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Dynamic Adjustment towards Target Capital Structure: Thailand Evidence

(Pelarasan Dinamik ke Arah Struktur Modal Sasaran: Bukti Thailand)

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ABSTRACT

By employing panel data, the present study examines the dynamic aspects of capital structure of 269 non-financial listed firms in Thailand from 2000 to 2009. This is a relatively new area in finance literature. The present study investigates the existence of target capital structure, speed of adjustment and factors affecting the speed of adjustment. The analyses are conducted using the dynamic Partial Adjustment Model (PAM) and estimated based on the Generalized Method of Moments. The results indicate the existence of target capital structure and firms undergone adjustment processes to be at their target capital structure from time to time with a considerably rapid speed of adjustment, consistent with the dynamic trade-off theory. Firms in Thailand are found to be under-adjusting, being below the required adjustment to be at the target within a year. Strong evidence exists that indicates that firm specific factors significantly influence speed of adjustment for firms in Thailand, such as distance from target, size of firm and profitability.

Keywords: Capital structure; partial adjustment model; speed of adjustment; generalized method of moments; Thailand

ABSTRAK

Dengan menggunakan data panel, aspek dinamik struktur modal 269 firma-firma bukan kewangan yang disenaraikan di Thailand telah dikaji bagi tempoh 2000-2009. Ini merupakan salah satu bidang yang agak baru dalam literatur kewangan. Kajian ini mengenal pasti kewujudan struktur modal sasaran, kelajuan pelarasan dan faktor-faktor yang mempengaruhi kelajuan pelarasan menggunakan Model Pelarasan Separa (PAM) dinamik dan dianggarkan berdasarkan kaedah Generalized Method of Moments. Kajian mendapati bahawa wujud struktur modal sasaran dan firma-firma melakukan peralarasan untuk berada di sasaran dari semasa ke semasa dengan kelajuan pelarasan yang pesat selaras dengan teori keseimbangan dinamik. Firma-firma di Thailand telah didapati terkurang-selaras iaitu di bawah tahap pelarasan yang diperlukan untuk berada di sasaran dalam tempoh setahun. Terdapat bukti-bukti kukuh menunjukkan beberapa faktor-faktor tertentu firma seperti jarak dari sasaran, saiz dan keuntungan firma secara ketara mempengaruhi kelajuan pelarasan bagi firma-firma di Thailand.

Kata kunci: Struktur modal; model pelarasan separa; kelajuan pelarasan; generalized method of moments*; Thailand*

INTRODUCTION

Capital structure has been concerned principal subject of concern in various theoretical and empirical studies in finance literature in past decades. The diverse results are hoped to offer alternatives to firms when making decisions regarding capital structure in a way that maximizes the value of the firms. Various studies attempt to advance the understanding of factors that influence the capital structure decisions of a firm, including Drobetz and Wanzenried (2006), Huang and Ritter (2009), Aybar-Arias et al. (2011). The models and the methodologies employed also continue to evolve in accordance with on-going developments in the capital structure studies. Capital structure theories appear to provide some assistance in understanding how the chosen financing mix affects the value of a firm. Fundamentally, three governing theories have been developed, studied and referred to in capital structure literature throughout the years. The trade-off theory states that optimal capital structure can be achieved if the net tax advantage of debt financing balances the leverage related costs (Myers 1977). The pecking order theory, on the other hand, emphasizes the hierarchical choices of financing (Myers & Majluf 1984), while the agency theory is derived from information asymmetries (Jensen & Meckling 1976).

DYNAMIC CAPITAL STRUCTURE

Extant studies examining the impact of firm specific and country specific factors on capital structure decisions have advanced the understanding of the financing behaviour of firms. Nevertheless, extant studies are performed under

static frameworks, which treat the observed leverage as optimal (Drobetz & Wanzenried 2006). However, a capital structure decision itself is dynamic by nature and should be examined using a dynamic framework. A dynamic model assumes a partial adjustment to the target capital structure, which appears to be more realistic. Therefore, using a dynamic model provides an advantage for estimating the target debt ratio because static capital structure models cannot account for this phenomenon since it assumes that firms are always at their target capital structure (Clark et al. 2009). Myers and Majluf (1984) suggest that the optimal level between the marginal costs and benefits of debt predicted by the static trade-off model may be different from the observed leverage ratio.

