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Islam Abdeljawad, Fauzias Mat Nor,

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The capital structure dynamics of Malaysian firms: timing behavior vs adjustment toward the target

Islam Abdeljawad
An-Najah National University, Nablus, Palestinian National Authority, and
Fauzias Mat Nor
Faculty of Economics and Muamalat, Universiti Sains Malaysia, Nilai, Malaysia

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Abstract

Purpose – The purpose of this paper is to investigate how the timing behavior and the adjustment toward the target of capital structure interact with each other in the capital structure decisions. Past literature finds that both timing and targeting are significant in determining the leverage ratio which is inconsistent with any standalone framework. This study argues that the preference of the firm for timing behavior or targeting behavior depends on the cost of deviation from the target. Since the cost of deviation from the target is likely to be asymmetric between overleveraged and underleveraged firms, the direction of the deviation from the target leverage is expected to alter the preference toward timing or targeting in the capital structure decision.
Design/methodology/approach – This study used the GMM system estimators with the Malaysian data for the period of 1992-2009 to fit a standard partial adjustment model and to estimate the speed of adjustment (SOA) of capital structure.
Findings – This study finds that Malaysian firms, on average, adjust their leverage at a slow speed of 12.7 percent annually and this rate increased to 14.2 percent when the timing variable is accounted for. Moreover, the SOA is found to be significantly higher and the timing role is lower for overleveraged firms compared with underleveraged firms. Overleveraged firms seem to find less flexibility to time the market as more pressure is exerted on them to return to the target regardless the timing opportunities because of the higher costs of deviation from the target leverage. Underleveraged firms place lower priority to rebalance toward the target compared with overleveraged firms as the costs of being underleveraged are lower and hence, these firms have more flexibility to time the market.
Research limitations/implications – The findings of this study support that firms consider both targeting and timing in their financing decisions. No standalone theory can interpret the full spectrum of empirical results. The empirical work is based on partial adjustment model of leverage; however, this model has been criticized by inability to distinguish between active adjustment behavior and mechanical mean reversion. This is an avenue for future research.
Originality/value – This study investigates if targeting and timing behaviors are mutually exclusive as theoretically expected or they can coexist. A theoretical explanation and an empirical investigation support the conclusion that firms consider both targeting and timing in their financing decisions. This study provides evidence from Malaysian firms that are characterized by concentrated ownership structure and separation of cash flow rights and control rights of the firm due to pyramid ownership structure. Therefore, it provides evidence on how environmental characteristics may affect the capital structure determinants of the firm.

Keywords Speed of adjustment, Dynamic capital structure, GMM system, Trade-off theory, Market timing theory

Paper type Research paper

1. Introduction

Equity market timing and trade-off theories get an increasing interest in the capital structure literature for the entire last decade. Market timing theory (Baker and Wurgler, 2002) suggests that firms can recognize times of mispricing of their own stock and time their issuing (repurchasing) activity accordingly. In this theory, firms are indifferent toward any target leverage and no steady adjustment toward any target should be noticed. Instead, changes in leverage are largely dominated by successive timing activities. On the other hand, the trade-off theory includes a family of models, both static and dynamic, in which firms attempt to balance the advantages against the costs associated with borrowing by

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keeping the leverage ratio at a certain target level (Baxter, 1967; Jensen and Meckling, 1976; Leary and Roberts, 2005). In the dynamic version of trade-off theory, any deviation from the target leverage is costly and requires a quick action to adjust to the target.

One important aspect that can differentiate between the timing and trade-off theories is by the estimation of the speed of adjustment (SOA) toward the target (Huang and Ritter, 2009). While trade-off theory expects high SOA, timing theory expects, basically, no adjustment. The other aspect for differentiating between the two theories is that trade-off theory is built on rational expectation assumption; mispricing is not expected to play a role as a capital structure determinant, while it is the main determinant in timing theory. However, literatures find that both timing and targeting motives actually exist at the same time which depart from the prediction of any standalone theory (Graham and Harvey, 2001; Huang and Ritter, 2009; Kayhan and Titman, 2007). How the two motives interact in the decision-making process remains largely unknown. Moreover, recent literature indicates that adjustment behavior is not homogenous across firms, i.e. no single SOA can fit all firms. A more reasonable approach to investigate the adjustment behavior is to use multiple SOA's (Clark *et al.*, 2009; Flannery and Hankins, 2007; Lemmon *et al.*, 2008; Dang *et al.*, 2014). Whether the firm is overleveraged or underleveraged is one of the aspects that are found to affect the SOA (Clark *et al.*, 2009; Lemmon *et al.*, 2008; Dang *et al.*, 2014). Overleveraged firms are found to have high SOA compared with underleveraged firms. The asymmetry in the SOA is interpreted as a result of the asymmetry in the costs of deviation from the target (Flannery and Hankins, 2007).

This study will investigate the adjustment behavior of Malaysian firms and how the accounting for timing behavior affects this adjustment. Malaysian firms are characterized by concentrated ownership structure (La Porta *et al.*, 1999) and separation of cash flow rights and control rights of the firm due to pyramid ownership structure (Claessens *et al.*, 2000; Bany-Ariffin *et al.*, 2010). Pyramid ownership structure maintains control over a firm in the hand of the largest shareholders even with a small ownership portion. This ownership structure may affect the difference between the cost of internal and external equity (Högfeldt and Oborenko, 2005) since outside shareholders are likely to demand compensation for the agency costs associated with new shares. Issuing new equity is costly in this case and market timing is less likely to occur. However, protecting shareholder rights may reduce the agency costs between external and internal shareholders (La Porta *et al.*, 1998, 2000) and, as a result, the wedge between the cost of external and internal equity is likely to be minimized. Shareholder rights in Malaysia are relatively good (La Porta *et al.*, 1998). It is still unknown how environmental characteristics may affect the capital structure determinants of the firm. Myers (2003) calls for exporting capital structure theories to developing countries, where the agency and information problems are more serious, in order to better understand the behavior of firm financing. Rajan and Zingales (1995) state that "[w]ithout testing the robustness of these findings outside the environment in which they were uncovered, it is hard to determine whether these empirical regularities are merely spurious correlations, let alone whether they support one theory or another" (Rajan and Zingales, 1995, p. 1421).

Moreover, this study will investigate if targeting and timing behaviors are mutually exclusive as theoretically expected or they can coexist. Timing is considered by the firm as an opportunity to reduce the cost of capital that will compete with the costs and benefits associated with using debt. A deviation from the target is costly and should be transitory since the firm is supposed to actively close the deviation back to the target to reduce the cost of deviation (Zhou *et al.*, 2016). However, the adjustment required to return to the target is itself costly (i.e. underwriter costs). In the presence of adjustment costs, rebalancing only takes place once the cost of deviation from the target is higher than the cost of adjustment. On the other hand, if the cost of deviation is higher than the benefits from timing, the firm will prioritize rebalancing the deviation back to the target despite the market conditions.

If the cost of deviation is small, relative to the benefits of timing, the firm will have room to watch the market and capture any timing opportunity. Given that the adjustment behavior depends on the difference between the cost of deviation and the cost of adjustment and that the cost of deviation is higher for overleveraged firms than underleveraged firms, the benefits of timing are more likely to outweigh the net cost of deviation for underleveraged firms more than that of overleveraged firms. Firms that are above the target will put higher priority to adjust than to exploit timing opportunities. For firms that are underleveraged, adjusting may not be a priority and firms are more likely to exploit the timing opportunities as they appear. This timing asymmetry is likely to continue in the long run since the firm is less active rebalance the short run timing effect once it is underleveraged compared with being overleveraged. The findings of Baker and Wurgler (2002) that timing activities drive the leverage ratio may be specific to underleveraged firms if this hypothesis holds.

The findings of this research will add more insight to the capital structure dynamics. The suggested interaction between timing behavior and targeting behavior in determining the capital structure of the firm is new. This study contributes to the literature by shedding more light on one possible interpretation for the otherwise apparent as contradicted results in the past literature. The new interpretation proposes that motives of timing and targeting are likely to coexist, but with different weights for firms above and below the target. While overleveraged firms are more likely to adjust faster, the underleveraged firms are expected to be better timers. This asymmetric behavior of timing is a result of the asymmetry of the costs and benefits associated with both motives. Moreover, this study will address the estimation problems highlighted in previous literature by using GMM system approach of Blundell and Bond (1998) which is found to be less biased than other estimators in the case of weak instruments, short time dimension and large number of cross-sections as typically the case of capital structure research. This estimator is recent to the Malaysian capital structure research and the results may improve the understanding of the way firms make financing decisions.

