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Full Length Research Paper

Capital structure and financing decision - Evidence from the four Asian Tigers and Japan

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This paper examines the relative importance of the Modigliani-Miller theorem, the trade-off theory, the pecking order theory and the market timing theory in the financing decisions of the firms for the Four Asian Tigers (Hong Kong, Korea, Singapore and Taiwan) and Japan. According to our findings, although several elements impact on capital structure temporarily, firms from all countries rebalance their leverage following equity issuances. The results are more in line with the dynamic trade-off theory rather than the equity market timing or pecking order hypothesis of capital structure. In other words, firms have their target capital structures, determined by the marginal benefits of debt and costs associated with debt. Therefore, this implies that firms adjust their capital structure in response to the temporary shocks that cause their leverage to deviate from the target in the Four Asian Tigers and Japan. This outcome would be consistent with the previous empirical evidences of the US and the other of the Group of Seven (G7).

Key words: Capital structure, trade-off theory, market timing hypothesis, pecking order theory.

INTRODUCTION

The capital structure refers to the way that a firm finances its assets through some combination of financing sources. The first choice is internal financing which is the using of profit or retained earnings as a source of capital for new investment. The second choice is external financing which is the usage of new money, such as equity, debt, hybrid securities, from outside of the firm brought in for investment. Based on different kinds of financial decisions, the capital structures of firms could be shaped differently. Eventually, it is an important issue for managers how to minimize financial costs and maximize shareholders' equity. The Modigliani-Miller theorem (Modigliani and Miller, 1958), the first relevant theory of capital structure, states that the value of a firm is irrelevant to how that firm is financed in a perfect market. However, the real world reflects the firm's value is relevant with its bankruptcy costs, agency costs, taxes, information asymmetry and so on. That is why a firm's value is affected by the capital structure it employs. Therefore, since Modigliani and Miller's irrelevance proposition, researchers have investigated firms' decisions about how to finance their operations. Based on the practical contradiction of the Modigliani-Miller theorem, two traditional theories of capital structure, the trade-off theory and the pecking order theory, are developed. The trade-off theory considers that firms have a target capital structure that is determined by the marginal benefits of debt, for example, tax advantage of debt and costs associated with debt, such as bankruptcy costs and agency costs (Jensen and Meckling, 1976; Myers, 1977). In other words, trade-off theory implies that firms adjust their capital structure in response to the temporary shocks

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Abbreviations: EFWAMB, External finance weighted-average market-to-book ratio; **M/B,** book ratio; **PPE,** property, plant, and equipment; **FD,** financial deficit; **EBITD,** earnings before interest, taxes and depreciation; **YT,** yearly timing; **LT,** long-term timing; **OLS,** ordinary least squares.

that cause their leverage to deviate from the target.

The pecking order theory is based on asymmetric information (Myers and Majluf, 1984; Myers, 1984), when a manager makes financial decisions by external funds, investors would see this behavior as the firm is overvalued. Therefore, investors tend to sell their stocks and the value of the firm will fall. For this reason, firms follow a financing hierarchy; descends from internal funds, to debt and finally to external equity. Recently, a new theory, the market timing theory of capital structure which was first introduced by Baker and Wurgler (2002), develops a different kind of view about capital structure. The market timing theory suggests that managers are able to identify certain time periods during which equity issuance is less costly due to the high valuation of company's stock. It means, firms are more likely to issue equity when their market values are high, relative to book and post market values and to repurchase equity when their market values are low. As a consequence, current capital structure is strongly related to historical market values. This result provides the theory that capital structure is the cumulative outcome of past attempts to time the equity market. However, Hovakimian (2005), Flannery and Rangan (2006), Alti (2006) and Kayhan and Titman (2007) disagree with Baker and Wurgler on the persistence of the effect on capital structure because the importance of historical average market-to-book ratios in leverage regressions does not influence the past equity market timing. Kayhan and Titman (2007) make the point that the significance of the historical market-to-book series in leverage regressions may be due to the noise in the current market-to-book ratio. Specifically, Kayhan and Titman decompose the external finance weighted average market-to-book ratio into the mean market-to-book ratio, the covariance between the market-to-book ratio, and the financing deficit.

They show that the persistence result of Baker and Wurgler is mainly driven by the persistence of the average market-to-book ratio rather than the covariance between the market-to-book ratio and the financing deficit. In finance, capital structure refers to the way a firm finances its assets through some combination of sources. Based on many kinds of financial decisions, firms could shape different capital structures. Data of previous studies are from the United States, G7 or Dutch firms. According to most of the findings, firms from all countries rebalance their leverage in response to the temporary shocks. These results are more in line with the dynamic trade-off theory rather than the equity market timing or pecking order hypothesis of capital structure. In our study, we tend to examine financing behaviors in the advanced and high-income economies in Asia region and compare the results of G7. We select the samples including Four Asian Tigers and Japan. These regions were noted for maintaining high growth rates and rapid industrialization between the early 1960s and 1990s. In the early 21st century, the original Four Asian Tigers are at fully developed status. In addition, Japan emerged as the most developed nation in Asia. Due to quite homogeneous of these countries in their level of economic development, we draw these five highly developed countries in Asia to compare with previous studies. As above, we will check two purposes of our study: (1) what drives capital structure developments? We investigate referring to the decision to issue equity, debt, both, or not to issue and we have a tendency to examine financing decisions in Asia. (2) Are the effects persistent? Does the capital structure have long-lasting effects? The remainder of the paper is organized as follows. Section 2 provides an overview of prior research on capital structure theories. Section 3 describes the methodology. The empirical analyses of financing decisions and their impacts on capital structure are presented in Section 4. Section 5 concludes.

CAPITAL STRUCTURE THEORIES

Modigliani-miller's theorem

The Modigliani-Miller's theorem (Modigliani and Miller, 1958) is the first relevant theory of capital structure. They assume that a perfect capital market has no transaction or bankruptcy costs and people receive perfect information. However, the real world reflects the firm's value is relevant with its bankruptcy costs, agency costs, taxes, information asymmetry and so on. That is why a firm's value is affected by the capital structure it employs. For this reason, since Modigliani and Miller's irrelevance proposition, researchers have investigated firms' decisions about how to finance their operations. Two traditional theories of capital structure, the trade-off theory and the pecking order theory, are developed. These theories guide most of the capital structure studies.

Trade-off theory

The trade-off theory refers to the idea that a firm chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. An important purpose of the theory is to explain the fact that firms usually are financed partly with debt and partly with equity. The marginal benefit of further increases in debt declines as debt increases, while the marginal cost increases, so that a firm that is optimizing its overall value will focus on this trade-off when choosing how much debt and equity to use for financing. This theory has static and dynamic versions as follows.

