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Key factors influencing capital structure decision and its speed of adjustment of Thai listed real estate companies

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Abstract

This paper investigates the significant factors influencing capital structure decision of the listed real estate companies and the speed of adjustment towards their target level. The study used homogeneous panel of 39 Thai companies in real estate industry listed in the Stock Exchange of Thailand (SET) during the period 2002 to 2009. The analysis employs multiple linear panel regression models in examining factors influencing capital structure decision, as well as, dynamic panel regression model using one-step and two-step Arellano and Bond GMM estimation methods in determining the speed of adjustment towards target capital structure. The findings indicate that firm leverage is positively related to median industry leverage. Furthermore, firm size and growth opportunities have positive relationship with firm leverage, whereas profitability and leverage are negatively associated. Our results support pecking order theory as higher profitability firms tend to have less debt and firms with higher growth opportunities tend to have greater leverage. Additionally, the study also discovers that real estate companies partially adjust their capital structure towards the target level capital structure only at the rate of 63 percent.

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Keywords: Target Capital Structure; Speed of Adjustment; Real Estate Companies; Dynamic Panel Models

1. Introduction

For any business organization, capital structure decision is one of the most important topics in corporate finance. Appropriate capital structure decisions would increase firms' value. According to numerous researches, capital structure decisions are determined by a complex set of factors (Chen, 2004; Mazur, 2007; Bhabra, Liu & Tirtiroglu, 2008; Frank & Goyal, 2009; Getzmann, Lang & Spremann, 2010). Bhabra, Lui and Tirtiroglu (2008) indicated that significant factors influencing capital structure decision are proportion of tangible assets, size, profitability, and growth opportunities. Furthermore, Frank and Goyal (2009) suggested 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. The significant determinants of optimal capital structure have been disagreed over decades of empirical studies. Specifically, what are the influential factors in determining how firms

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select the types of security to be issued are considered to be questionable. Additionally, most firms adjust their capital structure when debt levels are above-target leverage and below-target leverage as well (Byoun, 2007). Therefore when leverages differ from target capital structure, firms tend to move their capital structure towards the target capital structure, whereas the speeds of adjustment are considered to be questionable.

Moreover, financing decision especially leverage level consideration is crucial for real estate industry. Since, the industry needs a huge of fund to invest in land and property whereas real estate companies have a lot of assets as collateral on debt. Therefore, capital structure decision and its speed of adjustment towards target leverage level are worthy investigation for real estate companies.

The remainder of this paper proceeds as followed. Part II examines a concise literature review of the capital structure. Setting up the models and research methodology are presented in Part III. Part IV discusses the results, and part V concludes the study and suggestions.

2. Literature Review

2.1. Capital structure theories

To formulate a theoretical perspective for examining the keys factors influencing capital structures decisions, the trade-off theory, the pecking order theory and the market timing theory contribute a useful model [8]. Firstly, the trade-off theory 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. Using debt as a means of financing is attractive since the benefits of tax saving from debt payments shields a number of costs debt financing. More profitable firms could have higher benefits from debt financing and have lower level of financial distress costs. Therefore, soaring profit firms should have higher level of leverage. Secondly, the pecking order theory that 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 finance. If the firms issue securities, the firms favor debt over equity. The interpretation of this theory implies that 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 explains how firms decide whether to finance their investment with debt or equity instruments. This theory indicates that security issuance decisions are affected by managers' ability to time the equity market. Firms prefer equity when the relative cost of equity is low, and prefer debt otherwise. Therefore, stock markets conditions would be expected to explain the firm's leverage level; during bullish equity market, firms prefer equity issuance over debt financing.

2.2 Factors influencing capital structure decision

According to numerous empirical studies, capital structure decisions are relevant to both firm-level characteristics and the macro-level characteristics. Industry conditions, firm specific variables, and macroeconomic conditions are all included as capital structure determinants (Frank & Goyal, 2009). Furthermore, capital structure decisions vary closely with stock market conditions, explicitly stock price change (Welch, 2004). Various empirical studies endeavor to investigate determinants of capital structure. The key factors influencing capital structure decisions to be investigated include industry leverage, profitability, firm size, growth opportunities, asset tangibility, expected inflation, and stock market return. The empirical evidences and predicted relationships between firm's leverage and capital structure determinants under different theories are summarized in table 1.

3. Research Methodology

3.1 Sample and variables

This study uses data from separate financial statements including income statements and balance sheets of 39 Thai listed real estate companies for the period 2002 – 2009, SET index and stocks market value from the Stock Exchange of Thailand as well as inflation rate from the Bank of Thailand. The

variables and their proxies that are used in this study which is mainly adopted from existing literature are summarized in table 2.

