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Firm Characteristics, Economic Conditions and Capital Structure Adjustments*

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Abstract

We use a dynamic framework and panel methodology to investigate the determinants of a firms' time-varying capital structure. Our sample comprises 706 European firms from France, Germany, Italy and the U.K. over the period from 1983 to 2002. If capital structure adjustment is costly, firms may deviate temporarily from their target debt ratios. Therefore, we endogenize the adjustment process and analyze the impact of firm-specific characteristics as well as macroeconomic factors on the speed of adjustment towards target leverage. We find that larger and faster growing firms as well as firms that are further away from their targets adjust more readily. Additionally, we document interesting relations between well-known business cycle variables and the adjustment speed. In a nutshell, firms adjust faster in favorable macroeconomic conditions, e.g., if interest rates are low and the risk of disruptions in the global financial system are negligible. We also document that capital structure decision are largely determined by financial constraints. Finally, we shed new light on the interdependence between book value based and market value based measures of leverage as well as on capital structure rebalancing issues.

Keywords Capital Structure, dynamic analysis, panel data

JEL Classification G32, C61, C23

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1. Introduction

For almost 50 years now, theoretic as well as empirical research seeks to identify determinants of corporate capital structure decisions. While Miller and Modigliani (1958) derive conditions under which the capital structure choice is irrelevant to firm valuation, the subsequent theoretical literature has shown that a firm can influence its value and improve its future prospects by varying its ratio between debt and equity.[1] While renowned theories of capital structure explain differences in the optimal debt-to-equity ratio across firms, most of the empirical literature uses actual or observed debt ratios as a proxy for a firm's optimal leverage. For example, Titman and Wessels (1988) for U.S. data and Rajan and Zingales (1995) for an international sample document that leverage is related to firm-specific characteristics such as profitability, investment opportunities, tangibility of assets or earnings volatility.[2] However, as forcefully argued by Heshmati (2001), traditional capital structure theories do not explain observed differences in leverage ratios, but rather differences in optimal leverage ratios across firms. Using observed debt ratios is therefore particularly problematic if adjustments to the optimal leverage are costly. In the presence of adjustment costs, it may be cheaper for firms not to fully adjust to the target even if they recognize that their existing leverage ratios are not optimal.

However, traditional capital structure models cannot capture dynamic capital structure adjustments. Furthermore, recent survey evidence by Graham and Harvey (2001), Brounen, de Joung and Kloedijk (2004) and Drobetz, Pensa and Wöhle (2006) strongly suggests that firm decision makers seek a target debt-to-equity ratio. Their main objective in setting debt policy is not to minimize a firm's weighted average cost of capital, but rather to preserve financial flexibility, which is best explained in the context of a pecking order theory of capital structure. Nevertheless, due to random events or other changes, firms may temporarily deviate from the target or optimal leverage and only gradually work back to the optimum. To account for these stylized facts, several researchers have adopted a more dynamic approach, where the observed and target leverage may differ due to the presence of adjustment costs. For example, Fischer, Heinkel and Zechner (1989) study the difference between a firm's maximum and minimum leverage ratios over time and identify characteristics of firms with larger swings in their capital structures. They use the observed debt ratio range of a firm as an empirical meas-

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[1] See Andrés Alonso, Lopéz Iturriaga and Rodrìguez Sanz (2005) for more recent evidence.
[2] See also Bhaduri (2002) and Panno (2003).

ure of the capital structure. Their results are consistent with the capital structure choice in the presence of adjustment costs in a dynamic setting.[3] In an even earlier paper, Jalilvand and Harris (1984) document that a firm's financial behavior is characterized by partial adjustment to long-run financial targets. In their setup, the speed of adjustment is affected by firm characteristics and therefore varies across companies and over time. However, the long-run financial targets towards firms partially adjust are specified exogenously. Shyam-Sunder and Myers (1999) and Fama and French (2002) also use the historical mean debt ratio for each firm over the sample period as a proxy for the target debt ratio. Most recently, Wanzenried (2006) documents that capital structure adjustment behavior is also highly dependent on the institutional setting. In a dynamic setup, she finds that the development of the financial market, the efficiency of the legal system and better shareholder protection have positive effects on the adjustment speed towards endogenously specified target capital structures.

Using Spanish data, De Miguel and Pindado (2001) present a novel methodology to capture capital structure dynamics more appropriately. They develop a target adjustment model to explain a firm's leverage in terms of its leverage ratio in the previous period and its target leverage ratio, the latter being a function of well-known firm characteristics, such as profitability, growth and tangibility of assets. Their setup endogenizes the target leverage ratio, which allows to identify the determinants of the optimal or target capital structure rather than using the observed ratios. They specify a dynamic adjustment model with predetermined variables and apply the dynamic panel suggested by Arellano and Bond (1991). It is crucial to note that De Miguel and Pindado (2001) still estimate a time- and firm-constant adjustment coefficient. Their empirical results reveal that Spanish firms face lower adjustment costs than U.S. firms.[4]

While these papers constitute important steps towards more realistic tests of capital structure theories, they still remain silent on which factors determine the adjustment process towards target leverage. Banjeree, Heshmati and Whilborg (2004) were the first to simultaneously endogenize both the adjustment factor and the target leverage ratio. In addition to identifying the determinants of the target capital structure, their setup allows to estimate the speed of adjustment towards the target capital structure and to identify the determinants of the speed

[3] Consistent with Myers' (1984) pecking order theory of the capital structure, Hovakimian, Opler and Titman (2001) document that profitability is a predictor of observed leverage ratios in the short run. Nevertheless, firms make financing and repurchase decisions that offset earnings-driven changes in their capital structure. This supports the static trade-off theory of the capital structure and the existence of a target leverage ratios. However, the latter may not be a primary goal of firm's decision makers (see Panno, 2003; Leary and Roberts, 2005).

[4] Flannery and Rangan (2006) provide recent U.S. evidence for firm- and time-constant adjustment estimates.

of adjustment simultaneously. Using U.S. and U.K. data, they hypothesize that the speed of adjustment is dependent on the absolute difference between the current and the target leverage ratio, the firm's growth opportunities and its size. However, they do not find a significant relationship between the likelihood of adjustment and the absolute difference between target leverage in time *t* and observed leverage in *t-1*.[5] In a related paper, Lööf (2004) compares the dynamics of capital structure adjustments across the two archetypes of financial systems, the U.S. and the U.K.'s mostly market-based and the Swedish mostly bank-based system. His results reveal that although firms are frequently not at their target debt level, the deviation is smaller for the highly equity-dependent U.S. and U.K. firms. In addition, these firms adjust faster towards the target capital structure compared to the more debt-dependent Swedish companies. Using similar variables to capture the speed of adjustment as Banjeree, Heshmati and Whilborg (2004), he finds that the estimate for the distance variable is significantly negative for U.K. firms, indicating that it is less costly to adjust by relatively small amounts.[6]

Economic intuition suggests that the position of the economy in the business cycle phase is an important determinant of default risk and, hence, of financing decisions. It is therefore an interesting research question to analyze the impact of macroeconomic factors on the speed of adjustment to the target capital structure. Lacking well-defined empirical predictions, previous studies included e set of time dummies to capture these time-specific effects. Recently, Hackbarth, Miao and Morrelec (2006) developed a contingent claims model in which firm's cash flows depend on both an idiosyncratic shock and an aggregate shock that reflects the state of the economy (e.g., booms and recessions). Their model delivers state-dependent shareholders' default policies, which in turn have interesting implications for optimal leverage. First, the model predicts that leverage is counter-cyclical. Second, macroeconomic conditions determine both the pace and the size of capital structure changes. Allowing a firm to adjust its capital structure dynamically, the restructuring threshold is lower in good states than in bad states. Therefore, firms should adjust their capital structure more often and by smaller amounts in booms than in recessions. The empirical results in Korajczyk and Levy (2003) support some of these predictions. Looking at a 50 years history of the U.S. aggregate non-financial corporate debt to asset ratio, they show that target leverage is counter-cyclical, i.e., there is a negative relation between macroeconomic variables and leverage. Note that this is consistent with a pecking order theory of capital structure, but inconsistent with a trade-off

[5] See Heshmati (2001) for similar results using a sample of Swedish micro and small firms.
[6] In a comparable setup, Drobetz and Wanzenried (2006) find evidence for a panel of 90 Swiss firms.

theory. In a theoretical model, Levy (2001) argues that levered managers' wealth is reduced relative to outside shareholders in recessions, which exacerbates the agency problem. In order to realign manager's incentives with those of shareholders, the optimal amount of debt increases, implying counter-cyclical debt ratios for firms that are not financially constrained. Korajczyk and Levy (2003) further document that macroeconomic conditions are important for the issue choice. Firms tend to time their issues to periods of favorable macroeconomic conditions, i.e., periods of higher relative security prices. Most important, firms issue equity when the stock market experienced large run-ups and when economic prospects are good, as indicated by popular business cycle variables (e.g., interest rates, term spread or credit spread).[7] However, the findings are not uniform across their sample. Financially constrained firms exhibit a pro-cyclical target leverage ratio and their issue choice is less sensitive to variations in macroeconomic conditions than unconstrained firms. Intuitively, financially constrained firms should not be able to time their security issues.

We investigate the adjustment process to target capital structure using a sample of 706 firms from Germany, France, Italy and the United Kingdom over the period from 1982 to 2002. We start by identifying the determinants of the capital structure. We then analyze the effects of well-known firm characteristics as well as macroeconomic factors on the speed of adjustment towards endogenously specified target debt ratios. We document that large firms, faster growing firms and firms that are further away from target leverage adjust more readily. Our results further reveal interesting relations between the speed of adjustment and well-known business cycle variables. We find that the speed of adjustment is faster when economic prospects are good. Additionally, we shed new light on market timing and capital structure rebalancing arguments. Our results reveal a clear tendency that firms are reluctant to adjust their capital structure following periods of higher relative valuations and that large variation in market leverage ratios leads to faster adjustment in book leverage ratios in the following period. Finally, we document that financial constraints clearly determine capital structure decisions.

