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How Much is Too Much? Debt Capacity and Financial Flexibility

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Debt Capacity and Financial Flexibility*

by

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Abstract

We estimate the debt capacity of a firm as the critical debt ratio that causes a downgrade in creditworthiness. Unused debt capacities depict the temporal access to external debt funds and measure a firm's financial flexibility. Firms with high unused debt capacities realize a larger fraction of their investment opportunity set, borrow more often, and issue higher volumes of debt. Firms that have exhausted their debt capacity issue equity or pay down debt when having a financial surplus. These patterns of actively using and restoring unused debt capacities imply that preserving financial flexibility is of first-order importance in corporate finance.

In their survey on the practice of corporate finance, Graham and Harvey (2002) classify a firm as financially flexible if it is unconstrained in its issuance decision, sufficiently liquid to react to cash flow shocks, and able to pursue investment opportunities in a timely manner. Even though this definition leaves room for interpretation, one factor that is always closely related to financial flexibility, although often neglected, is the firm's debt capacity. DeAngelo, DeAngelo, and Whited (2011) and Denis and McKeon (2012) regard unused debt capacities as the central source for financial flexibility because a firm can only access external debt funds easily if it has sufficient unused debt capacity. However, neither study provides a measure of the debt capacity and thus the approaches do not give guidance on how to identify the unused debt capacities. In this study, we estimate a firm's debt capacity as a function of its credit rating and show explicitly that unused debt capacities provide financial flexibility and influence financing decisions.

Despite the vast number of empirical and theoretical capital structure studies, the literature struggles to provide debt capacity estimates. Leary and Roberts (2010) estimate a firm's debt capacity in a pecking order framework as the debt ratio that leads firms to issue equity, but the estimates do not serve well in explaining the decision between equity and debt issues. Lemmon and Zender (2010) classify firms as having a high or low debt capacity based on a firm's bond market access. However, their approach cannot be used to determine firm-year specific debt capacities. We fill this gap by presenting a novel approach for estimating firm-year specific debt capacities.

The debt capacity proposed in this paper is based on corporate credit ratings. We calculate the debt capacity as the critical debt ratio that triggers a downgrade in the creditworthiness of a firm. This debt ratio is of special relevance as firms have thresholds for their rating (Kisgen (2009)) and put high effort into preventing downgrades to convey a stable financial situation for future capital issues (Begley (2013)). Our definition of the debt capacity aims at identifying a critical debt ratio that firms try to avoid because exceeding this ratio leads to a downgrade which conveys negative information on the firm's financial situation and results in negative shock to a firm's cost of capital. It is not identical to a default threshold such as in Brennan and Schwartz (1978) that forces a firm to go bankrupt. Hence, the debt capacity is a fundamentally different concept and refers to the amount of debt that a firm is willing to tolerate in its financing policy but not to the amount of debt that ceases the existence of the firm.

To derive firm-year specific debt capacities, we estimate credit ratings as a function of the debt ratio and other firm characteristics (de Jong, Verbeek, and Verwijmeren (2011), Alp (2013)). Using the prediction of the estimation, we calculate the debt capacity as the critical debt ratio for which the downgrading probability corresponds to the historical downgrading probability of the respective rating category. The average debt capacity in our sample is 58.9% of firm's assets and increases in firm size, liquidity, and profitability. For AAA rated firms, the debt capacity amounts to 20.1% and increases with declining ratings. While firms with a rating of BBB can afford 53.1% of debt on average, the debt capacity for B rated firms is 77.9%. Preserving a higher rating enforces tighter constraints on the firm's funding abilities and leads to a lower debt capacity. This pattern of the debt capacity reflects the distribution of debt ratios across the rating categories. The average firm in our sample has a debt ratio of 47.3% while highly rated firms exhibit lower and firms with a low rating have higher debt ratios.

Since the subsequent results crucially depend on our estimates of the debt capacity, we show that the pattern of debt capacities across the rating categories emerges even without the assumption that firms intend to preserve their current rating level. Building on the work of Myers and Majluf (1984) and Leary and Roberts (2010), we also estimate an implied range for the debt capacity under the pecking order theory. The resulting range exhibits the same pattern as our debt capacity estimates, i.e. boundaries of the range increase with declining ratings even though the boundaries are not explicitly based on credit ratings. Moreover, our approach of estimating the debt capacity is related to de Jong, Verbeek, and Verwijmeren (2011) who calculate the debt capacity as the critical debt ratio that causes a firm to loose an investment-grade rating. Their estimated debt capacity is more closely related to a default threshold and is the largest for highly rated firms, which contrasts the empirical pattern of debt ratios across rating categories and neglects that firms deliberately choose rating thresholds.