2. Background

Adjustment toward the target leverage is a behavior expected by a set of capital structure theories that assume the existence of a target leverage and that the deviation from the target is costly. Examples of these theories include trade-off theory (Baxter, 1967; Kraus and Litzenberger, 1973), agency theory (Jensen and Meckling, 1976) and free cash flow theory (Jensen, 1986). Extant literature generally supports the existence of long-run target leverage and agrees on the notion that a typical firm adjust to that target gradually at a certain SOA but the magnitude of this SOA is not a settled issue (Frank and Goyal, 2007). Extreme finding of high SOA of about 80 percent yearly is found by De Miguel and Pindado (2001) while no adjustment is found by Baker and Wurgler (2002). Alti (2006) and Flannery and Rangan (2006) both documented a relatively rapid SOA which they interpreted in favor of trade-off theory. In contrast, Fama and French (2002) and Kayhan and Titman (2007) find only slow SOA which indicates that trade-off factors may be only secondary aspects in the capital structure decisions.

In timing theory, leverage ratio is driven solely by the mispricing of the firm's equity, whether real or just perceived by the managers of the firm. Timing theory assumes that the firm is indifferent toward any level of leverage since no target is assumed. Obviously, this theory departs from the rational expectation assumption to allow the mispricing of equity to consistently affect the leverage ratio. The prediction of timing theory of capital structure is supported internationally (Baker and Wurgler, 2002; Mahajan and Tartaroglu, 2008) and for Malaysia (Abdeljawad and Mat Nor, 2011).

If one motive drives the dynamism of capital structure, the effect of the other motives will vanish once the right motive is accounted for properly (Flannery and Rangan, 2006).

However, current literature supports that both targeting and timing motives may coexist. The survey evidence of Graham and Harvey (2001) finds that both targeting and timing are taken into consideration in the financing decisions. Managers consider the amount of overvaluation or undervaluation as a key determinant in the decision to issue common stock. Moreover, the increase in the price of common stock is found to be among the top reasons for issuing common stock. At the same time, about 81 percent of the managers agreed that they have some kind of target leverage. However, the target is strictly defined for only 10 percent while 34 percent have a targeted range and another 37 percent have flexible target. The survey findings of Graham and Harvey (2001) have been supported later by firm level studies. Huang and Ritter (2009) find that firms finance larger amount of the financing deficit using external equity when the cost of equity is lower. At the same time, they find that firms adjust to the target at a rate of 17 percent. Kayhan and Titman (2007) find that stock price history affects the debt ratio for about 10 years consistent with the timing theory. However, part of this effect is gradually reversed since debt ratios tend to adjust toward target debt ratio but at a slow rate.

The findings of these studies are hardly reconciled with just one capital structure theory. This study proposes that timing and targeting are not mutually exclusive. Timing benefits are opportunities to reduce the cost of equity by an amount equal to the difference between the intrinsic value and the market value of the stock. Each 1 percent of overvaluation of the stock issued leads to 1 percent reduction in the cost of equity. The benefit of market timing can be considered as an additional factor in a broad dynamic trade-off framework. In the dynamic trade-off framework, adjustment behavior depends on the cost of deviation from the target and the costs of adjustments toward the target. Adjustments take place only if the cost of deviation is larger than the cost of adjustment so the net of these two costs drive the capital structure decisions (Leary and Roberts, 2005). In the proposed framework, the benefits of timing are taken into account in the capital structure decision as an additional factor that is offset with the net cost of deviation. Assuming that the net cost of deviation is positive, if the benefit of timing is higher than the net cost of deviation, the firm will exploit the timing opportunity. If the net cost of deviation is larger than the timing benefit, the firm will adjust whatever the market valuation of the firm is. This view is consistent with DeAngelo and Roll (2015) who argue that leverage dynamism can be replicated by models with time varying target leverage ratios that change a lot over time, target zones with flexible boundaries that allow wide leverage variation, or speeds of adjustment to stationary target ratios of around 15 percent per year. The evidence is not enough to conclude that any one is doing better than the other. They suggest that firms have target leverage zones with: leverage dynamics inside the zone driven by factors not directly related to leverage; and rebalancing incentives that are operative when leverage falls outside the zone.

The adjustment behavior is not homogenous across all firms. The SOA varies across firms directly with the variation in the costs and benefits of being at the target, for instance the higher probability of distress leads to faster adjustments since it implies that the cost of deviation is high (Flannery and Hankins, 2007; Clark *et al.*, 2009; Dang *et al.*, 2014). Past literature finds that overleveraged firms face higher costs of deviation and should adjust faster compared with underleveraged firms. The heterogeneity between firms that are overleveraged and those are underleveraged is documented by Clark *et al.* (2009), Lemmon *et al.* (2008). This asymmetry in the SOA is interpreted as a result of the asymmetry in the costs of deviation from the target where the costs of deviation are likely to be higher for overleveraged firms than underleveraged firms.

The costs of deviation above the target include the increased probability of financial distress which lead to higher borrowing rates and more restrains on new debt for overleveraged firms. In addition, agency problems between debt-holders and shareholders may be deepening for these firms (Jensen and Meckling, 1976; Myers, 1977). As a result, the total cost of deviation is expected to be high and to intensify rapidly as the deviation above the target increases more.

Of course, there are costs to be underleveraged as well. The underleveraged firm may lose the tax advantage of debt financing and it may lack the role of debt as a manager disciplining device (Jensen, 1986). However, there is evidence that these costs are lesser for underleveraged firms than overleveraged firms. The zero leverage phenomenon studied by Strebulaev and Yang (2013) indicates that being underleveraged is not costly to many firms. About 9 percent of all US firms over the period from 1962 to 2002 have zero debt and almost one quarter of the firms have less than 5 percent debt. Moreover, the tax shield substitutes may reduce the tax advantages of debt for many firms (Deangelo and Masulis, 1980). The costs of deviation below the target are then lower and increase slowly as the deviation below the target increase compared to the rapid increase of the costs associated with being overleveraged.

If the costs of deviation for overleveraged firms are higher than the costs for underleveraged firms and the net cost of deviation is competing with the benefits of timing in the decision making, then underleveraged firms are likely to exploit more timing opportunities than overleveraged firms. Timing opportunities for underleveraged firms can outweigh the net cost of deviation more often compared with overleveraged firms. In sum, the firm will exploit more timing opportunities once it is underleveraged and it will not rush to adjust toward the target after that since the cost of deviation from the target is low. If the firm is overleveraged, it is more likely to have net cost of deviation that is larger than the timing benefits; hence the firm will not exploit many timing opportunities and will prefer to adjust even if favorable market conditions exist.

Based on this conjecture, this research suggests that the direction of the deviation from the target, i.e. whether the firm is overleveraged or underleveraged, is one of the determinants that are likely to moderate the behavior of timing vs targeting of the firm. The SOA is expected to be higher for overleveraged firms and the timing will be lower. Overleveraged firms will place higher priority on reducing their level of leverage than on waiting for market timing opportunities. On the other hand, underleveraged firms may find that the benefits of timing are higher than the cost of deviation from the target. These firms will place lower priority to rebalance toward the target compared with overleveraged firms and they are expected to have more flexibility to time the market, hence the SOA is expected to be lower and market timing is expected to be more pronounced.

The starting point for this research is to estimate the SOA for the full sample using GMM system approach which is found to be less biased than other estimators of dynamic models. Estimating the SOA is an investigation for whether the target considerations are a first priority factors in capital structure decisions or they are just secondary factors. Next, the research will investigate the effect of market valuation on the adjustment behavior of the firm. Following Flannery and Rangan (2006), if timing behavior dominates targeting behavior, it should wipe out the effect of targeting once it is accounted for in the model. The factors associated with the dominant theory will appear to be more important once both groups of factors are competing together. Lastly, this research will investigate when the role of timing is likely to show up and when it will be cool-off compared with trade-off motives. Specifically, this research hypothesizes that the trade-off vs timing motives are moderated by the direction of the deviation from the target.

In the remaining of this paper, the methodology and models are explained in Section 3. Data are described in Section 4 and the descriptive statistics are included in Section 5. Estimation results and discussion are presented in Section 6 and finally, Section 7 will conclude.

3. Methodology

In this section, the empirical approach of this paper is discussed. This includes the discussion of variables, models, econometrics, and model diagnostics.