This dynamic trade-off theory has recently found strong support in capital structure literature (e.g., Jalilvand & Harris 1984; Fischer et al. 1989; Hovakimian et al. 2001; Flannery & Rangan 2006; Huang & Ritter 2009). Initial studies on dynamic trade-off recognise the existence of target capital structure, with some factors determining the existence of target capital structure, and later proceed to examine the magnitude of the speed of adjustment when firms diverge from target. Later literature examines the factors that influence the rebalancing process to achieve a target capital structure (e.g, see Flannery & Hankins 2007; Faulkender et al. 2008). Nonetheless, few studies concerning dynamic capital structure examine the issue in the context of emerging markets remain (Rasiah & Kim 2011), especially in relation to how fast firms in emerging markets rebalance following deviation from their targets. The lacuna includes Thailand, where few studies have been performed that examine dynamic capital structure and the factors influencing the speed of adjustment to target capital structure (e.g., see De Jong et al. 2008; Deesomsak et al. 2009; Law & Chong 2012; Tongkong 2012). Unlike extant studies examining such issues in the context of Thailand, the present study intends to fill the gap by measuring the speed of adjustment and determining the factors affecting the speed of adjustment using a dynamic framework. The present study contributes to existing literature by offering a new dimension of capital structure study that examines an emerging market. After examining the factors affecting the speed of adjustment, the findings from the present study will assist managers in Thailand to manage adjustment costs effectively, thus enabling such firms to attain the target capital structure for firm value maximization.

Throughout the empirical analysis, a set of determinants commonly used and cited in extant studies of capital structure will be utilized.[1] Similar to Jalilvand and Harris (1984), De Miguel and Pindado (2001), Hovakimian et al. (2001) and Drobetz and Wanzenried (2006), several explanatory variables are assumed to affect target capital structure. The robustness of the results are also tested using various alternative definitions of corporate capital structure.

The remainder of the paper is organized as follows. Next, a review of extant studies concerning dynamic capital structure is performed, followed by a discussion of the data and methodology employed in the present study. Later, the empirical analysis of the data is performed, followed by discussions of the results and findings. Finally, the last section concludes the present study.

PRIOR STUDIES ON DYNAMIC CAPITAL STRUCTURE

Extant studies on dynamic capital structure primarily explore issues pertaining to the existence of target leverage level and the adjustment speed of firms following deviation from target. Generally, extant studies examining the speed of adjustment conclude that firms partially adjust their capital structure to target and attempts are made by firms to achieve that target ratio with variant speeds of adjustment (Jalilvand & Harris 1984) depending upon the impact of the adjustment costs faced by the respective firm. Also, firm characteristics significantly affect the speed of adjustment in different ways across firms and over time.

Fischer et al. (1989) use the observed debt ratio range of a firm as an empirical measure of capital structure and conclude that their findings are consistent with the capital structure choice in a dynamic setting when adjustment costs are present. De Miguel and Pindado (2001) develop a target adjustment model and reveal that Spanish firms bear considerable transaction costs during the process of adjusting their debt ratio to achieve their target level and face relatively lower adjustment costs than US firms. Still in a dynamic model setup, Drobetz and Wanzenried (2006) reveal that institutional settings exert significant influence over capital structure adjustment behaviour. A well-developed financial market, an efficient legal system and well protected shareholders are positively related to the adjustment speed towards target capital structures.

The need to further understand the nature of the speed of adjustment leads to another aspect of the dynamism: the factors affecting the speed of adjustment to target capital structure. Examinations of how quickly firms readjust following deviation from their targets and the affecting factors of the speed of adjustment to target are the principal concerns of contemporary research (Huang & Ritter 2009). Aybar-Arias et al. (2011) acknowledge Banerjee et al. (2004), Loof (2004) and Drobetz and Wanzenried (2006) as among the significant studies concerning factors that affect the speed of adjustment to target capital structure. These studies commonly agree that the varying adjustment costs incurred by firms are the cause of the varying speed of adjustment across firms and time periods. An adjustment cost is the function of certain factors, including the size of the firm; growth opportunity; profitability; and the distance between the observed and optimal leverage ratios. Consequently, the adjustment speed is also influenced by the factors that affect adjustment costs.

Banerjee et al. (2004) postulate that factors that affect the speed of adjustment of firms include growth

opportunity; firm size; and the distance between observed and target leverage. The study, which examines firms in the US and the UK, reveals larger firms adjust towards target more promptly and firms with higher growth opportunities adjust much slower. While distance appears to be insignificant for the firms in the US, the relationship is found to be negatively significant for firms in the UK. Loof (2004) also argues that growth opportunity, size and distance between target and observed debt ratio affect adjustment speed. Additionally, Loof (2004) finds that firms in an equity capital dominated country adjust faster than debt dependent firms. Drobertz and Wanzenried (2006) denote that Swiss firms with rapid growth rates adjust more rapidly, as do those firms that are away from the target capital structure. This finding is similar to Heshmati (2001) and Nivorozhkin (2004).

