0.090* | -0.112*** | -0.007 | -0.009 |
| | (-5.25) | (-5.54) | (-3.92) | (-4.24) | (-1.68) | (-2.68) | (-0.09) | (-0.15) |
| SIZE | 0.125*** | 0.035*** | 0.157*** | 0.158* | 0.103*** | 0.027*** | 0.107* | 0.070 |
| | (4.19) | (4.50) | (3.28) | (1.76) | (3.20) | (3.70) | (1.91) | (0.79) |
| MTB | 0.004 | 0.002 | 0.010** | 0.010*** | 0.002 | 0.002 | 0.001 | 0.001 |
| | (1.05) | (0.58) | (2.24) | (2.80) | (0.42) | (0.48) | (0.22) | (0.22) |
| TANG | 0.101** | 0.023 | 0.046 | 0.046 | 0.065 | 0.002 | -0.013 | -0.025 |
| | (2.31) | (1.30) | (0.70) | (0.43) | (1.39) | (0.13) | (-0.19) | (-0.30) |
| NDT | 0.299 | 0.216 | -0.018 | 0.039 | -0.083 | 0.054 | -0.121 | -0.087 |
| | (1.04) | (1.60) | (-0.04) | (0.08) | (-0.27) | (0.39) | (-0.27) | (-0.30) |
| LIQ | -0.0003 | -0.001* | 0.0001 | 0.00001 | 0.0001 | 0.0000 | 0.0001 | -0.0001 |
| | (-0.78) | (-1.80) | (0.12) | (0.02) | (0.22) | (0.03) | (0.19) | (-0.46) |
| DIVP | -0.003 | 0.002 | 0.001 | 0.002 | 0.002 | 0.004 | 0.003 | 0.003 |
| | (-0.58) | (0.36) | (0.10) | (0.48) | (0.28) | (0.60) | (0.40) | (0.91) |
| RISK | 0.283*** | 0.148* | 0.408*** | 0.358*** | -0.049 | -0.120 | -0.019 | -0.021 |
| | (3.61) | (1.94) | (4.29) | (4.48) | (-0.59) | (-1.56) | (-0.20) | (-0.31) |
| SETR | 0.005 | -0.003 | 0.007 | -0.001 | 0.017* | 0.005 | 0.020** | 0.012 |
| | (0.67) | (-0.28) | (0.78) | (-0.17) | (1.99) | (0.57) | (2.19) | (0.84) |
| INFLA | -0.490** | -0.560** | -0.631*** | -0.466* | -0.230 | -0.214 | -0.282 | -0.255 |
| | (-2.46) | (-2.46) | (-3.10) | (-1.83) | (-1.09) | (-0.92) | (-1.31) | (-1.27) |
| Constant | -1.120*** | -0.274*** | -1.447*** | -1.460* | -0.933*** | -0.238*** | -0.952* | -0.625 |
| | (-3.94) | (-3.93) | (-3.08) | (-1.71) | (-3.04) | (-3.38) | (-1.77) | (-0.74) |
| rss | 1.769 | | 3.488 | 3.462 | 1.982 | | 3.80 | 3.92 |
| ll | 559.99 | | | | 535.87 | | | |
| $R^2$ | 0.802 | 0.879 | | | 0.605 | 0.730 | | |
| F | 39.56*** | | | | 11.14*** | | | |
| ρ | 0.567 | 0.012 | | | 0.483 | 0.000 | | |
| $\chi^2$ | | 2810.62*** | 130.31*** | 239.54*** | | 1112.49*** | 56.45*** | 40.79*** |
| FE test | 3.69*** | | | | 2.83*** | | | |
| Hausman test | | 112.85*** | | | | 128.85*** | | |
| Sargen test | | | 21.08 | | | | 31.48 | |
| N | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| Obs | 424 | 424 | 371 | 371 | 424 | 424 | 371 | 371 |