The static trade-off theory

Modigliani and Miller (1963) argue that a firm would raise its value by financing debt because of a debt tax shield. However, one of the disadvantages of debt is the cost of

potential financial distress, especially when the firm relies on too much debt. In static trade-off theory (Myers, 1977), the agency costs of financial distress and the tax-deductibility of debt finance generate an optimal capital structure. Therefore, firms' capital structures are optimal when they determine by comparison off the costs against the benefits of the use of debt and equity. The costs of monitoring or solving agent problems are defined as agent costs. Incorporating agency costs into the static trade-off theory means that a firm determines its capital structure by trading off the tax advantage of debt against the costs of financial distress of too much debt and the agency costs of debt against the agency cost of equity (Jensen and Meckling, 1976; Jensen, 1986).

Dynamic trade-off theory

The dynamic trade-off theory has been proposed by Fischer et al. (1989). They argue a model of dynamic optimal capital structure choice in the presence of recapitalization costs. This implies the firms' capital structures may not always coincide with their target leverage ratios. In a dynamic model, the correct financing decision typically depends on the financing margin that the firm anticipates in the next period. Gradually, the capital structure will approach the optimal target. The firm undertakes capital structure adjustments when leverage reaches either of the two boundaries defining the range. The levels of the boundaries vary cross-sectional with firm characteristics such as the volatility of cash flows, the profitability of assets, interest rates and bankruptcy costs. The type of adjustment cost determines how much the firm adjusts their capital structure.

Pecking order theory

Myers (1984) and Myers and Majluf (1984) set the viewpoint of adverse selection into pecking order theory. The key idea is that the owner-manager of the firm knows the true value of the firm's assets and growth opportunities. Outside investors can only guess these values. If the manager offers to sell equity, then the outside investor must ask why the manager is willing to do so. In many cases, the manager of an overvalued firm will be willing to sell equity, while the manager of an undervalued firm will not. Therefore, when managers issue equity instead of riskless debt, outside investors rationally discount the firm's stock price. To avoid this discount, managers will follow a pecking order theory of finance. This theory maintains that businesses adhere to a hierarchy of financing sources and prefer internal financing (that is, retained earnings and excess liquid assets or 'slack') when available and debt is preferred over equity if external financing is required. Shyam-Sunder and Myers (1999) assess the non-nested capital structure models by examining debt financing patterns through time. They show that, under the pecking order theory, a regression of debt financing on the firm's deficit-of-funds, that is, real investment and dividend commitments less internal funds should yield a slope coefficient close to unity. Fama and French (2005) find firms issue or retire equity each year and the issues are on average large and not typically done by firms under duress.

Market timing theory

The market timing theory is brought up by Baker and Wurgler (2002). They use the market-to-book ratio to measure the market timing opportunities perceived by managers. Otherwise, they construct a historical market-to-book ratio (external finance weighted-average market-to-book ratio, EFWAMB) to capture firm's past equity market timing attempts. As claimed by its proponents of the United States between 1968 and 1999, Baker and Wurgler find out that firms prefer external equity when the cost of equity is low, and prefer debt vice versa. Besides, this market timing of equity issues have long-lasting effects on capital structure. Hovakimian (2005), Flannery and Rangan (2006), Alti (2006), Kayhan and Titman (2007) disagree with Baker and Wurgler on the persistence of the effect on capital structure. Hovakimian (2005) finds that the importance of historical average market-to-book ratios in leverage regressions is not due to past equity market timing. Flannery and Rangan (2006) find strong evidence that non-financial firms identified and pursued target capital ratios during the l966 to 2001 period. Alti (2006) uses a dummy variable called HOT to measure the market timing effect whether the IPO takes place in a hot issue market, characterized by high IPO volume in terms of the number of issuers, or a cold one. According to empirical outcome, he finds that market timing depresses the leverage ratio significantly in the very short run, but also finds that the timing effect on leverage quickly reverses. Kayhan and Titman (2007) examines how cash flows, investment expenditures, and stock price histories affect debt ratios between 1960 and 2003 in the United States.

They find that these variables have a substantial influence on changes in capital structure. Specifically, stock price changes and financial deficits (that is, the amount of external capital raises) have strong influences on capital structure changes, but in contrast to previous conclusions, they find that over long horizons their effects are partially reversed. Bie and Haan (2007) examine market timing and its effects on capital structure for a sample of Dutch listed firms and a sub-sample of Dutch IPO firms. Their result yield evidence of market timing. The stock price run-ups increase the probabilities of equity and dual issues. Further, the effects of stock price run-ups on the choices between issuance of debt, equity or both are consistent with the predictions of the market timing

hypothesis. However, they do not find persistent effects of market timing on capital structures of Dutch Firms. Mahajan and Tartaroglu (2008) argue an alternative historical market-to-book ratio. They investigate the equity market timing hypothesis of capital structure in major industrialized, Group 7 (G7), countries. According to empirical outcome between 1993 and 2005, there is a negative association between historical market-to-book ratio and leverage in all G7 countries. They find in all G7 countries, except Japan, undo the effect of equity issuance and the impact of equity market timing attempts on leverage is short lived.

These firms rebalance their leverage following equity issuances. This is inconsistent with the prediction of the equity market timing hypothesis and more in line with dynamic trade-off model. What factors determine the capital structure decisions? Despite decades of intensive research, there is a surprising lack of consensus even about many of the basic empirical facts. It is unfortunate for empirical research in corporate finance since it is unclear what factors should be used to control for "What do we already know?" According to the literature, it is more interesting in the findings of Kayhan and Titman (2007) and Mahajan and Tartarglu (2008). But they are focused on the U.S., G7 and Dutch countries; therefore, in this study, we will re-examines the models of Kayhan and Titman (2007) to provide evidences about the broad patterns of financing activity in advanced and high-income Asian emerging liberalized markets, including Hong Kong, Japan, Korea, Singapore and Taiwan, from 1988 to 2007 would be selected. We will check two purposes of our study: (1) what drives capital structure developments? We look at the decision to issue equity, debt, both, or not to issue, and have a tendency to examine financing decisions in East Asia. (2) Are the effects persistent? Does the capital structure have long-lasting effects? We tend to estimate whether the effect of trade-off, pecking order and timing variables on the debt ratio have long-lasting effects.