Using the cash flow of the companies to explain the adjustment cost, Faulkender et al. (2008) find that firms with large positive cash flows have the liberty to choose their financing methods to rebalance. Firms with significantly negative cash flows, on the other hand, must raise utilise external financing to be able to adjust towards their target capital structure, which includes the issuance of securities. Faulkender et al. (2008) argue that firms, characterised by either positive or negative cash flows, will readjust rapidly provided suitable financing alternatives exist. The findings of Mukherjee and Mahakud (2010) support extant studies that find that certain factors determine the speed of adjustment for Indian manufacturing companies, such as size, growth opportunity and the distance between target and observed leverage.

Mahakud and Mukherjee (2011) further examine the factors affecting speed of adjustment among Indian manufacturing firms and conclude that ownership and macroeconomic conditions also have significant influences on the speed of adjustment to target capital structure. Camara (2012) investigates the impact of macroeconomic conditions on the speed of adjustment in a study comparing US-based multinational firms to domestic firms and finds that US-based multinational firms adjust faster in favourable macroeconomic conditions than domestic firms. Dang (2013) finds fast adjustment speeds among firms in the UK, France and Germany.

PAST STUDIES ON FACTORS AFFECTING SPEED OF ADJUSTMENT

The most commonly cited firm specific factors affecting the speed of adjustment within studies completed in the past decade are firm size; growth; profitability; and the distance between the observed leverage and target leverage. Drobetz and Wanzenried (2006) argue, in support of Heshmati (2001) and Loof (2004), large firms should be able to correct deviations from debt targets more easily because they have better access to public debt markets and have relatively lower adjustment costs. Large firms usually incur smaller fixed costs when changing their capital structures and adjust rapidly as a result. Such a conclusion is also supported by the findings of Mukherjee and Mahakud (2010). From the information asymmetry perspective, larger firms have a lower level of information asymmetry in the market, which allows such firms to secure financing from lenders (Padron et al. 2005). Thus, the larger the firm, the more financial resources the firm can obtain and the faster the speed of adjustment is expected to take place. Loof (2004) finds that this positive relationship suggests that larger firms place more priority on capital structure than smaller firms.

Conversely, Nivorozhkin (2004) examines transition economies and finds that firm size is inversely related to speed of adjustment. Nivorozhkin (2004) argues that the inverse relationship exists because of conservative policies among banks where lending to a larger firm is associated with higher lending exposure for a bank and thus limits the ability of larger firms to adjust at the same rate as smaller firms. Gonzalez and Gonzalez (2012), on the other hand, find that no indication of a significant difference in adjustment speed exists between large and small Spanish firms.

In regards to growth opportunity, growth firms are very much in need of external financing alternatives because growth firms are generally young firms with limited or near to negative operating income. Drobetz and Wanzenried (2006) argue that due to limited operating income, growth firms frequently turn to external financing to finance their investments. Therefore, altering the existing capital structure is much easier for growth firms as they can alter the composition of their external financing accordingly. Due to the argument put forward by Drobetz and Wanzenried (2006), growth is forecasted to positively correlate with leverage.

In relation to profitability, Myers and Majluf (1984) stress that internal financing should be more preferable than external financing. Accordingly, as more profits result in the greater availability of internal capital, an increase in the speed of adjustment to target capital structure is expected. Therefore, profitability is expected to correlate positively with speed of adjustment. If profitability provides sufficient funds for growth purposes, Myers (1977) notes that profitability removes internal constraints. Meanwhile, Hovakimian et al. (2001) state that profitability may increase the speed of adjustment. Flannery and Hankins (2007) state that positive free cash flow from profitable investments reduces the costs associated with external financing, which, in turn, may affect speed of adjustment. Mahakud and Mukherjee (2011) argue that the availability of cash flows increases financial stability and reduces the need for external financing, which, in turn, may result in a higher speed of adjustment.

Two distinct arguments exist concerning the distance between the observed leverage and target leverage; and the speed of adjustment. The first argument is that the speed of adjustment is expected to be positively related to the distance from target. If a major portion of

transaction costs stems from fixed costs (such as legal fees and investment bank fees), firms deviating from their target capital structure will adjust only when they are sufficiently far away from target capital structure (Drobetz & Wanzenreid 2006). The argument implies that the speed of adjustment is positively correlated with the distance between observed and target capital structure, where firms will only adjust once they significantly deviate from their target capital structure (Aybar-Arias et al. 2011). A similar positive relationship is also found by Heshmati (2001), Nivorozhkin (2004), Drobetz and Wanzenried (2006) and Mahakud and Mukherjee (2011).