We introduce the debt buffer as a measure of financial flexibility which corresponds to the distance between the debt capacity and the debt ratio. A positive debt buffer provides financial flexibility as it denotes the amount of debt a firm can issue without facing high downgrading risk. These easily accessible funds contribute to the improvement of short-term and long-term liquidity so that a firm can react quickly to changing market conditions and productivity shocks. Besides the observed financing decisions, we calculate the debt buffer in counterfactual financing scenarios. First, we assume that the firm financed all investments in the past fiscal year exclusively with debt, and in the second case, we assume instead that all investments were financed exclusively with equity. In combination with the observed funding, these three versions of the debt buffer are used to identify the motives behind the observed financing scenarios.

The average debt buffer at the end of a firm's fiscal year amounts to 12.1% which enables the firms to issue more debt in the future. Examining a sample of debt issuers, we find that leverage increasing financing activities are only realized if the unused debt capacity is large enough to cover the need for external funds. If equity issuing firms had chosen debt instead of equity to settle their financing deficit, their debt buffers would have been substantially smaller than those of firms that have actually chosen debt. In fact, these firms would exceed their debt capacity and would face a high risk of being downgraded in the near future. The comparison of debt and equity repurchases as well as capital substitutions exhibits a similar pattern. This evidence indicates that the funding decision of a firm is related to our financial flexibility measure.

Firms with a high debt buffer realize a larger fraction of their investment opportunity set than other firms, they issue higher volumes of debt, and exhibit more frequent debt issues. In addition, the financial constraints index of Whited and Wu (2008) indicates a lower level of financial constraints for firm with a high debt buffer. These findings are consistent with the view that a high debt buffer provides financial flexibility to a firm. To show that preserving financial flexibility is a primary concern, we analyze a sample of firms that have a financial surplus and can repurchase capital. The chances of paying down debt increase when firms exhibit a low debt buffer and have previously issued debt. This financing behavior indicates that firms actively use their financial flexibility to pursue investments and afterwards pay down debt to restore their financial flexibility. Hence, we observe that firms tend to actively use, restore, and preserve their financial flexibility.

Our measure of financial flexibility has high explanatory power for firms' financing decisions even after controlling for factors that are commonly associated with capital structure decisions. Prior studies relate changes in the firm's debt ratio to firm characteristics which serve as proxies for the influence of the most predominant capital structure theories (Rajan and Zingales (1995), Frank and Goyal (2009)). Introducing the debt buffer to these regression models increases the explained variation from 29.2% to 31.7%, reflecting an economical significant improvement. Hence, the debt buffer enhances leverage regressions by adding a new source of information to the cross-sectional dispersion of changes in debt ratios.

The approach of explaining financing decisions with a firm's unused debt capacity can partly be integrated in capital structure models such as the trade-off theory. We demonstrate that the implications of a trade-off model with credit ratings (Kisgen (2006)) partly coincide with our approach, however, our approach offers additional empirically testable implications. We find that firms operating at target debt ratios are more likely to pay down debt, a behavior which is consistent with restoring financial flexibility for future periods but cannot be explained by the trade-off theory. Hence, the notion of preserving financial flexibility is a new approach to explain financing decisions which can be combined with other approaches in the literature on financing decisions.

Our study contributes to the literature on corporate capital structure choices in several ways. First, firms actively use, restore, and preserve unused debt capacities which highlights that preserving financial flexibility is a first-order concern for financial managers. The combination of the availability of external funds and the firm's investment opportunity set form the historical evolution of debt ratios. Firms issue debt when investment opportunities and external funds are available but restore unused debt capacities when they have a financial surplus. In contrast to DeAngelo, DeAngelo, and Whited (2011), who model financial flexibility as an option to issue debt when firms are close to their target debt ratios, our results are not based on a tax benefits trade-off model. We extend their model class through an explicit measure of the availability of external funds. Our implications still hold, even if target debt ratios are not a first-order concern of financial managers (DeAngelo and Roll (2012), Fama and French (2012)).

Second, we offer an alternative approach to measure a firm's financial flexibility that departs from previous work. A common approach in prior studies is to use cash holdings to measure financial flexibility as cash provides a buffer for unexpected cash outflows (Faulkender and Wang (2006), Gamba and Triantis (2008)). However, cash holdings provide rather short-term than long-term liquidity and are often insufficient for large investment projects. As management starts to pile up cash, agency problems arise due to shareholders' limited monitoring ability towards the use of funds (Jensen (1986)). We show that firms use unused debt capacities to remain financially flexible and thereby circumvent the agency problems associated with cash holdings.