The remainder of this paper is as follows. Section 2 starts by developing a dynamic capital structure framework and briefly introducing familiar determinants of the target capital structure. We proceed with a discussion of firm-specific and macroeconomic determinants of the

[7] Baker and Wurgler (2002) also document that firms tend to raise equity when market valuations are relatively high compared to book and past market values. The resulting effects on capital structure are persistent, suggesting that the current capital structure is the cumulative outcome of past market bets.

speed of adjustment towards target leverage. Section 3 describes the panel of our international company data. Section 4 contains the empirical results and section 5 concludes this paper.

2. A dynamic capital structure framework

In this section, we discuss the framework for our dynamic capital structure model. While section 2.1 presents the model and the estimation method, section 2.2 briefly introduces the determinants of target capital structure. We introduce the variables that influence the speed of adjustment to target debt ratios in section 2.3.

2.1 Model

Following previous work in this field (e.g., Heshmati, 2001, DeMiguel and Pindado, 2001, Hovakimian, Opler and Titman, 2001, Drobetz and Wanzenried, 2006), we consider a dynamic capital structure model. Let the optimal or target debt-to-equity ratio (leverage ratio) of firm i in period t, LV_{it}^*, be a linear function of a set of L explanatory variables, X_{jit} (where $j = 1,2,...,L$), that have been used in past cross-sectional studies of capital structure:

$$(1) \qquad LV_{it}^* = \sum_{j=1}^{L} \alpha_j X_{jit} .$$

It is important to note that this dynamic setup implies that target leverage ratios vary across both firms and over time. The purpose of equation (1) is to provide an estimate of each firm's target leverage ratio. Following Hovakimian, Opler and Titman (2001) and De Miguel and Pindado (2001), we define target leverage ratio as the extent of leverage, a firm would choose in the absence of information asymmetries, transaction costs and other adjustment costs. Without frictions, the observed leverage ratio of firm i at time t, LV_{it}, should be equal to its target leverage ratio, i.e. $LV_{it} = LV_{it}^*$. If, however, adjustment to target leverage is costly, firms may not fully adjust their actual leverage ratios to their target from one period to the other. Partial adjustment is usually formalized as follows:

$$(2) \qquad \left(LV_{it} - LV_{it-1}\right) = \delta_{it}\left(LV_{it}^* - LV_{it-1}\right),$$

where δ_{it} captures the speed of adjustment to the target leverage ratio, starting from previous year's leverage, LV_{it-1}. Note that in contrast to De Miguel and Pindado (2001), this adjustment is not firm and time-constant. In the presence of adjustment costs, we expect that $\delta_{it} < 1$, hence, a firm does not fully adjust its deviations from period $t-1$ to period t. This hypothesis is consistent with the stability condition that $|\delta_{it}| < 1$, which implies that $LV_{it} \to LV_{it}^{*}$ as $t \to \infty$. Note that if $\delta_{it} = 1$, all deviations from target or optimal leverage are corrected instantaneously and a firm's leverage is always at the target. If, however, $\delta_{it} > 1$, a firm adjusts more than would be necessary and does not meet its target leverage ratio.[8]

In other models of leverage ratio adjustments, the optimal target ratio is externally determined either in terms of historical data or by an adjustment process with lags of more than one year (e.g., Jalilvand and Harris, 1984; Shyam-Sunder and Myers, 1999). Our model follows De Miguel and Pindado (2001) and Hovakimian, Opler and Titman (2001), where firms adjust to a target ratio that is not determined externally as in previous studies. Instead, the target leverage ratio is included in the model as a linear function of the determining factors of capital structure, as specified in equation (1). Our contribution is that we extend this class of models and further endogenize the speed of adjustment to the target debt ratio. To explain the adjustment speed, we assume that δ_{it} varies over time and is itself a linear function of a constant term and some predetermined explanatory variables. A determinant of adjustment speed, Z_{it}, is either a firm-specific or a macroeconomic variable (see section 2.3). Specifically, we have:

(3) $$\delta_{it} = \beta_0 + \beta_1 Z_{it}.$$

To keep the estimation problem tractable and to avoid multicollinearity problems with macroeconomic variables, we apply the different determinants of adjustment speed separately one at a time in our main analysis but include the combined determinants in our robustness checks to address a potential omitted variables bias.[9] Therefore, Z_{it} is a scalar if only one adjustment speed determinant is considered and a vector if multiple determinants are included. When firm-specific variables are used to explain the speed of adjustment, Z_{it} has both a time-series and a cross-sectional interpretation. In the case of macroeconomic variables, Z_{it} is not firm-specific and hence does not have a cross-sectional interpretation. Followingly, we can drop the subscript it in favor of only t.

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[8] Lööf (2004) argues that overadjustment may reflect unanticipated changes in economic conditions.
[9] See table 3 for a correlation analysis of our variables.

Rewriting the target adjustment model in equation (2), treating target leverage, LV_{it}^{*}, as linearly dependent from the capital structure determinants as specified in equation (1), and substituting the linear specification for the adjustment speed, δ_{it}, from equation (3), yields the following expression for the leverage ratio of firm i in period t:

$$(4) \qquad LV_{it} = (1-\delta_{it})LV_{it-1} + \delta LV_{it}^{*} + u_{it}$$

$$= (1-\beta_0-\beta_1 Z_{it})LV_{it-1} + (\beta_0+\beta_1)\left(\sum_{j=1}^{L}\alpha_i X_{jit}\right) + u_{it},$$

where u_{it} is a statistical error term with mean zero and constant variance (i.e., white noise disturbance). Multiplying equation (4) out and bearing in mind that all our estimations are carried out with panel data, we finally obtain equation (5), which is subject to our empirical investigation:

$$(5) \qquad LV_{it} = (1-\beta_0)LV_{it-1} - \beta_1 Z_{it} LV_{it-1} + \beta_0 \sum_{j=1}^{L}\alpha_j X_{jit} + \beta_1 \sum_{j=1}^{L}\alpha_j Z_{it} X_{jit} + d_t + \eta_i + u_{it},$$

where d_t is a time-specific effect, and η_i is a firm-specific effect. Generally, it is assumed, that firm-specific effects are unobservable but have a significant impact on leverage. The effects differ across firms but are fixed for a given firm over time. In contrast, time-specific effects vary over time but are the identical for all firms in a given year, capturing mainly broader economic influences that are outside the firm's control.[10] When we estimate equation (5), we mainly focuse on β_1, which is the coefficient on the interaction term between the determinant variable(s) of adjustment speed, Z_{it}, and the lagged leverage, LV_{it-1}. The null hypothesis is that $\beta_1 = 0$, i.e., the speed of adjustment is independent from firm-specific characteristics and/or the business cycle. It is important to note, that this does not mean that firms do

[10] However, there is one caveat. In the estimations we find that the time-specific effects, d_t, absorb most of the explanatory power of our macroeconomic determinants of the speed of adjustment. Therefore, when Z_{it} denotes a macroeconomic variable (see section 2.3), we estimate equation (5) without time-specific effects and thus assume that all time-specific affects are captured sufficiently well by our variables.

not adjust their leverage ratios at all over time; this would only be the case if $(1-\beta_0)$ was estimated insignificantly as well.[11]

2.1.1 Estimation method

Using panel data, Banjeree, Heshmati and Wihlborg (2004) and Lööf (2004) apply a non-linear least square methodology to estimate the parameters in a setup similar to ours in equation (5). However, their methodology leads to biased and inconsistent estimators because error terms tend to be correlated with lagged leverage, LV_{it-1}. Therefore, we estimate the dynamic leverage model by controlling for fixed-effects by applying a first-difference transformation. Even when the regressors are not correlated with the unobservable firm-specific effects, it is still necessary to control for them in a dynamic setup. This is because LV_{it-1} will be correlated with η_i that does not vary over time, and a first-difference transformation to eliminate fixed effects introduces correlation between lagged dependent variables and the differenced errors. Therefore, ΔLV_{it-1} and Δu_{it} will be correlated through terms LV_{it-1} and u_{it-1}, and an ordinary least squares methodology will not to consistent estimates.[12]

Another estimation problem, which is not necessarily specific to the dynamic specification, arises because the firm-specific variables are unlikely to be strictly exogenous. Shocks that impact the a firm's leverage are likely to impact some of the regressor variables such as firm profitability and firm size as well. Furthermore, some of the regressor variables may be correlated with past und current values of idiosyncratic components of disturbances.

The problems described above suggest the use of an instrumental variables (IV) estimation methodology, where the lagged dependent and endogenous regressors are instrumented. Therefore, we apply the dynamic panel data estimator suggested by Arellano and Bond (1991). They prove that Generalized Method of Moments (GMM) estimation provides consistent parameter estimates by utilizing instruments that can be obtained from orthogonality conditions that exist between the lagged values of the variables and the disturbances. Specifically, we estimate equation (5) in first differences using GMM, where we use the levels of all

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[11] Finally, it must be noted that Z_{it} not only impacts the adjustment speed. As can easily be inferred from the second summation in equation (5), it also impacts the level of the time varying target leverage ratio. However, we are not interested in these dynamics and do not further comment on this issue.

[12] An alternative to first-difference transformation is the within transformation that is commonly used in the literature. Although this approach controls for the fixed effects, it introduces correlation between the lagged dependent variables and the lagged error term, leading to biased estimates. The magnitude of this bias falls with the number of observations (see Nickel, 1981). However, we have a maximum of 20 years of observations and, hence, the problem will not vanish.

right-hand side variables at the second lag as instruments.[13] Using instrumental variables also accounts for the fact that delays may arise between the decision to change the capital structure and its actual implementation. Finally, it must be noted that Hovakimian, Opler and Titman (2001), among others, estimate the target leverage ratio in a first step and the speed of adjustment in a second step using fitted values from the first step. This imposes an errors-in-variables problem. In contrast, our approach allows us to estimate the α and β coefficients in equation (5) simultaneously in one single step.

As suggested by Arellano and Bond (1991), we use their one-step GMM estimator for inference on coefficients. All coefficients are adjusted for heteroskedasticity. In addition, to make sure that target leverage is properly specified, we report a Wald test statistic for the null hypothesis that all coefficients on the determinants of target leverage are jointly equal to zero. Arellano and Bond (1991) further show that the coefficient estimates are only consistent if there is no second order serial correlation in the differenced residuals. Therefore, we report a test-statistic (z_2) for the null hypothesis of no second order serial correlation in the residuals. Because this restriction is violated in most of our model specifications, we estimate equation (5) by including the second lag of leverage, LV_{it-2}, as an additional explanatory variable. Note that the inclusion of this additional variable accomplishes a mere statistical requirement (hence, to guarantee consistent parameter estimates). However, the impact of past leverage beyond the first lag is not the subject of our empirical investigation. Therefore, we do not provide further economic interpretation of this variable. Additionally, we do not model the second lag of leverage, LV_{it-2}, in the same way as we model the first lag, LV_{it-1}, and we omit reporting the corresponding estimates.