Table 1. Summary of empirical evidences and predicted relationships between firm's leverage and capital structure determinants under different theories

| Determinants | Predicted signs by theories | Sample empirical evidences |
|---------------------------------------|------------------------------|--|
| <i>Industry variable</i> | | |
| Industry leverage | + (Trade-off) | Hovakimian et al. (2004); Frank and Goyal (2009) |
| <i>Firm-specific variables</i> | | |
| Profitability | + (Trade-off) | - |
| | - (Pecking order) | Chen (2004); Frank and Goyal (2009); Getzmann et al. (2010) |
| Size | + (Trade-off, Pecking order) | Chen (2004); Frank and Goyal (2009); Getzmann et al. (2010) |
| Growth opportunities | - (Trade-off) | Huang and Song (2006); Frank and Goyal (2009); Sibikov (2009) |
| | +(Pecking order) | Chen (2004); Shen (2008); Getzmann et al. (2010) |
| Tangibility | + (Trade-off) | Chen (2004); Frank and Goyal (2009); Getzmann et al. (2010) |
| | - (Pecking order) | Booth et al. (2001); Bas et al. (2009); Psillaki and Daskalakis (2009) |
| <i>Macroeconomic conditions</i> | | |
| Expected inflation/ GDP per capita | + (Trade-off) | Bas et al. (2009); Frank and Goyal (2009) |
| <i>Stock market conditions</i> | | |
| Stock market return | - (Market timing) | Deesomsak et al. (2004); Welch (2004) |

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 no suggestion by theories.

3.2 Regression models

The panel data method including static and dynamic multiple regression model are employed for this study. In order to determine factors influencing capital structure decisions, the model is specified as follows:

$$(TLBA)_{it}^* = \beta_0 + \beta_1(TLBAM)_{it} + \beta_2(PROF)_{it} + \beta_3(SIZE)_{it} + \beta_4(MTB)_{it} + \beta_5(TANG)_{it} + \beta_6(INFLA)_{it} + \beta_7(SETR)_{it} + \varepsilon_{it} \quad (1)$$

Moreover, dynamic regression model is also provided work for identify the firm's speed of adjustment towards target capital structure. Therefore, the partial adjustment model is suggested as follows:

$$(TLBA)_{it} = \lambda TLBA_{it-1} + \alpha_0 + \alpha_1(TLBAM)_{it} + \alpha_2(PROF)_{it} + \alpha_3(SIZE)_{it} + \alpha_4(MTB)_{it} + \alpha_5(TANG)_{it} + \alpha_6(INFLA)_{it} + \alpha_7(SETR)_{it} + u_{it} \quad (2)$$

Where *i* indicates the cross-section dimension, *t* represents the time dimension, and $(1 - \lambda)$ denotes partial adjustment parameter. The findings of static model based on three methods, Feasible Generalized Least Squares Regression (FGLS), Fixed Effects (within) Regression, Random Effects GLS Regression and the estimation results of dynamic model founded on four methods, Fixed Effects (within) Regression, Random Effects GLS Regression, Arellano-Bond dynamic panel-data estimation (GMM) one-step and two-step are reported in table 3

Table 2. Variables and proxies

| Variables | Proxies |
|--|---|
| <i>Dependent variable</i> | |
| Capital structure decision (Firm leverage) | 1. Total liability to book value of asset (TLBA) 2. Financial debt to book value of capital (FDBC) |
| <i>Independent variables</i> | |
| Median industry leverage | 1. Median of industry total liability to book value of asset (TLBAM) 2. Median of industry financial debt to book value of capital (FDBCM) |
| Profitability | Earnings before interest and tax to total asset (PROF) |
| Size | Log of total assets (SIZE) |
| Growth opportunities | The ratio of market value of asset to total book value of asset (MTB) |
| Tangibility | The ratio of net property, plant and equipment to total asset (TANG) |
| Expected inflation | The expected change in the consumer price index over the coming year (INFLA) |
| Stock market return | Annual SET index return (SETR) |

4. Result and Discussion

The empirical evidence as reported in table 3 indicates that significant factors influencing capital structure decision include median industry leverage, profitability, firm size, and growth opportunity. Specifically, firm leverage is positively related to industry leverage, firm size, and growth opportunity, whereas profitability and leverage are negatively associated. Furthermore, the study also realizes that real estate companies partially adjust their capital structure towards the target level capital structure only at the rate of 63 percent.

The findings are considered to support pecking order theory as higher profitability firms tend to have less debt and firms with higher growth opportunities tend to have greater leverage. Moreover, the relationship of firm size to firm leverage is positive that is corresponding to the predicted sign by both trade-off and pecking order theories.

5. Conclusion

This paper analyzes, based on trade-off, pecking order, and market timing theories, factors influencing capital structure decision and the speed of adjustment for the 39 listed real estate companies in the Stock Exchange of Thailand. The findings contribute a piece to the capital structure puzzle by supporting previous results of pecking order behavior in Asia.