The results of our study are robust in various dimensions. Using an alternative definition of the debt ratio that excludes non-financial liabilities as well as using book values instead of market values does not change the implications. We apply a robustness check to the debt capacity threshold by adding tighter constraints on firms, however, the systematic differences between debt and equity issuers still hold. Accounting for a possible bias in the estimates that stems from an endogenous relationship between ratings and the debt ratio does not change our results neither.

I The debt capacity

The most common definition of financial flexibility follows Graham and Harvey (2002) and classifies a firm as financially flexible if it is unconstrained in its issuance decision, sufficiently liquid to react to cash flow shocks, and able to timely pursue investment opportunities due to an easy access to external funds. A factor that is inherently related to this definition of financial flexibility is the firm's debt capacity. Often, studies argue that unused debt capacities provide financial flexibility (DeAngelo, DeAngelo, and Whited (2011), Denis and McKeon (2012)). However, none of these studies provides a measure of the debt capacity, and hence, it is not possible to use their frameworks to identify unused debt capacities explicitly. In this study, we provide firm-year specific estimates of the debt capacity which can be used to identify unused debt capacities and test the hypothesis that financing decisions are driven by concerns over financial flexibility.

I.1 The economic framework for estimating the debt capacity

Generally, the debt capacity of a firm can be seen as an assessment of the amount of debt that a firm can bear given the constraints in its financial policy. This critical amount of debt is an upper boundary for the amount of debt that a firm is willing to hold but it does not have to coincide with a default threshold. A firm's default threshold is a critical debt ratio or a related financial figure which ceases the existence of the firm if it is exceeded. Commonly, this boundary is tied to the value of the firm or to the value of stockholder's equity (Brennan and Schwartz (1978), Leland and Toft (1996)). Financial managers are constrained in their choice of funding means even before the firm defaults so that the capacity of debt that a manager can use to fund projects is determined by other economic forces, which may or may not be under the control of managers. Investors limit credit supply if they expect that further debt issues are not supported by a firm's liquidity and profitability and would jeopardize the quality of current debt outstanding even immediate liquidation (Leary (2009), Lemmon and Roberts (2010)). In addition, lenders protect their claims through bond covenants and loan agreements which all result in an upper threshold for the amount of firm's debt. On the other hand, corporate managers have incentives not to use excessive debt financing to avoid costly renegotiations with creditors and to maintain in control over the firm (Jensen and Meckling (1976), Roberts and Sufi (2009)), so that it is in their best interest to stay below some critical amount of debt. We call the critical amount of debt which is determined by these various forces the firm's debt capacity.

To define this critical amount of debt more precisely, we make use of common factors in financing policies across firms. To both, managers and investors, the level of a credit rating is an essential piece of information for making financing decisions and pricing assets (Graham and Harvey (2001)). Standard & Poor's (2013) define credit ratings as "an evaluation of available information to assess the potential impact of foreseeable future events" and claim them to be "relative opinions on the creditworthiness or credit quality of debt issuers". They combine various sources of risk and transform them into an easily processable figure, namely the credit rating which influences the pricing on bond and equity markets (Hand, Holthausen, and Leftwich (1992)).

Empirical evidence suggests that preventing downgrades and preserving the current rating level is of substantial importance for both managers and investors. Firms have lower thresholds for the level of their rating (Kisgen (2009)) and put more effort into preventing downgrades than into achieving upgrades by actively reducing leverage when their current credit rating level is threatened (Begley (2013)). Moreover, stock price reactions after downgrades announcements are more pronounced than after upgrades and a constant level of a credit rating conveys a stable financial situation and a low uncertainty about the level of a firm's risk (Ederington and Goh (1998)). Even though upgrades in creditworthiness possibly increase the firm value, they do not solely come with benefits. To preserve a higher rating level, the firm has to meet higher liquidity standards, be more profitable, and provide more stable earnings (Kaplan and Urwitz (1979)). Being able to meet these requirements permanently imposes higher constraints on a firm's financing structure. Hence, firms target preserving a given level of their credit rating by avoiding downgrades. Building on these findings, we define the debt capacity as the critical debt ratio that causes a firm to be downgraded. A firm stays in its equilibrium as long as it keeps its debt ratio below its debt capacity.