Again following the recommendation by Arellano and Bond (1991), we adopt their two-step GMM estimator for inference about model specification. With respect to the validity of the instruments, we conduct a Sargan (1958) test of the null hypothesis that the overidentifying restrictions are valid. As already mentioned above, we use the second lag of all (endogenous and exogenous) variables (in levels) as instruments, and a Sargan test indicates whether these instruments are independent from the residuals.

To further assess the stability of our system (i.e., to guarantee convergence to a target), we check that the test statistic defined as the estimated coefficient of the lagged dependent vari-

[13] Using first differences removes possible firm-specific effects by avoiding any correlation between unobservable firm-specific characteristics and regressor variables. See Verbeek (2004) for a textbook treatment.

able, LV_{it-1}, minus the estimate of β_1 times the mean of Z_{it} falls into the interval $[0,1]$. This requirement is fulfilled in all model specifications.

2.2 Capital structure determinants

According to Harris and Raviv (1991), the consensus is that "leverage increases with fixed assets, non-debt tax shields, investment opportunities, and firm size and decreases with volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product."[14] Therefore, we selected the following five variables for our empirical investigation: tangibility of assets (TANG), firm size (SIZE), the growth opportunities (GROWTH), profitability (ROA) and non-debt tax shields (TAX). We use these determinant variables to provide an estimate of each firm's target leverage ratio. Since this variables are all well known and common in empirical investigations of this manner, we omit a detailed discussion.[15]

2.3 Adjustment speed determinants

2.3.1 Firm-specific factors

We assume that the speed of adjustment towards the target capital structure, δ_{it}, depends on three firm-specific factors. Two of these determinant variables also affect the target debt level (GROWTH and SIZE). The third variable measures the distance between the current and the target debt ratio (DIST). All three variables can be interpreted as trading off the costs of changing the capital structure against the costs associated with a suboptimal level of leverage

Distance between observed and target leverage (DIST): If fixed costs (e.g., legal and investment bank fees) constitute a major portion of the total cost of changing the capital structure, firms with suboptimal leverage will change their capital structure if they are sufficiently far away from the target capital structure, i.e., the costs of maintaining the actual debt ratio are higher than the cost of changing the capital structure back towards the target. Accordingly, we hypothesize that the likelihood of adjustment is a positive function of the absolute difference between target leverage and current leverage. We define the variable $DIST_{it}$ as

$$(6) \qquad DIST_{it} = \left| LV_{it}^{*} - LV_{it} \right|,$$

[14] See Harris and Raviv (1991), p. 335.
[15] Drobetz, Pensa and Wanzenried (2006) contains a detailed discussion of these variables.

where LV_{it}^{*} is the fitted value from a fixed-effects regression of the debt ratio of the firm *i* on the capital structure determinants at time *t*.

If the fixed costs of adjustment are prohibitively high, firms will avoid approaching the capital market and are restricted to use payout policy to adjust towards the target leverage. Intuitively, the costs of a suboptimal payout policy are increasing with the magnitude of the absolute difference between the target leverage and the current leverage. In contrast to external adjustment, however, internal adjustment is limited by the possibilities of internal funding (e.g., share repurchases have to be paid) and the maximal amount to be paid out (e.g., all profits are paid out as dividends). The maximal adjustment step for internal adjustment is given by the sum of all internal funds, i.e., the sum of retained earnings, reserves and actual profit. In the presence of general investment plans, firms will refrain from using all internal funds for capital structure adjustments, and internal adjustment steps tend to be smaller. Hence, if firms adjust internally rather than externally through outside financing, dynamic capital structure adjustment is slower and there should be a negative relationship between DI S T and the speed of adjustment.

Sorting out between the two hypotheses is an empirical matter.

Growth opportunities (GROWTH): Growth firms generally have limited internal funds, because these firms are typically young and have zero or even negative operating income. Therefore, especially these firms are highly dependent on external financing possibilities (e.g., venture capital). Because growth firms regularly need to finance their investments externally, it should be easier for these firms to change their capital structures by altering the composition of the outside funding according to their target capital structures. Even under asymmetric information, the firm value of growing firms may remain unchanged because of positive effects of future growth opportunities. In contrast, a non-growth firm can only change its capital structure by swapping debt against equity or vice versa. However, this may induce negative signaling effects in the presence of asymmetric information with a negative impact on firm value. Accordingly, we hypothesize a positive relationship between GROWTH and the adjustment speed.

Firm size (SIZE): If changing the capital structure involves substantial fixed costs, these costs are relatively larger for small firms. Therefore, large firms should be able to correct deviations from the target capital structure at a relatively lower cost. In addition, due to better analyst coverage, more information is publicly available about large firms, implying better access to capital markets and lower anticipated costs arising from informational asymmetries upon announcement of debt or equity issues (e.g., negative share price reactions). Hence, we hypothesize a positive relationship between SIZE and the speed of adjustment.

2.3.2 Macroeconomic factors

In addition to firm-specific factors introduced above, Banjeree, Heshmati and Whilborg (2004) and Lööf (2004) argue that economy-wide factors should impact the speed of adjustment to target capital structures. They include time-specific effects to capture these impacts in a simplistic way. However, these time-specific effects are hard to interpret and therefore we apply a set of macroeconomic variables in our empirical analysis and measure their effect on adjustment speed. We examine the hypotheses proposed by Hackbarth, Miao and Morrelec (2005) that the speed of adjustment depends on the stage of the business cycle. They argue that the speed is higher in booms than in recessions. We use popular business cycle variables, i.e. variables that are assumed to be highly related to the current and/or future state of the economy, to model the time variation in the target-adjustment coefficient. The following factors are assumed to have an impact on the speed of adjustment: the short interest rate (ISHORT) and the term spread of interest rates (TERM), the credit spread (CREDIT), TED spread (TED) and finally the run-up average dividend yield (DY) and stock market performance (STOCKS).

Short interest rate (ISHORT) and term spread (TERM): The slope of the term structure of interest rates (TERM) is generally assumed to be a predictor of future business cycle stages. It is widely acknowledged in the literature that a high (low) term spread can be interpreted as an indicator of good (bad) economic prospects (e.g. Harvey, 1991; Estrella and Hardouvelis, 1991). Consumption smoothing drives the demand for insurance or hedging, and a natural way is to substitute bonds of different maturities. If the economy is in a growth stage, but a general slowdown is expected, investors will hedge by buying assets that deliver safe payoffs during the future economic downturn. For example, they could purchase long-term government bonds and simultaneously sell short-term bonds for hedging purposes. If many investors follow this pattern, the price of long-term bonds increases, implying decreasing yields. In contrast, the selling pressure in short-term bonds will drive down prices and increase yields. As a result, the term structure flattens or even becomes inverted. Chen (1991) also documents that an above average term spread forecasts that the gross natural product will continue to increase over the next four to six quarters. Following the predictions in Hackbarth, Miao, and Morrelec (2005), we expect faster adjustment in booms than in recessions and therefore the coefficient should be positive. In a similar vein, we hypothesize a negative relationship between ISHORT and adjustment speed.

There is increasing empirical evidence that managers attempt to time both equity and debt issues. Most important, the results in Baker and Wurgler (2002) suggest that the observed capital structure is the cumulative outcome of past (equity) market bets. An upward sloping term structure combined with generally low interest rates are usually interpreted as preceding indicators of an economic expansion. High expected real growth implies rising stock market valuations and, according to the market timing hypothesis, more equity financing activities in attempt to exploit "windows of opportunity".[16] Henderson, Jegadeesh and Weisbach (2004) find similar evidence for debt issuances and report a negative relationship between the level of interest rates and the quantity of long- and short-term debt issued.[17] Therefore, firms appear to time their debt issues for both long- and short-term bonds. These empirical results are supported by survey evidence by Graham and Harvey (2001) and Drobetz, Pensa and Wöhle (2006), where chief financial officers claim that they attempt to issue debt at times of low interest rates.[18] Firms thus attempt to time market interest rates and issue short-term debt when they feel interest rates are particularly low relative to long-term interest rates. Henderson, Jegadeesh and Weisbach (2004) further document that debt issues increase when interest rates are low mainly because firms have larger capital demands, and the substitution effect of debt for equity is of secondary importance. This is a crucial observation in our context, because we do not test predictions about the amount of leverage over the business cycle, but rather the speed of adjustment to the target leverage ratio.

Finally, better prospects for real activity should lead to increasing cash flows from operations and higher profitability. Even if firms do not approach financing markets, increased operational efficiency should enable them to adjust internally by altering their payout policy. The sum of these arguments strengthens our main hypothesis that there is a positive relationship between the term structure of interest rates (TERM) and adjustment speed, and a negative relationship between the level of short-term interest rates (ISHORT) and the speed of convergence to target leverage.

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[16] Dittmar and Tharok (2006) introduce a new framework that can explain this managerial behavior.

[17] See Baker, Greenwood and Wurgler (2003) for similar evidence. They document that firms borrow long when debt market conditions suggest that the relative cost of long-term debt is low.

[18] The evidence is not conclusive yet as to whether managers are in fact successful timers. Baker, Greenwood and Wurgler (2003) report that firms tend to borrow long when excess bond returns are predictably low. Long-term debt issues predict lower excess bond returns, and short-term debt issues predict higher excess bond returns. In contrast, Henderson, Jegadeesh and Weisbach (2004) only find weak evidence that the aggregate level of the quantity of new debt issued predicts future changes in interest rates.

In our empirical analysis, we use the 3-month money market interest rate as the short-term interest rate. The term spread is constructed as the difference between the yield on long-term government bonds with maturities of at least 10 years and the 3-month money market interest rate.