The empirical analysis indicates that industry leverage and firm-specific factors are significant factors influencing capital structure decision of Thai listed real estate companies, while macroeconomic conditions and stock market condition are insignificantly associated to firm leverage. Additionally, they partially adjust their capital structure towards the target leverage level.

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Table 3

Three different static regression model estimators and four dynamic regression model estimators

The regression estimated with panel data covering 39 firms over 8 years of data for the period 2002-2009. Columns (1) to (3) report the estimation of factors influencing capital structure decisions:

$$(TLBA)_{it}^* = \beta_0 + \beta_1(TLBAM)_{it} + \beta_2(PROF)_{it} + \beta_3(SIZE)_{it} + \beta_4(MTB)_{it} + \beta_5(TANG)_{it} + \beta_6(INFLA)_{it} + \beta_7(SETR)_{it} + \varepsilon_{it}$$

The estimated coefficients from FGLS, fixed effect regression, and random effect GLS are reported in column (1), (2), and (3). Columns (4) to (7) report the estimation of partial adjustment model:

$$(TLBA)_{it} = \lambda TLBA_{it-1} + \alpha_0 + \alpha_1(TLBAM)_{it} + \alpha_2(PROF)_{it} + \alpha_3(SIZE)_{it} + \alpha_4(MTB)_{it} + \alpha_5(TANG)_{it} + \alpha_6(INFLA)_{it} + \alpha_7(SETR)_{it} + u_{it}$$

The estimated coefficients from fixed effect regression, random effect GLS regression, one- step GMM, and two-step GMM are reported in column (4), (5), (6), and (7) where ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively. Coefficient estimates are reported with t-statistics in parentheses.

| | Static Model | | | Dynamic Model | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| | OLS | FE | RE | FE_Lag | RE_Lag | GMM | GMM_2 |
| L.TLBA | | | | 0.3034*** (5.85) | 0.6595*** (17.19) | 0.3693*** (3.16) | 0.3966** (2.32) |
| TLBAM | 0.9083 (1.25) | 1.0637** (2.51) | 1.0324** (2.47) | 0.5913 (1.26) | 0.9574* (1.84) | 0.5720 (1.32) | 0.6914 (1.13) |
| PROF | -0.5945*** (-6.44) | -0.3360*** (-4.51) | -0.3681*** (-5.10) | -0.3136*** (-4.96) | -0.3142*** (-5.42) | -0.3119*** (-4.54) | -0.3077** (-2.15) |
| SIZE | 0.1216*** (5.05) | 0.1290*** (3.18) | 0.1206*** (3.66) | 0.0986** (2.55) | 0.0423** (2.36) | 0.1094** (2.22) | 0.1129 (0.76) |
| MTB | 0.0604*** (3.37) | 0.0354** (2.42) | 0.0370*** (2.64) | 0.0325** (2.48) | 0.0433*** (3.76) | 0.0299** (2.09) | 0.0206 (1.00) |
| TANG | -0.0416 (-1.15) | -0.0053 (-0.22) | -0.0122 (-0.51) | -0.0113 (-0.13) | 0.0480 (0.93) | -0.0624 (-0.57) | -0.0024 (-0.02) |
| INFLA | -0.0777 (-0.12) | -0.0406 (-0.11) | -0.0597 (-0.17) | -0.1288 (-0.42) | 0.1655 (0.47) | -0.0328 (-0.12) | 0.1728 (0.58) |
| SETR | -0.0143 (-0.61) | 0.0070 (0.52) | 0.0053 (0.39) | 0.0037 (-0.33) | -0.0233* (-1.81) | -0.0106 (-0.96) | -0.0117 (-0.81) |
| Constant | -1.1804*** (-2.69) | -1.3249*** (-2.67) | -1.2174*** (-2.94) | -0.9355** (-2.21) | -0.7494** (-2.46) | -1.0560** (-2.07) | -1.1676 (-0.81) |
| rss | | 1.53 | | 0.85 | | 1.28 | 1.32 |
| Log likelihood | 117.92 | 295.63 | | 316.15 | | | |
| r ² | | 0.1817 | 0.1916 | 0.6331 | 0.7584 | | |
| F | | 4.76*** | | 9.74*** | | | |
| χ ² | 67.55*** | | 41.82*** | | 430.73*** | 36.83*** | 26.01*** |
| ρ | | 0.7420 | 0.7171 | 0.6942 | 0.1356 | | |
| F-test (FE test) | | 16.54*** | | 4.17*** | | | |
| Hausman RE test | | | 7.01 | | 168.11*** | | |
| Sargen test | | | | | | 24.81 | |
| Observations | 258 | 258 | 258 | 229 | 229 | 190 | 190 |