Table VII (continued)
Dynamic Results by Industry

| | **Services** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total liabilities to total book assets (TLBA) | | | | Total non-current liabilities to total book assets (LLBA) | | | |
| | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators One-step | Arellano-Bond Estimators Two-step | Fixed-effects Regression | Random-effects GLS Regression | Arellano-Bond Estimators One-step | Arellano-Bond Estimators Two-step |
| Panel C-2 Services industry which IL is the mean of industry sector leverage | | | | | | | | |
| $TLBA_{t-1}$ | 0.583*** | 0.826*** | 0.731*** | 0.726*** | | | | |
| | (17.05) | (40.73) | (7.58) | (4.99) | | | | |
| $LLBA_{t-1}$ | | | | | 0.352*** | 0.705*** | 0.426*** | 0.440*** |
| | | | | | (8.45) | (24.11) | (6.36) | (3.79) |
| TLBAA | 0.368*** | 0.091* | 0.487** | 0.206 | | | | |
| | (3.01) | (1.68) | (2.45) | (0.76) | | | | |
| LLBAA | | | | | 0.844*** | 0.345*** | 1.123*** | 0.963*** |
| | | | | | (5.79) | (4.77) | (6.00) | (2.74) |
| PROF | -0.253*** | -0.232*** | -0.262*** | -0.312*** | -0.076 | -0.132*** | -0.005 | -0.016 |
| | (-4.98) | (-5.60) | (-3.94) | (-4.04) | (-1.46) | (-3.13) | (-0.07) | (-0.25) |
| SIZE | 0.120*** | 0.035*** | 0.141*** | 0.145* | 0.112*** | 0.027*** | 0.108** | 0.146 |
| | (4.02) | (4.58) | (2.94) | (1.68) | (3.38) | (3.61) | (2.02) | (1.57) |
| MTB | 0.004 | 0.002 | 0.010** | 0.011*** | 0.002 | 0.003 | 0.003 | 0.005 |
| | (1.07) | (0.64) | (2.25) | (2.95) | (0.47) | (0.76) | (0.66) | (1.71)* |
| TANG | 0.086* | 0.020 | 0.042 | 0.045 | 0.037 | -0.004 | -0.006 | 0.012 |
| | (1.95) | (1.18) | (0.64) | (0.42) | (0.83) | (-0.23) | (-0.08) | (0.17) |
| NDT | 0.252 | 0.216 | -0.072 | 0.002 | -0.158 | 0.098 | -0.187 | -0.228 |
| | (0.87) | (1.59) | (-0.17) | (0.00) | (-0.54) | (0.72) | (-0.43) | (-0.80) |
| LIQ | -0.0003 | -0.001* | 0.0001 | 0.0001 | -0.0003 | 0.00001 | 0.0001 | 0.0000 |
| | (-0.69) | (-1.80) | (0.24) | (0.18) | (-0.08) | (0.04) | (0.15) | (0.00) |
| DIVP | -0.003 | 0.002 | 0.0001 | 0.002 | 0.002 | 0.004 | 0.002 | 0.003 |
| | (-0.47) | (0.39) | (0.02) | (0.34) | (0.39) | (0.75) | (0.30) | (0.84) |
| RISK | 0.274*** | 0.138* | 0.397*** | 0.353*** | -0.060 | -0.151* | -0.026 | -0.023 |
| | (3.49) | (1.81) | (4.19) | (4.03) | (-0.76) | (-1.95) | (-0.28) | (-0.37) |
| SETR | 0.002 | -0.003 | 0.0005 | -0.0003 | -0.003 | -0.002 | -0.010 | -0.007 |
| | (0.22) | (-0.33) | (0.06) | (-0.04) | (-0.39) | (-0.19) | (-0.98) | (-0.76) |
| INFLA | -0.321 | -0.524** | -0.413* | -0.330 | -0.036 | -0.141 | 0.006 | -0.114 |
| | (-1.50) | (-2.28) | (-1.75) | (-1.45) | (-0.18) | (-0.61) | (0.03) | (-0.59) |
| Constant | -1.136*** | -0.288*** | -1.411*** | -1.339* | -1.087*** | -0.248*** | -1.077** | -1.43 |
| | (-3.99) | (-4.15) | (-3.03) | (-1.65) | (-3.73) | (-3.56) | (-2.10) | (-1.61) |
| rss | 1.779 | | 3.456 | 3.495 | 1.849 | | 3.47 | 3.54 |
| ll | 558.83 | | | | 551.74 | | | |
| $R^2$ | 0.801 | 0.879 | | | 0.568 | 0.733 | | |
| F | 39.18*** | | | | 14.33*** | | | |
| ρ | 0.568 | 0.011 | | | 0.570 | 0.000 | | |
| $\chi^2$ | | 2813.16*** | 138.52*** | 204.65*** | | 1129.65*** | 92.18*** | 47.03*** |
| FE test | 3.66*** | | | | 3.47*** | | | |
| Hausman test | | 118.60*** | | | | 171.36*** | | |
| Sargen test | | | 22.46 | | | | 39.37 | |
| N | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| Obs | 424 | 424 | 371 | 371 | 424 | 424 | 371 | 371 |

## BIOGRAPHY


**Name –Surname** Supa Tongkong

**Work Place** Faculty of Business Administration, Rajamangala University of Technology Thanyaburi, Pathumthani, 10110, Email: supa_123@hotmail.com


**Education Background**

| | |
|---|---|
| 2013 | Ph.D. (Business Administration), Rajamangala University of Technology Thanyaburi, Thailand |
| 1984 | M.B.A. (Hons.) (Financial Management), National Institute of Development Administration, Thailand |
| 1981 | M.S. (Chemistry), Hons., Chiangmai University, Thailand |

**Work Experiences**

| | |
|---|---|
| 1997-Present | Lecturer, Faculty of Business Administration, Rajamangala University of Technology Thanyaburi |
| 1985-1997 | Lecturer, Borpitpimuk Chakrawad Campus, Rajamangala Institute of Technology |

**Publications**

**Tongkong, S.**, & Jantarakilica, T. (2013). Dynamic Panel Data Model for Capital Structural of Listed Companies in SET. *Journal of Asia Pacific Business Innovation & Technology Management, 3 (1).* 1-13**.**

**Tongkong, S.** (2012). Key factors influencing capital structure decision and its speed of adjustment of Thai listed real estate companies. *Procedia - Social and Behavioral Sciences, 40,* 716-720.

**Others**

**Tongkong, S.**, & Jantarakilica, T. (2013). *Outstanding Paper Award to Dynamic Panel Data Model for Capital Structural of Listed Companies in SET.* The 2013 International BITM Conference, International Society of Business Innovation Technology Management, January 22, 2013.