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How and When Do Firms Adjust Their Capital Structures toward Targets?

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ABSTRACT

If firms adjust their capital structures toward targets, and if there are adverse selection costs associated with asymmetric information, how and when do firms adjust their capital structures? We suggest a financing needs-induced adjustment framework to examine the dynamic process by which firms adjust their capital structures. We find that most adjustments occur when firms have above-target (below-target) debt with a financial surplus (deficit). These results suggest that firms move toward the target capital structure when they face a financial deficit/surplus—but not in the manner hypothesized by the traditional pecking order theory.

PREVIOUS STUDIES HAVE EXPRESSED A NEED for a unified framework that incorporates elements of both pecking order and trade-off behavior. For example, unsatisfied with empirical evidence for both the pecking order theory and the traditional trade-off theory of capital structure, Fama and French (2005) conclude:

> Thus it is probably time to stop running empirical horse races between them as stand-alone stories for capital structure. Perhaps it is best to regard the two models as stable mates with each having elements of truth that help explain some aspects of financing decisions. (p. 580–581)

Barclay and Smith (2005) also maintain:

> Although the pecking order theory is incapable of explaining the full array of financial policy choices, this does not mean that information costs are unimportant in corporate decision-making. On the contrary, such costs will influence corporate financing choices and, along with other costs and benefits, must be part of a unified theory of corporate financial policy. (p. 16)

In sum, the two competing theories, which have largely been evaluated in isolation from one another, can and should be viewed as complements. In order to address this issue, we combine the basic intuition of the pecking order theory

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with the observation that imbalances in cash flows (financial deficits/surpluses) will likely incur capital structure adjustments.

According to the pecking order theory, adverse selection costs are the dominant factor in capital structure decisions (Myers and Majluf (1984)). However, Frank and Goyal (2003), Fama and French (2002), and Barclay and Smith (2005) suggest that adverse selection costs are only one of many factors that firms take into account when making financing decisions—even when operating under the trade-off theory. The most apparent effect of adverse selection costs is a firm's preference for internal funds. Accordingly, in the presence of adverse selection costs, firms may have target debt levels and still prefer internal funds over costly external ones (Leary and Roberts (2005) and Strebulaev (2007)). Indeed, there is evidence that firms have target debt ratios but also prefer internal financing to external financing (Hovakimian, Opler, and Titman (2001) and Hovakimian, Hovakimian, and Tehranian (2004)). If, due to significant adverse selection/transaction costs, firms prefer internal funds, capital structure adjustments will likely occur when firms face imbalances in cash flows (financial deficits/surpluses). Consistent with this argument is evidence that firms do not immediately adjust their capital structures in order to offset either the effects of changes in the market value of equity (Baker and Wurgler (2002) and Welch (2004)) or the accumulation of earnings and losses (Hovakimian, Hovakimian, and Tehranian (2004)).

Firms often face financial deficits/surpluses, and these circumstances provide a convenient time for them to adjust their capital structures with low transaction costs. If the adverse selection/transaction costs are higher for equity than they are for debt, firms with financial surpluses are more likely to reduce debt than equity in order to preserve the debt capacity for future financing needs and to avoid the higher costs of re-issuing equity.[1] Thus, adjustments toward a target can be asymmetric in the sense that firms weigh differently positive and negative deviations of their leverage ratio from a target. Specifically, the preference to preserve debt capacity for future financing needs will result in a slower adjustment when the leverage ratio is below target than when it is above target. We also expect differential adjustment speeds conditional on the presence of a financial deficit or surplus: Firms are likely to make capital structure adjustments much more quickly when they face a financial deficit with below-target debt or a financial surplus with above-target debt than when they face a financial surplus with below-target debt or a financial deficit with above-target debt. These dynamics of capital structure adjustments cannot be captured by a constant adjustment speed as implied by typical partial adjustment models in previous studies.

We find evidence that supports our predictions. When we estimate the adjustment speed conditional on a financial deficit/surplus, we find that the

[1] Dynamic pecking order models (e.g., Viswanath (1993) and Chang and Dasgupta (2003)) make similar predictions of firms saving debt capacity for future needs (Lemmon and Zender (2004) test the predictions). Goldstein, Ju, and Leland (2001) also observe that a firm with current low leverage preserves the option to increase leverage subsequently.

adjustment speed is around 33% when firms have above-target debt with a financial surplus and about 20% when firms have below-target debt with a financial deficit, but that the adjustment speed is substantially reduced when firms have a financial deficit with above-target debt (around 2%) or when they have a financial surplus with below-target debt (around 5%). Thus, firms make the most significant adjustments toward the target when they have above-target debt with a financial surplus. Firms therefore appear to face lower adjustment costs in reducing debt from the above-target debt level than in issuing debt with the below-target debt level, or the costs of keeping above-target debt may be much higher than those of keeping below-target debt.

We also examine a firm's propensity to devote a financial deficit/surplus to the capital structure adjustment conditional on the above- and below-target debt level. If the adjustment occurs when facing a financial deficit/surplus, the adjustment should depend upon the firm's required external financing or available financial surplus as well as on the distance of the firm's current debt level from its target debt level.[2] Accordingly, we examine how financial deficits/surpluses are associated with changes in debt conditional on the above- and below-target debt levels. Consistent with our predictions, the results show that firms with above-target debt use all of their financial surpluses to pay off debt, whereas firms with below-target debt retire both debt and equity with their financial surpluses.

Firms tend to have larger financial deficits than the required increase in debt in order to adjust toward the target, whereas they tend to have smaller financial surpluses than the required reduction in debt in order to adjust toward the target. This could be attributed to the finding of differential adjustment speeds conditional on financial deficits/surpluses. Accordingly, we re-estimate the target adjustment model while controlling for the difference between the deviation from the target and the financial deficit/surplus. Our estimation produces an adjustment speed of close to 100% when firms have above-target debt with financial surpluses and an adjustment speed of around 80% when firms have below-target debt with financial deficits.

Finally, firms with high adjustment costs or financial constraints are more likely to absorb cash flow shocks internally without resorting to external capital than are firms with low adjustment costs or fewer financial constraints. Accordingly, we examine how the adjustment coefficients vary with firm characteristics related to adjustment costs and financial constraints. Although the speed of capital structure adjustment varies with these characteristics, Firms' capital structure adjustments are still in accordance with our prediction: Firms lower above-target debt when they have financial surpluses and increase below-target debt when facing financial deficits, but they make little adjustment when facing financial surpluses with below-target debt or financial deficits with above-target debt. Capital structure adjustments appear to occur in direct response to

[2] Under the pecking order framework, Lemmon and Zender (2004) argue that the capital structure decision should depend upon the firm's financial deficit and the distance between the firm's current debt level and its debt capacity.

available surpluses, whereas the amount of adjustments we observe in response to financial deficits appears to reflect endogenous investment decisions.

Examined together, our findings provide prima facie evidence that transaction costs and adverse selection costs associated with information asymmetry influence corporate capital structure adjustment decisions. Thus, information with regard to financial deficits/surpluses helps to account for the change in debt—but not in the manner hypothesized by the traditional pecking order theory. This is important to note because the relationship between the change in leverage and a financial deficit/surplus is often the basis for testing the pecking order theory (e.g., Shyam-Sunder and Myers (1999), Fama and French (2002), Frank and Goyal (2003), and Lemmon and Zender (2004)).

The rest of the paper proceeds as follows: Section I discusses the target adjustment model and methodology. Section II describes the data and presents summary statistics. Section III discusses estimation procedures, results, and their implications. Section IV provides the estimation results while controlling for the difference between the deviation from the target and a financial deficit/surplus. Section V discusses endogenous financial deficits/surpluses and their impact on the results. Section VI provides concluding remarks.

I. Methodology

A typical target adjustment can be written as

$$\Delta D_{it} = \left[\frac{D}{A}\right]_{it}^{*} A_{it} - D_{it-1}, \tag{1}$$

where $\Delta D_{it} = D_{it} - D_{it-1}$, $[\frac{D}{A}]_{it}^{*}$ represents the target debt-to-asset ratio for firm i at time t, A_{it} is total assets for firm i at time t, and D_{it} is total (long-term) debt for firm i at time t. The model's starting point is a firm's expected target position for the end of the current period rather than that at the end of the preceding period.[3] Thus, the right-hand side of equation (1) represents the required change in debt in order to adjust to the target.

Equation (1) is a special form of the target adjustment model with 100% adjustment speed. Some studies specify partial adjustment models (see equation (8)). But these adjustment models are too simple to capture the adjustment speed that can vary due to the asymmetric information/transaction cost of issuing equity versus debt (as suggested by the pecking order theory).[4]

By dividing both sides of equation (1) by A_{it} and allowing the differential adjustment speed to vary between increasing and decreasing leverage, we specify the target adjustment model as follows:

$$\frac{\Delta D_{it}}{A_{it}} = \alpha_1 + \alpha_2 TDE_{it} D_{it}^{above} + \alpha_3 TDE_{it} D_{it}^{below} + \varepsilon_{it}, \tag{2}$$

[3] Welch (2004) and Flannery and Rangan (2006) specify models with a similar assumption.