Credit spread (CREDIT) and Treasury Bill - Eurodollar Spread (TED): The credit spread is calculated as the difference between the yield on AAA graded corporate bonds and government bonds. We assume that this variable is a legitimate proxy for default risk in an economy. Similarly, the TED spread is defined as the difference between the 3-month Eurodollar rate and the 90-day yield on the U.S. Treasury bill. TED can be viewed as a “political” risk premium that reflects either actual or anticipated barriers to international investing (e.g., Ferson and Harvey, 1993). The yield differential widens when the risk of disruption in the global financial system increases. Thus, following the general notion in Hackbarth, Miao and Morrelec (2005) that the speed of adjustment is higher in good states than in bad states of the global economy, one would expect a negative relationship between the adjustment speed and the size of the credit spread (CREDIT) as well as TED spread (TED). However, Baker, Greenwood and Wurgler (2003) document that both the credit spread and the TED spread are unrelated to long-term debt as a fraction of total debt issues as well as future bond returns. Furthermore, Chen (1991) finds finds that CREDIT is a better indicator for past economic activity of up to 4 quarters. We therefore suspect that the relationships are weaker and more ambiguous compared to the relationship between the speed of adjustment and the term spread as well as the general level of interest rates.

3. Data

3.1 Sample

The basic sample of our empirical investigation corresponds to Wanzenried (2006) and targets all firms present in the country-specific DATASTREAM Thomson Financial market indices (TOTMK) of France, Germany Italy and the United Kingdom. For each country, these indices include the top 85% of all listed firms by market capitalization. The selection of those four countries follows Rajan and Zingales (1995). The indeces include a total of 1’203 firms (548 United Kingdom, 248 each Germany and France and 159 Italy). However, due to missing observations for our main regression variables, the number of firms shrinks to 1’021 corporations. Furthermore, we exclusively focus on non-financial firms. This restriction is necessary because banks as well as investment and insurance companies are subject to specific regulations concerning their capital structure and are additionally severely affected by exogenous factors (e.g., Rajan and Zingales, 1995). Therefore, we exclude an additional 109 companies that are categorized as banks, insurance firms or investment companies according to the DATASTREAM index classification. Finally, we require that firms exhibit complete company accounts for all firm years in the respective observation period and a minimum number of 3 consecutive observation years. This restriction eliminates an additional 108 companies. However, the firms with insufficient observations are slightly larger than the firms in the final sample. The sum of these restrictions leaves us with a final panel of 706 firms with 8'586 observations between 1982 and 2002. The panel is unbalanced and not all firms are present in all the observation years.

3.2 Definition of leverage

Similar to competing capital structure theories, there is no clear-cut definition of "leverage" in the academic literature. The specific choice depends on the objective of the analysis. As Bevan and Danboldt (2002) document, the determinants of leverage vary significantly depending upon which component of debt is being analyzed. Following Rajan and Zingales (1995), we apply two alternative measures of leverage. The first and broadest definition of leverage is the ratio of total (non-equity) liabilities to total assets, denoted as LVLTA. This definition can be viewed as a proxy of what is left to shareholders in case of liquidation. However, this measure also includes current liabilities, which are used for transaction purposes rather than for financing.[19] Therefore, this measure is likely to overstate the amount of leverage.

An alternative, and possibly more appropriate definition of leverage is the ratio of interest bearing debt to capital, where capital is defined as total debt plus equity, denoted as LVDC. This measure of leverage incorporates the employed capital and therefore best represents the effects of past financing decisions. It most directly relates to the agency problems associated with debt, as brought forward by Jensen and Meckling (1976) and Myers (1977).

An additional issue is whether leverage should be computed as the ratio of book or the market values of debt and equity. Fama and French (2002) argue that most of the theoretical predictions apply to book value based measures of leverage. Similarly, Thies and Klock (1992) suggest that book values better reflect the management's target debt ratios, because the

[19] Note, however, that maturity management of creditors and debtors, e.g., charging fast and paying slow, can be interpreted as short-term financing activities.

market value of equity is also dependent on a number of factors that are out of direct control of the firm. Therefore, using market values may not reflect the underlying alterations initiated by the firm's decision makers. Furthermore, from a more pragmatic point of view, the market value of debt is often not readily available (especially for small firms) and the calculation of market values of debt is cumbersome. However, there are some caveats to using book value based measures of leverage. First, book values of equity do not represent a firm's condition correctly: put simply, the book value of equity is determined through the difference between the left and the right-hand side of the balance sheet. It can therefore even be negative.[20] Second, international accounting rules imply that book values of equity grow with strong cash flows and shrink with depreciation. It comes at no surprise that profitability and tangibility of assets are strong predictors of book value based leverage ratios (e.g., Shyam-Sunder and Myers, 1999. See also section 4). Third, book value based measures of leverage are generally less volatile and therefore overstate the importance of corporate issuing activity. Finally, market value based measures better reflect the relative ownership between debt and equity holders and are the primary input into wheighted average cost of capital calculations (e.g., Miller and Modigliani, 1958). Lastly, Bowman (1980) finds strong positive correlation between market and book based leverage measures. Considering all these arguments, we report both book and quasi-market debt ratios. In the quasi-market debt ratios, we replace the book value of equity by the market value of equity while debt is still at its book value.

[insert table 1 here]

3.3 Descriptive statistics

Panel A in table 1 contains summary statistics for the determinants of capital structure. The exact definitions of the variables are as follows. First, TANG is the ratio of fixed to total assets. Second, following Titman and Wessels (1988), we measure firm size as the natural logarithm of sales (SIZE). The logarithmic transformation accounts for the conjecture that small firms are particularly affected by the size effect.[21] Third, GROWTH is measured as the ratio of market to book equity. Simple cash flow valuation models suggest that this is a forward looking measure. Several empirical studies motivate the use of the ratio of research and development (R&D) expenditures to total assets as a measure for expected investment (and thus

[20] An ad-hoc inspection of our data reveals that 129 observations or 1.5% of our 8'586 observations exhibit negative equity capital values.

[21] Alternatively, one could use total assets as a proxy for firm size. However, we have to choose between two evils. Both total assets and net sales are heavily affected by accounting regulations and/or manipulation.

growth, e.g., Fama and French, 2002). Unfortunately, we do not have this data item available for most of our firms in the sample because accounting regulations require firms to expel R&D costs only since the early 2000s. Alternatively, we could also use past growth rates of total assets. However, we think this measure is not appropriate because historical growth is not necessarily linked to future growth (e.g., Chan, Karkeski and Lakonishok, 2003). Fourth, return on assets (ROA) is defined as the ratio of pre tax profit over total assets. Finally, we use the ratio of total depreciation over total assets as a measure of non-debt taxshields (TAX). Panel B of table 1 presents the summary statistics for the macroeconomic variables while panels C and D contain the descriptive statistics for our debt ratio definitions and the distance measure that we use as determinants of speed of adjustment. Since the business cycle variables were already discussed in detail in section 2.3. and are well known as well as properly documented in the academic literature, we omit a detailed discussion.

[insert figure 1 here]

Figure 1 depicts the evolution of the four debt ratio measures for the 1983 to 2002 periods as well as the number of observations by period. Some remarks are in order. First, independent of the definition of leverage, the changes in average *book* leverage are small over the period considered. Even during the prosperous years in the 1990s, where market leverage ratios declined sharply, book value based definitions remain almost unchanged at about 0.6. Second, average market leverage declined from 1983 to 1990 and from 1993 to 1999 and they increased sharply between 1990 and 1993 and at the beginning of the 2000s. This can be explained by the harsh changes in stock market capitalization in these periods. Third, and most important regarding our capital structure dynamics investigation, cross-sectional dispersion in all four debt ratio definitions increases from around 17% at the beginning of the sample period to 25% in the final sample period.

4. Empirical analysis

4.1 Determinants of target leverage

The estimation of our dynamic model in (5) crucially depends on the correct specification of target leverage. We test our basic specification of the target debt ratio in equation (1) by running fixed effects regressions. Fixed effects regressions preserve the time series variation in leverage, but ignore most of the cross-sectional differences among firms. There is one caveat to mention, though: leverage is sticky. A firm with higher-than-predicted leverage in one year is likely to have higher-than-predicted leverage in the next year. This stickiness in financial policy may lead to inflated test statistics. Therefore, we add a dummy variable for each year to estimate a combined time and firm fixed effects regression model. The additional dummies control for variables that are constant across entities but evolve over time. This combined model eliminates an omitted variables bias arising both from unobserved variables that are constant over time and from unobserved variables that are constant across firms. Table 2 displays the estimation results.

[insert Table 2 about here]

Our results reveal that tangibility (TANG) is always positively correlated with leverage and all but one of the coefficients are significant at the 5% level of significance. This supports the prediction of the trade-off theory that debt-capacity increases with the proportion of tangible assets on the balance sheet. Firm size (SIZE) is also positively related to leverage, indicating that size is a proxy for a low probability of default, as suggested by the trade-off theory. All coefficients are significant at the 1% level. We further find a highly significant negative relationship between profitability and leverage for all definitions of leverage at book and market values, strengthening the theoretical predictions of the pecking order theory. In all but one definition we find a significantly negative relationship between non-debt tax shields (TAX) and leverage. This result supports the prediction of the trade-off theory and is consistent with the results in Fama and French (2002). The results on the coefficients of the growth opportunities variable (GROWTH) are mixed. We find highly significant positive coefficients for both leverage ratio definitions at book values, and significantly negative ones for leverage ratios at market values. While the latter result is consistent with both the trade-off theory and an extended version of the pecking order theory (e.g., Fama and French, 2002), the former supports a simple version of the pecking order theory, because debt typically grows when investment exceeds retained earnings. Given a limited profitability of growth firms, book leverage increases with increasing investment opportunities.

A Wald test rejects the null hypothesis that all explanatory variables are simultaneously equal to zero. Additionally, we report a Hausman (1978) test statistic, where the null hypothesis states the equivalence of the fixed effects estimator and the random effects estimator. As stated at the bottom of table 2, the Hausman test statistic rejects this null hypothesis, which is usually interpreted in favor of the fixed effects model. Overall, these preliminary results are comparable to previous empirical work (e.g., Rajan and Zingales, 1995; Fama and French, 2002; Drobetz and Fix, 2005) and indicate that our capital structure variables are appropriate to model the time-varying target debt ratio in a dynamic adjustment model. This is crucial, because most information contained in the panel data set is cross-sectional. However, cross-sectional information is ignored when introducing firm specific effects, as only deviations from means (or differences in time) remain.

