TIMING BEHAVIOR VERSUS ADJUSTMENT TOWARDS THE TARGET: WHAT DETERMINES THE CAPITAL STRUCTURE DYNAMICS

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Abstract

The adjustment towards the target leverage and the timing of equity market are not necessarily two distinct behaviors as theoretically suggested. The firm choice to adjust towards the target leverage depends on the costs of being away from the target and the cost of adjustment toward that target. If the cost of deviation is high, adjustment becomes a first priority whatever the market conditions of the firm are. Lower cost of deviation opens the door for other aspects, especially timing the market, to be considered in the financing decision. Using GMM system estimators with the Malaysian data for the period of 1992-2009, this study find that Malaysian firms, on average, are adjusting their capital structure toward the target but at a slow rate. At the same time, firms consider timing of the market conditions as an important factor when making financing decisions. Comparing subgroups of firms that are likely to have different costs of deviation reveal that the speed of adjustment is higher and the timing role is lower for firms with high cost of deviation. Particularly, firms far above the target adjust at a high speed and do not consider timing the market. Firms far below or close to the target adjust slowly and take market valuation into account. Deviating from the target to the upper side is more costly because bankruptcy costs and agency costs of debt will intensify quickly as the firm deviates more above the target. Firms seem to be very sensitive to be significantly above the target. Once the firm is not far above the target it becomes less sensitive to the cost of deviation and more likely to consider other motives including timing the equity market. The finding of this study supports that firms consider risk of distress and possible conflict with debtors as leading factors in the financing decision. This result is consistent with both tradeoff and agency theories. Only when the firm is not in the risky area, it may consider other factors as timing the market. Timing is better seen as an additional factor in a broad tradeoff framework. A framework that interprets all the empirical findings is still lacking.

Keywords: Market timing theory, Dynamic capital structure, Tradeoff theory, Speed of adjustment, GMM system

1. Introduction

Adjustment towards the target leverage is a dynamic behavior expected by several capital structure theories that presume the existence of target leverage. These theories suggest that firms attempt to balance the advantages against the costs associated with borrowing by keeping the

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leverage ratio at a certain target level (Baxter, 1967; Jensen and Meckling, 1976; Fischer et al., 1989). Any deviation from the target leverage is costly and requires quick action to get back to the target. On the other hand, market timing theory (Baker and Wurgler, 2002) suggests that firms time the issuing (repurchasing) activities according to periods of overvaluation (undervaluation) of their own stock. In this theory, firms do not have any target; hence firms do not attempt to adjust the effect of timing activities on their leverage ratio leaving changes in leverage largely dominated by successive timing activities.

Theoretically, the targeting and the timing are distinct behaviors. In timing theory, mispricing of common stock drives the relationship between market valuation and leverage ratio and the effect of timing is persistent. For mispricing to consistently play a role in the capital structure decisions, the rationality assumption of investors must be relaxed. In a rational expectation world, investors will learn that issues are mispriced and they will reflect this information in the pricing of subsequent issues. In turn, the firm will learn that attempts to exploit the mispricing opportunities are unsuccessful and will stop these attempts. As a result, mispricing will not steadily affect the leverage ratio in this rational world. Instead, the relationship between market valuation and leverage ratio in classical theories is driven by the value of investment opportunities available to the firm (Myers 1977). In this rational framework, any shock to the leverage ratio is short run because of the dynamic adjustment behavior. The speed of adjustment (SOA) towards the target is the main indicator that can differentiate the two motives of timing and targeting (Huang and Ritter, 2009). While targeting is associated with higher SOA, timing is characterized by the absence of adjustment. However, recent literature find that both motives actually exist at the same time which is inconsistence with any standalone theory (Graham and Harvey, 2001; Huang and Ritter, 2009; Kayhan and Titman, 2007).