[4] Altinkilic and Hansen (2000) find that equity issuing costs are on average 5.38% of the issue proceeds while debt issuing costs are on average 1.09%. Leary and Roberts (2005) also report significantly larger equity issuance costs.

where $TDE_{it} = [\frac{D}{A}]^*_{it} - \frac{D_{it-1}}{A_{it}}$, D^{above}_{it} is a dummy variable equal to one if leverage is above the target (so the adjustment means to reduce debt or raise equity and move toward the target) and zero otherwise for firm i at time t, and D^{below}_{it} is a dummy variable equal to one if leverage is below the target (so the adjustment means to raise debt or repurchase equity and move toward the target) and zero otherwise for firm i at time t. In a frictionless world, firms would completely adjust their capital structure to the target each period. In this case, we would observe $\alpha_1 = 0$ and $\alpha_2 = \alpha_3 = 1$. However, in the presence of adjustment costs, α_2 and α_3 are expected to be less than one. Note that the asymmetries in the adjustment speed possibly reflect a differential cost of issuing debt versus equity. If the adjustment cost is higher for equity than it is for debt, we expect $\alpha_2 > \alpha_3$. We also include the constant term (α_1) in equation (2) in order to capture changes in debt due to factors other than the deviation from the target. For example, firms may change debt in order to fill their financing gap (financial deficit/surplus) even when the deviation from the target is zero. Thus, the constant captures the mean tendency of nontarget-adjustment behavior, which need not be zero.[5]

A. How Should a Financial Deficit/Surplus Affect Capital Structure Adjustment?

In order to examine the adjustment to capital structure in the presence of a financial deficit or surplus, we measure the financial deficit/surplus using the following cash flow identity:

$$OCF_{it} - I_{it} - \Delta W_{it} = -\Delta D_{it} + DIV_{it} - \Delta E_{it}. \tag{3}$$

The first variable on the left-hand side, OCF_{it}, is operating cash flows after interest and taxes for firm i at time t. For firms reporting Compustat format codes (item 318)[6] 1 to 3, OCF equals item 123 + item 124 + item 125 + item 126 + item 106 + item 213 + item 217 + item 218. For firms reporting format code 7, OCF equals item 308 − item 302 − item 303 − item 304 − item 305 + item 314.[7] The second left-hand side variable, I_{it}, is net investment of firm i

[5] We would like to thank the referee for suggesting this interpretation.

[6] When we evaluate the Statement of Cash Flows or Changes in Financial Position for any company in Compustat, we first consider Format Code (item 318). This is important because the format code directs us to the data that are available for a particular company. Prior to the adoption of the Statement of Financial Accounting Standards (SFAS) #95 for U.S. companies and currently for foreign companies, the format code may have changed from 1 year to the next depending on the manner in which a company reported its data. Effective for fiscal years ending July 15, 1988, SFAS #95 required U.S. companies to report the Statement of Cash Flows (format code = 7). Prior to the adoption of SFAS #95, companies had the option of reporting any one of the following: 1) Working Capital Statement; 2) Cash Statement by Source and Use of Funds; or 3) Cash Statement by Activity. These formats were specified beginning in 1971, which is the reason our sample period begins with this year. (See Compustat manual.)

[7] Following Frank and Goyal (2003), we treat missing values that are not reported or combined with other data items in the definition of OCF as zero.

at time t. For firms reporting format codes 1 to 3, I equals item 128 + item 113 + item 129 + item 219 − item 107 − item 109. For firms reporting format code 7, I equals item 128 + item 113 + item 129 − item 107 − item 109 − item 309 − item 310. The third left-hand side variable, ΔW_{it}, is change in net working capital for firm i from time $t-1$ to t. For firms reporting format code 1, ΔW (with current debt included) equals item 236 + item 274 (+ item 301). For firms reporting format codes 2 and 3, ΔW equals − item 236 + item 274 (−item 301).[8] For firms reporting format code 7, ΔW equals − item 302 − item 303 − item 304 − item 305 − item 307 + item 274 − item 312 (− item 301). When long-term debt is used, the change in current debt (item 301) is included in the net working capital. The right-hand side variables are: ΔD_{it}, net long-term (total) debt issues for firm i from time $t-1$ to t which equals item 111 − item 114 (+ item 301 for format code 1 and − item 301 for other format codes); DIV_{it}, dividend payments of firm i at time t, which equals item 127; and ΔE_{it}, net equity issues for firm i from time $t-1$ to t, which equals item 108 − item 115.

Next, we define *financial deficit* as

$$FD_{it} = DIV_{it} + I_{it} + \Delta W_{it} - OCF_{it}. \tag{4}$$

Note that from the cash flow identity of equation (3), a negative financial deficit implies a financial surplus. The financial deficit/surplus must be supplemented by either debt or equity.[9]

We now consider the following target adjustment model that interacts with the financial deficit/surplus dummy variables:

$$\begin{aligned}\frac{\Delta D_{it}}{A_{it}} = {} & \left(\beta_1 D_{it}^{surplus} + \beta_2 D_{it}^{deficit}\right) + \left(\beta_3 D_{it}^{surplus} + \beta_4 D_{it}^{deficit}\right) TDE_{it} D_{it}^{above} \\ & + \left(\beta_5 D_{it}^{surplus} + \beta_6 D_{it}^{deficit}\right) TDE_{it} D_{it}^{below} + \varepsilon_{it},\end{aligned} \tag{5}$$

where $D_{it}^{surplus}$ is a dummy variable equal to one for a financial surplus (the firm reduces external capital) and zero otherwise for firm i at time t, and $D_{it}^{deficit}$ is a dummy variable equal to one for a financial deficit (the firm raises external capital) and zero otherwise for firm i at time t.

Equation (5) includes two constants (β_1 and β_2) in order to capture the nontarget-adjustment behavior when facing a financial surplus or deficit. Given the pecking order intuition, we expect firms with zero deviations to decrease

[8] Changes in current debt (item 301) represent an increase in working capital for format code 1 but a decrease in working capital for other format codes. For format codes 2 and 3, negative numbers in Changes in Other than Cash and Cash Equivalent (item 236) represent increases in working capital.

[9] Here, the implicit assumption is that the dividend policy and investment decisions are exogenous and independent of the financing decision. Frank and Goyal (2003), Shyam-Sunder and Myers (1999), and Lemmon and Zender (2004) use the financial deficit/surplus to test the pecking order theory's prediction with the same assumption. We address the implications of this assumption for our results later.

Table I

Expected Signs and Magnitudes of Adjustment Speeds and Propensities to Use Debt for Financial Deficits/Surpluses

This table provides expected signs for coefficient estimates on the following regressions:

$$\frac{\Delta D_{it}}{A_{it}} = \left(\beta_1 D_{it}^{surplus} + \beta_2 D_{it}^{deficit}\right) + \left(\beta_3 D_{it}^{surplus} + \beta_4 D_{it}^{deficit}\right) TDE_{it} D_{it}^{above} + \left(\beta_5 D_{it}^{surplus} + \beta_6 D_{it}^{deficit}\right) TDE_{it} D_{it}^{below} + \varepsilon_{it}, \quad (5)$$

$$\frac{\Delta D_{it}}{A_{it}} = \left(\gamma_1 D_{it}^{above} + \gamma_2 D_{it}^{below}\right) + \left(\gamma_3 D_{it}^{above} + \gamma_4 D_{it}^{below}\right) FDA_{it} D_{it}^{surplus} + \left(\gamma_5 D_{it}^{above} + \gamma_6 D_{it}^{below}\right) FDA_{it} D_{it}^{deficit} + \varepsilon_{it}, \quad (6)$$

where TDE_{it} is the deviation of the debt ratio from the target ratio for firm i at time t; FDA_{it} is the financial deficit/surplus defined as cash dividend plus net investment plus changes in working capital minus operating cash flow divided by total book or market value of assets for firm i at time t; D_{it}^{above} is a *dummy* variable equal to one if leverage is above the target (so the adjustment is to reduce debt to move toward the target) and zero otherwise for firm i at time t; D_{it}^{below} is a dummy variable equal to one if leverage is below the target (so the adjustment is to raise debt to move toward the target) and zero otherwise for firm i at time t; $D_{it}^{surplus}$ is a dummy variable equal to one for financial surplus (so the firm reduces external capital) and zero otherwise for firm i at time t; and $D_{it}^{deficit}$ is a dummy variable equal to one for financial deficit (so the firm raises external capital) and zero otherwise for firm i at time t.

	Above-Target Debt ($D^{above} = 1$)	Below-Target Debt ($D^{below} = 1$)
Financial Surplus ($D^{surplus} = 1$)	Adjustment toward target requires reducing debt. With a financial surplus, the adjustment is expected to be easier: $\beta_3 > 0$ and large.	Adjustment toward target requires raising debt. With a financial surplus, the adjustment is expected to be slower: $\beta_5 < \beta_6$.
	Financial surplus is used to reduce above-target debt: $\gamma_3 > 0$ and large.	Financial surplus may be used to reduce both debt and equity: $\gamma_4 < \gamma_3$.
Financial Deficit ($D^{deficit} = 1$)	Adjustment toward target requires reducing debt. With financial deficit, it is harder to a reduce debt: $\beta_4 < \beta_3$	Adjustment toward target requires raising debt. With a financial deficit, the adjustment is expected to be easier: $\beta_6 > 0$ and large.
	With above-target debt, it is harder to issue debt to meet a financial deficit: $\gamma_5 < \gamma_6$.	With below-target debt, it is easier to issue debt to meet a financial deficit: $\gamma_6 > 0$ and large.

debt when they have financial surpluses and to increase debt when they have financial deficits ($\beta_1 < 0$ and $\beta_2 > 0$). Table I provides the expected sign and relative magnitude of the adjustment coefficient under each circumstance. The coefficient β_3 measures the adjustment speed when firms have a financial surplus with above-target debt and is expected to be positive and highly significant. When firms have a financial deficit with above-target debt, they have less incentive to reduce debt ($\beta_3 > \beta_4$). If firms with below-target debt face a financial deficit, they are more likely to issue debt and β_6 is expected to be positive and highly significant. On the other hand, when firms with below-target debt face a financial surplus, the adjustment is likely to be slower, ceteris paribus ($\beta_5 < \beta_6$).