The concept of a debt capacity implicitly results from other theoretical approaches in corporate finance as well. In the dynamic trade-off theory with costly adjustments, the debt capacity is the upper threshold of the range of optimal debt ratios which results from balancing tax benefits and default costs. However, tests of the trade-off theory do not explicitly address the debt capacity even though it is nested in the theory (Strebulaev (2007) and Lemmon, Roberts, and Zender (2008)). In contrast to their approaches, modeling the debt capacity as a function of a firm's credit rating does not require managers' preference for tax benefits to drive financing decisions. Instead of constantly adjusting leverage to a target debt ratio, our approach assumes that firms avoid to exceed a critical debt ratio. In the pecking order theory, the debt capacity is determined by the degree of adverse selection costs under which managers prefer to issue equity instead of debt. Leary and Roberts (2010) estimate a debt capacity that results from pecking order behavior. However, their study indicates that the pecking order theory and thereby the estimated debt capacity has only limited explanatory power for financing decisions. Lemmon and Zender (2010) find evidence that is consistent with pecking order behavior when accounting for the debt capacity in capital structure test. Nevertheless, their measure remains in abstract terms as it is based on the possibility that a firm has a credit rating but does not come with a firm-year specific estimate. As our evidence shows, there is substantial variation in the debt capacity not just across rated firms, but also over time.

I.2 The data set

Our sample is a panel data set of US firms with Standard & Poor's (S&P) Long-Term Credit Issuer Ratings during the period of 1985 up to 2012 listed in the COMPUSTAT annual file. Financial firms and utilities (Standard Industrial Classification (SIC) code 4900 - 4999 and 6000 - 6999) are excluded from the sample because their capital structure is subject to regulation. We omit all firm-years that reflect a major merger or acquisition, change in the fiscal year, or an accounting change identified by the COMPUSTAT variable "compst" because of lack in comparability between the fiscal statements from the current and the previous year. Additionally, we exclude observations with negative sales or assets, debt ratios above one or below zero, and firms with missing information in relevant variables. Variables with extreme outliers are trimmed at the upper and lower tail at a 0.1% level.[1] All data is deflated to 2012 real US dollars by using the Consumer Price Index from the Federal Reserve Bank of St. Louis (ALFred).

Rating agencies, such as Standard & Poor's, assign a rating to the whole company (issuer-level) as well as to every single bond issue (issue-level). In this study, we focus on the issuer-level rating as it determines the rating of individual issues (Standard & Poor's (2013)). To each firm-year observation in COMPUSTAT we add the monthly S&P Credit Issuer rating from one month after the report date of the latest annual financial statement. Report dates are taken from the COMPUSTAT quarterly file and missing report dates are replaced with the median time between the end of the fiscal year and the report date in the sample. We add this additional month because rating agencies tend to react to new information slowly (Löffler (2005)). However, our results are robust to altering the timing of the rating because only very few changes in ratings are observed within this time interval. Credit ratings are transformed into a discrete variable on an ordinary scale from 1 to 10, where 10 stands for a AAA rating, 9 for AA, 8 for A and so on. We do not distinguish between rating notches

[1] Due to outliers in the data, we truncate the variables firm size, profitability, liquditiy_1, liquidity_2 and the financing deficit, which all will be later introduced, on both sides at a 0.1% level.

(i.e. AA+ or AA- are all treated as a rating of AA).

Our definition of the debt ratio in market values is based on Fama and French (2002) and Chang and Dasgupta (2009) and equals book debt over market assets. We calculate book debt as total liabilities plus preferred stock less deferred taxes and convertible debt. If missing, preferred stock is replaced with the redemption value of preferred stock. The market value of assets is defined as book assets less book equity plus market equity with market equity being stock price times number of shares outstanding. The primary source for stock prices is COMPUSTAT and missing information is completed with CRSP data.[2] Following Chang and Dasgupta (2009), equity issues ($\Delta equity$) are defined as the change in book equity less the change in retained earnings. Net debt issues ($\Delta debt$) correspond to the change in book assets less $\Delta equity$ and the change in retained earnings. The sum of $\Delta debt$ and $\Delta equity$ is the firm's financing deficit, *def*, and indicates how much capital the firm raised from external capital markets. If the financing deficit is negative, the firm has a financial surplus and repurchased debt or equity.[3] All variables are scaled by total assets of the last fiscal year.

Table 1 shows the summary statistics of our sample. Our final sample consists of 14,577 observations from 2,461 different firms. 89.8% of the firms have a rating between A and B, while BBB and BB ratings are the most common ones. The average firm has a debt ratio in market values of 47.3% which increases with declining ratings. AAA rated firms have 21.8%

[2]Our results are robust to alternative definitions of the debt ratio in book and market values. Our definition of the debt ratio classifies financial and non-financial debt, e.g., accounts payable, as debt. We explicitly include non-financial liabilities in the debt ratio because we are interested in the maximum amount of liabilities that a company can bear. For example, following Rajan and Zingales (1995), the debt ratio in market values equals short-term debt plus long-term debt divided by capital. Capital is defined as the sum of long-term debt, short-term debt, and the share price at the end of the fiscal year times the number of shares outstanding. This definition of the debt ratio captures the primary sources of external capital and does not include other use of debt, such as account payable and convertibles. For the sake of brevity, we only report results for the debt ratio in market values.