The adjustment behavior is not identical for all firms (Clark et al., 2009; Flannery and Hankins, 2007; Lemmon et al., 2008). The SOA depends on the cost of deviation from the target leverage and the costs of adjustment towards that target. The distance the firm leverage is away from the target and whether the firm is overleveraged or underleveraged are among the aspects that are found to affect the SOA (Clark et al., 2009; Lemmon et al., 2008). Firms close to the target have slower rate of adjustment than firms far from the target because the cost of deviation is lower. Overleveraged firms have higher SOA compared with underleveraged firms as a result of the higher costs of deviation from the target (Flannery and Hankins, 2007). This paper suggests that timing behavior is affected by this heterogeneity in the SOA. The costs of deviation from the target and the benefits of timing interact in the decision making process. If the cost of deviation is high, it is more likely to dominate the benefits of timing. The firm is expected to exhibit stronger adjustment behavior and less timing behavior in this case. If the cost of deviation is low, the expected adjustment behavior is slower and timing benefits have higher potential to dominate the cost of deviation. Therefore, timing is expected to be more prominent for these firms. This conjecture will be investigated for two cases that are likely to have different cost of deviation. The first is between firms over and under-leveraged. The second is between firms close and far from the target.

The findings of this research provide evidence that an interaction between timing behavior and targeting behavior is actually occurred in determining the capital structure of the firm. These two behaviors are not totally separated in real world. Firms consider targeting as a priority if the cost of deviation is high and consider other motivations that can add benefits to the firm other than targeting only if the cost of deviation is reasonable. If the highest cost of deviation is the cost of bankruptcy and the cost of agency conflict with debt-holders, this finding implies that firms put safety as a first priority in their financing decisions. Only when the level of risk is acceptable, the benefits of timing can be exploited. This finding shed light on a plausible interpretation for the otherwise apparent as contradicted results in the past literature about the coexistence of the two motives of timing and targeting.

In the remaining of this paper, the background will be given in Section 2. The methodology and models will be explained in Section 3. The data will be described in Section 4 and the descriptive statistics in Section 5. Estimation results and discussion in Section 6 and finally, Section 7 will conclude.

2. Background

Main stream literature normally supports the existence of long-run target leverage and agrees that a typical firm adjust to the target at a certain SOA but the degree of this SOA is still controversial issue (Frank and Goyal, 2007). Alti (2006) and Flannery and Rangan (2006) both document a relatively rapid SOA which they interpret in favor of tradeoff theory. In contrast, Fama and French (2002) and Kayhan and Titman (2007) find only slow SOA which indicates that tradeoff factors may be only secondary aspects in the capital structure decisions. Baker and Wurgler (2002) find eventually no adjustment.

The adjustment behavior of leverage ratio rationally attempts to target an optimal leverage that balances the costs and the benefits of debt. Any deviation from the target is costly and hence, it will be transitory since the firm is supposed to actively close the deviation back to the target to reduce the cost of deviation. The adjustment behavior reflects three factors: the target leverage, the cost of deviation from the target and the cost of adjustments toward the target (Flannery and Hankins, 2007). The SOA varies across firms directly with the variation in the costs and benefits of adjustments toward the target, for instance higher probability of distress leads to faster adjustments (Flannery and Hankins, 2007; Clark et al. 2009). On the other hand, timing theory of capital structure is supported internationally (Baker and Wurgler, 2002; Mahajan and Tartaroglu, 2008) and for Malaysia (Abdeljawad and Mat Nor, 2011).

Few papers that investigate the two theories find evidence that both targeting and timing motives exist at the same time. Survey evidence of Graham and Harvey (2001) find that 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% of the managers agreed that they have some kind of target leverage. 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%. Kayhan and Titman (2007) find that stock price history still affect the debt ratio for about 10 years consistent with the persistence expected by timing theory. However, part of this effect is subsequently reversed since leverage ratio tends to adjust toward the target but at a slow rate.

The findings of these studies are not consistent with any standalone capital structure theory. This study proposes that this behavior is expected once the overall costs and benefits of financing decisions are considers. The costs and benefits of financing decisions can be categorized in three groups; the costs of deviation from the target (the benefits of being at the target), the cost of adjustment and the net benefits of timing. Given a certain level of the cost of adjustment, once the cost of deviation is higher than the benefits of timing, the firm will put priority to rebalance the deviation from the target despite the market conditions. If the cost of deviation is lower than the benefits of timing, the firm will prefer to time the market. The distance, whether the firm is close or far from the target, and the direction, whether the firm is overleveraged or underleveraged, of the deviation from the target are likely to affect the cost of deviation and then to moderate the timing versus targeting behavior of the firm.