Conversely, the second argument posits that the speed of adjustment is expected to be negatively related to the distance from target. This implies that firms adjust faster if their actual leverage is not far from target. According to Banerjee et al. (2004) and Drobetz and Wanzenried (2006), if the fixed costs of adjustments are excessively high, most adjustments may occur without transactions in external capital markets. If firms adjust internally, as opposed to using external financing, an inverse relationship is expected to exist between the distance between the observed leverage and target leverage; and the speed of adjustment. Banerjee et al. (2004), Loof (2004) and Aybar-Arias et al. (2011) find negative relationships between the speed of adjustment and the distance between the observed leverage and target leverage. Drobetz and Wanzenried (2006) add that sorting out between the two arguments concerning the influence of the distance between the observed leverage and target leverage on the speed of adjustment is an empirical matter.

DATA AND METHODOLOGY

The present study employs panel data consisting of 269 firms (not including firms in the financial sector, such as banks, finance companies and insurance companies). Data covering a 10-year period (2000-2009) is used and firm level data is extracted from Datastream. Only firms with a minimum of three consecutive observations towards the end of the period under study are included in the data set (Deesomsak et al. 2009). This means that the firms should be listed on the stock exchange from at least 2007. Table 1 presents the structure of the panel data on sample firms for the present study.

TABLE 1. Structure of the panel data

No. of annual observations for each firm	No. of records on each firm	No. of observations
3	3	9
4	2	8
5	1	5
6	6	36
7	25	175
8	22	176
9	16	144
10	194	1940
Total	269	2493

Note: Three annual observations refer to minimum listing period of 2007-2009.
Source: Datastream

The top 2.5% and bottom 2.5% of the outliers are removed from dataset leaving 2368 final observations. The method of removing outliers in both tails of the distribution is also adopted by, among others, Frank and Goyal (2003). A multicollinearity test on the dataset is performed by first performing the *R*-squared between variables and then examining the variance inflation factor (VIF), as suggested by Gujarati and Porter (2009: 340). No multicollinearity problems exist in the data since the VIFs of the variables are less than 10 (refer VIF in Table 3).[2]

MEASURES OF LEVERAGE

Four separate measures of leverage are used. Following Titman and Wessels (1988), leverage is defined as (1) the ratio of total debt to total assets; (2) long term debt to total assets (book value basis); (3) total debt to total debt plus total equity; and (4) long term debt to total debt plus total equity (market value basis). However, debt is valued at its book value since data on the market value of debt is not available. The measures of leverage at book value and market value are used to check the robustness of the results obtained during the present study.

DETERMINANTS OF LEVERAGE

Thirteen explanatory variables are incorporated and divided according to firm and country specific. Country specific variables are incorporated in the present study because literature notes that country specific variables, as well as firm specific variables, have a significant influence on leverage (De Jong et al. 2008). The selection of variables and proxies employed in the present study are adopted from extant literature. Table 2 summarises

TABLE 2. Explanatory variables and proxies

No.	Explanatory Variable	Proxy
Firm Specific:		
1	Non-Debt Tax Shield	Annual Depreciation Expenses over Total Assets
2	Tangibility	Net Fixed Asset over Total Asset
3	Profitability	EBIT over Total Assets
4	Business Risk	Yearly Change of EBIT (EBIT1-EBIT0)
5	Firm Size	Natural Logarithm of Total Asset
6	Growth Opportunities	Market Value of Equity to Book Value of Equity
7	Liquidity	Current Assets over Current Liabilities
8	Share Price Performance	First Difference of the Year End Share Price
Country Specific:		
9	Stock Market Development	Stock Market Capitalization over GDP
10	Bond Market Development	Total Bond Market Capitalization over GDP
11	Economic Growth	Annual Percentage Changes in GDP
12	Interest Rates	Lending Rate
13	Country Governance	Aggregate Governance Indicators comprising of six indicators (voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption)

the explanatory variables and proxies used in the present study.

FACTORS AFFECTING SPEED OF ADJUSTMENT

In accordance with extant literature, four firm specific variables incorporated in the present study are forecasted to have an impact on the speed of adjustment to target capital structure for firms in Thailand: the size of the firm; growth opportunity; profitability; and the distance between observed leverage and target leverage.

MODEL SPECIFICATIONS

The present study specifies a dynamic panel data model to analyse the impact of adjustment costs and verify the existence of target leverage among firms in Thailand. Based upon the approach employed in the the Partial Adjustment Model (Drobetz & Wanzenried 2006), the present study assumes that the optimal leverage ratio for a firm is a function of sets of explanatory variables, as denoted in Equation (1):