[3]We use annual changes in balance sheet information to identify capital issues, repurchases, and the financing deficit. To mitigate the problem of not articulating data in COMPUSTAT which can result in misleading estimates of annual changes of financial variables (Casey, Gao, Kirschenheiter, Li, and Pandit (2013)), we exclude all firm-years that exhibit a change in accounting standards or that reflect a merger or acquisition. Nevertheless, using the statement of cash flows to identify capital issues and to calculate the financing deficit (Frank and Goyal (2003)) does not change the tone of our results.

debt while AA firms carry 27.0% debt. With declining ratings, the debt ratio increases up to 82.0% for firms close to default. The order of the mean values indicates a correlation between ratings and debt ratios, namely higher ratings are correlated with lower debt ratios.

In order to analyze financing decisions empirically, we need to distinguish between capital issues, reductions, and substitutions, and differentiate each of these categories further into debt and equity financing activities. Since firms usually issue or repurchase at least a small amount of both, equity and debt, a more precise definition of these financing activities is necessary. Following Korajczyk and Levy (2003) and Hovakimian (2006), we define debt issues as observations where net debt issues are larger than net equity issues and at the same time the sum of both exceeds 5% of a firm's assets at the begining of the fiscal period. We call an observation a debt-to-equity substitution if net debt issues are smaller than −5% but net equity issues exceed +5% and the absolute value of the sum is smaller than 5%. Equity issues, equity repurchases, debt repurchases, and equity-to-debt substitutions are defined analogously. Capital issues always correspond to a financing deficit while capital repurchases correspond to a financial surplus.

I.3 The credit score regression

The first step when estimating a firm's debt capacity as a function of its credit rating is to relate the credit rating to the debt ratio. We use a so called credit score regression (Altman (1968), de Jong, Verbeek, and Verwijmeren (2011), Alp (2013)) which expresses the credit rating of a firm as a function of the its debt ratio and other characteristics. The credit score regression reads:

$$\begin{aligned} \textit{credit score}^*_{it} &= \alpha dr_{it} + \beta_1 x_{it} + \beta_2 z_{it} + \varepsilon_{it} \\ \textit{rating}_{it} = j \ , \quad \text{if} \quad \mu_{j-1} &< \textit{credit score}^*_{it} \leq \mu_j \ , \quad j = 1, \ldots, 10 \ . \end{aligned} \tag{1}$$

The left hand variable $\textit{credit score}^*_{it}$ is the unobserved latent variable and μ_j, $j = 1, \ldots, 9$, denote the estimated cutoffs that separate the credit scores into the rating categories. Note that $j = 10$ indicates a rating of AAA and $j = 1$ a rating of D. We set $\mu_0 = -\infty$ and $\mu_{10} = +\infty$. All parameters are simultaneously estimated in the ordered logit regression by applying the maximum likelihood estimation method.

The debt ratio is denoted by dr_{it} and x_{it} is a vector of observable firm characteristics. Besides the debt ratio, Standard & Poor's (2008) name firm size, profitability, liquidity, age, characteristics of assets, and industry specific effects as the most important rating determinants. We measure these factors using the following variables:

$$\textit{firm size}_{it} = \log(\textit{sales}_{i,t-1}) \tag{2}$$

$$\textit{profitability}_{it} = \textit{ebitda}_{i,t-1} \ / \ \textit{assets}_{it} \tag{3}$$

$$\textit{liquidity ratio}_{1,it} = \textit{working capital}_{it} \ / \ \textit{assets}_{it} \tag{4}$$

$$\textit{liquidity ratio}_{2,it} = \textit{retained earnings}_{it} \ / \ \textit{assets}_{it} \tag{5}$$

$$\textit{tangibility}_{it} = \textit{property, plant \& equipment}_{it} \ / \ \textit{assets}_{it} \tag{6}$$

Since we are interested in a ceteris paribus analysis of the debt ratio and credit ratings but all five variables are correlated with the debt ratio, we need to substitute all these variables with their orthogonal values to the debt ratio. Orthogonal values of the variables correspond to the residuals of an univariate OLS-regression of the variable on the debt ratio and are uncorrelated with debt ratio by construction of the OLS-estimator.

Mählmann (2011) finds the age of the rating to influence the rating agency's decision independent of other observable firm characteristics because of the companies' ability to control the information flow to the rating agency. To capture this rating-age-specific effect, we include dummy variables for the age of the firm's rating, limited to a maximum of 10 and using the first year as base category. To account for differences across industries that are not captured in the explanatory variables above, we include dummy variables for each of the 38 Fama-French industries (Fama and French (1997)), which reduce to 33 dummy variables due to the exclusion of financial firms and utilities and using one category as base case. Moreover, we include dummy variables for each year to capture time-specific effects such as the change of the rating agency's standards over time (Blume, Lim, and Mackinlay (1998)). All dummy variables are contained in the vector z_{it}.