3.1 Variables

The dependent variable of this research is the leverage ratio of the firm. According to Rajan and Zingales (1995), the most relevant definition of leverage depends on the objective of the analysis. Measures like total liabilities to total assets can proxy for what is left for shareholders in case of liquidation but not a good indication of the risk of default that the firm faces since items that are used for transaction purposes rather than for financing, like accounts payable, can overstate the amount of leverage. A more relevant definition of leverage to this research is the total debt to total assets ratio which reflects only the debt financing policy of the firm (Hovakimian, 2006).

Another issue is whether to use book values or market values in the definition of leverage. Book leverage reflects the financing history of the firm while market leverage is largely future oriented reflecting the market valuation of leverage ratio. Fama and French (2002) argue that most predictions of trade-off and pecking order models apply directly to book leverage and some carry over to market leverage. Investigating the timing ability of the firm is also more related to past financing activities since timing is an active reaction to market opportunities. Shocks to market leverage can result either from active financing decisions or simply from passive fluctuations resulted from stock price movements (Welch, 2004). For timing behavior, only active financing transactions are relevant, hence book leverage is likely to better capture these transactions.

Market timing variable should capture the relationship between market valuation of the firm and leverage. The market valuation of the firm can be linked to mispricing through the representativeness heuristic (Tversky and Kahneman, 1974). People tend to use the last observation in a sequence as an anchor to make predictions (Bolger and Harvey, 1993). The proxy for timing is the stock price performance (SPP) defined as the difference in the logarithm of price between two successive periods which is basically the stock return (De Bie and De Haan, 2007; Deesomsak *et al.*, 2004; Homaifar *et al.*, 1994).

In addition to the timing variable, a set of control variables that are found to be significant in past literature has been included in the model. The control variables utilized in this research are the ones that are found to be significant in Rajan and Zingales (1995) and subsequently used by Baker and Wurgler (2002). Frank and Goyal (2009) find these factors to be the most reliable capital structure determinants. These variables are also identified to be the significant capital structure determinants in Malaysia (Booth *et al.*, 2001). These control variables are firm size, profitability, tangibility and growth options. We follow Rajan and Zingales (1995) and Baker and Wurgler (2002) in the measurement issue while the rationale of using each variable is discussed.

In a trade-off context, the company size affects the capital structure because larger firms tend to be more diversified and less prone to bankruptcy (Rajan and Zingales, 1995; Titman and Wessels, 1988). Add to this, since part of the bankruptcy costs are fixed, it is expected to find economies of scale in the bankruptcy costs. So, larger firms face lower unit cost of bankruptcy which may encourage the use of more leverage. In addition, agency costs of debt will be less with larger firms since bondholders are more likely to be repaid for their money, and hence, the firm is likely to use more leverage. The proxy for size in this research is the logarithm of sales, where sales are adjusted for inflation using constant prices of 2005.

For the profitability variable, Myers and Majluf (1984) argued that as a result of asymmetric information, companies prefer internal sources of finance. In other words, higher profitability companies tend to have lower debt levels. Relative to this theory Titman and Wessels (1988) and Rajan and Zingales (1995) find leverage to be negatively related to the level of profitability. Fama and French (2002) and Myers (1984) use this negative relationship as evidence against the trade-off model. The proxy for profitability in this research is the earnings before interest, taxes and depreciation to total assets.

Trade-off theory suggests that tangibility of assets affects leverage positively. The more tangible the assets of a firm are, the greater the assets that can be used as collateral. Tangible assets add more security to the debt and reduce losses associated with information asymmetry. Consequently, a positive relationship with the level of leverage is usually expected (Rajan and Zingales, 1995). The proxy for tangibility is the property, plant and equipment net of depreciation to total assets.

Growth opportunities are defined as "capital assets that add value to a firm but cannot be collateralized and do not generate current taxable income" (Titman and Wessels, 1988). Myers (1977) argued that due to information asymmetries, companies with high leverage ratios might have the tendency to undertake activities that transfer wealth a way from bondholders toward shareholders (under-invest in economically profitable projects and asset substitution) and this will increase the agency costs of debt. Therefore, it can be argued that companies with growth opportunities tend to use greater amount of equity finance because they have stronger incentives to avoid underinvestment and asset substitution that arise from stockholder-bondholder conflicts. Moreover, in the free cash flow theory of Jensen (1986), growth firms have less free cash flow and less debt is needed to be used as a control mechanism. In addition, growth options cannot be collateralized, and hence, financial distress will be higher for firms with higher growth leading these firms to use more equity. On the other hand, simple pecking order theory posits a positive association between leverage and growth opportunities. In this framework, a firm's leverage should increase as investments opportunities exceed retained earnings and vice versa. Thus, maintaining profitability level constant, funds needed in excess of retained earnings, will be obtained from debt expecting higher leverage for those firms with better growth opportunities. Empirical results are mixed. For example, Bradley *et al.* (1984), Rajan and Zingales (1995) and Fama and French (2002) find a negative relationship between leverage and growth opportunities while Titman and Wessels (1988) did not find support to the effect of growth on leverage. Booth *et al.* (2001) find a significant positive relationship for many developing countries including Malaysia, Thailand, India and Turkey. The main proxy for growth is the market to book ratio defined as total assets minus book equity plus market equity all divided by total assets where market equity is the result of the product of the number of common shares and the end of the year share price.

3.2 Models

In a dynamic adjustment model, if the costs of adjusting to the target leverage are zero, the firm will always keep its leverage at the target by instantly counteract shocks. However, in the presence of adjustment costs the firm will adjust only if the adjustment costs are less than the costs of deviation from the target. A standard partial adjustment model is usually used to capture this dynamism. The setup of the partial adjustment model is:

$$\mathrm{Lev}_{i,t}-\mathrm{Lev}_{i,t-1}=\delta\left(\mathrm{Lev}^{*}_{i,t}-\mathrm{Lev}_{i,t-1}\right)+\varepsilon_{i,t} \qquad (1)$$

where δ is the average SOA; $\mathrm{Lev}^{*}_{i,t}$ the target leverage.

The model assumes that the firm has a target leverage that minimizes the cost of capital. Nevertheless, shocks can make the firm deviates from the target. Once the firm is deviated from the target, it should adjust as long as the cost of deviation is higher than the cost of adjustment. According to the partial adjustment model, the actual adjustment in leverage is some fraction of the desired adjustment for each period which is called the SOA (δ). If $\delta=1$, it means that full adjustment occur each period, while if $\delta=0$, no adjustment takes place. The SOA should be a fraction between 0 and 1 if an adjustment behavior is followed by the firm.

The target leverage $\text{Lev}^*_{i,t}$ is unobservable and hence proxied by the fitted value from a regression of observed leverage on a set of firm characteristics identified in the previous literature as important determinants of the target (Fama and French, 2002; Flannery and Rangan, 2006; Hovakimian *et al.*, 2001; Kayhan and Titman, 2007). The target in this case changes from firm to firm and from year to year for the same firm as it is a function of the firm characteristics. The fit value of Equation (2) will be used as the target leverage:

$$\text{Lev}^*_{i,t} = \beta_1 + \beta_2\text{Growth}_{i,t-1} + \beta_3\text{Profit}_{i,t-1} + \beta_4\text{Tang}_{i,t-1} + \beta_5\text{Size}_{i,t-1} + \gamma_t + \eta_i \quad (2)$$

where γ_t and η_i are firm and time fixed effects and other variables are self-explanatory. However, estimation of the partial adjustment model can be done by incorporating the target leverage (Equation (2)) into the partial adjustment model (Equation (1)) and rearranging the terms. Then, the estimation can be done in a single step using Equation (3):

$$\text{Lev}_{i,t} = \delta\beta X_{i,t-1} + (1-\delta)\text{Lev}_{i,t-1} + \gamma_t + \eta_i + \varepsilon_{i,t} \quad (3)$$

where the SOA (δ) equals one minus the coefficient of the lagged leverage. $X_{i,t}$ is the set of control variables. The firm and time fixed effects are accounted for in the model by Flannery and Rangan (2006) and Lemmon *et al.* (2008).

To investigate the effect of market timing on the adjustment process, a regression that includes the timing variable as well as the other variables that is supposed to determine the target leverage will be used. Flannery and Rangan (2006) argue that if timing behavior can dominate the targeting behavior, the timing variable should be able to wipe out the influence of targeting behavior once it is added to the model. Following Flannery and Rangan (2006), the following model will be used to investigate the effect of timing behavior on the targeting behavior:

$$\text{Lev}_{i,t} = \delta\beta X_{i,t-1} + (1-\delta)\text{Lev}_{i,t-1} + \gamma_1\text{Timing}_{i,t-1} + \gamma_t + \eta_i + \varepsilon_{i,t} \quad (4)$$

Equation (4) is similar to Equation (3) except that a timing variable is added to the model. The benchmark that will be used for comparison is Equation (3). If adding the timing variable reduces the estimated coefficients of $X_{i,t}$ and the SOA significantly, that mean that timing variable has dominated the trade-off forces.