METHODOLOGY

Data

Our sample is drawn from the database of Standard and Poor's Compustat Global (Global Vantage) files in five countries, including Hong Kong, Japan, Korea, Singapore and Taiwan. The observed period is from 1988 to 2007. For comparability of results for each country, we translate sales figures in local currencies to US dollars, using respective yearly average exchange rates. According to Kayhan and Titman (2007), we restrict the sample to exclude financial firms (SIC 6000–6999) and regulated firms (SIC 4000–4999) since their accounting and reporting environments differ from those in other industries. Besides, following Baker and Wurgler (2002), we eliminate firms with book value of assets less than $10 million and observations that have a market-to-book ratio greater than 10. Our sample is further restricted to include firms that have at least three years of data due to our long-horizon analysis. We define book equity as equal to total assets less total liabilities and preferred stock plus deferred taxes. Baker and Wurgler (2002) reclassify convertible debt as equity. However, Global Vantage does not provide detail data on convertible debt. Following recent capital structure studies,that is, Alti (2006), convertible debt is included in debt in our study. Book leverage is defined as the ratio of book debt to total assets, where book debt is defined as total assets minus book equity. In addition, we drop individual firm-year observations where this ratio is greater than one. Market leverage is the ratio of the book value of debt to the sum of the book value of debt and the market value of equity. Net debt and net equity issues that are used both in market timing and financial deficit variables are calculated using balance sheet items. We define net equity issues as the change in the book value of equity minus the change in retained earnings, as Baker and Wurgler (2002) do. Net debt issues are then defined as the change in total assets net of the change in retained earnings and net equity issues.

Operational variables

In the study, we apply two-stage method to figure how financial decisions affect capital structure of the companies. First, we develop a target leverage regression including several important proxy variables which are argued by several scholars. Especially, Titman and Wessels (1988) and Rajan and Zingales (1995) mention that the financial decisions of the firm will be affected significantly by several factors including the market-to-book ratio, asset tangibility, profitability, firm size, uniqueness and so on. Second, we estimate the financial behaviors by proxy variables including leverage deficit and change in target.

Variables of first stage

Market-to-book ratio (M/B)

Myers (1977) states that the market-to-book ratio (M/B) proxy is for the investment opportunity sets that firms face. Firms with higher growth would have higher bankruptcy cost, so managers might lower the debt ratio to avoid bankruptcy. Equally, firms with higher growth might need more cash to expand their business. Managers would reduce the level of debt to avoid huge interests. That is to say, the coefficient of market to book ratio is less than zero.

Asset tangibility (net property, plant, and equipment scaled by total assets; PPE)

Asset tangibility is the ratio of fixed to total assets. Myers and Majluf (1984) argue that this proxy is the collateral ability of the assets and can thus be associated with higher debt capacity. In other words, firms with debt might invest the project with higher risk and increase agency cost of debt. Firms with collateral could reduce the agency cost and get lower interest rate of debt. Therefore, they argued that firms with more collateral would get higher debt ratios.

Profitability earnings before interest, taxes and depreciation (EBITD)

In pecking order theory, due to asymmetric information (Myers and Majluf, 1984; Myers, 1984), firms follow a financing hierarchy; they finance their investments first with internal funds, then external debt, and finally with equity as a last resort. Firms with high profitability can obtain high retained earnings. As there is any financial deficit, firms would use internal fund rather than fund from outside. So profitability would be negative to firms' leverage.

Table 1. Definition of the variables in the first stage.

Property	Proxy variable	Definition	Expected relation
Growth opportunity	The market-to-book ratio	Market Value of Total Asset / Book Value of Total Asset	-
Asset tangibility	PPE	Net property, plant, and equipment / total assets	+
Profitability	EBITD	Earnings before interest, tax, and depreciation / total assets	-
Uniqueness	Research and development expense	Research and development expense / sales	-
Firm size	Firm size	Natural logarithm of net sales	+

Research and development expenditure

Titman and Wessels (1988) point out that a firm's liquidation decision is causally linked to its bankruptcy status. As a result, the firm's cost can potentially impose on their customers, suppliers, and workers by liquidating are relevant to their capital structure decisions. Customers, workers and suppliers of firms that produce unique or specialized products probably suffer relatively high costs in the event that they liquidate. Their workers and suppliers probably have job specific skills and capital and their customers may find it difficult to find alternative servicing for their relatively unique products. For these reasons, uniqueness is expected to be negatively related to debt ratios.

Firm size (size)

An argument for size is that informational asymmetries between insiders in a firm and the capital markets are lower for large firms. Hence, large firms should be more capable of issuing external debts (Myers and Majluf, 1984). The other argument for size is that size is likely to be positively correlated with leverage, since large firms are likely to be more diversified and have greater access to capital markets. According to already mentioned, proxy variables of the first stage are summarized in Table 1.

Variables of second stage

Pecking order financing

Financing deficit

The financial deficit (FD) is defined as the sum of investments (I), dividends (D) and changes in working capital (ΔWC), net of net cash flow (CF). This sum is identical to net equity issues (Δe) plus net debt issues (Δd). Due to asymmetric information (Myers and Majluf, 1984; Myers, 1984), firms follow a financing hierarchy; they finance their investments first with internal funds, then external debt and finally with equity as a last resort. In recent years, Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) find that the financing deficit is positively related to changes in leverage which indicates pecking order financing behavior. In other words, managers prefer issuing debts to issuing equity when firms tend to make a financial decision by taking external funds. Therefore, the financial deficit is seen as a proxy variable of measuring pecking order theory on capital structure changes.

Profitability (EBITD)

The profitability measure is defined as EBITD, scaled by total assets at the start of the year. Because firms generate a lot of internal cash, investment can be more easily financed with retained earnings. According to the pecking order theory, firms prefer to use internal finance first, implying a negative relationship between profitability and leverage.

Market timing

The proxy of market timing tends to capture the Baker and Wurgler's (2002) idea that a firm raises external capital when its stock price is relatively high more likely to decrease its debt ratio. They argue two parts of the proxy as below:

$$\text{Yearly timing } (YT) = \left[\sum_{s=0}^{t-1} FD_s * (M/B)_s\right] \Big/ t - \overline{FD} * \overline{M/B} = \hat{\text{cov}}(FD, M/B) \quad (1)$$

$$\text{Long-term timing } (LT) = \left[\sum_{s=0}^{t-1} (M/B)_s / t\right] * \left[\sum_{s=0}^{t-1} FD_s / t\right] = \overline{M/B} * \overline{FD} \quad (2)$$

Covariance:

$$Cov(X,Y) = E\left[(X - E(X))(Y - E(Y))\right] = E(XY) - E(X)E(Y) \quad (3)$$

The yearly timing measure (YT) is the sample covariance between total external financing and the market-to-book ratio. Managers are able to identify certain time periods during which equity issuance is less costly due to the high valuation of company's stock. In other words, firms are more likely to issue equity when their market values are high, relative to book and post market values, and to repurchase equity when their market values are low. The logic here is that managers take advantage of short-term over-valuation to fund their capital needs by issuing equity. Therefore, the notion of over- or under-valuation is determined by the firm's current market-to-book ratio relative to its market-to-book ratio in surrounding years. In this case, YT is expected to be negatively related to leverage. The long-term timing (LT) measure is also expected to have a negative relationship with leverage because we test whether managers act as though their costs of equity financing is inversely related to the market-to-book ratio, leading them to fund their financial deficit with equity rather than debt if their market-to-book ratio is sufficiently high.