Table 2 shows the results of the credit score regression using a maximum likelihood estimation to determine all coefficients and parameters. The first column represents a specification using all variables and the second column reports the results without using the age, industry, and year dummy variables. The standard errors of the estimated coefficients are reported in parenthesis and the odds ratios in brackets. All explanatory variables are significant at the 1% level using robust standard errors (Huber (1967)). A negative coefficient coincides with an odds ratio smaller than one and indicates that the variable decreases the latent credit score, and hence, reduces the likelihood of a high rating, or likewise, increases the probability of being downgraded. Positive signs work in the opposite direction. The negative coefficient of the debt ratio shows that with an increasing amount of debt it becomes more likely that a firm loses its current rating. Similarly, large and profitable firms tend to have higher ratings. The liquidity ratio$_1$, defined as retained earnings scaled by total assets, increases the credit score, but the liquidity ratio$_2$, defined as working capital over total assets, decreases the credit score, which is consistent with the findings of de Jong, Verbeek, and Verwijmeren (2011). The combined hypothesis that the sum of both coefficients is smaller than zero can be rejected at the 1% level (not reported). Altogether, we find that liquidity has a positive effect on the firm's credit rating as predicted by theory.

The relative size of the effect that a variable has on the chances of observing a higher rating is reflected in the odds ratios. An odds ratio larger than one indicates that for one unit change in the predictor variable the odds for observing a rating higher than the current one increase proportionally by the odds ratio. An odds ratio smaller one reduces the chances of observing a higher rating by the estimated ratio. The results reported in table 2 show that profitability has the strongest positive effect on the credit rating while debt ratio with its odds ratio close to zero has the strongest negative effect of all variables.

We call a dummy variable significant if its p-value is below 0.10. All 9 age dummy variables are significant and indicate that the age of the rating contains information on the rating agency's decision. Consistent with Mählmann (2011), untabulated results yield that younger ratings tend to be lower than older ratings. 23 out of 27 year dummies capture significant time-specific heterogeneity, such as the change of the rating agency's standards in assigning ratings (Alp (2013)). The time pattern of the dummies (not reported) does not yield systematic difference of ratings across the business cycle which coincides with the findings of Amato and Furfine (2004). The significance of 30 out of 33 industry dummies points out that there are further industry characteristics that rating agencies take into account which are not captured in other explanatory variables. The comparison of regression (1) and (2) shows that the dummy variables improve the fit of the regression, however, the non-dummy explanatory variables provide the largest fraction of explained variation according to the pseudo R^2.

Our methodology accounts for different marginal effects of the debt ratio on the level of the credit rating across different rating categories. This can be seen from the estimated cutoffs μ_j, $j = 1, .., 9$ of regression (1), which show that the distance between the cutoffs is not constant. For example, the interval for the rating B has a width of 4.188 ($=\mu_5 - \mu_4$) while the interval for being rated AA is just 2.358. One standard deviation in the debt ratio is more likely to cause a downgrade from AA to A than from B to CCC.

We report the precision of the estimation results in the bottom of table 2. We use the debt ratio, firm characteristics, and dummy variables to estimate the firm's credit rating and then calculate the error as the difference between the observed and the estimated rating. Our results show that 54.4% of the firms are accurately classified into the rating categories. 94.5% of the observations are estimated exactly or, at the maximum, one category off resulting in 5.5% that deviate more than one category.

The relationship between the debt ratio and credit ratings is partly endogenous because a reduction in operating risk leads to an increase in creditworthiness but at the same time it encourages the firm to take on more debt. To account for the endogeneity in the simultaneous choice of leverage and credit ratings, we follow Molina (2005) and instrument the debt ratio in a two stage regression with the history of the firm's past market valuations[4] (Baker and Wurgler (2002)), the firm's marginal tax rates (Graham and Mills (2008)), and the variables size, profitability, tangibility, and the industry dummies. Column 3 of table 2 reports the results of the second stage. The first stage is not reported but coincides with the results in the prior literature. A comparison of the first column and the third column shows that the tenor of the results remains the same after introducing these instruments. Introducing these instruments comes at the cost of a reduced sample size due to the need of various lags of the market-to-book ratio or missing marginal tax rates. Hence, we continue our analysis without using the instrumental variable regression. Using an ordered probit regression instead of an ordered logit regression does not change the tenor of the results either.

In line with prior research, our evidence shows that the cross-sectional variation of credit ratings can be explained to a large extent with the given variables. In particular, the debt ratio is of special importance which motivates a definition of the debt capacity using the credit score regression.