Lastly, this research has controlled for the direction of the deviation from the target by dividing the sample based on whether the firm is over or underleveraged and re-estimate Equations (3) and (4) for the two subsamples then compare the results. Since instrumental variables are used in the estimation, separating the two groups aims to ensure that the instruments used for estimation are from the same group not the other group. To create the subsamples, the deviation from the target is calculated first based on the following relationship:

$$\text{Deviation} = \text{Observed leverage} - \text{Target leverage}$$

If the deviation is positive (negative), the firm is overleveraged (underleveraged). The target leverage is a function of firm characteristics hence; it varies across firm and time. Since leverage value is, by definition, bounded by minimum 0 and maximum 1, any fit value for the target leverage that is out of the sample observations is replaced by its actual value to be consistent with the defined boundaries.

3.3 Econometrics approach

The estimation of Equations (3) and (4) raises many econometric issues. Mainly, the lagged leverage regressor is likely to be endogenous because it arises within a system that influences the error term. To obtain consistent estimators for this model, instrumental variables should be used to account for endogeneity problem. The instruments should satisfy the two requirements:

(1) Exogeneity requirement which mean no correlation between the instrument and the error is exists. This requirement leads to instrument validity.

(2) Relevance requirement which mean a high correlation of the instrument and the endogenous regressor should be satisfied.

The instrumental variable estimators are consistent once the instruments are valid. If the instruments are only marginally relevant, they are called weak instruments. In case of weak instruments, estimators are still consistent but may provide poor approximation to actual sampling distribution. The challenge is then to find the appropriate instruments.

An increasingly popular approach for estimation of dynamic models is the difference generalized methods of moments (difference GMM) of Arellano and Bond (1991). The difference GMM is able to account for the unobservable time invariant variables by using the first difference of the variables. Moreover, GMM is able to mitigate the endogeneity problem by using the instrumental variable approach where the lags in level of the endogenous variable are used as instruments.

The main drawback of GMM difference is that it has poor finite sample properties in case that the instruments are weak. If the time series are persistent, the number of periods are short and the number of cross-sections are large the lagged levels are likely to be only weak instruments for subsequent first differences (Blundell and Bond, 1998). Unfortunately, these features typically exist in the case of capital structure studies (Lemmon *et al.*, 2008). Therefore, GMM difference may result in imprecise or even biased estimators in this case.

An alternative to GMM difference is the GMM system of Arellano and Bover (1995) and Blundell and Bond (1998) where two simultaneous equations are estimated; one in the level and the other in the first difference. The lagged level of the endogenous variable is used to instrument the first difference equation and the differenced variable is used to instrument the level equation. The GMM system estimator is found to be more efficient and has less finite sample bias due to the exploitation of more moment conditions especially when the instruments are weak. Recently, many papers have utilized the system GMM in estimating the dynamic capital structure models (Antoniou *et al.*, 2008; Clark *et al.*, 2009; Lemmon *et al.*, 2008). Lemmon *et al.* (2008) argue that system GMM is expected to produce large efficiency gains over other approaches that use difference GMM or two-stage least square methods. This research will employ the GMM system in estimation.

This study uses orthogonal deviation to get rid of the firm fixed effects (Arellano and Bover, 1995). In this method, the average of all future available observations of the variable is subtracted from each observation. This type of deviation is able to remove the fixed effect and is computable for all the observations except the last one for each firm (Roodman, 2006). Since the lagged observation is not included in the orthogonal deviation, the resulted deviations are available as valid instruments as well. The use of orthogonal deviations is preferable in the case that many gaps exist in the unbalanced panel data which is likely to occur once the two subsamples are created while the first differencing transformation is likely to magnify the number of gaps and may affect the estimated coefficients. Time fixed effects are captured by including year dummies to remove the effect of general time-related shocks (e.g. macroeconomic shocks common to all firms) from the error term as recommended by Roodman (2006) and Ozkan (2001).

The instruments used for the leverage endogenous variable, in all models, are the lagged, level and difference, two periods and earlier, up to the end of the available time series of the firm. Other variables are assumed to be exogenous and hence they instrument themselves. All GMM models are estimated using robust two-step estimation method and standard errors are corrected using Windmeijer (2005) finite sample correction.

3.4 Model diagnostics

It is expected for GMM estimators to have first order autocorrelation, but the crucial requirement for GMM estimators to be consistent is the absence of second order autocorrelation. If second order autocorrelation exists, some lags are invalid instruments and should be removed from the instrument set. Both first order autocorrelation and second order autocorrelation developed by Arellano and Bond (1991) are reported in this research. In addition, instruments must be exogenous to be valid. Otherwise, the moment conditions will not be satisfied. A test for the validity of the over-identifying restrictions called "Hansen test" is used in this research. The null hypothesis for this test is that "all instruments are valid." This is a null that should not be rejected in order to proceed with GMM estimation. The rejection of the null indicates that at least one of the instruments is not valid.

Lastly, Wald test indicates that the model well fit the data. The null hypothesis of this test is that the set of coefficients of the model are simultaneously equal to zero. If the null cannot be rejected, the variables of the model are not doing good job in predicting the dependent variable.

4. Data

The data of this research include all firms available in Thomson Financial Worldscope Database[1] for the Malaysian market during the period of 1992-2009. Data before 1992 are often missing and hence, returning earlier than that year is not feasible. Financial firms are excluded since their capital structure reflects special regulations more than independent policy. Moreover, to reduce the effect of outliers, this research will follow Baker and Wurgler (2002) and Hovakimian (2006) in restricting the sample by excluding the firm-year observations where:

(1) the book value of assets is missing;

(2) the book leverage is larger than one; and

(3) the MB ratio is larger than 10.

In addition, observations without at least 2 lags of data available fall out of the sample. The final sample will be an unbalanced panel data where different number of firm-year observations may be available for each firm. The total number of firm-year observations used in the analysis is 7,978 observations.

5. Descriptive statistics

The descriptive statistics for the variables used in this research are presented in Table I. The mean, median, maximum, minimum, standard deviation and the number of observations

	Mean	Median	Maximum	Minimum	SD	Observations
LEV_TB	0.251	0.233	0.997	0.000	0.196	7,978
MB	1.116	0.918	9.297	0.000	0.737	7,978
TANGIBLE	0.403	0.394	0.999	0.000	0.222	7,978
SIZE	19.104	19.026	23.969	9.250	1.545	7,955
PROFIT	0.067	0.075	11.096	−2.434	0.188	7,978
SPP	−0.074	−0.048	2.238	−3.258	0.565	7,829

Notes: LEV_TB is the book leverage defined as the total debt to total assets in book terms; MB is the market to book ratio; TANGIBLE is the property, plant and equipment net of depreciation to total assets; SIZE is the logarithm of sales, where sales are adjusted for inflation using constant prices of 2005; PROFIT is the earnings before interest, taxes and depreciation to total assets; SPP is the stock price performance defined as the difference in the logarithm of price between two successive periods

Table I.
Descriptive statistics

for each variable are reported. Moreover, Figure 1 presents the evolution of the mean of the variables from year to year with the solid line. A one standard deviation interval is also presented with the dotted lines.

Notably, book leverage has peaked between 1997 and 1998 just before or concurrent with the financial crisis. The leverage ratio continues to decrease since that time. Remarkably also, there is a sharp decrease in profitability and SPP (return) during the crisis year. However, the profitability ratio gets better after that.

6. Estimation results and discussion

6.1 Trade-off vs timing motives

Results of estimation of Equations (3) and (4) appear in column (a) and column (b) of Table II, respectively. For diagnostics, the table reports the significance levels for both AR(1) and AR(2). AR(2) is insignificant thus the absence of second order autocorrelation required for GMM is satisfied. The validity of instruments is satisfied under the Hansen test also. Wald test of the joint significance of the estimated coefficients indicates that the regressors are jointly significant in explaining the dependent variable. The number of instruments is also reported in Table II following the recommendation of Roodman (2006).

In column (a), the lagged leverage is found to be the most important determinant of current leverage. Holding all other regressors constant, about 87.4 percent change in the mean of current leverage is resulted from a 100 percent change in the lagged leverage.