$$Y_{it}^{*} = F(X_{it}, X_i, X_t) \tag{1}$$

where Y_{it}^{*} is the optimal leverage ratio of firm i at time t; X_{it} is a vector of firm and time variant determinants of the optimal leverage; and X_i and X_t are unobservable firm specific and country specific effects, respectively, that are common to all firms and can change through time. In a perfect market with no adjustment costs, a firm would immediately respond with a complete adjustment to variations in the independent variables by varying its existing leverage ratio to equalize its optimal leverage. Thus, at any point in time, the observed leverage of firm i at time t (Y_{it}) should be equal to the optimal leverage (i.e., $Y_{it} = Y_{it}$), which implies that $Y_{it} - Y_{it-1} = Y_{it}^{*} - Y_{it-1}$. However, the existence of significant adjustment costs permits only partial adjustment to take place and is represented by a partial adjustment model, as denoted in Equation (2):

$$Y_{it} - Y_{it-1} = \delta_{it}\,(Y_{it}^{*} - Y_{it-1}) \tag{2}$$

where δ_{it}, is the speed of adjustment which represents the rate of convergence of Y_{it} to its optimal value. The effects of adjustment costs are represented by the restriction that $|\delta_{it}| < 1$, which is a condition that $Y_{it} \rightarrow Y_{it}^{*}$ as $t \rightarrow \infty$. Since δ_{it} represents the speed of adjustment, equation (2) explains the adjustment speed depending upon the respective adjustment parameter value. The behaviour of a firm can be represented as follows:

$$Y_{it}^{*} = \sum_{n=1}^{N} \beta_k X_{kit} + \varepsilon_{it} \tag{3}$$

Combining Equation (2) and (3), the following equations are derived:

$$Y_{it} = Y_{it-1} + \delta_{it}\,(Y_{it}^{*} - Y_{it-1}) \tag{4}$$

$$Y_{it} = Y_{it-1} + \delta_{it}\,Y_{it}^{*} - \delta_{it}\,Y_{it-1} \tag{5}$$

$$Y_{it} = (1-\delta_{it})Y_{it-1} + \delta_{it}\left(\sum_{n=1}^{N} \beta_k X_{kit} + \varepsilon_{it}\right) \tag{6}$$

$$Y_{it}^{*} = (1-\delta_{it})Y_{it-1} + \sum_{n=1}^{N} \delta_{it}\beta_k X_{kit} + \delta_{it}\varepsilon_{it} \tag{7}$$

To simplify, Equation (7) can also be written as follows:

$$Y_{it}^{*} = \lambda_0 Y_{it-1} + \sum_{n=1}^{N} \lambda_k X_{kit} + \mu_t \tag{8}$$

where $\lambda_0 = 1 - \delta_{it}$, $\lambda_k = \delta_{it}\beta_k$, and $\delta_{it}\varepsilon_{it} = \mu_{it}$ (where μ_{it} has the same properties as ε_{it}).

Equation (8) is the dynamic capital structure model of which this study is intended to estimate using the Generalized Method of Moments (GMM) technique suggested by Arellano and Bond (1991). The model is expanded to study the factors affecting the speed of adjustment to the target leverage. To enable the examination of the factors affecting the speed of adjustment, the present study adopts the methodology of Drobetz and Wanzenried (2006) because the study is considered to be one of the most important studies in the field, as highlighted by Aybar-Arias et al. (2011). The same methodology is also adopted by in other extant research (e.g., Mukherjee & Mahakud 2010; and Aybar-Arias et al. 2011). Following Drobetz and Wanzenried (2006), the distance between observed leverage and target leverage is defined as the absolute difference between target leverage and observed leverage, $| Lev^*_{i,t} - Lev_{i,t} |$, where $Lev^*_{i,t}$ (target leverage), which is unobservable, is derived from the fitted value of the fixed effect regression line of leverage of firm *i* on the capital structure firm-specific determinants as of time *t*, while $Lev_{i,t}$ is the observed leverage from the data set employed in the present study.

To explain the factors affecting the speed of adjustment, it is assumed that δ_{it} varies over time and is itself a linear function of a constant term and some predetermined explanatory variables. A determinant variable of the speed of adjustment, which is labelled as Z_{it}, is a firm specific variable.

$$\delta_{it} = \alpha_0 + \alpha_k Z_{it} \tag{9}$$

Rewriting the target adjustment model in Equation (4) by treating target leverage, Y^*_{it}, as linearly dependent from the capital structure determinants as specified in Equation (3) and substituting the linear specification for adjustment speed, δ_{it}, from Equation (9) yields the following expression for the leverage ratio at time *t*:

$$Y_{it} = \delta_{it}Y^*_{it} + (1 - \delta_{it})Y_{it-1} + \varepsilon_{it} = (1 - \alpha_0 - \alpha_k Z_{it}) Y_{it-1} + (\alpha_0 + \alpha_k Z_{it})\left(\sum_{n=1}^{N}\beta_k X_{kit}\right) + \varepsilon_{it} \tag{10}$$

where ε_{it} is a statistical error term with mean zero and constant variance. Multiplying Equation (10) and taking into consideration that all estimations are carried out with panel data, Equation (11) is obtained, which is the subject of the present empirical investigation.