I.4 Debt capacity estimates

To specify our measure of the debt capacity, we build on our economic framework and assume that all firms in the same rating class have a common lower threshold for their desired rating which is the current rating. In this manner, firms do not aim for maximizing their rating but rather for staying above a given threshold. For example, all AAA rated firms target preserving a rating of AAA while all AA rated firms intend not to fall below a rating

[4]Baker and Wurgler's (2002) external finance weighted-average market-to-book ratio $\left(\frac{M}{B}\right)_{efwa}$ is defined as

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

e are the firm's net equity issues and d are the net debt issues. Negative weights are set to zero and 11 observations with market-to-book ratios above 10 are excluded.

of AA.

Using the functional form of the credit score regression (1), we calculate the probability p_{it} that the firm with a current rating level j will be downgraded to a rating smaller than j with help of the logit distribution:

$$p_{it} = p(rating_{it} < j) = \frac{1}{1 + \exp(-\mu_{j-1} + \alpha dr_{it} + \beta_1 x_{it} + \beta_2 z_{it})} \ , \quad j = 2, \ldots, 10 \ . \tag{7}$$

To receive an explicit formula for the debt capacity, we solve equation (7) for dr_{it}:

$$dr_{it} = \frac{\log(1/p_{it} - 1) + \mu_{j-1} - \beta_1 x_{it} - \beta_2 z_{it}}{\alpha} \ . \tag{8}$$

A firm reaches its debt capacity if the probability of being downgraded exceeds some critical rating specific value p_j. This parameter p_j, $j = 2, \ldots, 9$, is most likely not observable in the day-to-day business of financial managers unless they implement an ordered logit model which is to the best of our knowledge not common in the industry. However, financial managers do observe downgrades of competitors and what caused them. Rating agencies communicate with corporate managers to make them aware of critical firm characteristics that can lead to a downgrade. The combined effect of all firm characteristics that finally lead to a downgrade are summarized in the resulting parameter p_j. Hence, for each rating category, we calibrate p_j to fit the average firm characteristics that triggered a downgrade in creditworthiness. If the management knows which combination of firm characteristics leads to a downgrade and therefore tries to avoid them, it implicitly keeps a firm's p_{it} below the calibrated critical level. The value for p itself should hence not be interpreted as a real world probability, but rather as the parameter that results in an accurate fit of our model.

To calibrate p_j, we proceed as follows. First, we identify all downgrades. Our sample exhibits 731 downgrades of one or more rating categories. The distribution of downgrades across the rating levels is similar to the distribution of all observations in table 1. Next, we calculate p_{it} with equation (7) using data from the last annual filing before the downgrade.

Then, we calculate the average value for p_{it} for all downgrades for each of the rating categories $j = 2, \ldots, 9$. Using this calibration procedure has the advantage that the parameter is endogenously determined through data on observed downgrades and not through exogenous assumptions. We extend the discussion of the robustness in the parameter p in section III.2 in which we show that our results are robust to a variation in p.

Using the calibrated rating specific parameters p_j, we calculate the debt capacity DC_{it} as the critical debt ratio that causes a firm to be downgraded:

$$DC_{it} = \frac{\log(1/p_j - 1) + \mu_{j-1} - \beta_1 x_{it} - \beta_2 z_{it}}{\alpha}, \quad j = 2, \ldots, 10 \ . \tag{9}$$

We call this specification the *rating threshold debt capacity*. Since the debt capacity is given in terms of the debt ratio, we need to restrict the value for DC_{it} to the interval $[0, 1]$. Estimates of DC_{it} that exceed the boundaries are replaced with 0 or 1, respectively, which is the case in 1.1% of all estimates.

Table 3 reports the results of the debt capacity estimation. The indicated significances correspond to a t-test which examines whether the debt ratio is smaller than the debt capacity. The average debt capacity is 0.589 while the average debt ratio in market values is 0.473, and hence, substantially lower. The difference between the debt capacity and the debt ratio is statistically and economically significant which indicates that firms operate on average below their debt capacity and could take on additional debt without being threatened to lose their current rating.

Taking a look at the debt capacity across different ratings, we observe that the debt capacity increases with declining ratings. AAA firms face the hardest restrictions, on average only 20.1% of their assets can be financed with debt. Even though AAA firms have the largest fraction of liquid assets, are bigger and more profitable than the other firms, they cannot take on more debt if they aim to preserve their rating. Hence, preserving a rating of AAA is the most challenging one as intuitively expected. Only 176 out of the 14,422 observations succeeded in being rated AAA which corresponds to 1.2% of the sample. The restrictions on the debt ratio to preserve a rating category become milder as the rating decreases. Firms in the lowest investment-grade rating class BBB have a debt capacity of 0.531 which is substantially larger than for the upper categories. Intuitively, speculative-grade firms can use more debt than investment-grade rated firms. Firms have a debt capacity of 0.619 if their lower rating threshold is BB and firms accepting a high default risk (rating CCC−C) can finance up to 84.2% of their assets with debt. The standard deviation of the debt capacity across different ratings increases with declining ratings up to the rating of BB and decreases afterwards. On the one hand, these findings support that financing constraints are stronger for highly rated firms but, on the other hand, are partly driven the debt ratio's upper and lower bound of zero and one.