B. How Does Deviation from the Target Affect the Debt-Equity Choice?

Shyam-Sunder and Myers (1999) estimate two separate models to test the pecking order theory against the trade-off theory. Their tests are implemented by looking at estimated coefficients and statistical power from regressions of financial deficit and deviations from target on changes in long-term debt. If firms adjust their capital structures as they offset financial deficits/surpluses with external capital, then the adjustment speed will depend on the firm's required external financing or available financial surplus as well as on the distance of the firm's current debt level from its target debt level. Accordingly, we estimate firms' propensities to devote financial deficits/surpluses to capital structure adjustments with the following financial deficit/surplus model:

$$\frac{\Delta D_{it}}{A_{it}} = \left(\gamma_1 D_{it}^{above} + \gamma_2 D_{it}^{below}\right) + \left(\gamma_3 D_{it}^{above} + \gamma_4 D_{it}^{below}\right) FDA_{it} D_{it}^{surplus} + \left(\gamma_5 D_{it}^{above} + \gamma_6 D_{it}^{below}\right) FDA_{it} D_{it}^{deficit} + \varepsilon_{it}, \tag{6}$$

where $FDA_{it} = \frac{FD_{it}}{A_{it}}$. This model allows us to examine how much of financial deficits/surpluses "go into" debt/equity, conditional on whether debt levels are above or below target. Table I provides the expected propensity under each circumstance. We predict that in order to move toward target capital structures, firms show greater propensities to use financial surpluses to reduce above-target debt rather than to reduce below-target debt ($\gamma_3 > \gamma_4$),[10] and to finance deficits with debt when facing below-target debt rather than above-target debt ($\gamma_5 < \gamma_6$).

C. Estimating Target Debt Ratios

For the models specified above, determining the target debt ratio is the most difficult task. While we measure the target in several ways, the main results are based on a regression in which firm and industry characteristics related to the costs and benefits of operating with various leverage ratios are regressed on the observed debt ratio

$$\left[\frac{D}{A}\right]_{it}^{*} = \lambda X_{it} + \varepsilon_{it}, \tag{7}$$

[10] Lemmon and Zender (2004) argue that firms' "stockpiling" of debt capacity is consistent with the pecking order theory but not with the trade-off theory. However, under our framework, in which firms trade off between future issuing costs (including adverse selection costs) and the benefit of moving toward optimal leverage, firms may retire debt even when they have below-target debt.

where X is a vector of firm and industry characteristic variables that include the following:

- *Med* = industry median debt ratio (based on two-digit SIC or Fama and French (2002) industry groupings). According to Frank and Goyal (2004), the industry median leverage is an important determinant of a firm's leverage ratio, acting as a proxy for several factors, including intangibility, regulation, stock variance, uniqueness, purchasing manager's sentiment index, etc.;
- *Tax* = marginal tax rate, equal to the statutory tax rate if the firm reports no net operating loss carryforwards (item 52) with a positive pretax return (item 170) and zero otherwise. The statutory taxes are 48% from 1971 to 1978, 46% from 1979 to 1986, 40% in 1987, 34% from 1988 to 1992, and 35% from 1993 to 2003. Plesko (2003) shows that this binary measure captures the marginal tax effects;
- *OI* = operating income (item 13) divided by total assets (item 6). A firm with higher earnings could prefer to operate with either lower or higher leverage. Lower leverage might occur as higher retained earnings mechanically reduce leverage, or if the firm limits leverage to protect the franchise responsible for producing these high earnings. Higher leverage might reflect the firm's ability to meet debt payments out of its relatively high earnings cash flow;
- *MB* = market-to-book ratio of assets. The market value of assets equals total assets (item 6) minus total equity (item 216) minus balance sheet deferred taxes and investment tax credit (item 35) plus the market value of common equity (price (item 199) times shares outstanding (item 54)) plus preferred stock liquidating value (item 10, replaced by the redemption value of preferred stock (item 56) when missing).[11] A higher *MB* is generally taken as a sign of more attractive future growth options, which a firm tends to protect by limiting its leverage;
- *LnA* = log of total assets (item 6) as a measure of firm size. Larger firms tend to have more leverage (perhaps because they are more transparent) and lower asset volatility, or naturally sell large enough debt issues that the fixed costs of public borrowing are not prohibitive;[12]
- *DEP* = depreciation and amortization (item 14) as a proportion of total assets. Firms with more depreciation expenses have less need for the interest deductions associated with debt financing;
- *FA* = fixed assets (item 8) divided by total assets. Firms operating with greater tangible assets have a higher debt capacity;

[11] The results do not change when we exclude deferred taxes and investment tax credit or include convertible debt (item 79) in the definition of book equity (as in Alti (2006) and Kayhan and Titman (2007)).

[12] The results are not affected if size is defined in terms of market value of assets or net sales (item 12).

RND = research and development expenditures (item 46) divided by net sales (item 12). RND can be taken as a proxy for future expected investment (Fama and French (2002)). They also serve as an additional proxy for nondebt tax shields. We set missing values to zero;

D_RND = dummy variable that equals one for firms with missing RND and zero otherwise;

DIV = common stock dividends (item 127) divided by total assets. DIV controls for possible trade-off between debt and dividends in reducing agency costs of free cash flow (Fama and French (2002)); and

AZ = Altman's Z-score modified by MacKie-Mason (1990): (3.3$EBIT$ (item 178) + sales (item 12) + 1.4 retained earnings (item 36) + 1.2 working capital (item 4 − item 5)) divided by total assets. Altman's Z-score measures the ex ante probability of distress (Graham (1996, 2000)).

Our primary target measure is the fitted value from the cross-sectional regression specified by equation (7). We use it as the basis to tabulate the results.[13] Unless firms as a whole are systematically under- or overlevered relative to their targets, and as long as there are no omitted variables, the fitted value from regression (7) should provide a reasonable estimate for the target. However, this approach is based on the assumption that the adjustment is perfect (i.e., a firm's observed debt ratio is always equal to its target ratio), whereas equation (5) assumes that the firm makes partial adjustments toward the target due to adjustment costs. In order to provide some robustness results, we also consider the following model based on the assumption of a constant partial adjustment speed:[14]

$$\left[\frac{D}{A}\right]_{it} = (\beta\lambda)X_{it-1} + (1-\beta)\left[\frac{D}{A}\right]_{it-1} + \varepsilon_{it}. \tag{8}$$

II. Data

The initial sample consists of all available U.S. firms from the annual Compustat files for the period of 1971 to 2003. Following previous studies, we exclude financial firms and regulated utilities from the sample.[15] We also require firms

[13] When we try lagged variables for X, the results are similar. Using the concurrent variables allows us to include more observations.

[14] Flannery and Rangan (2006) and Lemmon, Roberts, and Zender (2006) use a similar specification.

[15] Financial firms are represented by SIC codes 6000-6799 and utilities by SIC codes 4800-4999. These firms have very different capital structures and their financing decisions may not convey the same information as nonfinancial and nonregulated firms. For example, a relatively high leverage ratio is normal for financial firms, but the same high leverage ratio for nonfinancial firms may indicate possible financial distress.

to have positive total assets, book and market value of equity, and net sales. These variables are used to deflate other variables and the results become difficult to interpret when they have nonpositive values. Accordingly, about 8% of firm-year observations in the sample are dropped because of nonpositive total assets, book and market value of equity, or net sales.

While Shyam-Sunder and Myers (1999) and Myers (1984) argue that there are rational reasons for managers to specify debt targets in terms of book values, Titman and Wessels (1988) and Welch (2004) are inclined toward the use of market values to measure debt levels. Accordingly, we estimate the models using total (item 9 + item 34) and long-term (item 9 + item 44) debt ratios measured with both book and market value of total assets (as previously defined).

Table II presents summary statistics on the book value of assets, the market value of assets, the long-term debt ratio, and the total debt ratio relative to both book and market value of assets for the years 1973, 1983, 1993, and 2003 as well as the full sample of 118,731 firm-year observations. Overall, the average total debt-to-book (market) asset ratio is 0.2308 (0.2046) and the average long-term debt-to-book (market) asset ratio is 0.1923 (0.1706). The debt ratio tends to be lower in later years than in earlier years.

Table III reports summary statistics for financial deficits, net debt issues, and equity issues. During the sample period, firms issue more equity than debt—especially in later years.[16] The minimum and maximum numbers show the existence of extreme values. Since we divide all the variables by the book (or market) value of total assets, small asset values create these extreme variables. Accordingly, in the next section we test for influential variables and estimate the models with the winsorization of the ratios or minimum requirements of book and market asset values.

III. Estimation and Results

We first measure the target based on the specification given in equation (7). With the requirement of nonmissing observations and the winsorization at the 1st and/or 99th percentiles for the variables used, the sample size is reduced to 100,339 firm-year observations.[17] The mean and the standard deviation of parameter estimates from the yearly regressions are reported in Table IV. The estimation results show that the industry median debt ratio (*Med*)[18] positively affects firms' debt ratios, which is consistent with the results in Frank and Goyal (2004). The marginal tax rate (*Tax*) has a negative effect on leverage. All other parameter estimates, including the negative coefficient estimates on

[16] Note that the amount of financial deficit and net external financing (net debt issues plus net equity issues) are matched up to three decimal points due to rounding errors.