The covariance is a measure of how much two variables change together. If two variables tend to vary together, then the covariance between the two variables will be positive. On the other hand, if two variables do not vary together, the covariance between the two variables will be negative. However, high market-to-book firms are relative to the pecking order tests of Shyam-Sunder and Myers (1999) and Frank and Goyal (2003). This has nothing to do with equity market timing behavior. We will mention those reasons in the following. First, firms with high market-to-book ratios are more willing to issue equity due to asymmetric information problems. Secondly, firms with higher market-to-book ratios may be more willing to be exposed to the increased scrutiny that occurs when their shares are issued on public markets. Thirdly, high market-to-book firms often have many growth opportunities and for that reason may avoid using too much debt because they want to reserve their borrowing capacity for the future. Finally, it may be the case that firms with low market-to-book values are relatively under-levered, since they tend to add a lot of equity to their balance sheets via retained earnings. Growth firms, on the other hand, generate less retained earnings and therefore need to finance their financial deficits at least partially with equity to keep from becoming over-levered. As already mentioned, Baker and Wurgler (2002) state their timing measure which is market-to-book ratio in EFWAMB.

M/B_{efwa}), defines as:

$$M/B_{efwa,t-1}=\sum_{s=0}^{t-1}\frac{\Delta e_s+\Delta d_s}{\sum_{r=0}^{t-1}\Delta e_r+\Delta d_r}\left(\frac{M}{B}\right)_s=\frac{\left[\hat{\mathrm{cov}}(FD,\frac{M}{B})+\overline{FD}*\frac{\overline{M}}{B}\right]*t}{\sum_{r=0}^{t-1}\Delta e_r+\Delta d_r}=\frac{\hat{\mathrm{cov}}(FD,\frac{M}{B})+\overline{FD}*(\frac{\overline{M}}{B})}{\sum_{r=0}^{t-1}\Delta e_r+\Delta d_r \Big/ t}=\frac{\hat{\mathrm{cov}}(FD,\frac{M}{B})+\overline{FD}*(\frac{\overline{M}}{B})}{\overline{FD}}=$$

$$(YT+LT)/\overline{FD}=\frac{\hat{\mathrm{cov}}(FD,M/B)}{\overline{FD}}+\overline{(M/B)} \quad (4)$$

The first term in this decomposition, $\hat{\mathrm{cov}}(FD,M/B)$ divided by $\overline{FD}$, is scaled by the average financial deficit. When the amount of capital raises this average financial deficit term is invariant. In contrast, Kayhan and Titman (2007) argue their yearly timing measure (*YT*), accounts for the fact that market timing is likely to affect a firm's capital structure more if the firm raises more external capital. The first term in this decomposition, the average market-to-book ratio $\overline{(M/B)}$, is not an appropriate proxy for timing theory. Due to the market-to-book ratio is likely to proxy for a firm's investment opportunity set, Baker and Wurgler recognize this possibility and include a one period lag of M/B to control for differences in investment opportunities.

However, if leverage changes more slowly than investment opportunities, or alternatively if M/B is a very noisy proxy for investment opportunities, the average market-to-book ratio, calculated over a number of prior years, may provide a better proxy for a firm's investment opportunities than does the one year lagged M/B. In the previous section we showed, Hovakimian (2005), Flannery and Rangan (2006), Alti (2006), Kayhan and Titman (2007) disagree with Baker and Wurgler on the persistence of the effect on capital structure because the importance of historical average market-to-book ratios in leverage regressions is not due to past equity market timing. Kayhan and Titman (2007) make the point that the significance of the historical market-to-book series in leverage regressions may be due to the noise in the current market-to-book ratio. Specifically, Kayhan and Titman decompose the external finance weighted average market-to-book ratio into the mean market-to-book ratio and the covariance between the market-to-book ratio and the financing deficit. They show that the persistence result of Baker and Wurgler is mainly driven by the persistence of the average market-to-book ratio rather than the covariance between the market-to-book ratio and the financing deficit. As a consequence, we tend to use timing measures of Kayhan and Titman (YT and LT) in both book and market leverage regressions.

Trade-off financing

In trade-off theory, we develop the target leverage model as Equation 5 which is a Tobit regression with M/B, asset tangibility (PPE, net scaled by total assets), profitability (EBITD, operating income before depreciation scaled by total assets), research and development expense (R&D scaled by net sales) and firm size (SIZE, logarithm of net sales). The predicted value of the leverage ratio is restricted to be between 0 and 100.

$$L_t=\alpha_0+\beta_1 M/B_{t-1}+\beta_2 PPE_{t-1}+\beta_3 EBITD_{t-1}+\beta_4 R\&D_{t-1}+\beta_5 SIZE_{t-1}+\varepsilon_t \quad (5)$$

Table 2. Definitions of the variables in the second stage.

Property	Proxy variable	Variable definition	Expect relation
Pecking order financing	Financial Deficit	$\Delta e + \Delta d$	+
Pecking order financing	Profitability (EBITD)	*Earnings before interest, tax, and depreciation / total assets*	-
Market timing	Yearly timing	$\hat{\text{cov}}(FD, M/B)$	-
Market timing	Long-term timing	$\overline{M/B} * \overline{FD}$	-
Trade-off financing	Leverage deficit	$Ldef_{t-3} = L_{t-3} - L^T_{t-3}$	-
Trade-off financing	Change in target	$\Delta T \arg et_{t-3} = L^T_t - L^T_{t-3}$	+

Then, we tend to estimate the leverage deficit, which is the difference between the actual debt ratio and the target debt ratio. Similarly, our measure of the change in the target is the difference between the current target debt ratio and the target debt ratio measured at the beginning of the observation period. Previous empirical capital structure studies generally examine yearly changes in debt ratios.

Kayhan and Titman (2007) look at longer horizons 5 to10 to understand the role of transitory shocks on the debt ratios. In this study, we cover 3 to 6 years, instead of the 5 to 10 years used by KT.

Leverage deficit

The leverage deficit is the difference between the actual debt ratio (L_{t-3}) and the target debt ratio (L^T_{t-3}). If the financial decision of the firm is inclined to the trade-off theory, the firm tended toward the target debt ratio whether the actual debt ratio is higher than the target debt ratio or not.