4.2 Determinants of adjustment speed

In this section we report the dynamic panel estimation results from equation (5), which compounds our main hypothesis regarding the time-variations in adjustment speed. Dynamic panel data estimation using GMM (see Arellano and Bond, 1991) allows us to estimate all coefficients in equation (5) simultaneously. We do *not* use the fitted values from estimating the target debt ratio in equation (1) and table 2, but rather estimate all α and β parameters in one single step. Our main focus lies on the estimate of β_1, which is the coefficient on the interaction term between a determinant variable of adjustment speed, Z_{it}, and lagged leverage, LV_{it-1}. As laid out in section 2.1, we use the determinant variables of adjustment speed in our estimations only separately one at a time to keep the estimation problem tractable and to avoid multicollinearity problems. In unreported results, pairwise correlation analysis indicates that the latter problem is particularly important with macroeconomic variables. Therefore, for each specification in the remaining tables, we test the null hypothesis that $\beta_1 = 0$, i.e., the speed of adjustment is constant and independent from a particular firm characteristic or a business cycle variable. We include a full specification of a model including all adjustment speed determinants as a robustness check. In addition to our specification tests laid out in section 2.1, we report the coefficient of this interaction term, β_1, together with the coefficient on the lagged debt ratio, denoted as $(1-\beta_0)$. Note that equation (5) specifies a negative sign on β_1. Therefore, the signs of the respective estimates for the coefficients of the interaction terms must be interpreted accordingly, i.e., a negative (positive) sign means faster (slower) adjustment.

Table 3 summarizes the impact of our firm-specific adjustment factors on the speed of adjustment. Most important, similar to Lööf (2004) and Banjeree, Heshmati and Wihlborg (2004), we find a statistically strong positive relationship between the speed of adjustment and the distance variable (DIST). This result supports the notion that firms' cost of maintaining a sub-optimal leverage ratio are higher than the cost of adjustment. Followingly, firms adjust faster if they are further away from the target leverage. Second, our findings for the impact of SIZE and GROWTH support the hypotheses that larger firms and firms with more growth opportunities exhibit higher financial flexibility through relative cost advantages and/or adjustments in external growth funding and thus adjust faster. Especially the results for SIZE are statistically strong and are in line with findings by Lööf (2004), Banjeree, Heshmati and Wihlborg (2004) as well as by Drobetz and Wanzenried (2006). Furthermore, the full model specification including all three speed determinants confirms the results for SIZE and GROWTH: not only are the estimates comparable to those in the single case but also remain highly significant. However, the results for DIST are mixed.

[insert Table 3 about here]

Table 4 contains the results of the impact of our macroeconomic variables on the adjustment speed. Consistent with our hypotheses, the coefficients on the interaction terms related to ISHORT and TED are estimated significantly positive (indicating lower adjustment speed). Because higher interest rates (ISHORT) and a higher TED indicate that economic prospects are worse, this result confirms the notion by Hackbarth, Miao and Morellec (2006) that adjustment speed is lower in economic contractions than in expansions. Our results for CREDIT are reassuring, although the coefficient needs some explanation. Our finding implies that firms adjust faster if current default risk is high. We interpret this result according to Chen (1991), where current default risk is shown to be a variable to explain past economic circumstances in up to four quarters. Accordingly, we expect better future prospects after phases of high default risk and therefore faster readjustment. Unfortunately, the results for TERM are not significant and leave no room for interpretation. Finally, the results for the full model specification including all four variables confirm the strong findings of CREDIT and TED. The weak results for ISHORT and TERM can be explained by partial multicollinarity although we find strong results in one leverage definition. However, the z_2 test statistics indicate that the estimates in the full model specifications are not consistent due to significant second order serial correlation in the differenced residuals. Ultimately, it is important to note that a Wald test rejects the null hypothesis that the coefficients on the determinants of the target debt ratio are jointly zero in all models, indicating that the target leverage is properly specified.

[insert Table 4 about here]

We further explore the case of book- vs. market value-based leverage measures. This extended analysis allows us to investigate the notion that firms try to rebalance their capital structure (e.g., Leary and Roberts, 2005; Chen and Zhao, 2005). It is often argued that market valuations of equity are beyond the influence of management and are thus a weak measure of leverage; treasury management generally concentrates on book leverage. Furthermore, while making the case for market leverage, Welch (2004) reports that firms do not rebalance their capital structure after changes in market valuation and that the variation in stock returns accounts for most of the (market) leverage variation. Table 7 contains the coefficients on the interaction term between past book leverage, LV_{it-1}, and relative change in market leverage from *t-2* to *t-1*, LVCHNG.

[insert Table 5 about here]

Contrary to what we would expect according to the notion of the lesser importance of book leverage and the Welch (2004) argument, we find a positive relationship between adjustment speed and past change in market leverage. This finding implies that a large variation in past *market* leverage leads to faster adjustment to target *book* leverage. Thus, firms do tend to rebalance their book capital structure after sharp changes in market leverage (lending support to evidence by Leary and Roberts, 2005). Furthermore, large changes in leverage (both book and market leverage) do not significantly affect the adjustment speed in market leverage ratios. We thus conclude that firms are more concerned with book leverage ratios than with market leverage ratios: they do not counteract variations in market value-based leverage immediately, but adjust their book leverage ratios after large swings in market leverage.

An important issue brought forward by Korajczyk and Levy (2003) is that results should differ for subsamples of financially constrained and unconstrained firms. Given that a firm's access to financial markets is expected to influence its capital structure choice and financial constraints clearly have a macroeconomic dimension, we split our sample in two categories, depending on whether a firm is financially constrained or unconstrained.[22] Financially constrained firms cannot postpone adjustment in either state of high or low. Accordingly, there should not be any significant relationship between the speed of adjustment and both the credit spread (CREDIT) and the TED spread (TED) for financially constrained firms.

[insert Table 6 about here]

Korajczyk and Levy (2003) define a firm as financially constrained if it does not have sufficient funds to undertake investment opportunities and if it faces severe agency costs when accessing financial markets. Although this classification is straight-forward, it lacks a balance sheet-based criteria. We therefore include the current ratio as the second criteria. This ratio is

[22] Note that a sample split-up allows that all coefficients in the model are different between the two subsamples, whereas a dummy variable approach usually only allows that selected coefficients differ between the subsamples.

of high importance when dealing with banks (in fact, the classification we use refers to the so called “Banker’s Rule”, e.g. Ross, Westerfield and Jaffe, 2004) and is an important indicator of a firms’ ability to meet its short-term debt obligations. The current ratio is given through the ratio of current assets to current liabilities. Therefore, we classify a firm as financially constrained if in a given year a firm has (i) a Tobin's Q greater than one and (ii) a current ratio of less than 2. All firm-events that are considered financially constrained constitute the first subsample and all the other firm events fall into the financially unconstrained subsample. This algorithm classifies a total of 1’833 observations in 356 different firms as “financially constrained”. The time-series restriction of at least 3 consecutive firm years leaves us with a sample of 193 firms with 870 firm years. Tables 6 and 7 report all the coefficients our analysis for the two subsamples.

[insert Table 7 about here]

Overall, our empirical results show a coherent picture. Although not all coefficients on adjustment speed determinants are estimated as predicted, there is a clear tendency that capital structure adjustment of financially constrained firms is affected differently of both firm characteristics and macroeconomic conditions. First, our results for the firm characteristic variables are reassuring. While firm size (SIZE) and distance to target leverage (DIST) are estimated insignificantly, growth opportunities still have a significant impact on adjustment speed in market leverage ratios, further strengthening the notion that growth firms exhibit higher financial flexibility through adjustments in external investment financing. Overall, we find a stronger negative relationships between ISHORT and the adjustment speed of financially constrained firms, lending support to the notion that especially constrained firms are hit harder by bad states than financially unconstrained firms. However, the default and global political risk premia (CREDIT and TED) are again a little harder to interpret. Although we find no significant relationship with TED, CREDIT still largely determines adjustment speed of financially constrained firms. We again argument according to Chen (1991) and expect faster adjustment of financially constrained firms after phases of higher default risk. In contrast, financially unconstrained firms are rather influenced by global political risk (TED) and not by local default risk. Overall, our evidence for the Korajczyk and Levy (2003) argument is weak at best. However, we find strong evidence that the capital structure adjustment behavior of financially constrained firms is determined differently from the behavior of financially unconstrained firms.

5. Conclusion

Empirical evidence as well as survey response indicates that capital structure choice lies at the very heart of corporate financial decision making. The interdependence between leverage ratios and firm characteristics has usually been described in favor of one of the traditional capital structure theories, e.g. the trade-off theory or the pecking order theory. However, these models do not characterize the nature of the adjustment process towards target leverage ratios. Firm temporarily deviate from their target capital structure and then gradually work back in a seemingly random manner. In fact, in the presence of market imperfections, adjustment to target is costly and it may be cheaper for firms not to fully adjust to their target even if they recognize that their current leverage ratio is not optimal. Nevertheless, there is surprisingly little empirical evidence on the determinants of a time-varying speed of adjustment to target leverage and about the influence of macroeconomic variables on the adjustment process in particular. As a matter of fact, a broader body of literature devoted to partial capital structure adjustments has been developed only recently (e.g., Flannery and Rangan, 2006; Drobetz and Wanzenried, 2006, Drobetz, Pensa and Wanzenried, 2006).

We present a dynamic model that endogenizes both the target leverage ratio and the speed of adjustment. Using a dynamic adjustment model and panel methodology for a sample of 706 non-financial firms from Germany, France, Italy and the United Kingdom over the period from 1982 to 2002, we are able to provide further evidence (i) on the determinants of the target capital structure rather than observed capital structure and (ii) on the determinants of adjustment speed. Most important, we analyze the effects of firm-specific characteristics as well as macroeconomic factors on the speed of adjustment to target leverage. We document that faster growing firms and larger firms adjust more readily, lending support to the notion that especially these firms exhibit higher financial flexibility and/or cost advantages over their peers. Furthermore, we document that firms that are further away from target leverage adjust faster. Our results further reveal interesting relations between the speed of adjustment and well-known business cycle variables. Most important, the speed of adjustment is higher if interest rates are low and the risks of disruption in the global financial system are negligible. Additionally, we shed new light capital structure rebalancing arguments. Our results reveal that a large swing in market leverage ratios leads to faster adjustment in book leverage ratios in the following period. Finally, we document that financial constraints clearly affect capital structure decisions: firm characteristics and the distance to target leverage do not affect the speed of adjustment of financially constrained firms. Only faster growing financially constrained firms adjust faster, lending further support to the notion that growth firms exhibit higher financial flexibility through changes in external growth financing. Furthermore, financially constrained firms are hit harder by unfavorable macroeconomic conditions and cannot take advantage of favorable conditions in the same manner than unconstrained firms can.