[17] We winsorize all the variables deflated by total assets at the 1st and 99th percentiles except for dividend (*DIV*) and R&D (*RND*), which are winsorized only at the 99th percentile because many firms have a value of zero for these variables. We also try minimum requirements (e.g., $3 million and $10 million) for assets and estimate the models; the results are not materially different.

[18] We obtain *Med* based on the two-digit SIC, but the results are similar when it is based on Fama and French (2002) industry classification.

Table II

Summary Statistics for Asset Value and the Debt Ratio

The sample consists of 118,731 firm-year observations from the 1971 to 2003 Annual Industrial Compustat files, excluding financial and regulated firms. Book and market values of assets are in $ millions. The market value is the total assets minus book value of equity minus deferred taxes and investment tax credit plus market value of common equity (number of shares outstanding times closing price on the fiscal-year's ending date) plus preferred stock liquidating value.

	N	Mean	Minimum	Median	Maximum	Standard Deviation
Book value of total assets						
1973	2,796	274.39	1.29	47.79	25,079.50	1,050.91
1983	3,572	589.40	0.15	50.70	62,963.00	2,691.68
1993	3,830	1,211.12	0.73	81.96	251,506.00	7,315.71
2003	4,143	2,737.17	0.27	202.72	647,483.00	16,411.69
1971–2003	118,731	1,091.22	0.05	76.42	647,483.00	7,515.83
Market value of total assets						
1973	2,796	336.84	0.79	47.51	31,356.89	1,324.78
1983	3,572	689.25	0.45	71.06	87,819.45	2,984.50
1993	3,830	1,748.67	0.82	132.50	310,099.65	9,027.92
2003	4,143	4,537.85	0.48	363.46	867,411.46	23,550.67
1971–2003	118,731	1,722.06	0.04	102.02	1,825,102.63	13,028.68
Total debt/Book value of total assets						
1973	2,796	0.2592	0	0.2551	0.8732	0.1655
1983	3,572	0.2335	0	0.2084	0.9164	0.1796
1993	3,830	0.2051	0	0.1782	0.8748	0.1779
2003	4,143	0.1834	0	0.1471	0.9125	0.1814
1971–2003	118,731	0.2308	0	0.2133	0.9718	0.1844
Total debt/Market value of total assets						
1973	2,796	0.2798	0	0.2704	0.9388	0.1932
1983	3,572	0.1938	0	0.1553	0.8988	0.1703
1993	3,830	0.1557	0	0.1104	0.9149	0.1586
2003	4,143	0.1373	0	0.0797	0.9038	0.1610
1971–2003	118,731	0.2046	0	0.1641	0.9514	0.1864
Long-term debt/Book value of total assets						
1973	2,796	0.2079	0	0.1947	0.8732	0.1565
1983	3,572	0.1945	0	0.1630	0.9164	0.1680
1993	3,830	0.1720	0	0.1321	0.8562	0.1692
2003	4,143	0.1625	0	0.1143	0.8990	0.1738
1971–2003	118,731	0.1923	0	0.1635	0.9718	0.1739
Long-term debt/Market value of total assets						
1973	2,796	0.2243	0	0.2016	0.9388	0.1776
1983	3,572	0.1631	0	0.1217	0.8988	0.1575
1993	3,830	0.1314	0	0.0811	0.9147	0.1479
2003	4,143	0.1214	0	0.0643	0.8963	0.1504
1971–2003	118,731	0.1706	0	0.1247	0.9442	0.1717

operating income (*OI*) and cash dividend (*DIV*), are consistent with previous results.

We measure the target leverage ratio each year by the fitted value from the yearly cross-sectional regression specified by equation (7) and report the results in the following tables based on this target measure. We also check

Table III

Financing Deficit and Net Debt and Equity Issues as a Fraction of Total Book Assets

The sample consists of 118,731 firm-year observations from the 1971 to 2003 Annual Industrial Compustat files, excluding financial and regulated firms. Book and market values of assets are in $ millions. The market value is the total assets minus book value of equity minus deferred taxes and investment tax credit plus market value of common equity plus preferred stock liquidating value. The financial deficit is defined as cash dividend plus net investment plus change in working capital (with or without current debt) minus operating cash flow.

	N	Mean	Minimum	Median	Maximum	Standard Deviation
Financial deficit (with current debt included)						
1973	2,796	0.0245	−1.5792	0.0018	0.6813	0.0909
1983	3,572	0.0529	−1.0917	0.0024	3.1634	0.1763
1993	3,830	0.0562	−3.0369	0.0058	2.6404	0.1984
2003	4,143	0.0440	−2.9142	0.0005	2.9884	0.2068
1971–2003	118,731	0.0443	−5.5567	0.0037	6.2798	0.1829
Financial deficit (with current debt excluded)						
1973	2,796	0.0110	−1.5792	−0.0007	0.8013	0.1114
1983	3,572	0.0534	−1.2214	0.0052	3.1634	0.1976
1993	3,830	0.0545	−6.4608	0.0038	2.5957	0.2263
2003	4,143	0.0461	−2.9142	0.0011	2.3466	0.2082
1971–2003	118,731	0.0428	−8.9967	0.0024	16.7263	0.1978
Net total debt issues						
1973	2,796	0.0227	−0.7862	0.0000	0.6584	0.0762
1983	3,572	0.0053	−0.8792	−0.0016	0.6141	0.0997
1993	3,830	0.0026	−3.0369	−0.0007	0.8427	0.1085
2003	4,143	−0.0016	−2.9142	−0.0012	2.5016	0.1169
1971–2003	118,731	0.0123	−5.5423	0.0000	3.0568	0.1174
Net long-term debt issues						
1973	2,796	0.0093	−0.7862	−0.0010	0.8013	0.0997
1983	3,572	0.0057	−1.3967	−0.0016	1.2522	0.1318
1993	3,830	0.0008	−6.4608	−0.0009	0.7733	0.1525
2003	4,143	0.0005	−2.9142	−0.0004	1.8894	0.1198
1971–2003	118,731	0.0108	−11.0413	0.0000	16.7181	0.1401
Net equity issues						
1973	2,796	0.0018	−1.5792	0.0000	0.6705	0.0518
1983	3,572	0.0476	−1.0475	0.0008	3.2441	0.1491
1993	3,830	0.0536	−0.5915	0.0015	2.6093	0.1714
2003	4,143	0.0456	−0.7913	0.0020	2.3466	0.1689
1971–2003	118,731	0.0320	−1.8846	0.0001	4.0442	0.1448
Net external financing (net debt issues + net equity issues)						
1973	2,796	0.0245	−1.5792	0.0018	0.6813	0.0909
1983	3,572	0.0528	−1.0917	0.0024	3.1634	0.1762
1993	3,830	0.0562	−3.0369	0.0058	2.6404	0.1983
2003	4,143	0.0440	−2.9142	0.0005	2.9884	0.2067
1971–2003	118,731	0.0443	−5.5567	0.0037	4.0310	0.1820

the robustness of the results with alternative target measures (not reported), including the one based on equation (8). In order to estimate equation (8), we need to address the issue of the serial correlation between the lagged dependent variable and the error term (Baltagi (2001) and Wooldridge (2002)). Flannery

Table IV

Parameter Estimates from Cross-sectional/Panel Regressions on Determinants of Target Debt Ratio

The sample consists of 100,339 (71,146) firm-year observations for equation (7) (equation (8)) with relevant Compustat data from 1972 to 2003. Regressions are based on nonmissing observations and winsorization at the 1st and 99th percentiles except for dividend and R&D, which are winsorized only at the 99th percentile because many firms have a value of zero for these variables. The dependent variable is the total (long-term) debt (*TD* (*LD*)) divided by book (market) value of assets (*BA* (*MA*)). The independent variables are as follows: industry median debt ratio based on the two-digit SIC (*Med*); marginal tax rate equal to the statutory tax rate if the firm reports no net operating loss carryforwards with positive pre-tax return and zero otherwise (*Tax*); operating income divided by total assets (*OI*); market-to-book ratio of assets (*MB*); log of book value of total assets (*LnA*); depreciation and amortization divided by total assets (*DEP*); fixed assets divided by total assets (*FA*); research and development expenditures divided by total assets (*RND*); a dummy variable for missing values in *RND* (*D_RND*); common stock dividends divided by total assets (*DIV*); Altman's *Z*-score (*AZ*); and an instrument for the lagged dependent variable (*IV*). A fitted value from a regression of the lagged dependent variable on the second-lagged debt ratio (used as an instrument for the lagged dependent variable). Numbers in parentheses are *t*-values.