Change in target

The change in the target is the difference between the current target debt ratio (L^T_t) and the target debt ratio measured at the beginning of the observation period (L^T_{t-3}). If the firm moves toward the new target debt ratio when the target ratio makes an alteration, the capital structure of the firm is tended to the trade-off theory. The proxy variables of the second stage are as Table 2.

Empirical models

Developments of capital structure

We apply two-stage method for the empirical study. The first-stage is estimated using a Tobit specification (Tobit, 1958) where the predicted value of the leverage ratio is restricted to be between 0 and 100. In the second-stage, we estimate the coefficients with standard ordinary least squares (OLS) regressions with fixed effects as Equation 6. Because of the overlapping intervals, we use a bootstrapping technique (Efron, 1979) to determine the statistical significance of the estimated coefficients. The sample drawn during each replication is a bootstrap sample of clusters, which preserves the time-series structure of the data. Observations that belong to the same firm form a cluster.

$$L_t - L_{t-3} = \alpha_0 + \beta_1 FD_{[t,t-3]} + \beta_2 EBITD_{[t,t-3]} + \beta_3 YT_{[t,t-3]} + \beta_4 LT_{[t,t-3]} + \beta_5 Ldef_{t-3} + \beta_6 \Delta T \arg et_{t-3} + \varepsilon_t \quad (6)$$

Persistent effects of capital structure

We use Equation 7 to test the effect of persistent and the long-lasting effect of capital structure. This equation is specified for the change in leverage from *t*-6 to *t,* and this is twice as long as three years. We tend to check whether the proxy variables over a three-year period *t*-6 to *t*-3 still affect the change in leverage over a six-year period running from *t*-6 to *t*. In other words, if the capital structure has long-lasting effects, we call this the test for persistence.

$$L_t - L_{t-6} = \alpha_0 + \beta_1 FD_{[t-3,t-6]} + \beta_2 EBITD_{[t-3,t-6]} + \beta_3 YT_{[t-3,t-6]} + \beta_4 LT_{[t-3,t-6]} + \beta_5 FD_{[t,t-3]} + \beta_6 EBITD_{[t,t-3]} + \beta_7 YT_{[t,t-3]} + \beta_8 LT_{[t,t-3]} + \beta_9 Ldef_{t-6} + \beta_{10} DT \arg et_{t-6} + \varepsilon_t \quad (7)$$

Table 3. Descriptive statistics.

Number of firm		Hong Kong	Japan	Korea	Singapore	Taiwan
		81	988	358	148	560
Book leverage	Mean	0.3945	0.6598	0.5594	0.4680	0.4494
	SD	0.2017	0.1710	0.2013	0.1731	0.1639
Market leverage	Mean	0.4334	0.2603	0.6960	0.4279	0.3995
	SD	0.2459	0.2336	0.2013	0.2056	0.2057
Net equity issues	Mean	0.0203	0.0034	0.0338	0.0197	0.0320
	SD	0.2570	0.0298	0.1482	0.1853	0.1356
Net debt issues	Mean	0.0081	0.0008	0.0283	0.0228	0.0170
	SD	0.2734	0.0885	0.2145	0.2298	0.9521
Newly retained earnings	Mean	0.0233	0.0007	0.0117	0.0153	0.0098
	SD	0.2527	0.0335	0.1123	0.1799	0.1378

Note: Unit of net equity issues, net debt issues and newly retained earnings: Millions of dollars.

EMPIRICAL RESULTS

In this section, we summarizes leverage ratio, net equity issues, debt issues and changes in retained earnings for each country for the overall period from 1988 to 2007. Then, we apply two-stage method to find out what drives capital structure developments?

Descriptive statistics

Table 3 reports the summary statistics for leverage, net equity issues, debt issues and changes in retained earnings for each country for the overall period from 1988 to 2007. We observe the mean of book leverage is lower than the mean of market leverage in Korea, contrary to other countries as well as common sense. This suggests that, these firms on average have higher book values than market values during the test period. We also find the average of net equity issues, debt issues and changes in retained earnings are positive. The outcome may imply managers make financial decisions of corporations by two ways which includes internal financing and external financing.

Determinants of capital structure developments

Table 4 reports Tobit regressions where the predicted value of the leverage ratio is restricted to be between 0 and 100. The independent variables are book leverage and market leverage. The dependent variables are the market-to-book ratio, asset tangibility PPE, profitability (EBITD), research and develop expense and the size of the company. These variables are found to be determinants of leverage in previous studies. The results of the estimation appear to be similar for the whole sample of firms in Panel A and Panel B. As shown in Table 4, it indicates that asset tangibility PPE and firm size have significantly positive relationship with debt issued. Firms with more tangibility might offer more collateral to banks for lower information asymmetry in debt market, managers would raise debt issued for lower weighted average cost of capital. Large firms usually have good reputation with less information asymmetry in debt market might increase the debt issued than equity as they need external fund. Meanwhile, large firms usually associated with more sales and tangibility can easily borrow money from debt market. Our results here are consistent with the results of Frank and Goyal (2003). In addition, we find that M/B, profitability (EBITD, operating income before depreciation scaled by total assets) and research and development expense (R&D scaled by net sales) have almost significantly negative relationship with debt issued in Panel A. The market-to-book ratio usually represents the growth opportunity that investors predict. Firms with higher market to book ratio which face less symmetric information would issue more equity than debt when they encounter financial deficit. On the other hand, high growth firms associated with higher bankruptcy cost might lower their leverage to avoid bankruptcy. Smith and Watts (1992) and Barclay et al. (2001) suggest that high growth firms consistently use less debt in their capital structure.

We also find firms with higher profitability can obtain more net income and lead to more retained earnings to fit the additional funds needed, so debt issued would drops as profitability goes up. In pecking order theory, due to

Table 4. Predicting target leverage (based on tobit regressions).