$$Y_{it} = (1 - \alpha_0)Y_{it-1} - \alpha_k Z_{it}Y_{it-1} + \alpha_0\sum_{n=1}^{N}\beta_k X_{kit} + \alpha_k\sum_{n=1}^{N}\beta_k Z_{it}X_{kit} + \varepsilon_{it} \tag{11}$$

When equation (11) is estimated, interest is primarily in α_k parameters, which is the coefficient of the interaction term between the determinant variable of adjustment speed and lagged leverage (i.e., $Z_{it}Y_{it-1}$). The null hypothesis is that, $\alpha_k = 0$, which indicates that the firm specific variable has no influence on the adjustment speed if the null hypothesis is accepted.

EMPIRICAL RESULTS

Table 3 records the results according to the various leverage definitions as reported by the GMM estimators. The present study adopts three standard diagnostic tests designed to detect problems with GMM estimation arising from a lack of joints significance (Wald test); the validity of instruments (*J*-statistic); and autocorrelations of the residuals (AR2). Two definitions are found that satisfy the diagnostic tests: Lev2 (long term debt at book value) and Lev3 (total debt at market value). If more than one estimator satisfies the test, the most preferred estimator will be determined based upon the R^2 between the actual value and the fitted value of the residuals of the model, as suggested by Driffield and Pal (2010). After computing the *R*-squared among the models, Lev2 and Lev3 yield *R*-squared values of 0.3027 and 0.4053, respectively. Therefore, Lev3 is employed to explain the dynamic capital structure of firms in Thailand.

TABLE 3. Generalized Method of Moments (GMM) – first difference

(N = 2368) Independent Variable	Book Value		Market Value		
	Lev1	Lev2	Lev3	Lev4	VIF
Lev(-1)	0.7196***	0.6937***	0.3590***	0.3193***	
	[5.9748]	[5.4157]	[5.6137]	[4.2039]	
NDTS	-0.3102	-0.3609**	0.0073	-0.1967	1.040
	[-0.7532]	[-2.2800]	[0.0211]	[-1.1588]	
TANG	0.0128	-0.0001	0.0145	-0.0030	1.394
	[0.9185]	[-0.0139]	[1.1371]	[-0.4366]	
PROFIT	-0.3654***	-0.1481	-0.2301***	-0.0487*	1.058
	[-3.2063]	[-1.5370]	[-3.4467]	[-1.7292]	

Continued

Continue

(N = 2368) Independent Variable	Book Value		Market Value		
	Lev1	Lev2	Lev3	Lev4	VIF
RISK	0.0001	0.0001	-0.0002	0.0001	1.009
	[0.4936]	[1.2758]	[-1.1258]	[0.6607]	
SIZE	0.1266***	0.0289	0.1730***	0.0453***	1.115
	[2.6368]	[1.4771]	[4.7098]	[2.5255]	
GROWTH	0.0001	-0.0003	0.0001	-0.0003	1.010
	[0.3356]	[-1.0837]	[0.3905]	[-1.3168]	
LIQUIDITY	-0.0010	0.0026	-0.0014	0.0023	1.081
	[-0.7397]	[1.2322]	[-0.9719]	[1.5258]	
SPP	0.0002***	0.0000***	-0.0005***	0.0000	1.008
	[3.0442]	[-2.5281]	[-7.2677]	[-1.1132]	
STOCK MKT	-0.0006	-0.0005*	-0.0024***	-0.0014***	5.372
	[-1.5446]	[-1.6140]	[-6.4283]	[-3.7503]	
BOND MKT	0.3501	0.1724	-0.5516**	-0.3915*	8.333
	[1.5806]	[0.7648]	[-2.3518]	[-1.6845]	
ECONOMIC	0.0149*	0.0092	-0.0035	-0.0018	6.667
	[1.8005]	[1.2860]	[-0.4163]	[-0.2557]	
INTEREST	0.0054	-0.0022	-0.0321***	-0.0184***	3.644
	[0.8662]	[-0.3795]	[-3.8234]	[-2.5288]	
GOVERNANCE	0.1711**	0.1157	-0.2213***	-0.0926	7.143
	[2.2914]	[1.4910]	[-2.4538]	[-1.0351]	
R^2	0.2776	0.3027	0.4053	0.1637	
1st Order Cor.	-0.2363***	-0.3063***	-0.2850***	-0.3208***	
2nd Order Cor.	-0.0659**	0.0029	0.0413	0.0250	
Wald (joint) χ^2	90.7645***	177.3935***	424.5110***	159.6277***	
J-Statistic	60.4067***	28.8222	32.2300	122.3711***	

Notes:

1. Each variable is in its first difference. Asterisks ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. The t-statistics in parentheses are the t-values adjusted for Whites heteroscedasticity consistent standard errors. Wald test statistic refers to the null hypothesis that all coefficients on the determinants of the target debt ratio are jointly equal zero. Second order correlation, AR(2), refers to the null of no second order correlation in the residuals. The J test statistic represents the null hypothesis that the over identifying restrictions are valid.
2. Leverage Definitions: Book Value Leverage [Lev1 = Total Debt/Total Asset; Lev2 = Long Term Debt/Total Asset; Market Value Leverage [Lev3 = Total Debt/(Total Debt + Total Equity); and Lev4 = Long Term Debt/(Total Debt + Total Equity).
3. The independent variables are NDTS = Non-Debt Tax Shield; TANG = Tangibility; PROFIT = Profitability; RISK = Business Risk; SIZE = Firm Size; GROWTH = Growth Opportunities; LIQUIDITY = Liquidity; SPP = Share Price Performance; STOCK MKT = Stock Market Development; BOND MKT = Bond Market Development; ECONOMIC = Economic Growth; INTEREST = Lending Rates; and GOVERNANCE = Country Governance.

EXISTENCE OF TARGET AND SPEED OF ADJUSTMENT TO TARGET CAPITAL STRUCTURE

Table 3 shows the estimated coefficient of the lagged leverage is significant (p = 0.01), which indicates the existence of target leverage for firms in Thailand. These firms adjust to long term targets leverage from time to time, but they are under-adjusting (i.e., $\delta < 1$ at the speed of 0.6410 ($\delta_{it} = 1 - \lambda_0$)). The speed of adjustment explains how quickly firms converge to their optimal capital structure (Clark et al. 2009). To elaborate further, the speed of adjustment can also be converted in 1.56 years ($1/\delta_{it}$) or 0.67 year [$ln0.5/ln(1\text{-}\delta)$] (Huang & Ritter 2009; Mukherjee & Mahakud 2010). This concludes that Thailand firms close the gap between current and target leverage by 64.10% within one year. This is equivalent to 1.56 year to fully reach the target or 0.67 year to reach half of the target from the current leverage level. Such a rapid adjustment towards target leverage suggests the applicability of dynamic trade-off theory (Flannery & Rangan 2006; Mukherjee & Mahakud 2010). Clark et al. (2009) conclude that, consistent with the dynamic trade-off theory, the faster the adjustment takes place, the greater the expected benefits of closing the gap with the target capital structure will be. Tongkong (2012) finds a similar speed of adjustment of 0.63 among real estate companies in Thailand.

FACTORS AFFECTING SPEED OF ADJUSTMENT

Referring to the empirical results presented in Table 4, Equation (11) in the methodology section specifies a negative sign on the coefficient of the interaction term between Lev(-1) and firm specific determinants (i.e., $-Z_{it}Y_{it-1}$). Therefore, the signs of the estimated coefficients on the respective interaction terms must be interpreted accordingly. In relation to this result, a negative sign in the interaction term as shown in the regression output implies a positive relationship and a positive sign, implies a negative relationship, as stated by Drobetz and Wanzenried (2006), Mukherjee and Mahakud (2010) and Aybar-Arias et al. (2011).

TABLE 4. Firm specific factors affecting speed of adjustment

Independent Variable	Total Debt/(Total Debt + Total Equity)
Lev(-1)	-2.2973** [-2.1890]
Lev(-1) × Distance	0.7089*** [4.7825]
Lev(-1) × Size	0.1201* [1.7832]
Lev(-1) × Growth	0.0002 [0.8617]
Lev(-1) x Profit	-0.5638*** [-2.9714]
1st Order Correlation (AR1)	0.095***
2nd Order Correlation (AR2)	0.1140
Wald(Joint)χ^2	51.9552***
J-Statistic	35.6326
No. of Observations (N)	2368

Notes:
1. $Lev_{i,t} = Lev(-1)_{i,t} + \beta 1\ Lev(-1)_{i,t} \times Distance_{i,t} + \beta 2\ Lev(-1)_{i,t} \times Size_{i,t} + \beta 3\ Lev(-1)_{i,t} \times Growth_{i,t} + \beta 4\ Lev(-1)_{i,t} \times Profit_{i,t} + \varepsilon_{i,t}$.
2. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.
3. *t*-statistics in parentheses are the *t*-values adjusted for Whites heteroscedasticity consistent standard errors.
4. The Wald test statistic refers to the null hypothesis that all coefficients on the determinants of the target debt ratio are jointly equal zero. Second order correlation, AR(2), refers to the null of no second order correlation in the residuals. The *J* test statistic represents the null hypothesis that the over identifying restrictions are valid.