Independent	*TD/BA*		*TD/MA*		*LD/BA*		*LD/MA*	
Variable	Equation (7)	Equation (8)	Equation (7)	Equation (8)	Equation (7)	Equation (8)	Equation (7)	Equation (8)
Constant	0.2050		0.2493		0.1304		0.1581	
	(3.125)		(2.254)		(2.786)		(2.145)	
IV		0.6750		0.7287		0.7012		0.7194
		(259.61)		(280.3)		(259.7)		(276.6)
Med	0.4015	0.5021	0.3129	0.4521	0.3477	0.4203	0.2746	0.4057
	(5.000)	(40.168)	(3.806)	(46.61)	(4.939)	(30.90)	(3.917)	(36.88)
Tax	−0.0974	−0.0010	−0.1082	−0.0218	−0.0712	0.0001	−0.0817	−0.0201
	(−3.062)	(−0.303)	(−3.057)	(−6.813)	(−2.543)	(0.031)	(−2.424)	(−6.700)
OI	−0.2113	−0.1463	−0.3855	−0.4158	−0.1012	−0.0988	−0.1948	−0.2836
	(−1.639)	(−17.42)	(−2.598)	(−43.76)	(−1.390)	(−12.20)	(−2.219)	(−31.86)
MB	−0.0185	−0.0036	−0.0743	−0.0245	−0.0175	−0.0039	−0.0523	−0.0171
	(−2.102)	(−5.143)	(−1.581)	(−27.22)	(−3.646)	(−5.57)	(−1.629)	(−21.38)
LnA	0.0159	0.0324	0.0115	0.0151	0.0166	0.0304	0.0126	0.0125
	(3.786)	(46.29)	(3.194)	(21.57)	(3.609)	(43.43)	(4.065)	(17.86)
DEP	−0.1120	−0.4718	0.0756	0.0114	−0.1028	−0.4235	0.0102	−0.0750
	(−0.648)	(−14.04)	(0.355)	(0.318)	(−0.568)	(−13.15)	(0.046)	(−2.232)
FA	0.1072	0.1725	0.2099	0.3425	0.1724	0.1842	0.2561	0.3244
	(2.305)	(26.14)	(4.675)	(59.05)	(3.972)	(29.24)	(7.055)	(58.98)
RND	−0.5227	−0.2504	−0.7050	−0.2287	−0.3798	−0.1925	−0.5491	−0.2114
	(−4.021)	(−10.75)	(−4.623)	(−7.753)	(−3.440)	(−8.593)	(−4.534)	(−7.632)
D_RND	0.0008	0.0100	−0.0023	0.0253	0.0030	0.0108	−0.0013	0.0218
	(0.107)	(11.11)	(−0.365)	(28.11)	(0.390)	(12.00)	(−0.200)	(27.25)
DIV	−2.6669	−0.2913	−4.0431	−0.5684	−2.6109	−0.6040	−3.6816	−0.7624
	(−3.560)	(−4.045)	(−10.03)	(−8.226)	(−5.044)	(−8.77)	(−13.05)	(−11.77)
Z	−0.0213	−0.0395	−0.0025	−0.0033	−0.0159	−0.0260	−0.0028	0.0016
	(−1.821)	(−43.89)	(−0.253)	(−4.125)	(−1.871)	(−28.89)	(−0.384)	(2.000)
Adjusted-R^2	0.3341	0.5441	0.4461	0.6022	0.3207	0.5371	0.4202	0.5934

and Rangan (2006) experiment with various approaches to address this issue and suggest an instrumental variables approach. Following their suggestion, we use a fitted value from a regression of the lagged dependent variable on the second-lagged *book*-value debt ratio (if the dependent variable is *market*-value debt ratio and vice versa) and X_{t-2} as an instrument for the lagged dependent variable.[19,20] Flannery and Rangan (2006) and Lemmon, Roberts, and Zender (2006) show that firm fixed effects significantly contribute to the variation in target debt ratios. Accordingly, we estimate the entire panel with firm fixed effects. We then obtain $\hat{\lambda}X_{it-1}$ from the coefficient estimates of equation (8) and use it as the target ratio.[21] Even though the results based on this target proxy lead to the same conclusion, since our specification is not based on a constant partial adjustment speed, this specification does not fully address the issue that firms are not always at their targets. We also try the historical average and industry median as target proxies. It is important to note that our results are robust to alternative target proxies.

Table V reports the ordinary least squares (OLS) estimation results for the target adjustment model specified by equation (2). We also present results from a simple regression without allowing for the asymmetric adjustment. Panel A shows the estimates of the regressions for book-value debt ratios and Panel B shows the estimates for market-value debt ratios. In Panel A, the adjustment coefficient estimates from the simple regression are 0.2258 for total debt and 0.2217 for long-term debt. When we allow for differential speeds of adjustment, the estimated coefficients for above-target debt ratios become 0.2784 for total debt and 0.2507 for long-term debt, while the estimates for below-target debt ratios are 0.1936 for total debt and 0.1772 for long-term debt. The differences in the estimates are highly significant as indicated by F-test p-values. The significant differences in adjustment speeds between above-target and below-target ratios suggest that the adjustment is much slower when the debt ratio is below the target. Similar results obtain with the market value debt ratios in Panel B, except that the difference in adjustment speeds when facing below- and above-target debt ratios is more profound.

As noted above, the unobserved firm fixed effects are important in explaining the leverage ratio. The typical fixed effects model assumes that the error term, conditional on the firm effects, is uncorrelated. However, the effects of unobserved variables are likely to vary systematically across firms and over time, which may bias the coefficient estimates as well as standard errors (Petersen (2005)). We first run unreported fixed effects regressions and find evidence for the presence of autocorrelation. Accordingly, we estimate the

[19] Note that this estimation procedure requires a minimum of three consecutive years of data. Accordingly, the sample size is reduced to 71,146 firm-year observations.

[20] We also try alternative instruments for the lagged dependent variable, such as the lagged industry median and the second-lagged dependent variable. We find that the coefficient estimates vary with different choices of instrument.

[21] The fitted value from the fixed effects regression, $[\widehat{\frac{D}{A}}]_{it} = \widehat{(\beta\lambda)}X_{it-1} + \widehat{(1-\beta)}[\frac{D}{A}]_{it-1}$, provides the "predicted" debt ratio. We also try the predicted debt ratio as a proxy for the target ratio in our model. The results are similar.

Table V

Ordinary Least Squares (OLS) Estimation Results of the Target Adjustment Models

The sample consists of 100,339 firm-year observations for equation (2) with relevant Compustat data from 1972 to 2003. The dependent variable is change in total (long-term) debt (ΔTD (ΔLD)) divided by book (market) value of assets (*BA* (*MA*)). The target debt level is estimated by the predicted value from a cross-sectional regression each year, where the total/long-term debt divided by book/market value of assets is regressed on the following variables: industry median debt ratio; marginal tax rate; operating income divided by assets; market-to-book ratio of assets; log of book value of assets; depreciation and amortization divided by assets; fixed assets divided by assets; research and development (R&D) expenditures divided by assets; a dummy variable for missing R&D; cash dividends divided by assets; and Altman's *Z*-score. *TDE* represents the deviation of the total (long-term) debt-to-asset (book (market)) ratio from its target. D^{above} (D^{below}) is a dummy variable equal to one if *TDE* is negative (nonnegative) and zero otherwise. In Panel A, all variables are scaled by the book value of total assets (*BA*). In Panel B, all variables are scaled by the market value of assets (*MA*). Numbers in parentheses are *t*-values. *F*-test *p*-value for *difference* is for the null hypothesis that the parameter estimates for above- and below-target deviations are equal.

Panel A: Variables Are Scaled by Book Value of Assets (*BA*)				
Dependent Variable	$\Delta TD/BA$	$\Delta TD/BA$	$\Delta LD/BA$	$\Delta LD/BA$
Constant	0.0102	0.0137	0.0088	0.0131
	(33.53)	(29.17)	(25.79)	(24.67)
TDE	0.2258		0.2217	
	(124.95)		(100.36)	
$TDE.D^{above}$		0.2784		0.2507
		(84.84)		(71.41)
$TDE.D^{below}$		0.1936		0.1772
		(51.87)		(37.43)
Adjusted-R^2	0.1312	0.1320	0.0888	0.0898
F-test *p*-value for *difference*		0.0001		0.0001

Panel B: Variables Are Scaled by Market Value of Assets (*MA*)				
Dependent Variable	$\Delta TD/MA$	$\Delta TD/MA$	$\Delta LD/MA$	$\Delta LD/MA$
Constant	0.0073	0.0117	0.0064	0.0111
	(28.83)	(30.40)	(21.48)	(24.86)
TDE	0.2157		0.2147	
	(130.64)		(101.28)	
$TDE.D^{above}$		0.2765		0.2507
		(94.16)		(75.86)
$TDE.D^{below}$		0.1603		0.1488
		(49.79)		(35.58)
Adjusted-R^2	0.1417	0.1436	0.0903	0.0921
F-test *p*-value for *difference*		0.0001		0.0001

mixed effects model (MEM), which allows for a cross-sectional heteroskedastic and time-wise autoregressive covariance as well as firm and year fixed effects.[22] We simultaneously estimate the fixed effects and random effects

[22] The dependence among the repeated observations for the same firm in the panel can lead to specific covariance/correlation structures of error. Petersen (2005) suggests "consulting the data" to determine the form of dependence in the panel data. We consider several covariance structures and choose one with AR(1) autocorrelation and cross-sectional heteroskedasticity based on the Akaike information criterion (AIC) and the Schwarz-Bayesian criterion (SBC). In order to check the robustness of our results, we also estimate the models with the Fama and MacBeth (1973)

Table VI
Mixed Effects Model (MEM) Estimation Results of the Target Adjustment Models

The sample consists of 100,339 firm-year observations for equation (2) with relevant Compustat data from 1972 to 2003. The dependent variable is change in total (long-term) debt (ΔTD (ΔLD)) divided by book (market) value of assets (*BA* (*MA*)). The target debt level is estimated by the predicted value from a cross-sectional regression each year, where the total/long-term debt divided by book (market) value of assets is regressed on the following variables: industry median debt ratio; marginal tax rate; operating income divided by assets; market-to-book ratio of assets; log of book value of assets; depreciation and amortization divided by assets; fixed assets divided by assets; research and development (R&D) expenditures divided by assets; a dummy variable for missing R&D; cash dividends divided by assets; and Altman's *Z*-score. *TDE* represents the deviation of the total (long-term) debt-to-asset book (market) ratio from its target. D^{above} (D^{below}) is a dummy variable equal to one if *TDE* is negative (nonnegative) and zero otherwise. In Panel A, all variables are scaled by the book value of total assets (*BA*). In Panel B, all variables are scaled by the market value of assets (*MA*). Numbers in parentheses are *t*-values.