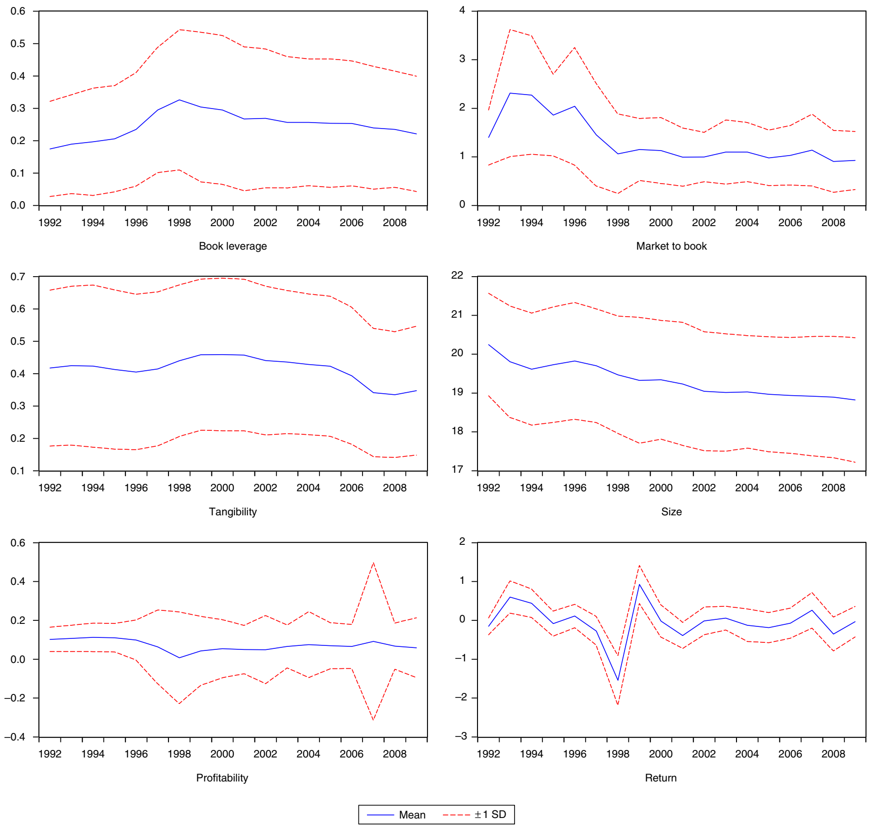

Figure 1.
The evolution of the mean and the standard deviation of the variables over the period 1992 to 2009

Independent variables	Equation (3) (a)	Equation (4) (b)
LEV_TB(−1)	0.8743 (36.91)***	0.8579 (38.12)***
MB	0.0117 (3.59)***	0.0136 (4.42)***
PROFIT	−0.2156 (−8.61)***	−0.213 (−8.11)***
SIZE	0.0049 (4.23)***	0.0058 (4.76)***
TANGIBLE	0.0365 (5.04)***	0.0356 (4.86)***
SPP	–	−0.0176 (−5.28)***
Speed of adjustments (%)	12.7	14.2
Number of observations	6,931	6,842
Number of instruments	156	157
Sig. of AR(1)	0.000	0.000
Sig. of AR(2)	0.989	0.710
Sig. of Hansen test	0.668	0.589
Wald χ^2	(2,579.78)***	(3,129.19)***

Notes: Constant coefficient and time dummies are included but not reported. Standard errors are robust and corrected using (Windmeijer, 2005) finite sample correction. The significance of Arellano-Bond test for AR(1) and AR(2) are reported. *t*-statistics are shown in parentheses. ***Significant at 1 percent level

Table II. Estimation results for the short-run determinants of book leverage using Equations (3) and (4)

This is an evidence for the high persistence of the leverage variable. The lagged dependent variable is of special importance in the partial adjustment model. If the firm follows an adjustment policy, the coefficient of this variable must lie between 0 and 1. The SOA δ equal unity minus this coefficient. The results of this research is consistent with the findings of Fama and French (2002), Kayhan and Titman (2007), Huang and Ritter (2009) and Lemmon *et al.* (2008). On the other hand, the results are different from Flannery and Rangan (2006) who find an active adjustment behavior, with an SOA of about 34 percent for book leverage and 35 percent for market leverage. This will be discussed in Section 6.2 with the SOA discussion.

The growth options as proxied by market-to-book ratio are found to be positively related to book leverage ratio. The coefficient of this variable is about 1.1 percent. The positive relationship is usually interpreted as supporting simple pecking order where funds needed for growth in excess of retained earnings are obtained using debt. This result is consistent with the findings of Booth *et al.* (2001). Profitability has high significant negative effect. The coefficient of profitability is −21.5 percent which makes it the second most important firm characteristic in determining the leverage ratio in the short run next to the lagged leverage. The negative result is consistent with most empirical works and can be interpreted in light of pecking order theory as firms tend to prefer internal finance over external finance in the presence of information asymmetry as a result of adverse selection costs (Myers and Majluf, 1984; Rajan and Zingales, 1995). Size is found to be positively significant but the coefficient is economically small (about 0.48 percent). The positive relationship of leverage with size can be interpreted as a result of the less probability of incurring bankruptcy costs as large firms are more diversified and less prone to fail (Rajan and Zingales, 1995). Tangibility is found to have positive and significant effect on leverage. The coefficient of this variable is 3.6 percent. This result is consistent with the prediction that firms with more tangible assets use more debts since tangible assets can be used as collateral.

Column (b) presents the results for Equation (4). Interpretation of the results is similar to that of column (a). However, an additional variable, that is SPP, is added to capture the association between capital structure changes and the market conditions. This variable is found to be negatively and significantly related to leverage as expected. A 10 percent increase in SPP is associated with 1.7 percent decrease in leverage. The SOA for both models is discussed next.

6.2 The SOAs

The SOA (δ) in column (a) of Table II is 12.7 percent. This result means that only 12.7 percent of the difference between desired and actual level of leverage is closed each year. The low SOA found in this research is consistent with many recent papers in developed markets (Baker and Wurgler, 2002; Fama and French, 2002; Huang and Ritter, 2009; Iliev and Welch, 2010; Lemmon *et al.*, 2008; Shyam-Sunder and Myers, 1999; Welch, 2004). However, this result is different from Flannery and Rangan (2006) who document a relatively high SOA of 34.4 percent. The difference can be traced to the estimation approach used. Flannery and Rangan (2006) use a within-estimator to remove the fixed effects. Within estimator is found to be severely biased in estimating dynamic models (Lemmon *et al.*, 2008).

The slow SOA found in this paper is not conclusive in supporting or rejecting the trade-off theory. The adjustment behavior is significant but it is too small to be the first priority of the firm. Fama and French (2002) find similar slow SOA ranging between 7 and 17 percent and they find it difficult to interpret their results in favor of trade-off theory. Though the SOA they find is statistically reliable, it is too slow to draw conclusions in favor or against trade-off theory. This result implies that the door is open for other interpretations that do not have targeting as a distinct behavior.

In column (b), the SOA becomes 14.2 percent after introducing the timing variable. Based on the proposition of Flannery and Rangan (2006), if the firm's first priority is timing, the SOA should be less once a variable that capture the timing behavior is included in the regression. On the other hand, if the priority of the firm is to rebalance toward the target, the SOA should be high and the timing variable should not be able to reduce the targeting behavior.

The result of adding the timing variable appears to slightly increase, not decrease, the SOA. This result counters the intuition of Flannery and Rangan (2006). The question becomes what is the interpretation of the increase in the SOA noticed in column (b). To answer this question, recall that the adjustment behavior of the firm is impeded by the adjustment costs (i.e. the costs of issuing new securities). Adjustment costs are usually thought of as the reason why the firm does not adjust instantly to any shock to leverage. The perceived timing is an opportunity for the firm to offset the cost of adjustment by issuing overvalued shares. Reducing the cost of adjustment of the firm is likely to encourage the firm to adjust faster. The timing variable seems to capture this reduction in the cost of adjustment. The overall results are more consistent with the proposition that both targeting and timing motives are co-existing.

6.3 Controlling for the direction of the deviation from the target

Lastly, this research hypothesizes that timing vs targeting behaviors are moderated by the direction of the deviation from the target. The switch in the preference between the two motives is a result of the difference in the behavior of the costs and benefits associated with both trade-off and timing motives between over and underleveraged firms. Costs of being overleveraged are higher and increasing sharply as the firm deviates more above the target, while costs of being more underleveraged are lower and do not encounter such sharp increase in costs. Firms that are overleveraged face more pressure to adjust and less flexibility to time the market as their priority is to get back to the target whatever the market conditions are. Firms that are underleveraged face relatively lower pressure to adjust and more flexibility to exploit timing opportunities.