Firm size is found to be inversely related to the speed of adjustment for firms in Thailand ($p = 0.10$). This finding does not confirm the argument put forward by Drobetz and Wanzenried (2006) that larger firms adjust faster due to easy access to debt financing, which indicates a positive relationship. However, a similar negative relationship is also documented by Nivorozhkin (2004), who argues that the inverse relationship exists because of the conservative policies of banks where lending to larger firms is associated with higher lending exposure for a bank and limits the ability of larger firms to adjust at the same rate as smaller firms.

A significant positive relationship ($p = 0.01$) is found between profitability and the speed of adjustment. This finding confirms those of Loof (2004), Mukherjee and Mahakud (2010) and Mahakud and Mukherjee (2011). Higher profits indicate a greater availability of internal financing, which eventually increases the speed of adjustment to target capital structure through internal financing. When we do regression between profitability with leverage (refer Table 3), a negative relationship is found to exist between profitability and leverage ($p = 0.01$). The finding validates the interrelationship found in extant literature between profitability, leverage and speed of adjustment. The higher the profit of the firm, the more internal funding is available to the firm. As a result, such a firm has a lower demand for outside financing (i.e., debt financing), which eventually results in a faster adjustment speed.

A negative relationship ($p = 0.01$) is found to exist between the distance between the observed leverage and target leverage; and the speed of adjustment. The finding implies a closer the gap in the distance between the observed leverage and target leverage results in a faster adjustment speed. The results also indicate that firms in Thailand readjust faster because the benefit of being at target is greater than adjustment costs. Banerjee et al. (2004) and Drobetz and Wanzenried (2006) also argue if the fixed costs of adjustments are excessively high, most adjustments may occur without transactions in external capital markets. As a result, firms readjust using internal financing as opposed to external financing. Therefore, the

positive relationship between profitability and the speed of adjustment noted previously complements the negative relationship between the distance between the observed leverage and target leverage and the speed of adjustment among firms in Thailand. The same negative relationship is also recorded by Banerjee et al. (2004), Loof (2004) and Aybar-Arias et al. (2011).

However, results concerning growth are insignificant and do not allow for further interpretation. Hence, the commonly held view that growing firms find it easier to change their capital structure by altering the composition of the new capital they raise cannot be confirmed in the case of firms in Thailand.

CONCLUSION

The present study investigates whether target capital structure exists among firms in Thailand; and, if so, what is the rate of its speed of adjustment and what are the factors that influence the adjustment speed? The findings from the present study enrich existing literature on dynamism in emerging markets, particularly Thailand. The partial adjustment model is employed to examine capital structure dynamic with estimation performed based upon GMM estimator. The dynamic adjustment model enables the examination of the existence of target capital structure; the magnitude of the adjustment speed when the capital structure of a firm deviates from its target; and the factors affecting the adjustment speed of 269 non-financial firms in Thailand firms between 2000 and 2009.

The results demonstrate the convergence towards target leverage for firms in Thailand and firms adjust to long term target leverage. Firms deviating from target capital structure will undergo rebalancing processes from time to time to be as close as possible to, if not attaining, the target. While results indicate that firms in Thailand under-adjust, the present study also reveals that the adjustment rate, with the magnitude of 0.641, implies a rapid speed of readjusting to their respective targets. Firms in Thailand are found to take 1.56 years to reach their target leverage. Such adjustment towards the target leverage suggests the applicability of dynamic trade-off theory. The present study also investigates factors affecting speed of adjustment, a relatively new area in the study of dynamism. The present study finds strong evidence that firm size, profitability and the distance between the observed leverage and target leverage have significant influence on the speed of adjustment of firms in Thailand.

The findings of the present study are expected to shed some lights to future researchers and managers in Thailand when making decisions concerning the capital structure of their respective firms. The findings in the present study contribute to the existing literature by filling the gap concerning the capital structure of firms in emerging markets, particularly that of Thailand.

ENDNOTES

1 The present study does not intend to give equal attention to the relationship between determinants and leverage because many of the findings are generally consistent with related extant studies examining Thailand, including De Jong et al. (2008); Deesomsak et al. (2009) and Law and Chong (2012). As a result, little purpose would be served with long discussions of findings would effectively repeat what is already present in existing literature. Instead, the present study focuses on analysing the factors affecting speed of adjustment among firms in Thailand.

2 Gujarati and Porter (2009: 340) state that, as a rule of thumb, if the variance inflation factor (VIF = $1/(1-r^2_{23})$ of a variable exceeds 10, which will happen if R^2_j exceeds 0.90 (that is, $R_j = 0.95$), that variable is said to be highly collinear. The present study concludes that no concern exists regarding multicollinearity among the set of explanatory variables since the VIFs of all variables are less than 10.

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