Panel A: Variables Are Scaled by Book Value of Assets (*BA*)				
Dependent Variable	$\Delta TD/BA$	$\Delta TD/BA$	$\Delta LD/BA$	$\Delta LD/BA$
TDE	0.3947		0.2396	
	(174.78)		(129.70)	
$TDE.D^{above}$		0.4441		0.2661
		(123.94)		(92.43)
$TDE.D^{below}$		0.2963		0.1908
		(66.19)		(48.47)
Adjusted-R^2	0.2063	0.2068	0.1512	0.1517

Panel B: Variables Are Scaled by Market Value of Assets (*MA*)				
Dependent Variable	$\Delta TD/MA$	$\Delta TD/MA$	$\Delta LD/MA$	$\Delta LD/MA$
TDE	0.3227		0.2175	
	(160.44)		(131.50)	
$TDE.D^{above}$		0.3846		0.2519
		(122.32)		(100.25)
$TDE.D^{below}$		0.2163		0.1547
		(52.78)		(44.12)
Adjusted-R^2	0.2051	0.2062	0.1432	0.1446

(covariance components) using the restricted maximum likelihood (REML) method.[23]

Table VI reports the MEM estimation results. Panels A and B show the estimates for book-value debt ratios and market-value debt ratios, respectively.

approach, in which the coefficients are estimated by the averages from year-over-year cross-sectional regressions and the time-series standard errors of the estimated coefficients are used to draw inferences. The overall results lead to the same conclusions.

[23] This procedure is performed using PROC MIXED from the SAS System. We also estimate the mixed effects models using the two-step procedure specified in Goldstein (1995). Specifically, we first estimate the covariance structure by maximizing the marginal likelihood of the residuals from a least squares fit of the model, and then estimate the fixed effects model by maximum likelihood (assuming that the covariance structure is known), which amounts to fitting by the generalized least squares (GLS). The results are similar to those we report.

Compared with the results from the OLS estimation, the magnitude and significance of the MEM-estimated target adjustment coefficients are considerably increased. Flannery and Rangan (2006) also find significantly higher adjustment speeds when they use the fixed effects model compared to the OLS. Regardless of the leverage ratio used, the adjustment speeds are significantly faster when facing above-target debt than when facing below-target debt.[24] Thus, our results suggest that the adjustment is not only partial but also asymmetric.

We now estimate equations (5) and (6) by the MEM approach and report the estimation results in Table VII. The estimation results are similar whether the debt ratio is defined by book or market value. For the target adjustment model in Panel A, the significant and positive (negative) coefficient estimates on $D^{deficit}(D^{surplus})$ suggest that firms facing a financial deficit (surplus) tend to increase (decrease) debt regardless of the level of debt. The coefficient estimates on the above-target debt with a financial surplus $D^{surplus}.TDE.D^{above}$ are between 0.2916 and 0.3162, while the coefficient estimates for the above-target debt with a financial deficit $D^{deficit}.TDE.D^{above}$ are significantly smaller (between −0.0240 and 0.0518). These results suggest that firms with above-target debt are much more likely to reduce debt when they face a financial surplus than when they face a financial deficit. Conversely, the coefficient estimates on the below-target debt with financial surplus $D^{surplus}.TDE.D^{below}$ are between 0.0166 and 0.0892, which are significantly smaller than the coefficient estimates on the below-target debt with financial deficit $D^{deficit}.TDE.D^{below}$ (between 0.2387 and 0.2696). These results suggest that firms with below-target debt issue more debt as a proportion of total assets when they face a financial deficit than when they face a financial surplus.

Panel B shows the estimation results of equation (6). A preliminary analysis reveals that the average distance of the debt ratio from the target ratio is greater (in absolute value) than the average financial surplus for firms with an above-target debt ratio, while the average deviation of the debt ratio from the target ratio is smaller than the average financial deficit for firms with a below-target debt ratio. Thus, firms with above-target debt ratios would, on average, still have above-target debt even if they retired debt with all their surpluses, whereas firms with below-target debt ratios would, on average, have above-target debt if they completely financed their deficits with debt. Thus, firms with financial surpluses and above-target debt are likely to use most of these financial surpluses to lower their debt, while firms with financial deficits and below-target debt are likely to use some combination of debt and equity if they are to adjust to a target debt ratio. Consistent with this observation, the coefficient estimates on the financial surplus with above-target debt $D^{above}.FDA.D^{surplus}$ are close to one for all regressions, suggesting that firms with above-target debt and financial surpluses are using their entire financial surpluses to pay off debt. When firms face below-target debt with financial surpluses, the retirement of

[24] We perform t-tests for the null hypothesis of equal adjustment speed for below-target and above-target deviations. All the test statistics are significant at the lower than 0.01 level and we reject the null hypothesis.

Table VII

Mixed Effects Model (MEM) Estimation of Target Adjustment Model and Financial Deficit-Surplus Model

The sample consists of 100,339 firm-year observations for equation (5) and equation (6) with relevant Compustat data from 1972 to 2003. The dependent variable is change in total (long-term) debt (ΔTD (ΔLD)) divided by book (market) value of assets (BA (MA)). The target debt level is estimated by the predicted value from a cross-sectional regression each year, where the total/long-term debt divided by book/market value of assets is regressed on the following variables: industry median debt ratio; marginal tax rate; operating income divided by assets; market-to-book ratio of assets; log of book value of assets; depreciation and amortization divided by assets; fixed assets divided by assets; research and development (R&D) expenditures divided by assets; a dummy variable for missing R&D; cash dividends divided by assets; and Altman's *Z*-score. *TDE* represents the deviation of the total (long-term) debt-to-asset book (market) ratio from its target. *FDA* is financing deficit defined as cash dividend plus net investment plus changes in working capital minus operating cash flow divided by book/market value of assets. Changes in working capital are adjusted, including the change in current debt when the change in long-term debt is the dependent variable. $D^{surplus}$ ($D^{deficit}$) is a dummy variable equal to one if *TDE* is negative (nonnegative) and zero otherwise. D^{above} (D^{below}) is a dummy variable equal to one if *FDA* is negative (nonnegative) and zero otherwise. In Panel A, all variables are scaled by the book value of total assets (*BA*). In Panel B, all variables are scaled by the market value of assets (*MA*). Numbers in parentheses are *t*-values.

Panel A: Target Adjustment Model (equation (5))

	$\Delta TD/BA$	$\Delta TD/MA$	$\Delta LD/BA$	$\Delta LD/MA$
$D^{surplus}$	−0.0224	−0.0194	−0.0278	−0.0206
	(−37.81)	(−39.39)	(−41.40)	(−37.02)
$D^{deficit}$	0.0393	0.0277	0.0453	0.0282
	(69.86)	(59.57)	(68.79)	(52.41)
$D^{surplus}.TDE.D^{above}$	0.3005	0.2916	0.3034	0.3162
	(92.00)	(104.22)	(79.21)	(93.00)
$D^{deficit}.TDE.D^{above}$	0.0518	−0.0186	0.0195	−0.0240
	(11.58)	(−4.43)	(3.41)	(−4.09)
$D^{surplus}.TDE.D^{below}$	0.0892	0.0647	0.0168	0.0166
	(16.56)	(13.43)	(2.52)	(2.75)
$D^{deficit}.TDE.D^{below}$	0.2429	0.2580	0.2387	0.2696
	(58.34)	(66.55)	(43.51)	(57.97)
Adjusted-R^2	0.3333	0.3515	0.2941	0.3045

Panel B: Financial Deficit-Surplus Model (equation (6))

	$\Delta TD/BA$	$\Delta TD/MA$	$\Delta LD/BA$	$\Delta LD/MA$
D^{above}	0.0013	−0.0032	−0.0014	−0.0043
	(2.97)	(−11.25)	(−2.99)	(−14.22)
D^{below}	0.0151	−0.0001	0.0145	0.0003
	(39.48)	(−0.67)	(37.65)	(1.31)
$D^{above}.FDA.D^{surplus}$	0.9733	0.9378	0.9825	0.9461
	(206.63)	(295.55	(213.36)	(308.25)
$D^{below}.FDA.D^{surplus}$	0.5102	0.4288	0.7009	0.6889
	(61.42)	(71.58)	(131.18)	(170.24)
$D^{above}.FDA.D^{deficit}$	0.3562	0.4672	0.4071	0.4847
	(90.75)	(177.06)	(109.82)	(316.12)
$D^{below}.FDA.D^{deficit}$	0.3935	0.6339	0.4488	0.6892
	(177.94)	(297.50)	(188.42)	(223.11)
Adjusted-R^2	0.5374	0.7310	0.5793	0.7708

debt is substantially reduced, as shown by the significantly smaller coefficient estimates for $D^{below}.FDA.D^{surplus}$ (0.5102 (0.4288) for the total book (market) debt ratio and 0.7009 (0.6889) for the long-term book (market) debt ratio). However, these estimates suggest that firms with below-target debt still retire debt (especially long-term debt) with their financial surpluses. The estimated coefficients on $D^{above}.FDA.D^{deficit}$ are positive and significant (0.3562 (0.4672) for the total book (market) debt ratio and 0.4071 (0.4847) for the long-term book (market) debt ratio), which suggests that firms with above-target debt issue both debt and equity in order to finance their financial deficit. The coefficient estimates on $D^{below}.FDA.D^{deficit}$ (0.3936 (0.6339) for the total book (market) debt ratio and 0.4488 (0.6892) for the long-term book (market) debt ratio) are significantly greater than those on $D^{above}.FDA.D^{deficit}$ (0.3562 (0.4672) for the total book (market) debt ratio and 0.4071 (0.4847) for the long-term book (market) debt ratio), which implies that firms are more likely to use debt in order to finance a financial deficit when they have below-target debt than when they have above-target debt.