Target leverage		Hong Kong	Japan	Korea	Singapore	Taiwan
Panel A. book leverage						
M/B^{t-1}	Coefficient	-0.0584**	-0.0318***	-0.0163***	-0.1527***	-0.0130**
	t-statistics	-2.02	-23	-2.18	-5.63	-3.51
PPE^{t-1}	Coefficient	0.1413***	0.1932***	0.0511**	0.3099***	0.0335**
	t-statistics	3.08	12.11	2.10	3.04	2.41
$EBITD^{t-1}$	Coefficient	-0.0741**	-0.6999***	-0.6515***	-0.3231**	-0.6353***
	t-statistics	-1.87	-9.67	-13.28	-2.25	-16.63
$R\&D^{t-1}$	Coefficient	-0.9030	-0.8197***	-0.5258***	-0.0171	-0.4933***
	t-statistics	0.64	-6.92	-7.26	0.08	-9.74
$SIZE^{t-1}$	Coefficient	0.0817***	0.0494***	0.0490***	0.0473***	0.0429***
	t-statistics	4.66	35.57	20.63	4.91	23.22
Number of observations		99	4902	4902	194	3264
Log Likelihood		32.0006	2589.02	2547.4471	55.4938	1721.18
p-value		0.00	0.00	0.00	0.00	0.00
Predicted target leverage	Mean	0.4362	0.6603	0.4910	0.4710	0.4611
	SD	0.1945	0.0986	0.1020	0.0686	0.1318
Leverage deficit $^{t-3}$	Mean	-0.0521	-0.0374	0.0756	-0.0081	0.0745
	SD	0.2435	0.2219	0.1975	0.1729	0.2462
Change in target $^{t-3}$	Mean	-0.0002	-0.0105	0.0127	0.0062	0.1450
	SD	0.1365	0.0684	0.0531	0.0351	0.2490
Panel B. market leverage						
M/B^{t-1}	Coefficient	-0.1269***	-0.0521***	-0.1951***	-0.0872***	-0.0758***
	t-statistics	-3.95	-45.94	-19.28	-5.63	-18.35
PPE^{t-1}	Coefficient	0.2749*	0.0352***	0.1015***	0.3567***	0.0902***
	t-statistics	1.80	2.69	3.09	3.04	5.83
$EBITD^{t-1}$	Coefficient	-1.0975***	-0.5507***	-0.6227***	-0.4928***	-0.9171***
	t-statistics	-3.20	-9.28	-9.37	-1.66	-21.58
$R\&D^{t-1}$	Coefficient	-0.2066	-0.7563***	-0.7990***	-0.2542	-0.6384***
	t-statistics	-0.12	-7.58	-8.14	-0.98	-11.34
$SIZE^{t-1}$	Coefficient	0.0370*	0.0135***	0.0244***	0.0352***	0.0292***
	t-statistics	1.77	11.85	7.57	2.56	14.20
Number of observations		85	4903	4903	188	3262
Likelihood		14.6847	2940.37	3518.3706	45.4578	1375.55
p-value		0.00	0.00	0.00	0.00	0.00
Predicted target leverage	Mean	0.4879	0.2667	0.6070	0.4527	0.4082
	SD	0.2507	0.1174	0.1317	0.1406	0.1637

Table 4. Contd.

Leverage deficit $_{t-3}$	Mean	-0.0650	-0.0095	0.0689	-0.0416	0.0410
	SD	0.2677	0.2064	0.3077	0.2235	0.2536
Change in target $^{t-3}$	Mean	-0.0003	-0.0153	-0.0123	0.0014	0.1277
	SD	0.2243	0.1055	0.1078	0.1247	0.2538

Note: Values significantly different from zero at 10, 5 and 1% are marked *, ** and *** respectively.

asymmetric information (Myers and Majluf, 1984; Myers, 1984), firms follow a financing hierarchy; they finance their investments first with internal funds, then external debt and finally with equity as a last resort. Firms with high profitability can obtain high retained earnings. As there is any financial deficit, firms would use internal fund rather than fund from outside. So profitability would be negative to firms' leverage. It shows research and development expense (R&D) is included to proxy for the uniqueness of the firm's products as well as the uniqueness of the firm's collateral. Titman and Wessels (1988) point out that a firm's liquidation decision is causally linked to its bankruptcy status. As a result, the firm's cost can potentially impose on their customers, suppliers and workers by liquidating are relevant to their capital structure decisions. Customers, workers and suppliers of firms that produce unique or specialized products probably suffer relatively high costs in the event that they liquidate. Their workers and suppliers probably have job specific skills and capital and their customers may find it difficult to find alternative servicing for their relatively unique products. For these reasons, uniqueness is expected to be negatively related to debt ratios. In other word, the firms sell products with close substitutes are likely to do less research and development since their innovations can be more easily duplicated. Successful research and development projects lead to new products that differ from those existing in the market. Due to avoid higher settlement costs, firms with higher research and develop expenses prefer financing by equity.

We observe that the coefficients of research and development expense are significant except Hong Kong and Singapore. However, there are negative relations of R&D and debt ratio. The result may be shown that because there are almost traditional industry after excluding financial firms (SIC 6000–6999) and regulated firms (SIC 4000-4999). Hence, R&D may not have significant effect on leverage. Nevertheless, the five variables used as determinants in these regressions are the usual Rajan and Zingales (1995) and Titman and Wessels (1988), market-to-book ratio, asset tangibility PPE, profitability (EBITD), research and develop expense and the size of the company. Therefore, we follow Bie and Haan (2007) to reserve the variables which results are not significant. Moreover, the coefficients of log likelihood in Panel A are significant ($\alpha<0.01$). That means the Tobit function fits our data. After predicting target leverage, we construct the target proxy variables, the leverage deficit and the change in the target, to examine the trade-off theory in these areas. The leverage deficit is the difference between the actual debt ratio and the target debt ratio. If the financial decision of the firm is inclined to the trade-off theory, the firm tended toward the target debt ratio whether the actual debt ratio is higher than the target debt ratio or not. The change in the target is the difference between the current target debt ratio and the target debt ratio measured at the beginning of the observation period. If the firm moves toward the new target debt ratio when the target ratio makes an alteration, the capital structure of the firm is tended to the trade-off theory.

In bottom of Table 4, we state the means and standard errors of predicted target leverage, leverage deficit and the change in the target. Then, we estimate the coefficients with fixed effects. The panel A of Table 5 reports the regression results of change in book leverage between year t and t-3. It can be observed that the coefficients of FD are significantly positive in Hong Kong, Singapore and Taiwan. Even if the outcomes are not significant in Japan and Korea, there are positive relations of debt ratio. In addition, the coefficients of EBITD in all countries are negative. It may imply that pecking order theory is tenable. The coefficients of YT in Japan, Korea and Taiwan are significantly negative; however, the coefficients of LT in these countries are significantly positive. It claims that firms just follow market timing theory partly when they finance. Moreover, the evidences of YT and LT are not significant in Hong Kong and Singapore, which states that the financing decision of firms in these two countries seem not to support market timing theory. The coefficients of the variables, *Ldef and*Δ*Target,* are strongly significant ($\alpha<0.01$) in all countries. We could easily observe that financing decisions of most Asian firms follow the trade off theory. The Panel B reports the regression results of change in market leverage between year t and t-3. The signs of the coefficients in corporate accounts in Panel B of Table 5 also show the similar outcome as Panel A. We observe that there are positive relations between FD and debt ratio, even though the evidences are not significant in Korea and Japan. Even if the outcomes are not significant, there are positive relations of debt ratio.

Additionally, the coefficients of EBITD are significantly negative in all countries. It shows that the financing

Table 5. Estimation results of change in book and market leverage between year t and t-3.