The complete list of costs of deviation and market timing benefits may clarify the argument. Timing exists when managers believe that they can exploit the windows of opportunities that appear in the market, whether for rational or irrational reasons, for the benefits of existing shareholders. The direct benefit of market timing is to reduce the cost of equity by an amount equal to the difference between the intrinsic value and the market value of the stock despite the position from the target leverage.

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 overleveraged firms (Jensen and Meckling, 1976; Myers, 1977). The total cost of deviation is expected to increase sharply as the deviation above the target increases since the mentioned costs are likely to intensify rapidly as the deviation exceeds certain levels.

The costs of deviation below the target include the loss of the tax advantage of debt financing and the less role of debt as a manager disciplining device (Jensen, 1986). There is evidence that the costs of deviation are lesser for underleveraged firms than overleveraged firms. The zero leverage phenomenon studied by (Strebulaev and Yang, 2007) indicates that being underleveraged is not costly to many firms. About 9% 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% 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.

The cost of deviation is higher for firms far from the target compared with firms close to the target and for firms overleveraged compared with firms underleveraged. It follows that firms that are far over the target will face the highest cost of deviation and firms that are close to the target, whether above or below, will face the lowest costs. The SOA is directly related to the cost of adjustment. Flannery and Hankins (2007) argue that higher probability of distress leads to faster adjustment. Clark et al. (2009) find that factors associated with greater benefits of being at the target are associated with faster adjustment. The asymmetry between overleveraged and underleveraged firms is also documented in (Byoun, 2008).

This research proposes that the heterogeneity in the cost of deviation from the target affects not only the adjustment behavior but also the timing behavior of the firm. Firms that are far above the target will face high costs of deviation; hence these firms will put higher priority to adjust toward the target regardless the timing opportunities. Underleveraged firms and firms close to the target 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 likely to have more flexibility to time the market. For these firms, 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 follow Flannery and Rangan (2006) who suggest that if timing behavior dominates targeting behavior, it will wipe out the effect of targeting once it is included in the model. They conjecture that the factors associated with the dominant theory will appear to be more important once both groups of factors are competing together. This research will investigate when the role of timing is likely to show up and when it can be cool-off compared with tradeoff motives. Specifically, this research hypothesize that the tradeoff versus timing motives are moderated by the distance and the direction of the deviation from the target.

3. Methodology

3.1. Variables

The dependent variable of this research is the book leverage ratio of the firm. 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 can be the total debt to total assets ratio which reflects only the debt financing policy of the firm (Hovakimian, 2006). 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 tradeoff 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 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 captures the relationship between market valuation of the firm and leverage. The proxy used 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 have been used. 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). These variables are also identified to be the significant capital structure determinants in Malaysia (Booth et al., 2001). These control variables are size, profitability, tangibility and growth options.

In a tradeoff 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). 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 the year 2005.

For profitability, 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.

Tradeoff theory suggests that tangibility affects the capital structure as 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 is expected with the level of debt finance (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 story 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. Maintaining profitability level constant, funds needed, in excess of retained earnings, will be obtained from debt. This implies 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 product of the number of common shares and the end of the year share price.

3.2. Models

In a dynamic adjustment framework, if the costs of adjusting to the target leverage are zero, the firm will always keep its leverage at the target by instantly adjusting to 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 used to capture this dynamism. The setup of the partial adjustment model is

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

where δ is the average SOA to the target each period and $Lev^{*}_{i,t}$ is the target leverage.

The model assumes that the firm has a target leverage that minimizes the cost of capital. Nevertheless, the firm may deviate from the target but it should adjust the deviation 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. The fraction of adjustment is called the SOA= δ. If δ=1, it means that full adjustment occur each period, while if δ=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 $Lev^{*}_{i,t}$ 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 Eq. (2) will be used as the target leverage.

$$Lev^{*}_{i,t} = \beta_1 + \beta_2 Growth_{i,t-1} + \beta_3 Profit_{i,t-1} + \beta_4 Tang_{i,t-1} + \beta_5 Size_{i,t-1} + \gamma_t + \eta_i \qquad \text{Eq. (2)}$$

where $\gamma_t$and η_i are firm and time fixed effects and other variables are self explanatory.