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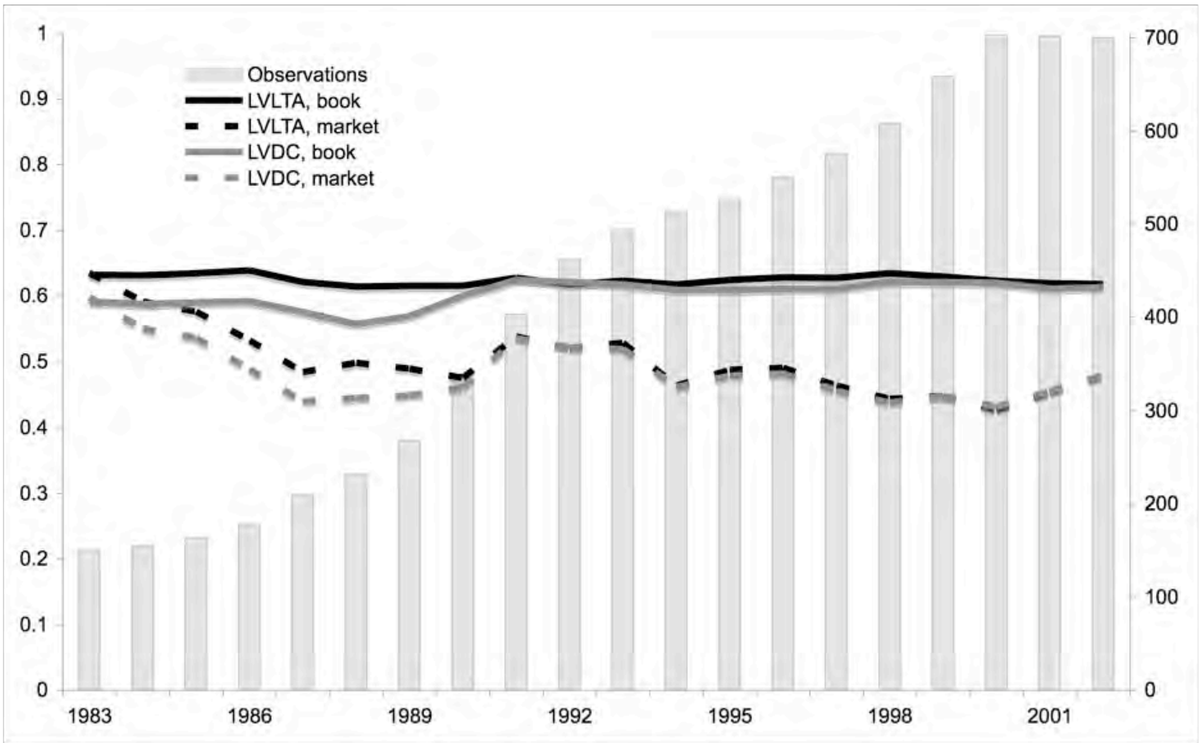
Table 1: Debt ratio and sample dynamics



The figure graphs the annual averages of our main debt ratio definitions LVLTA and LVDC (lines, left-hand scale) and annual observation count (bars, right-hand scale). LVLTA is the ratio of total (nonequity) liabilities to total assets, and LVDC is the ratio of total interest bearing debt to capital, where capital is defined as total debt plus equity. For the market values of leverage the book value of equity is replaced by the market value of equity.

Table 1: Descriptive statistics

	Mean	Median	Stdev.	Mean	Median	Stdev.
			Panel A: Capital structure determinants			
Tangibility, TANG	0.354	0.305	0.232			
Firm size, SIZE	13.386	13.466	1.892			
Growth opportunities, GROWTH	1.718	1.291	1.701			
Profitability, ROA	0.079	0.071	0.099			
Non-debt tax shields, TAX	0.046	0.041	0.033			
			Panel B: Macroeconomic variables			
Short interest rate, ISHORT	0.067	0.060	0.030			
Term spread, TERM	0.005	0.009	0.015			
Credit spread, CREDIT	0.014	0.017	0.017			
T-Bill Eurodollar (TED) spread	0.005	0.006	0.003			
Stock market return, STOCKS	0.142	0.165	0.208			
Dividend yield, DY	0.026	0.024	0.009			
			Panel C: Debt ratio measures			
	Book values			Market values		
LVLTA	0.623	0.629	0.185	0.483	0.466	0.239
LVDC	0.609	0.595	0.209	0.474	0.425	0.271
			Panel D: Target deviation measures			
	Book values			Market values		
$DIST_{LVLTA}$	0.135	0.110	0.109	0.159	0.141	0.115
$DIST_{LVDC}$	0.162	0.132	0.123	0.195	0.170	0.140

The table reports descriptive statistics of the explanatory variables. TANG is the ratio of fixed assets to total assets, SIZE is the natural logarithm of net sales, GROWTH is the ratio of market to book equity, ROA is the pre tax profit over total assets and TAX is the ratio of depreciation over total assets. DIST is the difference between the target and the current leverage ratio, where target leverage is constructed as the fitted value of a fixed-effect regression of the leverage ratio on the five capital structure determinants TANG, SIZE, GROWTH, ROA and TAX. ISHORT is the 3-month money market interest rate, TERM is the difference between the yield of government bonds with a maturity of at least 10 years and ISHORT, CREDIT is the difference between the yields of AAA rated corporate bonds and government bonds and TED is the difference between the 3-month Eurodollar rate for U.S. Dollars and the 90-day yield on U.S. Treasury bills. STOCKS and DY are the run-up annual stock market return and the run-up average annual dividend yield, respectively.

Table 2: Fixed effects regression for capital structure determinants

	LVLTA		LVDC	
	Book values	Market values	Book values	Market values
$TANG_{it}$	0.039***	0.081***	0.002	0.035**
	(0.126)	(0.014)	(0.014)	(0.015)
$SIZE_{it}$	0.058***	0.057***	0.010***	0.011***
	(0.002)	(0.002)	(0.002)	(0.002)
$GROWTH_{it}$	0.010***	-0.026***	0.010***	-0.022***
	(0.001)	(0.001)	(0.001)	(0.001)
ROA_{it}	-0.309***	-0.506***	-0.246***	-0.465***
	(0.014)	(0.016)	(0.016)	(0.017)
TAX_{it}	-0.036	-0.465***	-0.354***	-0.813***
	(0.068)	(0.075)	(0.077)	(0.081)
constant	-0.191***	-0.237***	0.489***	0.424***
	(0.028)	(0.031)	(0.032)	(0.034)
R^2 within	0.155	0.311	0.042	0.232
R^2 between	0.228	0.493	0.034	0.338
R^2 overall	0.200	0.400	0.058	0.278
Wald test	1642.71*** (24)	4287.54*** (24)	371.91*** (24)	2640.51*** (24)
Hausman test	123.97*** (23)	176.20*** (23)	104.60*** (23)	178.62*** (23)
Observations	8561	8561	8561	8561
Groups	705	705	705	705

The table reports the results for fixed effects panel regressions of the leverage ratio on firm-specific capital structure determinants. LVLTA is the ratio of total (nonequity) liabilities to total assets, and LVDC is the ratio of total debt to capital, where capital is defined as total debt plus equity. For the market values of leverage the book value of equity is replaced by the market value of equity. TANG is the ratio of fixed assets to total assets, SIZE is the natural logarithm of net sales, GROWTH is the ratio of market to book equity, ROA is the pre tax profit over total assets and TAX is the ratio of depreciation over total assets. Firm-specific and time-specific effects are included. Coefficients significantly different from zero at the 1%/5%/10% level are marked with ***/**/*. Robust standard errors are in brackets. Numbers in brackets for the Wald and Hausman test denote the degrees of freedom.

Table 3: Firm-specific adjustment factors

	Book values				Market values			
				Panel A: LVLTA				
LV_{it-1}	1.239***	0.496***	0.488***	1.170***	1.176***	0.495***	0.633***	1.486***
	(0.205)	(0.037)	(0.064)	(0.227)	(0.165)	(0.068)	(0.039)	(0.160)
$LV_{it-1} \times SIZE_{it}$	-0.061***			-0.061***	-0.058***			-0.060***
	(0.016)			(0.018)	(0.012)			(0.012)
$LV_{it-1} \times GROWTH_{it}$		0.007		-0.002		-0.115***		-0.235***
		(0.004)		(0.006)		(0.048)		(0.025)
$LV_{it-1} \times DIST_{it}$			0.062	0.116			-0.738***	-0.138
			(0.185)	(0.146)			(0.110)	(0.122)
Wald test	488.60***	657.28***	529.65***	694.12***	657.68***	796.87***	743.78***	1029.0***
z_2	-1.64	-0.97	-1.19	-0.99	-1.11	0.07	-0.52	-0.92
Sargan test	555.73	548.89	548.78	639.47	548.06	559.11	560.00	628.19
				Panel B: LVDC				
LV_{it-1}	0.887***	0.550***	0.533***	1.057***	1.000***	0.536***	0.690***	1.343***
	(0.215)	(0.038)	(0.082)	(0.222)	(0.201)	(0.042)	(0.048)	(0.174)
$LV_{it-1} \times SIZE_{it}$	-0.034***			-0.044***	-0.040***			-0.049***
	(0.017)			(0.015)	(0.015)			(0.012)
$LV_{it-1} \times GROWTH_{it}$		-0.020		-0.030*		-0.091***		-0.160***
		(0.017)		(0.018)		(0.025)		(0.020)
$LV_{it-1} \times DIST_{it}$			-0.307	-0.068			-0.615***	-0.185
			(0.365)	(0.178)			(0.129)	(0.120)
Wald test	267.86***	379.58***	389.89***	444.41***	667.32***	663.02***	678.84***	1043.9***
z_2	0.68	0.48	0.54	0.29	-0.88	-0.61	-0.60	-0.61
Sargan test	550.67	549.55	547.46	630.59	551.28	561.08	554.91	637.53
Observations	6454	6454	6454	6454	6454	6454	6454	6454
Groups	660	660	660	660	660	660	660	660

The table reports the results of estimating equation (5) with the General Method of Moments (GMM) dynamic panel data estimator proposed by Arellano and Bond (1991). Variations in sample size are due to potential data limitations. LVLTA is the ratio of total (nonequity) liabilities to total assets, and LVDC is the ratio of total debt to capital, where capital is defined as total debt plus equity. For the market values of leverage the book value of equity is replaced by the market value of equity. The determinants of the adjustment speed are as follows: SIZE is the natural logarithm of net sales; GROWTH is the ratio of market to book equity; DIST is constructed as the fitted value of the fixed effects regression of the leverage ratio on the five capital structure determinants TANG, SIZE, GROWTH, ROA and TAX. The table shows the coefficients on the lagged leverage ratio and on the interaction term of the determinant of adjustment speed with the lagged leverage ratio. Coefficients significantly different from zero at the 1%/5%/10% level are marked with ***/**/*. Robust standard errors are in brackets. The Wald test statistic refers to the null hypothesis that all coefficients on the determinants of target debt ratio are jointly equal to zero. The test statistic z_2 tests the null hypothesis of no second order correlation in the residuals. The Sargan test statistics refers to the null hypothesis that the overidentifying restrictions are valid and uses the Arellano and Bond (1991) two-step estimator.