Market leverage		Hong Kong	Japan	Korea	Singapore	Taiwan
Panel A. book leverage						
$FD^{[t,t-3]}$	Coefficient	0.0547***	0.0016	0.0145	0.0574***	0.0293***
	SD	0.0261	0.0116	0.0161	0.0184	0.0601
$EBITD^{[t,t-3]}$	Coefficient	-0.0581***	-0.1108***	-0.0325***	-0.1203***	-0.0919***
	SD	0.0477	0.0113	0.0267	0.0398	0.0222
$YT^{[t,t-3]}$	Coefficient	0.0719	-0.0469***	-0.0986**	0.0288	-0.0596*
	SD	0.2298	0.0231	0.0480	0.0822	0.1111
$LT^{[t,t-3]}$	Coefficient	0.0173	0.0713***	0.1137**	0.0285	0.0963***
	SD	0.0861	0.0132	0.1079	0.0319	0.0401
$Ldef_{t-3}$	Coefficient	-0.6013***	-0.8393***	-0.5507***	-0.8970***	-0.8317***
	SD	0.0720	0.0111	0.0270	0.0428	0.0360
$\Delta T\arg et_{t-3}$	Coefficient	0.3703***	0.4792***	0.4643***	0.6384***	0.8323***
	SD	0.0827	0.0146	0.0656	0.1295	0.0351
Number of observations		730	9470	3323	1385	2938
Number of clusters		81	988	988	173	560
Panel B. market leverage						
$FD^{[t,t-3]}$	Coefficient	0.0541***	0. 0108	0.0113	0.1365***	0.0124***
	SD	0.0229	0.0102	0.0329	0.0227	0.0607
$EBITD^{[t,t-3]}$	Coefficient	-0.0712*	-0.0900***	-0.2161***	-0.0509*	-0.1612***
	SD	0.0586	0.0171	0.0401	0.0434	0.0097
$YT^{[t,t-3]}$	Coefficient	0.0853	-0.1225***	-0.0193	0.0013	-0.0051
	SD	0.1546	0.0310	0.1011	0.1006	0.1520
$LT^{[t,t-3]}$	Coefficient	0.1190**	0.0522***	0.1814*	0.0270	0.0650***
	SD	0.0588	0.0165	0.1789	0.0203	0.0470
$Ldef_{t-3}$	Coefficient	-0.4594***	-1.0061***	-0.7711***	-0.7117***	-0.8852***
	SD	0.0529	0.0126	0.0255	0.0318	0.0280
$\Delta T\arg et_{t-3}$	Coefficient	0.2856***	0.8913***	0.6903***	1.0596***	0.8249***
	SD	0.0499	0.0126	0.0540	0.0469	0.0295
Number of observations		719	9417	3323	1373	2804
Number of clusters		81	988	988	173	560

Note: Values significantly different from zero at 10, 5 and 1% are marked *, ** and *** respectively. The standard error is the sample standard deviation of the 500 estimates.

decisions of firms in Asian countries do support pecking order theory. We argue that market timing theory is partly tenable. The coefficients of YT in Japan, Korea and Taiwan are significantly negative; on the other hand, the coefficients of LT in these countries are significantly positive. It may imply that firms just follow market timing theory partly when they finance. Moreover, the evidences of YT and LT are not significant in Hong Kong and

Singapore, which states that the financing decision of firms in these two countries seems not to support market timing theory. Due to there are negative relations between YT and market leverage and the coefficients of LT are positive, expecting Hong Kong and Singapore, the results state that market timing theory may be a key factor to debt issued but is not a main factor. The coefficients of the variables, *Ldef and*Δ*Target,* are significant at 0.01 significance level in all countries. We could observe that financing decisions of most Asian firms follow the trade off theory obviously.

Effects of persistence

The panel A of Table 6 reports the regression results of change in book leverage between year t and t-6. It can be observed that the estimated coefficients during the three-year period *t*-6 to *t*-3 in Hong Kong and Singapore, including FD, YT, LT and EBITD, are not significant. We argue that it may show the effects of history do not persist. Additionally, the variables of trade off theory, $Ldef_{t-6}$ and $\Delta Target_{t-6}$, are significant at 0.1 level. The estimated results of the three-year period *t*-3 to *t* in leverage over a six-year period running from *t*-6 to *t* are the same as the outcomes of the three-year period *t*-3 to *t* in leverage over a three-year period running from *t*-3 to *t.* It shows managers may consider pecking order, market timing and trade off theories at the same time; however, the effects of history, the three-year period *t*-6 to *t*-3, do not persist. In other words, pecking order theory and market timing theory does not long-lasting effects. Firms in Hong Kong and Singapore follow the trade off theory more than pecking order theory or market timing theory. We argue that managers prefer seeking for the optimal capital structure. We observe that the estimated coefficients of EBITD during the three-year period *t*-6 to *t*-3 in Japan, Korea and Taiwan are significant. It may show that pecking order has long-lasting effects in these two countries. Due to Japan and Korea face a bigger domestic market than Hong Kong and Singapore, their managers may consider not only overseas market but also domestic market when they do financial decisions. In this reason, they could be more conservative to avoid using external financing under information asymmetry. That may be the reason why we have different results from Hong Kong and Singapore. Moreover, the estimated results of the three-year period *t*-3 to *t* in leverage over a six-year period running from *t*-6 to *t* are the same as the outcomes of the three-year period *t*-3 to *t* in leverage over a three-year period running from *t*-3 to *t.*

The signs of the coefficients in corporate accounts in Panel B also show the similar outcome as Panel A. It can be observed that the estimated coefficients during the three-year period *t*-6 to *t*-3 in Hong Kong and Singapore, including FD, YT, LT and EBITD, are not significant. We argue it may show the effects of history if it do not persist. Additionally, the variables of trade off theory, $Ldef_{t-6}$ and $\Delta Target_{t-6}$, are significant at 0.1 level. The estimated results of the three-year period *t*-3 to *t* in leverage over a six-year period running from *t*-6 to *t* are the same as the outcomes of the three-year period *t*-3 to *t* in leverage over a three-year period running from *t*-3 to *t.* In other words, pecking order theory and market timing theory does not have long-lasting effects. Firms in Hong Kong and Singapore follow the trade off theory more than pecking order theory or market timing theory. We argue that managers prefer seeking for the optimal capital structure. However, we observe the leverage deficit variable and the change in the target are highly significant. There are a significantly negative coefficient of the leverage deficit and a significantly positive coefficient of the change in target. This implies firms follow with trade-off theory when they make financial decisions. As a consequence, the capital structures of these five economies will adjust toward their target leverage when the distant history variables make effects and tent to cause the deviation from their target debt ratios. According to these evidences previous, we argue the proxy variables, the leverage deficit and the change in target, seem to have the strongest economic impact on how debt ratios change over the six year period.