The estimation of the partial adjustment model can be done by incorporating the target leverage (Eq. (2)) into the partial adjustment model (Eq. (1)) and rearranging the terms. This result in Eq. (3)

$$Lev_{i,t} = \delta\beta X_{i,t} + (1-\delta)Lev_{i,t-1} + \gamma_t + \eta_i + \varepsilon_{i,t} \qquad \text{Eq. (3)}$$

where the SOA (δ) equals one minus the coefficient of the lagged leverage. $X_{i,t}$ is the set of control variables all used as concurrent regressors, except for the lagged leverage, to allow for more observations to be used. The firm and time fixed effects are accounted for in the model following (Flannery and Rangan, 2006; 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's 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

$$Lev_{i,t} = \delta\beta X_{i,t} + (1-\delta)Lev_{i,t-1} + \gamma_1 Timing_{i,t} + \gamma_t + \eta_i + \varepsilon_{i,t} \qquad \text{Eq. (4)}$$

Eq. (4) is similar to Eq. (3) except that a timing variable is added to the model. The benchmark that will be used for comparison is Eq. (3). If adding the timing variable reduces the estimated coefficients of $X_{i,t}$ or the SOA significantly, that implies that timing variable has dominated the tradeoff factors.

Lastly, this research has controlled for the distance and the direction of the deviation from the target. Firstly, by dividing the sample into two groups based on whether the firm is over or underleveraged. Secondly, by dividing the sample into three sub-samples based on the distance and direction from the target, hence one group is for firms close to the target and the other two groups for firms far above and far below the target. Finally, re-estimate Eq. (3) and Eq. (4) for the sub-samples and compare the results. Since instrumental variables are used in the estimation, separating of groups aims to insure that the instruments used for estimation are from the same group not any other group. To create the subsamples, the deviation from the target is calculated first based on the following relationship

$$Deviation = Observed\ leverage - target\ leverage \qquad \text{Eq. (5)}$$

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. The first two subsamples are created based on the sign of the deviation. If the deviation is positive (negative), the firm is overleveraged (underleveraged). The second three sub-samples are created based on the 33.33^{rd} and 66.66^{th} percentiles of the deviation used as cut-off points. The middle group consists of firms that are close to the target while the other two groups include firms that are far below and far above the target.

3.3. Econometrics Approach

The estimated SOA from the literature varies with the econometric approach used where biased estimators are frequently employed for estimating dynamic models (Hovakimian and Li, 2011; Iliev and Welch, 2010). The lagged leverage regressor is likely to be endogenous in the estimation of Eq. (3) and Eq. (4) because it arises within a system that influences the error term. To obtain consistent estimators in this case, instrumental variables should be used. The instruments should satisfy the two requirements

i. Instrument validity that means no correlation between the instrument and the error is exists. If the instruments are valid, the estimators are consistent.

ii. Instrument relevance that means a high correlation of the instrument and the endogenous regressor should be satisfied. 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.

An increasingly popular approach to estimate partial adjustment models with the appropriate instruments is the difference generalized methods of moments (difference GMM) of Arellano and Bond (1991). The difference GMM is able to account for the unobservable firm fixed effects by using the first difference of the variables. In this approach the lags of the endogenous variable in levels are used as instruments for the first difference of the variable. 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 variables 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.

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. The system GMM becomes popular in estimating the dynamic capital structure models (Antoniou et al., 2008; Clark et al., 2009; Lemmon et al., 2008). This research will employ the GMM system as the estimation approach with orthogonal deviation to get rid of the firm fixed effect (Arellano and Bover, 1995). In this method, the average of all future available observations of the variable is subtracted from each observation. The use of orthogonal deviations is preferable in the case that many gaps exist in the unbalanced panel data (Roodman, 2006). 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 (Roodman, 2006; 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 contains all Malaysian firms available in the WorldScope from the DataStream database during the period of 1992-2009. Data before 1992 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 further restricts 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 (Baker and Wurgler, 2002; Hovakimian, 2006).

In addition, observations without at least 2 lags of data available fall out of the sample. The final sample is an unbalanced panel data where different number of firm-year observations is available for different firms. The total number of firm-year observations used in the analysis is 7978 observations.

5. Descriptive Statistics

The descriptive indicators for the variables used in this research are presented in Table 1. The mean, median, maximum, minimum, standard deviation and the number of observations for each variable are reported.