Table 4: Macroeconomic adjustment factors

	Book values					Market values				
					Panel A: LVLTA					
LV_{it-1}	0.410***	0.521***	0.501***	0.487***	0.400***	0.332***	0.459***	0.469***	0.438***	0.507***
	(0.060)	(0.033)	(0.036)	(0.043)	(0.110)	(0.043)	(0.026)	(0.025)	(0.035)	(0.084)
$LV_{it-1} \times ISHORT_{it}$	1.249***				-0.203	1.511***				-1.054
	(0.539)				(1.290)	(0.464)				(0.994)
$LV_{it-1} \times TERM_{it}$		0.022			-0.349		-1.082			-1.223
		(0.735)			(1.576)		(0.686)			(1.205)
$LV_{it-1} \times CREDIT_{it}$			-2.521**		-4.561**			-1.494*		-2.875**
			(1.128)		(1.965)			(0.763)		(1.288)
$LV_{it-1} \times TED_{it}$				7.473***	17.20***				2.144***	6.139*
				(3.049)	(4.049)				(2.730)	(3.277)
Wald test	762.0***	552.3***	676.0***	523.3***	990.3***	881.8***	781.5***	935.3***	968.9***	1419***
z_2	-1.56	-1.65*	-1.60	-1.72*	-2.47**	-1.07	-0.73	-1.19	-1.87*	-2.78***
Sargan test	549.51	552.50	546.70	395.12	620.30	551.51	545.85	556.44	443.34	963.82
					Panel B: LVDC					
LV_{it-1}	0.398***	0.489***	0.484***	0.465***	0.111	0.479***	0.527***	0.531***	0.479***	0.389***
	(0.078)	(0.061)	(0.056)	(0.059)	(0.172)	(0.038)	(0.026)	(0.025)	(0.032)	(0.077)
$LV_{it-1} \times ISHORT_{it}$	1.149***				2.921*	0.554***				0.743
	(0.421)				(1.622)	(0.015)				(0.934)
$LV_{it-1} \times TERM_{it}$		1.106			3.678*		0.702			1.546
		(0.740)			(2.007)		(0.563)			(1.009)
$LV_{it-1} \times CREDIT_{it}$			-2.593***		-1.450			-0.857*		-0.784
			(0.788)		(1.608)			(0.470)		(1.124)
$LV_{it-1} \times TED_{it}$				7.905***	14.09***				5.039***	6.797***
				(2.463)	(3.137)				(2.039)	(2.401)
Wald test	381.8***	305.6***	344.1***	301.2***	563.1***	734.6***	764.9***	782.4***	874.0***	1226***
z_2	0.44	0.50	0.25	0.56	-0.15	-1.41	-0.99	-1.17	-1.80*	-2.17**
Sargan test	554.89	554.71	565.27	399.42	616.80	563.39	556.20	564.90	435.90	619.78
Observations	6454	6454	6454	6454	6454	6454	6454	6454	6454	6454
Groups	660	660	660	660	660	660	660	660	660	660

The table reports the results of estimating equation (5) with the General Method of Moments (GMM) dynamic panel data estimator proposed by Arellano and Bond (1991). Variations in sample size are due to potential data limitations. LVLTA is the ratio of total (nonequity) liabilities to total assets, and LVDC is the ratio of total debt to capital, where capital is defined as total debt plus equity. For the market values of leverage the book value of equity is replaced by the market value of equity. The determinants of the adjustment speed are as follows: ISHORT is the 3-month money market interest rate, TERM is the difference between the yield of government bonds with a maturity of at least 10 years and ISHORT, CREDIT is the difference between the yields of AAA rated corporate bonds and government bonds, TED is the difference between the 3-month Eurodollar rate for U.S. Dollars and the 90-day yield on U.S. Treasury bills. The table shows the coefficients on the lagged leverage ratio and on the interaction term of the determinant of adjustment speed with the lagged leverage ratio. Coefficients significantly different from zero at the 1%/5%/10% level are marked with ***/**/*. Robust standard errors are in brackets. The Wald test statistic refers to the null hypothesis that all coefficients on the determinants of target debt ratio are jointly equal to zero. The test statistic z2 tests the null hypothesis of no second order correlation in the residuals. The Sargan test statistics refers to the null hypothesis that the overidentifying restrictions are valid and uses the Arellano and Bond (1991) two-step estimator.

Table 5: Impact of past changes in leverage

	LVLTA	LVDC
	Book value	Book value
LV_{it-1}	0.590***	0.529***
	(0.044)	(0.064)
$LV_{it-1} \times LVCHNG_{it, LVLTAM}$	-0.199***	-0.175***
	(0.059)	(0.055)
Wald test (χ^2)	511.80***	276.11***
z_2	-0.91	0.90
Sargan test	544.72	554.66
LV_{it-1}	0.558***	0.518***
	(0.043)	(0.070)
$LV_{it-1} \times LVCHNG_{it, LVDCM}$	-0.159***	-0.080*
	(0.052)	(0.048)
Wald test (χ^2)	529.54***	251.73***
z_2	-1.09	0.84
Sargan test	560.89	565.94
Observations	6454	6454
Groups	660	660

The table reports the results of estimating equation (5) with the General Method of Moments (GMM) dynamic panel data estimator proposed by Arellano and Bond (1991). Variations in sample size are due to potential data limitations. LVLTA is the ratio of total (nonequity) liabilities to total assets, and LVDC is the ratio of total debt to capital, where capital is defined as total debt plus equity. For the market values of leverage the book value of equity is replaced by the market value of equity. LVCHNG is the relative change in leverage from period t-2 to t-1. The table shows the coefficients on the lagged leverage ratio and on the interaction term of the determinant of adjustment speed with the lagged leverage ratio. Coefficients significantly different from zero at the 1%/5%/10% level are marked with ***/**/*. Robust standard errors are in brackets. The Wald test statistic refers to the null hypothesis that all coefficients on the determinants of target debt ratio are jointly equal to zero. The test statistic z2 tests the null hypothesis of no second order correlation in the residuals. The Sargan test statistics refers to the null hypothesis that the overidentifying restrictions are valid and uses the Arellano and Bond (1991) two-step estimator.

Table 6: Firm-specific adjustment factors for financially constrained and unconstrained firms

	Financially unconstrained firms				Financially constrained firms			
				Panel A: LVLTA, book values				
LV_{it-1}	1.001***	0.380***	0.355***	1.078***	0.172	0.307***	0.291***	0.747**
	(0.205)	(0.048)	(0.069)	(0.238)	(0.275)	(0.099)	(0.137)	(0.391)
$LV_{it-1} \times SIZE_{it}$	-0.053***			-0.056***	0.017			-0.032
	(0.016)			(0.018)	(0.021)			(0.026)
$LV_{it-1} \times GROWTH_{it}$		-0.022		-0.017		0.016		0.023**
		(0.022)		(0.027)		(0.018)		(0.011)
$LV_{it-1} \times DIST_{it}$			-0.026	-0.054			0.197	-0.038
			(0.197)	(0.170)			(0.342)	(0.292)
Wald test	293.94***	385.69***	346.80***	492.18***	461.13***	653.23***	120.08***	1441.4***
z_2	0.07	-0.00	0.44	-0.03	-1.33	-1.39	-1.66*	-1.62
Sargan test	511.35	522.17	523.59	524.42	179.60	176.86	179.36	157.43
				Panel B: LVLTA, market values				
LV_{it-1}	1.045***	0.716***	0.488***	1.325***	0.385	0.336***	0.315***	0.737
	(0.172)	(0.056)	(0.045)	(0.159)	(0.377)	(0.058)	(0.078)	(0.554)
$LV_{it-1} \times SIZE_{it}$	-0.056***			-0.046***	-0.018			-0.026
	(0.012)			(0.011)	(0.028)			(0.044)
$LV_{it-1} \times GROWTH_{it}$		-0.406***		-0.388***		-0.075***		-0.121***
		(0.050)		(0.055)		(0.020)		(0.021)
$LV_{it-1} \times DIST_{it}$			-0.647***	-0.067			-0.128	0.895***
			(0.130)	(0.119)			(0.338)	(0.307)
Wald test	472.21***	938.77***	607.07***	1186.8***	191.35***	791.48***	146.59***	1436.6***
z_2	0.31	-0.40	-0.04	-0.55	-0.86	-0.53	-0.71	-0.20
Sargan test	519.90	517.98	521.56	521.45	180.88	177.87	175.42	171.42
				Panel C: LVDC, book values				
LV_{it-1}	1.077***	0.457***	0.386***	1.147***	0.043	0.439***	0.426***	1.140**
	(0.220)	(0.042)	(0.081)	(0.241)	(0.330)	(0.085)	(0.147)	(0.470)
$LV_{it-1} \times SIZE_{it}$	-0.052***			-0.057***	0.010			-0.046
	(0.016)			(0.016)	(0.024)			(0.033)
$LV_{it-1} \times GROWTH_{it}$		-0.017		-0.055*		-0.034**		-0.034*
		(0.016)		(0.030)		(0.017)		(0.020)
$LV_{it-1} \times DIST_{it}$			-0.099	0.117			-1.024*	-0.753**
			(0.219)	(0.177)			(0.554)	(0.340)
Wald test	249.19***	272.29***	286.02***	445.14***	319.25***	616.63***	166.83***	935.08
z_2	0.38	0.09	0.12	-0.05	1.30	1.08	0.45	0.57
Sargan test	522.12	520.14	517.51	532.04	178.38	175.08	181.66	161.36
				Panel D: LVDC, market values				
LV_{it-1}	1.054***	0.413***	0.577***	1.181***	0.179	0.339***	0.372***	
	(0.243)	(0.038)	(0.059)	(0.180)	(0.359)	(0.056)	(0.082)	(0.)
$LV_{it-1} \times SIZE_{it}$	-0.051***			-0.046***	-0.002			
	(0.017)			(0.013)	(0.026)			(0.)
$LV_{it-1} \times GROWTH_{it}$		-0.068***		-0.131***		-0.083***		
		(0.024)		(0.028)		(0.018)		(0.)
$LV_{it-1} \times DIST_{it}$			-0.524***	-0.184			-0.529	
			(0.151)	(0.120)			(0.361)	(0.)
Wald test	340.22***	327.67***	369.12***	643.81***	166.30***	622.45***	165.47***	
z_2	-0.21	-0.21	-0.01	-0.70	-0.38	0.01	-0.25	
Sargan test	515.14	522.77	519.07	582.91	176.54	181.19	175.42	
Observations	4448	4448	4448	4448	870	870	870	870
Groups	547	547	547	547	193	193	193	193