Based on the above conjecture, it is expected that the SOA is higher for overleveraged firms whereas the timing variable is expected to be more important for underleveraged firms compared with the other group of firms. To investigate this hypothesis, the full sample has been split into two subsamples; one contains overleveraged firms and the other contains underleveraged firms. Both Equations (3) and (4) have been re-estimated separately for each subsample. Table III presents the results of estimation. Column (a) and column (c) present the results of Equation (3) for the overleveraged and underleveraged firms, respectively. These two columns are presented for comparison purposes. Column (b) and column (d) present the estimation results of Equation (4) for the overleveraged and underleveraged firms, respectively. Adding the timing variable slightly increases the SOA for overleveraged firms by 1.3 percent while it increases the SOA for underleveraged firms by 2.2 percent. It is likely that timing affects the targeting behavior by reducing the cost of adjustments more for underleveraged firms. Discussion of the results for each sub-sample separately is largely similar to the previous discussion of the full sample. More interesting is the comparison between the two samples. Comparison between column (b) and column (d) appears in column (e) (see the Appendix for computation method of (e)).

In general, firms are found to be much more sensitive to be overleveraged than to be underleveraged. The SOA for overleveraged firms is much higher (about 30.7 percent) than underleveraged firms (15.3 percent). The timing coefficient for underleveraged firms is more than doubled than that of overleveraged firms. For overleveraged firms the coefficient of timing is 1 percent and it is significant only at $p=10$ percent level while for underleveraged firms the coefficient is 2.2 percent and it is significant at $p=1$ percent level. It is apparent that underleveraged firms are more affected by market valuation and less hurry to adjust to the target.

	Overleveraged firms		Underleveraged firms		Difference
	(a) Equation (3)	(b) Equation (4)	(c) Equation (3)	(d) Equation (4)	(e) (d)-(b)
LEV_TB(−1)	0.706	0.693	0.869	0.847	0.154
	(9.41)***	(10.13)***	(21.08)***	(19.66)***	(1.9477)**
	[0.075]	[0.068]	[0.041]	[0.043]	
MB	0.020	0.022	0.0029	0.004	−0.018
	(4.62)***	(5.12)***	(1.09)	(1.49)	(−3.56)***
	[0.004]	[0.004]	[0.0026]	[0.0028]	
PROFIT	−0.261	−0.278	−0.126	−0.116	−0.162
	(−8.04)***	(−8.86)***	(−3.93)***	(−4.27)***	(−3.9)***
	[0.032]	[0.031]	[0.032]	[0.027]	
SIZE	0.0045	0.0054	0.0026	0.0033	−0.0021
	(2.35)**	(2.71)***	(2.14)**	(2.88)***	(−0.94)
	[0.0019]	[0.002]	[0.0012]	[0.0012]	
TANGIBLE	0.0477	0.0426	0.015	0.0183	−0.024
	(3.26)***	(3.45)***	(2.35)**	(2.68)***	(−1.76)**
	[0.0146]	[0.0123]	[0.0064]	[0.0069]	
SPP		−0.010		−0.022	0.012
		(−1.84)*		(−7.01)***	(1.86)**
		[0.0056]		[0.0031]	
Speed of adjustments (%)	29.4	30.7	13.1	15.3	
Number of observations	2,384	2,357	2,644	2,614	
Number of instruments	156	157	154	155	
AR(1) Sig. +	0.000	0.000	0.000	0.000	
AR(2) Sig. +	0.679	0.724	0.942	0.946	
Hansen test	0.352	0.425	0.454	0.408	
Wald	(888.94)***	(962.86)***	(1,169.21)***	(1,208.24)***	

Notes: Constant coefficient and time dummies are included with all models but not reported. Standard errors in brackets are robust and corrected using Windmeijer (2005) finite sample correction. The significance level of Arellano-Bond test for AR(1) and AR(2) are reported. *t*-statistics are shown in parentheses. *,**,***Significant at 10, 5 and 1 percent levels, respectively

Table III. Estimation results of Equations (3) and (4) for both overleveraged and underleveraged firms

The higher coefficient of SPP for underleveraged firms is not likely to be a result of growth options. The variable that is supposed to capture growth, market-to-book ratio, is actually much higher for overleveraged firms than for underleveraged firms in which it is insignificant. Profitability may signal growth but it is higher for overleveraged firms also. The tangibility variable is higher for overleveraged firms as it is more important to reduce the costs of distress for these firms (Harris and Raviv, 1990). All the variables that are thought to relate with the trade-off dynamism are higher for the overleveraged firms. SPP is the only factor that is higher for underleveraged firms.

6.4 New insight to the role of historical timing of Baker and Wurgler (2002) as a capital structure determinant

In their seminal paper, Baker and Wurgler (2002) propose a timing variable that captures the history of timing activities of the firm and they called it the temporal "external finance weighted-average market-to-book (EFWAMB)" ratio. For a given firm-year, this variable is defined as:

$$\mathrm{EFWAMB} = \left(\frac{M}{B}\right)_{\mathrm{efwa},t-1} = \sum_{s=0}^{t-1} \frac{e_s + d_s}{\sum_{r=0}^{t-1} e_r + d_r} \cdot \left(\frac{M}{B}\right)_s \quad (5)$$

where e and d denote net equity and net debt issues, respectively. The sum of $e+d$ is the external financing raised each year. $(M/B)_s$ is market-to-book ratio. The weight for $(M/B)_s$ each year is the ratio of external financing raised by the firm in that year to the total external financing raised by the firm in years (0) through $(t-1)$. Negative weights are reset to zero. This variable takes high values for firms that raise external finance when the MB ratio is high and low values for firms that raise external finance while the MB ratio is low. This paper defines (e) as "Δ(Common stock + Capital surplus)" while (d) is defined as "Δ Total debt."

Abdeljawad and Mat Nor (2011) find that this variable is significant in determining the capital structure for Malaysian firms. If firms time the mispricing periods and they do not rebalance the effect of this timing, timing effect may accumulate over time and hence the history of timing will continue affecting the current leverage. Flannery and Rangan (2006) examine this variable and find it significant in explaining market leverage. If the hypothesis about the asymmetric effect of timing is valid in the short run, it should continue to hold in the long run. To investigate this possibility, this research will re-run a model similar to that used by (Abdeljawad and Mat Nor, 2011; Baker and Wurgler, 2002) but with a dummy variable that captures whether the firm is overleveraged or underleveraged and an interaction term between the EFWAMB and the dummy variable. Using the dummy variable to differentiate the two possibly different behaviors is more reliable here to capture the moderating effect (Whisman and McClelland, 2005) since no concern about the instruments. The model includes the same control variables used previously in this research but in a static framework. OLS with both firm and year fixed effects are used. Standards errors are corrected using "panel corrected standard errors." The setup of the equation to be estimated is:

$$\begin{aligned}\mathrm{Leverage}_{i,t} = {} & \alpha + \beta_1 \mathrm{EFWAMB}_{i,t-1} + \beta_2 \mathrm{Growth}_{i,t-1} + \beta_3 \mathrm{Profit}_{i,t-1} \\ & + \beta_4 \mathrm{Tang}_{i,t-1} + \beta_5 \mathrm{Size}_{i,t-1} + \beta_6 D + \beta_7 \mathrm{D} \times \mathrm{EFWAMB}_{i,t-1} + \gamma_t + \eta_i + \varepsilon_{i,t} \quad (6)\end{aligned}$$

Table IV presents the results of Equation (6). Column (a) replicates Abdeljawad and Mat Nor (2011) and Baker and Wurgler (2002) model using the current data. The historical timing is highly negatively significant. Column (b) presents the results for the model with the interaction term. The deviation dummy is set to 1 if the firm is underleveraged and 0 otherwise. The interaction term is significant indicating that the direction of the deviation

	Original model (a)	$D=0$ for overleveraged firms (b)	$D=0$ for underleveraged firms (c)
EFWAMB	−0.039 (−5.86)***	−0.008 (−1.4)	−0.023 (−4.27)***
MB(−1)	0.0197 (4.81)***	0.010 (3.00)***	0.010 (3.00)***
PROFIT(−1)	−0.178 (−13.38)***	−0.112 (−9.33)***	−0.112 (−9.33)***
SIZE(−1)	0.011 (3.65)***	0.009 (3.60)***	0.009 (3.60)***
TANGIBLE(−1)	0.114 (7.22)***	0.099 (7.85)***	0.099 (7.85)***
DEVIATDUM(−1)		−0.074 (−14.01)***	0.074 (14.01)***
EFWAMB × DEVIATDUM(−1)		−0.015 (−4.051)***	0.015 (4.051)***
Number of observations	6,932	6,932	6,932
Adj. R^2	0.7088	0.766	0.766
F-statistic	(17.83)***	(23.55)***	(23.55)***