Table 1: Descriptive statistics for the variables of the research

	Mean	*Median*	*Maximum*	*Minimum*	*Std. Dev.*	*Observations*
LEV_TB	0.251	0.233	0.997	0.000	0.196	7978
MB	1.116	0.918	9.297	0.000	0.737	7978
TANGIBLE	0.403	0.394	0.999	0.000	0.222	7978
SIZE	19.104	19.026	23.969	9.250	1.545	7955
PROFIT	0.067	0.075	11.096	-2.434	0.188	7978
SPP	-0.074	-0.048	2.238	-3.258	0.565	7829

6. Estimation Results and Discussion

6.1. Tradeoff versus timing motives

Results of estimation of Eq. (3) and Eq. (4) for the full sample appear in column (a) and column (b) of Table 2, respectively. 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.

In Column (a) of Table 2, the lagged leverage is found to be the most important determinant of current leverage. Holding all other regressors constant, about 87.4% change in the mean of current leverage is resulted from a 100% change in the lagged leverage. This is an evidence for the high persistence of the leverage variable. The speed of adjustment (δ) equals unity minus this coefficient as will be discussed in Section 6-2.

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%. The positive relationship is usually interpreted as supporting simple pecking order where funds needed for growth in excess of retained earnings will be 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% which make 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%). 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 positively and significantly affecting leverage. The coefficient of this variable is 3.6%. 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 Eq. (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 valuation. This variable is found to be negatively and significantly related to leverage as expected. A 10% increase in SPP is associated with 1.7% decrease in leverage. The SOA for both models will be discussed next.

6.2. The speed of adjustments for the full sample

The speed of adjustment (δ) in Column (a) of Table 2 indicates that only 12.7% of the difference between desired and actual level of leverage is closed each year. This low SOA 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 C. Myers, 1999; Welch, 2004). However, this result is different from Flannery and Rangan (2006) who document a relatively high SOA of 34.4%. 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 upward biased in the estimation of the SOA (Lemmon et al., 2008).

Table 2: Estimation results for the short-run determinants of book leverage using Eq. (3) and Eq. (4).

Independent variables	*Eq. (3)* *(a)*	*Eq. (4)* *(b)*
LEV_TB(-1)	0.8743	0.8579
	(36.91)**	**(38.12)****
MB	0.0117	0.0136
	(3.59)**	**(4.42)****
PROFIT	-0.2156	-0.213
	(-8.61)**	**(-8.11)****
SIZE	0.0049	0.0058
	(4.23)**	**(4.76)****
TANGIBLE	0.0365	0.0356
	(5.04)**	**(4.86)****
SPP	--	-0.0176
	--	**(-5.28)****
Speed of adjustments	**12.7%**	**14.2%**
Number of observations	6931	6842
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 Chi^2	2579**	3129**

*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. ** and * indicate the coefficient is significant at 1% and 5% levels, respectively.*

The resulted slow SOA is not conclusive in supporting or rejecting of the dynamic adjustment as the main determinant of cross-section variation in leverage ratio. 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% and they find it difficult to interpret their results in favor of tradeoff theory. Though the SOA they find is statistically reliable, it is too slow to draw conclusions in favor or against tradeoff theory. This 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% after introducing the timing variable. Based on the proposition of Flannery and Rangan (2006), if the firm's first priority is timing, timing variable should wipe out the observed adjustment behavior once a variable that capture timing is included in the regression. The results of adding the timing variable appear to slightly increase, not decrease, the SOA. This result counters the intuition of Flannery and Rangan (2006). To interpret this result, recall that the adjustment behavior of the firm is impeded by the adjustment costs (i.e. the costs of issuing new securities). Adjustment costs prevent firms from adjusting instantly for shocks. 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

This research hypothesize that timing behavior is asymmetric between over and underleveraged firms. This asymmetry is a result of the difference in the costs and benefits associated with tradeoff as well as timing motives between over and underleveraged firms. Costs of being overleveraged are higher, hence these firms have 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 costs of deviation and less pressure to adjust. Consequently, these firms have more flexibility to exploit timing opportunities.

To investigate this hypothesis, the full sample has been split into two subsamples; one contains overleveraged firms and the other contains underleveraged firms. Both Eq. (3) and Eq. (4) have been re-estimated separately for each subsample. Table 4 presents the results of estimation. Column (a) and Column (c) present the results of Eq. (3) for the overleveraged and underleveraged firms, respectively. Column (b) and Column (d) present the estimation results of Eq. (4) for the overleveraged and underleveraged firms, respectively. Discussion of the results for each sub-sample separately is largely similar to the previous discussion for the full sample. Adding the timing variable has slightly increase the SOA for overleveraged firms by about 1.3% while it increase the SOA for underleveraged firms by about 2.2%. It is apparent that timing affects the targeting behavior more for underleveraged firms.