The table reports the results of estimating equation (5) with the General Method of Moments (GMM) dynamic panel data estimator proposed by Arellano and Bond (1991). Variations in sample size are due to potential data limitations. LVLTA is the ratio of total (nonequity) liabilities to total assets, and LVDC is the ratio of total debt to capital, where capital is defined as total debt plus equity. For the market values of leverage the book value of equity is replaced by the market value of equity. The determinants of the adjustment speed are as follows: SIZE is the natural logarithm of net sales; GROWTH is the ratio of market to book equity; DIST is constructed as the fitted value of the fixed effects regression of the leverage ratio on the five capital structure determinants TANG, SIZE, GROWTH, ROA and TAX. An observation is classified as financially constraint if the Tobin's Q is greater than 1 and the current ratio is below 2. The table shows the coefficients on the lagged leverage ratio and on the interaction term of the determinant of adjustment speed with the lagged leverage ratio. Coefficients significantly different from zero at the 1%/5%/10% level are marked with ***/**/*. Robust standard errors are in brackets. The Wald test statistic refers to the null hypothesis that all coefficients on the determinants of target debt ratio are jointly equal to zero. The test statistic z2 tests the null hypothesis of no second order correlation in the residuals. The Sargan test statistics refers to the null hypothesis that the overidentifying restrictions are valid and uses the Arellano and Bond (1991) two-step estimator

Table 7: Macroeconomic adjustment factors for financially constrained and unconstrained firms

	Financially unconstrained firms					Financially constrained firms				
					Panel A: LVLTA, book values					
LV_{it-1}	0.292***	0.362***	0.352***	0.333***	0.275**	0.061	0.344***	0.456***	0.351***	0.043
	(0.058)	(0.038)	(0.037)	(0.048)	(0.122)	(0.112)	(0.059)	(0.076)	(0.086)	(0.253)
$LV_{it-1} \times ISHORT_{it}$	0.811				0.554	4.262***				3.464
	(0.554)				(1.414)	(1.515)				(3.157)
$LV_{it-1} \times TERM_{it}$		-0.571			-0.367		0.980			4.406
		(0.681)			(1.768)		(1.922)			(3.505)
$LV_{it-1} \times CREDIT_{it}$			-1.192		-1.479			-9.486***		-8.575*
			(1.054)		(2.033)			(2.792)		(4.577)
$LV_{it-1} \times TED_{it}$				4.061	8.713***				2.797	20.180**
				(3.113)	(4.375)				(8.771)	(9.347)
Wald test	509.0***	352.4***	547.9***	262.8***	782.6***	81.86***	93.30***	48.65***	78.20***	230.0***
z_2	-0.11	-0.57	-0.33	0.04	-1.93*	-1.18	-1.15	-1.12	-1.52	-0.94
Sargan test	521.07	518.00	522.49	385.59	514.30	176.04	172.11	176.03	172.94	160.17
					Panel B: LVLTA, market values					
LV_{it-1}	0.212***	0.350***	0.334***	0.327***	0.453***	-0.026	0.227***	0.323***	0.183***	0.435*
	(0.044)	(0.028)	(0.026)	(0.037)	(0.109)	(0.097)	(0.049)	(0.056)	(0.062)	(0.257)
$LV_{it-1} \times ISHORT_{it}$	1.477***				-1.428	3.829***				-3.101
	(0.546)				(1.257)	(1.108)				(3.237)
$LV_{it-1} \times TERM_{it}$		-2.322***			-3.105*		-2.370			-4.273
		(0.844)			(1.639)		(1.548)			(3.701)
$LV_{it-1} \times CREDIT_{it}$			-0.381		-2.149			-7.026***		-10.87***
			(0.810)		(1.583)			(1.729)		(3.952)
$LV_{it-1} \times TED_{it}$				1.441	4.362				5.197	21.192**
				(3.221)	(3.684)				(8.215)	(9.810)
Wald test	549.4***	469.0***	643.6***	531.5***	938.4***	162.9***	152.3***	141.2***	154.6***	282.5***
z_2	0.05	0.18	-0.87	-1.12	-1.92*	-0.14	-1.62	0.13	-0.54	-1.78*
Sargan test	523.79	518.72	518.05	408.70	516.59	176.04	184.60	176.53	172.60	164.54
					Panel C: LVDC, book values					
LV_{it-1}	0.355***	0.434***	0.436***	0.413***	0.033	-0.124	0.174	0.351***	0.104	-0.462
	(0.051)	(0.036)	(0.035)	(0.044)	(0.124)	(0.155)	(0.111)	(0.126)	(0.185)	(0.415)
$LV_{it-1} \times ISHORT_{it}$	1.092***				3.893***	4.076***				8.299*
	(0.427)				(1.485)	(1.548)				(4.545)
$LV_{it-1} \times TERM_{it}$		0.316			4.358***		5.484			12.150**
		(0.586)			(1.589)		(3.347)			(5.999)
$LV_{it-1} \times CREDIT_{it}$			-1.533**		0.897			-11.55***		-6.430
			(0.759)		(1.849)			(2.425)		(4.595)
$LV_{it-1} \times TED_{it}$				5.919**	6.905*				11.500	25.783**
				(2.651)	(3.578)				(10.992)	(10.491)
Wald test	252.3***	228.3***	258.8***	232.0***	375.7***	51.03***	61.12***	50.92***	59.86***	210.4***
z_2	-0.11	0.06	-0.12	0.23	-0.79	1.35	1.26	1.16	1.18	1.11
Sargan test	515.33	524.53	513.90	401.66	525.23	180.11	179.50	181.32	176.52	157.52
					Panel D: LVDC, market values					
LV_{it-1}	0.372***	0.431***	0.426***	0.381***	0.226**	-0.028	0.211***	0.300***	0.154**	0.477*
	(0.040)	(0.029)	(0.025)	(0.032)	(0.090)	(0.101)	(0.046)	(0.054)	(0.065)	(0.257)
$LV_{it-1} \times ISHORT_{it}$	0.626*				1.727	3.648***				-3.899
	(0.373)				(1.104)	(1.219)				(3.249)
$LV_{it-1} \times TERM_{it}$		0.274			2.208*		-2.019			-4.948
		(0.620)			(1.175)		(1.654)			(3.684)
$LV_{it-1} \times CREDIT_{it}$			-0.240		0.552			-6.502***		-10.94***
			(0.554)		(1.353)			(1.721)		(4.008)
$LV_{it-1} \times TED_{it}$				5.629***	4.771*				6.355	21.016**
				(2.054)	(2.638)				(8.690)	(10.254)
Wald test	397.0***	367.1***	454.8***	497.8***	819.1***	123.5***	114.0***	105.7***	118.4***	225.6***
z_2	-0.86	-0.39	-0.89	-1.63	-1.51	0.19	-1.13	0.33	-0.25	-1.44
Sargan test	517.16	522.33	514.40	410.37	513.62	181.22	179.85	180.98	175.30	163.50
Observations	4448	4448	4448	4448	4448	870	870	870	870	870

Groups	547	547	547	547	547	193	193	193	193	193

The table reports the results of estimating equation (5) with the General Method of Moments (GMM) dynamic panel data estimator proposed by Arellano and Bond (1991). Variations in sample size are due to potential data limitations. LVLTA is the ratio of total (nonequity) liabilities to total assets, and LVDC is the ratio of total debt to capital, where capital is defined as total debt plus equity. For the market values of leverage the book value of equity is replaced by the market value of equity. The determinants of the adjustment speed are as follows: ISHORT is the 3-month money market interest rate, TERM is the difference between the yield of government bonds with a maturity of at least 10 years and ISHORT, CREDIT is the difference between the yields of AAA rated corporate bonds and government bonds, TED is the difference between the 3-month Eurodollar rate for U.S. Dollars and the 90-day yield on U.S. Treasury bills. An observation is classified as financially constraint if the Tobin's Q is greater than 1 and the current ratio is below 2. The table shows the coefficients on the lagged leverage ratio and on the interaction term of the determinant of adjustment speed with the lagged leverage ratio. Coefficients significantly different from zero at the 1%/5%/10% level are marked with ***/**/*. Robust standard errors are in brackets. The Wald test statistic refers to the null hypothesis that all coefficients on the determinants of target debt ratio are jointly equal to zero. The test statistic z2 tests the null hypothesis of no second order correlation in the residuals. The Sargan test statistics refers to the null hypothesis that the overidentifying restrictions are valid and uses the Arellano and Bond (1991) two-step estimator.