Notes: In (b), the "deviationdum" variable equal 1 for underleveraged firms and 0 otherwise while in (c) the coding is switched. All other regressors remain the same as described for Equation (3). All regressions are estimated using OLS with firm and period fixed effects. The constant and all the fixed effects coefficients are suppressed. The numbers in parenthesis are t-statistic calculated based on robust standard errors (PCSE). *,**,***Significant at 10, 5, and 1 percent levels, respectively

Table IV. The moderating effect of the direction of the deviation on the role of EFWAMB as a determinant of leverage ratio

from the target is able to moderate the relationship between EFWAMB and leverage. A simple way to find the direct effect of EFWAMB in each subsample is to switch the coding of the dummy variable and noting the coefficient of EFWAMB (Whisman and McClelland, 2005). The direct effect of EFWAMB when firms are overleveraged is not significant in column (b) while it is highly significant for the underleveraged firms as appear in column (c). It can be concluded that underleveraged firms are more inclined to exploit mispricing opportunities and the effect of this timing behavior takes longer time to be rebalanced. This result may add doubt to the generalizability of the timing theory since the results of Baker and Wurgler (2002) may be driven by underleveraged firms as the period of their study, the late 1980s and the 1990s, are characterized by the low leverage used by firms (Huang and Ritter, 2009).

7. Conclusions

Using an estimator that is found to be more efficient for estimating dynamic panel data with short time dimension, that is system GMM; this study reveals that Malaysian firms are adjusting their capital structure to the target but at a slow rate. At the same time, firms consider timing of the market conditions as an important factor when making financial decisions. This study finds evidence for asymmetric timing behavior as well as targeting behavior between firms over- and underleveraged. Specifically, overleveraged firms adjust to the target faster and they are less concern with timing. On the other side, underleveraged firms adjust slower but they consider timing more seriously. This behavior is likely to result from taking into account all the costs and benefits of being at the target, adjustment toward the target and timing opportunities. Deviating from the target to the upper side is likely to be more costly than deviating below the target because bankruptcy costs and agency costs of debt will intensify quickly as the firm deviates more above the target. Hence, overleveraged firms need to adjust faster to reduce these costs despite the market conditions. Underleveraged firms are less urged to adjust and hence it is feasible for them to consider market conditions more in their financing decisions. These results are confirmed in the short run as well as long run modeling.

The findings of this study support that firms consider both targeting and timing in their financing decisions. No standalone theory can interpret the full spectrum of empirical results. This result is consistent with the view of Myers (2003) that capital structure "theories are conditional not general."

Nevertheless, the conclusion of this research is not without limitations. The empirical work is based on partial adjustment model of leverage; however, this model has been criticized by inability to distinguish between active adjustment behavior and mechanical mean reversion (Chang and Dasgupta, 2009; Chen and Zhao, 2007). This is an avenue for future research. It would be interesting to extend this work into a more general approach and estimation method that could be used to account for the potential mechanical mean reversion of leverage.

Note

1. Part of THOMSON DATASTREAM database.

References

Abdeljawad, I. and Mat Nor, F. (2011), "Equity market timing and capital structure: evidence from Malaysia", 13th Malaysian Finance Association, Langkawi.

Alti, A. (2006), "How persistent is the impact of market timing on capital structure?", *The Journal of Finance*, Vol. 61 No. 4, pp. 1681-1710.

Antoniou, A., Guney, Y. and Paudyal, K. (2008), "The determinants of capital structure: capital market-oriented versus bank-oriented institutions", *Journal of Financial and Quantitative Analysis*, Vol. 43 No. 1, pp. 59-92.

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

Arellano, M. and Bover, O. (1995), "Another look at the instrumental variable estimation of error-components models", *Journal of Econometrics*, Vol. 68 No. 1, pp. 29-51.

Baker, M. and Wurgler, J. (2002), "Market timing and capital structure", *The Journal of Finance*, Vol. 57 No. 1, pp. 1-32.

Bany-Ariffin, A.N., Mat Nor, F. and McGowan, C.B. (2010), "Pyramidal structure, firm capital structure exploitation and ultimate owners' dominance", *International Review of Financial Analysis*, Vol. 19 No. 3, pp. 151-164.

Baxter, N.D. (1967), "Leverage, risk of ruin and the cost of capital", *Journal of Finance*, Vol. 22 No. 3, pp. 395-403.

Blundell, R. and Bond, S. (1998), "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics*, Vol. 87 No. 1, pp. 115-143.

Bolger, F. and Harvey, N. (1993), "Context-sensitive heuristics in statistical reasoning", *The Quarterly Journal of Experimental Psychology Section A*, Vol. 46 No. 4, pp. 779-811.

Booth, L., Aivazian, V., Demirguc-Kunt, A. and Maksimovic, V. (2001), "Capital structures in developing countries", *Journal of Finance*, Vol. 56 No. 1, pp. 87-130.

Bradley, M., Jarrell, G.A. and Kim, E.H. (1984), "On the existence of an optimal capital structure: theory and evidence", *The Journal of Finance*, Vol. 39 No. 3, pp. 857-878.

Chang, X. and Dasgupta, S. (2009), "Target behavior and financing: how conclusive is the evidence?", *The Journal of Finance*, Vol. 64 No. 4, pp. 1767-1796.

Chen, L. and Zhao, X. (2007), "Mechanical mean reversion of leverage ratios", *Economics Letters*, Vol. 95 No. 2, pp. 223-229.

Claessens, S., Djankov, S. and Lang, L.H.P. (2000), "The separation of ownership and control in East Asian corporations", *Journal of Financial Economics*, Vol. 58 Nos 1/2, pp. 81-112.

Clark, B.J., Francis, B.B. and Hasan, I. (2009), *Do Firms Adjust Toward Target Capital Structures? Some International Evidence*, SSRN eLibrary, available at: https://ssrn.com/abstract=1364095 (accessed January 18, 2015).

Clogg, C.C., Petkova, E. and Haritou, A. (1995), "Statistical methods for comparing regression coefficients between models", *American Journal of Sociology*, Vol. 100 No. 5, pp. 1261-1293.

Cohen, A. (1983), "Comparing regression coefficients across subsamples", *Sociological Methods & Research*, Vol. 12 No. 1, pp. 77-94.

Dang, V.A., Kim, M. and Yongcheol, S. (2014), "Asymmetric adjustment toward optimal capital structure: evidence from a crisis", *International Review of Financial Analysis*, Vol. 33 No. C, pp. 226-242.

De Bie, T. and De Haan, L. (2007), "Market timing and capital structure: evidence for Dutch firms", *Economist*, Vol. 155 No. 2, pp. 183-206.

De Miguel, A. and Pindado, J. (2001), "Determinants of capital structure: new evidence from Spanish panel data", *Journal of Corporate Finance*, Vol. 7 No. 1, pp. 77-99.

Deangelo, H. and Masulis, R.W. (1980), "Optimal capital structure under corporate and personal taxation", *Journal of Financial Economics*, Vol. 8 No. 1, pp. 3-29.

Deesomsak, R., Paudyal, K. and Pescetto, G. (2004), "The determinants of capital structure: evidence from the Asia pacific region", *Journal of Multinational Financial Management*, Vol. 14 Nos 4-5, pp. 387-405.

DeAngelo, H. and Roll, R. (2015), "How stable are corporate capital structures?", *The Journal of Finance*, Vol. 70 No. 1, pp. 373-418.

Fama, E.F. and French, K.R. (2002), "Testing trade-off and pecking order predictions about dividends and debt", *The Review of Financial Studies*, Vol. 15 No. 1, pp. 1-33.

Flannery, M.J. and Hankins, K.W. (2007), "A theory of capital structure adjustment speed", working paper, University of Florida, FL.

Flannery, M.J. and Rangan, K.P. (2006), "Partial adjustment toward target capital structures", *Journal of Financial Economics*, Vol. 79 No. 3, pp. 469-506.

Frank, M.Z. and Goyal, V.K. (2007), *Trade-Off and Pecking Order Theories of Debt*, SSRN eLibrary, available at: https://ssrn.com/abstract=670543 (accessed Septemper 10, 2014).

Frank, M.Z. and Goyal, V.K. (2009), "Capital structure decisions: which factors are reliably important?", *Financial Management*, Vol. 38 No. 1, pp. 1-37.

Graham, J.R. and Harvey, C.R. (2001), "The theory and practice of corporate finance: evidence from the field", *Journal of Financial Economics*, Vol. 60 Nos 2-3, pp. 187-243.