More interesting is the comparison between the two subsamples. 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%) than underleveraged firms (15.3%). The timing coefficient for underleveraged firms is significant while for overleveraged firms it is not. It is apparent that underleveraged firms are more affected by market valuation and less hurry to adjust to the target.

The effect 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 tradeoff dynamism are higher for the overleveraged firms. SPP is the only factor that is higher for underleveraged firms.

Table 4: Estimation results of Eq. (3) and Eq. (4) for both overleveraged and underleveraged firms

	Overleveraged firms		*Underleveraged firms*	
	(a)	*(b)*	*(c)*	*(d)*
	Eq. (3)	*Eq. (4)*	*Eq. (3)*	*Eq. (4)*
LEV_TB(-1)	0.706	0.693	0.869	0.847
	(9.41)**	**(10.13)****	**(21.08)****	**(19.66)****
MB	0.020	0.022	0.0029	0.004
	(4.62)**	**(5.12)****	(1.09)	(1.49)
PROFIT	-0.261	-0.278	-0.126	-0.116
	(-8.04)**	**(-8.86)****	**(-3.93)****	**(-4.27)****
SIZE	0.0045	0.0054	0.0026	0.0033
	(2.35)*	**(2.71)****	**(2.14)***	**(2.88)****
TANGIBLE	0.0477	0.0426	0.015	0.0183
	(3.26)**	**(3.45)****	**(2.35)***	**(2.68)****
SPP		-0.010		-0.022
		(-1.84)		**(-7.01)****
Speed of adjustments	**29.4%**	**30.7%**	**13.1%**	**15.3%**
Number of observations	2384	2357	2644	2614
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 Sig.	0.352	0.425	0.454	0.408
Wald	888**	962**	1169**	1208**

*Notes: Constant coefficient and time dummies are included with all models but not reported. Standard errors 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. ** and * indicate the coefficient is significant at 1% and 5% levels, respectively.*

6.4. Controlling for the distance of the deviation from the target

Controlling for the distance can be done by having two groups only; one for firms close to the target and one for firms far from the target despite the direction of the deviation. However, since overleveraged firms behave differently from underleveraged firms, combining both groups may hinder the true behavior of the firm. Hence, firms far from the target are better separated also based on whether they are over or underleveraged. The results appear in Table 5 for the speed of adjustment support the hypothesis that the SOA and timing behaviors varies in a predictable way with the variation in the cost of deviation. Firms far above the target adjust at a speed of 43.3%. The timing variable for these firms is insignificant. Firms far below the target adjust by 10% annually and timing variable is significant. Firms close to the target exhibit, basically, no adjustment and timing variable is significant also.

For other variables, growth options variable is highly significant for the far overleveraged firms. The same variable is insignificant for firms far below the target and significant but with small coefficient for firms close to the target. The coefficient for profitability variable is the highest for firms far above the target. Firms far below the target affected less and firms close to the target affected the least by variation in profitability. Other variables are insignificant for all groups.

Since the cost of deviation for firms far above the target is especially high; adjustment towards the target becomes first priority despite the market conditions of the firm. The cost of deviation above the target consists mainly of the higher cost of distress and the higher agency costs between debt-holders and shareholders. The results imply that firms are very sensitive to, at least, one of these costs associated with high leverage. Once the leverage ratio is close or far below the target, the firm seems to be relaxed in its adjusting behavior and has more ability to watch the market conditions of the firm.