In sum, the results in Table VII provide evidence that firms issue debt in order to finance their financial deficit when they have below-target debt and issue much less debt when they have above-target debt (generally consistent with the trade-off theory). Of interest is the finding that firms use their entire financial surpluses to reduce debt when they face above-target debt but are much more reluctant to repurchase equity—even when they have below-target debt. These results suggest that the most significant capital structure adjustment occurs when a firm faces a financial surplus with above-target debt. Our results contrast with Kayhan and Titman (2007), who conclude that the financial deficit has a much stronger effect on capital structure when it is positive (i.e., when firms are raising capital) than when it is negative (i.e., when firms are paying out capital). By balancing the future financing needs and the costs of repurchasing and re-issuing equity, firms appear to deviate from the target capital structure, lowering their debt when they have financial surpluses (despite having below-target debt). This is consistent with Fama and French (2002), who argue that firms with large expected investments maintain low-risk debt capacity in order to avoid either forgoing future investments or financing them with risky securities. Viswanath (1993) and Lemmon and Zender (2004) also note firms' debt capacity "savings" behavior for future financing needs. Goldstein, Ju, and Leland (2001) observe that a firm with low leverage has the option to increase leverage. Alternatively, firms are more sensitive to high debt relative to low debt either because the costs of high debt dominate the benefits or because managers prefer keeping debt levels low.[25] Adjusted-R^2s in Table VII obtained from separate OLS estimations of the models are on average twice those reported in Table V, suggesting that firms' capital structure

[25] Lewellen (2003) argues that stock-based compensation exposes managers to firm-specific risk and gives them an incentive to keep debt levels low. Jung, Kim, and Stulz (1996) find evidence consistent with managerial discretion, causing some firms to issue equity when they should be issuing debt. Berger, Ofek, and Yermack (1997) find that managers prefer to use debt conservatively.

decisions are better explained by concurrent consideration of the target debt ratio and external capital needs.

IV. Accounting for Excess Financial Deficit over Distance from Target

As noted earlier, the average deviation of debt from the target (the desired change) is greater than the average financial surplus (the available change) for firms with above-target debt while it is smaller than the average financial deficit for firms with below-target debt. If a firm adjusts its capital structure when facing a financial deficit/surplus (*FDA*), the mismatch between the deviation from the target and the financial deficit/surplus could result in asymmetric adjustment speeds. For example, if the deviation from the target is 0.1 while the deficit 0.15, the change in debt includes not only the adjustment induced by the deviation from the target but also that which is induced by the additional financial deficit. Note the following:

$$FDA_{it} = TDE_{it} + (FDA_{it} - TDE_{it}) = TDE_{it} + DIF_{it} D_{it}^{exdev} + DIF_{it} D_{it}^{exdef} \quad (9)$$

where $DIF_{it} = FDA_{it} - TDE_{it}$ measures the excess financial deficit/surplus, D_{it}^{exdef} is a dummy variable equal to one if there is excess financial deficit ($DIF_{it} > 0$) and zero otherwise, and D_{it}^{exdev} is a dummy variable equal to one if there is excess deviation from the target ($DIF_{it} < 0$) and zero otherwise.

Based on equation (9), we re-specify the target adjustment model from equation (6) while controlling for the difference between the financial deficit/surplus and the deviation from the target as follows:[26]

$$\begin{aligned}\frac{\Delta D_{it}}{A_{it}} = {} & \left(\beta_1^* D_{it}^{above} + \beta_2^* D_{it}^{below}\right) + \left(\beta_3^* D_{it}^{surplus} + \beta_4^* D_{it}^{deficit}\right) TDE_{it} D_{it}^{above} \\ & + \left(\beta_5^* D_{it}^{surplus} + \beta_6^* D_{it}^{deficit}\right) TDE_{it} D_{it}^{below} \\ & + \left(\beta_7^* D_{it}^{surplus} D_{it}^{above} + \beta_8^* D_{it}^{surplus} D_{it}^{below} + \beta_9^* D_{it}^{deficit} D_{it}^{below}\right) DIF_{it} D_{it}^{exdev} \\ & + \left(\beta_{10}^* D_{it}^{surplus} D_{it}^{above} + \beta_{11}^* D_{it}^{deficit} D_{it}^{above} + \beta_{12}^* D_{it}^{deficit} D_{it}^{below}\right) DIF_{it} D_{it}^{exdef} \\ & + \varepsilon_{it}. \end{aligned} \quad (10)$$

In this specification, β_3^* to β_6^* measure the adjustment speeds after controlling for the excess financial deficit/surplus. The interaction variables associated with coefficients β_7^* and β_{12}^* account for the excess of a financial surplus and deficit, respectively, over the deviation from the target. If firms issue debt in order to finance the excess deficit or if they reduce debt with the excess financial surplus, both coefficients are expected to be positive. The coefficients β_9^* and β_{10}^* measure adjustments induced by the deviation from the target in excess of any existing financial deficit/surplus. Other variables associated with

[26] Note that $D_{it}^{deficit} D_{it}^{above} (D_{it}^{surplus} D_{it}^{below})$ implies a consistently positive (negative) DIF_{it} and does not interact with $D_{it}^{exdev} (D_{it}^{exdef})$.

the coefficients β_8^* and β_{11}^* account for adjustments in the cases of financial surpluses with below-target debt and financial deficits with above-target debt, respectively.

The estimation results from MEM regressions are reported in Table VIII. The coefficient estimates on $D_{it}^{surplus}.D_{it}^{above}.DIF_{it}.D_{it}^{exdev}$ (excess financial surplus over above-target deviation) are between 0.6498 and 0.8639, while those on $D_{it}^{deficit}.D_{it}^{below}.DIF_{it}.D_{it}^{exdef}$ (excess financial deficit over below-target deviation) are between 0.1648 and 0.5947. These estimates suggest that firms use much of their financial surplus to lower debt below the target, while they are reluctant to issue debt above the target to finance the excess financial deficit. The coefficient estimates on $D_{it}^{deficit}.D_{it}^{below}.DIF_{it}.D_{it}^{exdev}$ (excess below-target deviation over financial deficit (between 0.7996 and 0.9268)) and $D_{it}^{surplus}.D_{it}^{above}.DIF_{it}.D_{it}^{exdef}$ (excess above-target deviation over financial surplus (between 0.9794 and 0.9905)) suggest that the excess deviation from the target is likely to be offset by the corresponding change in debt.

Controlling for the difference between the deviation from the target and the financial deficit/surplus significantly affects adjustment coefficient estimates. The coefficient estimates on $D^{surplus}.TDE.D^{above}$ (above-target debt with a financial surplus) are between 0.9839 and 1.0288 and the coefficient estimates on $D^{deficit}.TDE.D^{below}$ (below-target debt with a financial deficit) are between 0.7629 and 0.8753. Compared to the results in Panel A of Table VII, these adjustment speeds are quite impressive. Also, the adjusted-R^2s are doubled. These results suggest that firms adjust the capital structure as external financing needs arise. However, they clearly take the target debt ratio into consideration as they respond to external financing needs. The coefficient estimates on $D^{deficit}.TDE.D^{above}$ (above-target debt with financial deficit (between 0.4681 and 0.6774)) and $D^{surplus}.TDE.D^{below}$ (below-target debt with financial surplus (between 0.3849 and 0.6820)) suggest that adjustment is significantly slower when firms face above-target debt with a financial deficit or below-target debt with a financial surplus than when they face above-target debt with a financial surplus or below-target debt with a financial deficit.

The results again show that firms reduce debt toward the target much more quickly than they increase it toward the target, which may indicate that the adjustment costs of reducing debt are lower than those of increasing debt and/or the costs of having above-target debt are higher than those of having below-target debt.

V. How Does Endogenous Financial Deficit Affect the Results?

In the above analysis, we treat firms' financial deficits/surpluses (*FD*) as exogenously given. However, it is possible that financial deficits/surpluses are endogenously determined. For example, a firm with excess cash may increase its net working capital (*NWC*), such as cash balances, rather than retire debt because of high costs of raising external capital. Conversely, a firm that is short of cash can run down accumulated *NWC* and make itself a nondeficit firm. Further, due to prohibitively high capital adjustment costs, firms may

Table VIII

Mixed Effects Model (MEM) Estimation of Target Adjustment Model Controlling for Mismatch between Financial Deficit/Surplus and Deviation from Target

The sample consists of 100,339 firm-year observations for equation (10) with relevant Compustat data from 1972 to 2003. The dependent variable is change in total (long-term) debt (ΔTD (ΔLD)) divided by book (market) value of assets (*BA* (*MA*)). The target debt level is estimated by the predicted value from a cross-sectional regression each year, where the total/long-term debt divided by book/market value of assets is regressed on the following variables: industry median debt ratio; marginal tax rate; operating income divided by assets; market-to-book ratio of assets; log of book value of assets; depreciation and amortization divided by assets; fixed assets divided by assets; research and development (R&D) expenditures divided by assets; a dummy variable for missing R&D; cash dividends divided by assets; and Altman's *Z*-score. *TDE* represents the deviation of the total (long-term) debt-to-asset book (market) ratio from its target. *FDA* is financing deficit defined as cash dividend plus net investment plus changes in working capital minus operating cash flows divided by book or market value of assets. Changes in working capital are adjusted including the change in current debt when the change in long-term debt is the dependent variable. $D^{surplus}$ ($D^{deficit}$) is a dummy variable equal to one if *TDE* is negative (nonnegative) and zero otherwise. D^{above} (D^{below}) is a dummy variable equal to one if *FDA* is negative (nonnegative) and zero otherwise. $DIF = FDA - TDE$ measures the excess financial deficit/surplus. D^{exedef} (D^{exedev}) is a dummy variable equal to one if $DIF > 0$ ($DIF < 0$) and zero otherwise. Numbers in parentheses are *t*-values.