Conclusion

In this study, we tend to check two purposes of our study: (1) what drives capital structure developments? (2) Are the effects persistent? Does the capital structure have long-lasting effects? For the first purpose, we observe that firms in Hong Kong Singapore follow pecking order theory and trade off theory when they do financial decisions. On the other side, managers in Japan and Korea obey pecking order theory and market timing theory partly; however, follow trade off theory totally. Specially, the financing decisions of firms in Taiwan support market timing theory partly; nevertheless, trace pecking order theory and trade off theory totally. The results of the estimation appear that managers may consider pecking order, market timing and trade off theories at the same time; basically, we can notice that high developed Asian firms follow the trade off theory more than pecking order theory or market timing theory. It implies that pecking order theory and marketing timing theory are key factors but not main factors. In Japan and Korea, the reason why firms follow pecking partly may be that lower law enforcement would lead to a higher level in information asymmetry. Firms in countries with better law enforcement would face less information asymmetry so as to support pecking order less. We argue that high developed Asian firms seem to have a target debt level to minimize their weighted average cost of capital.

This is in agreement with trade off theory, which believes that firms' value can be maximized when the cost of capital is minimized. For the second purpose, we find the capital structures of these five economies will

Table 6. Estimation results of change in book and market leverage between year t and t-6.

Market leverage		Hong Kong	Japan	Korea	Singapore	Taiwan
Panel A. book leverage						
$FD^{[t-3, t-6]}$	Coefficient	0.0418	0.0170	0.0003	0.0102	0.0669
	SD	0.0321	0.0038	0.0262	0.0413	0.0511
$EBITD^{[t-3, t-6]}$	Coefficient	-0.0762	-0.2889***	-0.1357***	-0.0134	-0.0589**
	SD	0.1057	0.0186	0.0479	0.0468	0.0433
$YT^{[t-3, t-6]}$	Coefficient	0.0606	-0.0180	-0.0129	0.0684	-0.0985
	SD	0.1955	0.0223	0.0929	0.1121	0.1713
$LT^{[t-3, t-6]}$	Coefficient	0.0641	0.0144	0.0498	0.0387	0.2291
	SD	0.1258	0.0138	0.0587	0.0911	0.1953
$FD^{[t, t-3]}$	Coefficient	0.1289***	0.0028	0.0307	0.0814***	0.1623***
	SD	0.0396	0.0140	0.0267	0.0382	0.0492
$EBITD^{[t, t-3]}$	Coefficient	-0.2495***	-0.1376***	-0.0596*	-0.0974***	-0.2219***
	SD	0.1050	0.0269	0.0355	0.0751	0.0517
$YT^{[t,t-3]}$	Coefficient	0.0534	-0.0361**	-0.1957***	0.0200	-0.3181***
	SD	0.3287	0.0236	0.0866	0.1839	0.1934
$LT^{[t, t-3]}$	Coefficient	0.0688	0.0727***	0.00546	0.0006	0.0079
	SD	0.0859	0.0144	0.1499	0.0552	0.0776
$Ldef_{t-6}$	Coefficient	-0.9228***	-0.9461***	-0.8153***	-1.0938***	-0.9933***
	SD	0.0602	0.0059	0.0246	0.0398	0.0530
$\Delta Target_{t-6}$	Coefficient	0.6721***	0.7380***	0.7964***	0.6660***	0.9664***
	SD	0.0979	0.0129	0.0769	0.1076	0.0579
Number of observations		497	8301	2341	879	1340
Number of clusters		73	981	341	148	536
Panel B. market leverage						
$FD^{[t-3, t-6]}$	Coefficient	0.0445	0.0050	-0.0382	0.0164	0.0126
	SD	0.0405	0.0315	0.0952	0.0634	0.1072
$EBITD^{[t-3, t-6]}$	Coefficient	-0.0197	-0.4408***	-0.1589***	-0.0609	-0.1085***
	SD	0.1467	0.0598	0.0794	0.0616	0.0399
$YT^{[t-3, t-6]}$	Coefficient	0.2334	-0.2169***	0.1545	0.1309	0.2329
	SD	0.2103	0.0648	0.2868	0.1051	0.3464
$LT^{[t-3, t-6]}$	Coefficient	-0.0840	0.1182	0.0925	0.0301	-0.0996
	SD	0.1115	0.0277	0.4084	0.1411	0.1390
$FD^{[t, t-3]}$	Coefficient	0.1199***	0.0038	0.0700	0.1487***	0.1058***
	SD	0.0517	0.0420	0.0480	0.0557	0.0445
$EBITD^{[t, t-3]}$	Coefficient	-0.0830***	-0.2450***	-0.0362***	-0.1191**	-0.04918***
	SD	0.1549	0.0826	0.1289	0.0644	0.1207

Table 6. Contd.

$YT^{[t, t-3]}$	Coefficient	0.0714	-0.0767	-0.1897	0.1443	-0.4989**
	SD	0.2619	0.0638	0.1395	0.2700	0.4424
$LT^{[t, t-3]}$	Coefficient	0.1404	0.1174***	0.1940	0.0573	0.0773
	SD	0.0968	0.0368	0.2240	0.0909	0.1589
$Ldef_{t-6}$	Coefficient	-0.5379***	-0.5683***	-0.0299*	-0.7596***	-0.9286***
	SD	0.0860	0.0151	0.0907	0.0879	0.0958
$\Delta Target_{t-6}$	Coefficient	0.6041***	1.7652***	0.2161*	1.3835***	1.1057***
	SD	0.1272	0.0444	0.1894	0.2632	0.1250
Number of observations		481	8215	2341	879	1339
Number of clusters		69	981	341	148	536

Note: Values significantly different from zero at 10, 5 and 1% are marked *, ** and *** respectively. The standard error is the sample standard deviation of the 500 estimates.

adjust toward their target leverage when the distant history variables make effects and tent to cause the deviation from their target debt ratios. According to these evidences previous, we argue the proxy variables, the leverage deficit and the change in target, seem to have the strongest economic impact on how debt ratios change over the six year period. Our results are somewhat like the results of Kayhan and Titman (2007) and Mahajan and Tartaroglu (2008), which states that supporting of pecking order theory and market timing theory declines over time. The results are more in line with the dynamic trade-off theory rather than the equity market timing or pecking order hypothesis of capital structure. Based on what we mentioned above, we tend to give our suggestions for managers. First, the managers could use our model to capture their appropriate leverage when they make financial decisions. Second, managers could minimize financial costs and maximize shareholders' equity by adjusting their capital structure in response to the temporary shocks.

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