Table 5: Estimation results of Eq. (3) and Eq. (4) for different distances from the target

	Far Overleveraged		*Far Underleveraged*		*Close To Target*	
	(a)	*(b)*	*(c)*	*(d)*	*(e)*	*(f)*
	Eq. (3)	*Eq. (4)*	*Eq. (3)*	*Eq. (4)*	*Eq. (3)*	*Eq. (4)*
LEV_TB(-1)	0.561	0.567	0.914	0.90	0.990	1.002
	(4.54)**	**(4.46)****	**(20.25)****	**(20.47)****	**(29.84)****	**(28.53)****
MB	0.021	0.022	0.005	0.006	0.003	0.004
	(3.99)**	**(3.66)****	(1.29)	(1.80)	**(3.29)****	**(3.84)****
PROFIT	-0.232	-0.247	-0.125	-0.116	-0.033	-0.027
	(-5.86)**	**(-5.66)****	**(-2.86)****	**(-2.97)****	**(-2.57)***	**(-1.97)***
SIZE	0.001	0.003	0.001	0.002	-0.0001	-0.0003
	(0.48)	(1.04)	(0.75)	(1.30)	(-0.11)	(-0.27)
TANGIBLE	0.031	0.027	0.01	0.009	0.009	0.006
	(1.88)	(1.57)	(1.11)	(1.11)	(1.10)	(0.78)
SPP		-0.015		-0.019		-0.004
		(-1.92)		**(-4.21)****		**(-2.62)****
Speed of adjustments	**43.9%**	**43.3%**	**8.6%**	**10%**	**1%**	**0%**
Number of observations	1496	1474	1521	1506	1328	1312
Number of instruments	142	143	142	143	116	114
AR(1) Sig. +	0.006	0.005	0.000	0.000	0.000	0.000
AR(2) Sig.+	0.646	0.659	0.361	0.409	0.407	0.521
Hansen test Sig.	0.900	0.904	0.638	0.609	0.992	0.988
Wald chi-sqr	560**	497**	921**	663**	18129**	18710**

*Notes: Constant coefficient and time dummies are included with all models but not reported. Standard errors 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. ** and * indicate the coefficient is significant at 1% and 5% levels, respectively.*

7. Conclusions

Malaysian firms, on average, are adjusting their capital structure toward the target but at a slow rate. At the same time, firms consider timing of the market conditions as an important factor when making financing decisions. The averaging of all firms in past investigations of timing versus adjustment behaviors seems to hinder the actual behavior of firms. Firms vary in their adjustment behavior as a result of the heterogeneity of the costs of deviation. Timing behavior is also found to be affected by the heterogeneity of the adjustment behavior. Specifically, overleveraged firms adjust to the target faster and they are not concern with timing. On the other side, underleveraged firms adjust slower but they consider timing more seriously. This behavior is expected once the cost of deviation is taken into account. 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. This finding is confirmed by the results of the grouping of firms based on the distance in addition to the direction of the deviation. Firms close to the target and firms far below the target are adjusting slowly and affected by market valuation significantly. Firms far above the target are adjusting faster and do not affected by market valuation. Firms seem to be very sensitive to be significantly above the target. Once the firm is not far above the target it becomes less sensitive to the cost of deviation and more likely to consider other motives including timing the equity market.

The finding of this study supports that firms consider risk of distress and possible conflict with debtors as a leading factors in their financing decisions. This is consistent with tradeoff and agency theories. Only when the firm is not in the risky area, it may consider other factors as timing the market. Timing behavior seems to be an additional factor in a general tradeoff framework. A framework that interprets all the empirical findings is still lacking.

References

Abdeljawad, I., Mat Nor, F., 2011. Equity Market Timing and Capital Structure: Evidence from Malaysia., 13th Malaysian Finance Association, Langkawi, Malaysia.

Alti, A., 2006. How Persistent Is the Impact of Market Timing on Capital Structure? The Journal of Finance 61, 1681-1710.

Antoniou, A., Guney, Y., Paudyal, K., 2008. The determinants of capital structure: capital market-oriented versus bank-oriented institutions. Journal of Financial and Quantitative analysis 43, 59-92.

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

Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. Journal of econometrics 68, 29-51.

Baker, M., Wurgler, J., 2002. Market Timing and Capital Structure. The Journal of Finance 57, 1-32.

Baxter, N.D., 1967. Leverage, risk of ruin and the cost of capital. Journal of Finance 22, 395-403.

Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of econometrics 87, 115-143.

Booth, L., Aivazian, V., Demirguc-Kunt, A., Maksimovic, V., 2001. Capital structures in developing countries. Journal of Finance 56, 87-130.

Bradley, M., Jarrell, G.A., Kim, E.H., 1984. On the Existence of an Optimal Capital Structure: Theory and Evidence. The Journal of Finance 39, 857-878.