Harris, M. and Raviv, A. (1990), "Capital structure and the informational role of debt", *Journal of Finance*, Vol. 45 No. 2, pp. 321-349.

Högfeldt, P. and Oborenko, A. (2005), *Does Market Timing or Enhanced Pecking Order Determine Capital Structure*, SSRN eLibrary, available at: https://ssrn.com/abstract=592501 (accessed June 14, 2015).

Homaifar, G., Zietz, J. and Benkato, O. (1994), "An empirical model of capital structure: some new evidence", *Journal of Business Finance & Accounting*, Vol. 21 No. 1, pp. 1-14.

Hovakimian, A. (2006), "Are observed capital structures determined by equity market timing?", *Journal of Financial and Quantitative Analysis*, Vol. 41 No. 1, pp. 221-243.

Hovakimian, A., Opler, T. and Titman, S. (2001), "The debt-equity choice", *The Journal of Financial and Quantitative Analysis*, Vol. 36 No. 1, pp. 1-24.

Huang, R. and Ritter, J. (2009), "Testing theories of capital structure and estimating the speed of adjustment", *Journal of Financial and Quantitative Analysis*, Vol. 44 No. 2, pp. 237-271.

Iliev, P. and Welch, I. (2010), *Reconciling Estimates of the Speed of Adjustment of Leverage Ratios*, SSRN eLibrary, available at: https://ssrn.com/abstract=1542691 (accessed October 20, 2015).

Jensen, M. (1986), "Agency costs of free cash flow, corporate finance, and takeovers", *The American Economic Review*, Vol. 76 No. 2, pp. 323-329.

Jensen, M. and Meckling, W. (1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.

Kayhan, A. and Titman, S. (2007), "Firms' histories and their capital structures", *Journal of Financial Economics*, Vol. 83 No. 1, pp. 1-32.

Kraus, A. and Litzenberger, R. (1973), "A state-preference model of optimal financial leverage", *Journal of Finance*, Vol. 28 No. 4, pp. 911-922.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (1998), "Law and finance", *Journal of Political Economy*, Vol. 106 No. 6, pp. 1113-1155.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (1999), "Corporate ownership around the world", *Journal of Finance*, Vol. 54 No. 2, pp. 471-517.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (2000), "Investor protection and corporate governance", *Journal of Financial Economics*, Vol. 58 Nos 1/2, pp. 3-27.

Leary, M.T. and Roberts, M.R. (2005), "Do firms rebalance their capital structures?", *The Journal of Finance*, Vol. 60 No. 6, pp. 2575-2619.

Lemmon, M.L., Roberts, M.R. and Zender, J.F. (2008), "Back to the beginning: persistence and the cross section of corporate capital structure", *The Journal of Finance*, Vol. 63 No. 4, pp. 1575-1608.

Mahajan, A. and Tartaroglu, S. (2008), "Equity market timing and capital structure: international evidence", *Journal of Banking & Finance*, Vol. 32 No. 5, pp. 754-766.

Myers, S. (1977), "Determinants of corporate borrowing", *Journal of Financial Economics*, Vol. 5 No. 3, pp. 147-175.

Myers, S. and Majluf, N. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, Vol. 13 No. 2, pp. 187-221.

Myers, S.C. (1984), "The capital structure puzzle", *The Journal of Finance*, Vol. 39 No. 3, pp. 575-592.

Myers, S.C. (2003), "Chapter 4 – financing of corporations", in Constantinides, G.M., Harris, M. and Stulz, R.M. (Eds), *Handbook of the Economics of Finance*, Vol. 1 (Part A), Elsevier, Amesterdam, pp. 215-253.

Ozkan, A. (2001), "Determinants of capital structure and adjustment to long run target: evidence from UK company panel data", *Journal of Business Finance & Accounting*, Vol. 28 No. 1, pp. 175-198.

Paternoster, R., Brame, R., Mazerolle, P. and Piquero, A. (1998), "Using the correct statistical test for the equality of regression coefficients", *Criminology*, Vol. 36 No. 4, pp. 859-866.

Rajan, R. and Zingales, L. (1995), "What do we know about capital structure? Some evidence from international data", *Journal of Finance*, Vol. 50 No. 5, pp. 1421-1460.

Roodman, D. (2006), "How to do Xtabond2: an introduction to 'Difference' and 'System' GMM in Stata", Working Paper No. 103, Center for Global Development, available at: https://ssrn.com/abstract=982943 (accessed June 5, 2015).

Shyam-Sunder, L. and Myers, S.C. (1999), "Testing static tradeoff against pecking order models of capital structure", *Journal of Financial Economics*, Vol. 51 No. 2, pp. 219-244.

Strebulaev, I. and Yang, B. (2013), "The mystery of zero-leverage firms", *Journal of Financial Economics*, Vol. 109 No. 1, pp. 1-23.

Titman, S. and Wessels, R. (1988), "The determinants of capital structure choice", *The Journal of Finance*, Vol. 43 No. 1, pp. 1-19.

Tversky, A. and Kahneman, D. (1974), "Judgment under uncertainty: heuristics and biases", *Science*, Vol. 185 No. 4157, pp. 1124-1131.

Welch, I. (2004), "Capital structure and stock returns", *The Journal of Political Economy*, Vol. 112 No. 1, pp. 106-131.

Whisman, M.A. and McClelland, G.H. (2005), "Designing, testing, and interpreting interactions and moderator effects in family research", *Journal of Family Psychology*, Vol. 19 No. 1, pp. 111-120.

Windmeijer, F. (2005), "A finite sample correction for the variance of linear efficient two-step GMM estimators", *Journal of Econometrics*, Vol. 126 No. 1, pp. 25-51.

Zhou, Q., Tan, K.J.K., Faff, R. and Zhu, Y. (2016), "Deviation from target capital structure, cost of equity and speed of adjustment", *Journal of Corporate Finance*, Vol. 39, pp. 99-120.

Further reading

Byoun, S. (2008), "How and when do firms adjust their capital structures toward targets?", *The Journal of Finance*, Vol. 63 No. 6, pp. 3069-3096.

Cook, D.O. and Tang, T. (2010), "Macroeconomic conditions and capital structure adjustment speed", *Journal of Corporate Finance*, Vol. 16 No. 1, pp. 73-87.

Drobetz, W. and Wanzenried, G. (2006), "What determines the speed of adjustment to the target capital structure?", *Applied Financial Economics*, Vol. 16 No. 13, pp. 941-958.

Hovakimian, A. and Li, G. (2011), "In search of conclusive evidence: how to test for adjustment to target capital structure", *Journal of Corporate Finance*, Vol. 17 No. 1, pp. 33-44.

Hussain, M.I. (2005), *Determination of Capital Structure and Prediction of Corporate Financial Distress*, Universiti Putra Malaysia, Selangor.

Smith, D.J., Chen, J. and Anderson, H.D. (2010), "Partial adjustment towards target capital structure: evidence from New Zealand", Massey U. College of Business Research Paper No. 15, available at: https://ssrn.com/abstract=1640324 (accessed December 25, 2015).

Appendix. Comparing the regression coefficients across subsamples

The difference between the coefficients of two subsamples can be tested as a *t*-test where the numerator is the difference between the two coefficients and the denominator is the estimated standard error of the difference. Several suggestions are available on how to estimate the standard error for the difference (for detailed discussion see for instant (Cohen, 1983; Paternoster *et al.*, 1998)). Fortunately, when the number of observations is large, the variation in the results between different approaches decreases (Cohen, 1983). This research has tested the difference using the following formula for finding the *t*-statistics under the null hypothesis that the coefficients are the same for the two subsamples or $b1 = b2$:

$$t = \frac{b1 - b2}{\sqrt[2]{\left[\frac{(m-1)^2}{(m+n-2)}\mathrm{Var}(b1) + \frac{(n-1)^2}{(m+n-2)}\mathrm{Var}(b2)\right]} \times \left[\sqrt{\frac{1}{m} + \frac{1}{n}}\right]}$$

where n and m are the number of observations for each of the two samples and Var($b1$), Var($b2$) are the square of the standard errors for each of the two samples. Actually, if the number of observations is large enough, estimating *t*-statistic by the simpler formula:

$$t = \frac{b1 - b2}{\sqrt[2]{\mathrm{Var}(b1) + \mathrm{Var}(b2)}}$$

qualitatively makes no difference in the results (Clogg *et al.*, 1995; Paternoster *et al.*, 1998).

Corresponding author

Islam Abdeljawad can be contacted at: islamjawad@najah.edu