	$\Delta TD/BA$	$\Delta TD/MA$	$\Delta LD/BA$	$\Delta LD/MA$
D^{above}	−0.00563	−0.00525	0.000013	−0.00005
	(−12.30)	(−17.03)	(0.03)	(−0.16)
D^{below}	0.01953	−0.00252	0.01617	−0.00819
	(43.72)	(−8.14)	(31.43)	(−24.88)
$D^{surplus}.TDE.D^{above}$	0.9980	0.9839	1.0288	1.0012
	(183.55)	(259.68)	(170.67)	(243.18)
$D^{deficit}.TDE.D^{above}$	0.4681	0.6774	0.5316	0.6274
	(76.80)	(142.84	(80.68)	(152.09)
$D^{surplus}.TDE.D^{below}$	0.3849	0.4419	0.6667	0.6820
	(42.58)	(64.67)	(95.29)	(133.43)
$D^{deficit}.TDE.D^{below}$	0.7629	0.8269	0.8203	0.8753
	(168.31))	(226.92)	(148.32)	(207.25)
$D^{surplus}.\ D^{above}.DIF.D^{exedev}$	0.6498	0.6988	0.8167	0.8639
	(59.12)	(87.01)	(88.66)	(135.78)
$D^{surplus}.D^{below}.DIF.D^{exedev}$	0.3664	0.4239	0.7582	0.7751
	(48.49)	(73.55)	(136.42)	(187.29)
$D^{deficit}.D^{below}.DIF.D^{exedev}$	0.8554	0.7996	0.9268	0.8172
	(148.70)	(174.69)	(129.55)	(149.10)
$D^{surplus}.D^{above}.DIF.D^{exedef}$	0.9794	0.9902	0.9900	0.9905
	(141.87)	(204.78)	(128.06)	(184.99)
$D^{deficit}.D^{above}.DIF.D^{exedef}$	0.3928	0.7681	0.4640	0.8383
	(95.79)	(188.62)	(115.22)	(232.13)
$D^{deficit}.D^{below}.DIF.D^{exedef}$	0.1648	0.5460	0.2739	0.5947
	(52.08)	(140.15)	(89.46)	(208.45)
Adjusted-R^2	0.5887	0.7398	0.6110	0.7752

adjust their investments rather than their capital. In general, firms choosing to absorb cash flow shocks internally without resorting to external capital will not respond to the deviation of their debt ratio from the target. Accordingly, the adjustment toward the target capital structure can be much slower for such constrained firms than for unconstrained firms. Also, financial constraints are probably more binding for firms with negative cash flow shocks than for firms with positive cash flow shocks, which may make firms with negative cash flow less responsive to the deviation from the target than firms with positive cash flow. It is also possible that such firms make infrequent but large adjustments. However, once firms face financial deficits/surpluses (whether exogenously or endogenously determined), we expect them to show the same propensities: to use financial surpluses more to reduce above-target debt than to reduce below-target debt, and to finance deficits more with debt when facing below-target debt than when facing above-target debt.

In order to gauge the potential effect of endogenously determined financial deficits/surpluses, we re-estimate our adjustment models separately for groups of the sample firms divided by various firm characteristics that may be related to financial constraints or adjustment costs. Our reasoning behind this is that firms with high adjustment costs or financial constraints are more likely to internalize cash flow shocks than are firms with low adjustment costs or fewer financial constraints.

We first divide the sample into "small" and "large" firms based on the median of the sample-period average total assets. Small firms are subject to severe asymmetric information problems and have less access to external funds than do large firms, while large firms have relatively easy access to the capital market. Thus, small firms incur much higher costs of issuing debt or equity (Titman and Wessels (1988)) and are more likely to face liquidity constraints on real investment than are large firms.

We also divide the sample into "dividend-paying" and "nondividend-paying" firms based on whether or not they paid any dividend during the sample period. Fazzari and Petersen (1993) argue that low dividend firms are the most likely to face financial constraints and show that nondividend-paying firms rarely make use of new equity financing. Also, Barclay and Smith (1995) provide evidence that firms' debt levels are related to dividend yields. In our sample, 55% do not pay any dividend during the sample period.

Previous studies argue that bond ratings are related to a firm's financial constraints: Firms with bond ratings can borrow in the public debt markets and have lower adjustment costs than firms without bond ratings.[27] Accordingly, we group the sample firms into "rated" and "nonrated" based on whether or not they have any bond rating during the sample period.

Additionally, we divide the sample firms into "low market-to-book (*MB*)" and "high *MB*" based on the median of the sample-period average *MB* and "low profit" and "high profit" based on the median of the sample-period average operating income. Market-to-book may represent financial constraint due to asymmetric information or growth opportunities, and low profit firms are more likely constrained than are high profit firms.

[27] See Whited (1992), Cantillo and Wright (2000), Faulkender and Petersen (2006), and Lemmon and Zender (2004).

We estimate and compare the adjustment speeds using the adjustment models (equations (2), (5), and (6)) between two groups (e.g., between "small" and "large") and then among subgroups further divided within each group (e.g., "small" and "dividend-paying," "small" and "nondividend-paying," "large" and "dividend-paying," and "large" and "nondividend-paying"). We also estimate each adjustment speed as a function of the above-mentioned firm-specific variables (dummy variables for dividend and bond rating) plus the split- and dividend-adjusted stock returns from the beginning of the previous fiscal year to the end of the current fiscal year. Our results (not reported in tables) show: i) small firms and firms without bond ratings adjust faster when their debt ratio is above target (indicating higher costs of maintaining above-target leverage and/or lower costs of reducing above-target leverage for these firms) than do large firms and firms with bond ratings; ii) dividend-paying firms exhibit a greater tendency to adjust their capital structure toward the target with a financial deficit/surplus (because dividend payers are less constrained) than do non-paying firms; iii) firms with better stock performance are slower to adjust (as they use equity to finance financial deficits); iv) firms with higher operating profits use more debt when they have financial deficits (because of large debt capacity) than do firms with lower profits; and v) firms with high *MB* use less debt when facing financial deficits (because debt is less attractive to high growth firms and/or equity financing is less restrictive) than do firms with low *MB*.

In sum, even though the speed of capital structure adjustment varies with firm characteristics, firms' capital structure adjustments are still in accordance with the results in previous sections—lowering above-target debt with a financial surplus and increasing below-target debt when facing a financial deficit. Our results suggest that there may be fewer "endogenous components" in a financial surplus (related to a positive cash flow shock) than in a financial deficit (related to a negative cash flow shock). As a result, capital structure adjustments occur in direct response to available surpluses, whereas the slower adjustments we observe in response to financial deficits may reflect the adoption of investment (or any other component in the definition of financial deficit) around the adoption of capital structure. A further examination of this issue lies beyond the scope of the current study.

VI. Summary and Conclusions

We examine the capital structure adjustment conditional on the required external capital changes as measured by a financial deficit/surplus. The results suggest that most adjustments occur when firms have above-target debt with a financial surplus or when they have below-target debt with a financial deficit. We also examine firms' propensities to use financial deficits/surpluses to capital structure adjustments conditional on above- and below-target debt. We find that firms with above-target debt use all of their financial surpluses to pay off debt, whereas firms with below-target debt retire both debt and equity with their financial surpluses. Firms appear to preserve their debt capacity for future financing needs in order to avoid the higher costs of repurchasing and re-issuing equity. Further, our results show that firms finance their deficits with more debt when they have below-target debt than when they have above-target debt. Controlling for the disparity between the deviation from the target and the financial deficit/surplus, we find that the changes in capital structure are impressively consistent with the target adjustment model: The adjustment coefficient is close to 100% when firms have above-target debt with a financial surplus and around 80% when firms have below-target debt with a financial deficit, which may indicate that the adjustment costs of reducing debt are lower than those of increasing debt and/or the costs of having above-target debt are higher than those of having below-target debt.

Our findings may shed light on certain issues raised in recent studies. For example, it would be interesting to see if firms' unresponsiveness to the effects of stock value changes (Welch (2004)) and earnings (Hovakimian, Hovakimian, and Tehranian (2004)) and the market timing effect on capital structure (Baker and Wurgler (2002)) are driven by firms with financial surpluses with below-target debt or firms with financial deficits with above-target debt, the investigation of which we delegate to future study.

We also examine the effects of financial constraints on capital structure adjustments. Our results seem to suggest that there are fewer "endogenous components" in the financial surplus (related to a positive cash flow shock) than in the financial deficit (related to a negative cash flow shock). Accordingly, capital structure adjustments appear to occur in direct response to available surpluses, whereas the slower adjustments we observe in response to financial deficits appear to reflect the interaction between investment and financing decisions by constrained firms. Nonetheless, the capital structure adjustments for both constrained and unconstrained firms show the same pattern: lowering above-target debt with a financial surplus and increasing below-target debt when facing a financial deficit.

In conclusion, adverse selection costs associated with information asymmetry influence firms' capital structure adjustment decisions—but not in the manner hypothesized by the traditional pecking order theory. Thus, adverse selection costs, along with other costs and benefits, must be part of a unified theory of capital structure.

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