Byoun, S., 2008. How and When Do Firms Adjust Their Capital Structures toward Targets? The Journal of Finance 63, 3069-3096.

Clark, B.J., Francis, B.B., Hasan, I., 2009. Do Firms Adjust Toward Target Capital Structures? Some International Evidence. SSRN eLibrary.

De Bie, T., De Haan, L., 2007. Market timing and capital structure: Evidence for Dutch firms. Economist 155, 183-206.

Deangelo, H. & Masulis, R. W. 1980. Optimal Capital Structure under Corporate and Personal Taxation. *Journal of Financial Economics* 8(1): 3-29.

Deesomsak, R., Paudyal, K., Pescetto, G., 2004. The determinants of capital structure: evidence from the Asia Pacific region. Journal of Multinational Financial Management 14, 387-405.

Fama, E.F., French, K.R., 2002. Testing Trade-Off and Pecking Order Predictions about Dividends and Debt. The Review of Financial Studies 15, 1-33.

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

Flannery, M.J., Hankins, K.W., 2007. A theory of capital structure adjustment speed. Unpublished Manuscript, University of Florida.

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

Frank, M.Z., Goyal, V.K., 2007. Trade-Off and Pecking Order Theories of Debt. SSRN eLibrary.

Graham, J.R., Harvey, C.R., 2001. The theory and practice of corporate finance: evidence from the field. Journal of Financial Economics 60, 187-243.

Harris, M., Raviv, A., 1990. Capital structure and the informational role of debt. Journal of Finance 45, 321-349.

Homaifar, G., Zietz, J., Benkato, O., 1994. An empirical model of capital structure: some new evidence. Journal of Business Finance & Accounting 21, 1-14.

Hovakimian, A., 2006. Are observed capital structures determined by equity market timing? Journal of Financial and Quantitative analysis 41, 221-243.

Hovakimian, A., Li, G., 2011. In search of conclusive evidence: How to test for adjustment to target capital structure. Journal of Corporate Finance 17, 33-44.

Hovakimian, A., Opler, T., Titman, S., 2001. The Debt-Equity Choice. The Journal of Financial and Quantitative Analysis 36, 1-24.

Huang, R., Ritter, J., 2009. Testing theories of capital structure and estimating the speed of adjustment. Journal of Financial and Quantitative analysis 44, 237-271.

Iliev, P., Welch, I., 2010. Reconciling estimates of the speed of adjustment of leverage ratios. SSRN eLibrary.

Jensen, M., 1986. Agency costs of free cash flow, corporate finance, and takeovers. The American Economic Review 76, 323-329.

Jensen, M., Meckling, W., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics 3, 305-360.

Kayhan, A., Titman, S., 2007. Firms' histories and their capital structures. Journal of Financial Economics 83, 1-32.

Lemmon, M.L., Roberts, M.R., Zender, J.F., 2008. Back to the Beginning: Persistence and the Cross Section of Corporate Capital Structure. The Journal of Finance 63, 1575-1608.

Mahajan, A., Tartaroglu, S., 2008. Equity market timing and capital structure: International evidence. Journal of Banking & Finance 32, 754-766.

Myers, S., 1977. Determinants of corporate borrowing. Journal of Financial Economics 5, 147-175.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have informationthat investors do not have. Journal of Financial Economics 13, 187-221.

Myers, S.C., 1984. The Capital Structure Puzzle. The Journal of Finance 39, 575-592.

Myers, S.C., 2003. Chapter 4 Financing of corporations, in: G.M. Constantinides, M.H., Stulz, R.M. (Eds.), Handbook of the Economics of Finance. Elsevier, 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 28, 175-198.

Rajan, R., Zingales, L., 1995. What do we know about capital structure? Some evidence from international data. Journal of Finance 50, 1421-1460.

Roodman, D., 2006. How to do xtabond2: An Introduction to" Difference" and" System" GMM in Stata. Center for global development.

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

Strebulaev, I. & Yang, B. 2007. The Mystery of Zero-Leverage Firms. *working paper, Stanford University.*

Titman, S., Wessels, R., 1988. The Determinants of Capital Structure Choice. The Journal of Finance 43, 1-19.

Welch, I., 2004. Capital Structure and Stock Returns. The Journal of Political Economy 112, 106-131.

Windmeijer, F., 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. Journal of econometrics 126, 25-51.