The cross-sectional variation of the debt capacity within each rating category can be inferred from the regression results in table 2. Size and profitability have a positive influence on the amount of debt a firm can take on, as well as the tangibility of assets and firms' liquidity. The significance of the year and industry dummies indicates that debt capacities vary over time and across industries.

Hovakimian, Kayhan, and Titman (2009) provide an alternative approach to estimating rating thresholds by estimating rating targets. They determine target credit ratings using a regression of past observed ratings on firm characteristics. Their approach is closely related to the estimation of target debt ratios by Fama and French (2002) and Flannery and Rangan (2006), and hence, comes with the same problems of technical mean reversion (Chang and Dasgupta (2009)). Therefore, we rely on rating thresholds that are given exogenously and further motivated through the surveys by Graham and Harvey (2002), Bancel and Mittoo (2004), and Brounen, de Jong, and Koedijk (2004) that point out the importance of the firm's current rating level.

I.5 Alternative debt capacity specifications

This section shows that the pattern of the debt capacity across rating categories emerges even without the assumption of rating thresholds. We provide two alternative specifications of the debt capacity, first the implied debt capacity and second the investment-grade debt capacity.

The first alternative specification of the debt capacity, the *implied debt capacity*, builds upon a technique proposed in Leary and Robert's (2010) test of the pecking order theory. Under the pecking order hypothesis, firms prefer debt over equity when accessing external capital markets. Whenever a firm issues debt, its debt ratio at the end of the fiscal year does not exceed the debt capacity because else, the pecking order theory would have predicted an equity issue. For each debt issue, we derive a lower boundary $DC_{\min}$ for the debt capacity that is the firm's debt ratio at the end of the fiscal year:

$$DC_{\min,t} = dr_t \ . \tag{10}$$

Similar conclusion can be drawn from debt-to-equity substitutions and from debt repurchases. In contrast, equity issues impose an upper threshold on a firm's debt capacity because under the pecking order theory firms will issue equity only if the need for external funding cannot be settled with debt. We calculate this upper boundary $DC_{\max}$ as:

$$DC_{\max,t} = dr_t + \Delta equity \ . \tag{11}$$

Debt repurchases and debt-to-equity substitutions yield an upper boundary in a analogous way.

Table 4 presents the average boundaries $DC_{\min}$ and $DC_{\max}$ for each rating category. We have substantially less observations than for the other debt capacity specifications because firm-years in which a firm did not access external capital market cannot be used to construct either boundary. As expected, the lower boundary $DC_{\min}$ is smaller than $DC_{\max}$ which leaves room for an interval in which the actual debt capacity from the pecking order theory should be. More importantly, both boundaries increase with declining ratings which is of particular relevance. The implied debt capacity does not explicitly involve the credit rating of a firm but the structure of the results exhibit a pattern that is similar to the estimates of the rating threshold debt capacity. The rating threshold debt capacity is more closely related to the upper boundary than to the lower but is not always within the interval. This is partly due to the different approaches and the strong restrictions in this specification. Even though the rating threshold and the implied debt capacity are built on different econometric approaches, the systematic differences across rating categories are similar.

This approach comes with some disadvantages. First, firms have no discretion over funding activities because all financing activities are predetermined by a strict pecking order. This leaves no room for alternative financing motives, such as market-timing behavior or behavioral motives (Baker and Wurgler (2002), Malmendier, Tate, and Yan (2011)) which results in estimates for the upper boundary that are downwardly biased. Second, by construction we receive either an upper or a lower boundary but never both. In the end, we do not have a closed range for the debt capacity because the interval will always reach one or zero.

De Jong, Verbeek, and Verwijmeren (2010) propose a debt capacity that uses a similar credit score regression but puts up different assumptions on the rating thresholds. They set BBB as a unique lower rating threshold for all investment-grade firms and assume that the model probability of losing this rating must not exceed 0.50. In their specification, equation (7) is rearranged to

$$DC_{it} = \frac{\mu_6 - \beta_1 x_{it} - \beta_2 z_{it}}{\alpha} \ . \tag{12}$$

Note that $j = 6$ (BB is coded as $rating = 6$) represents the highest speculative-grade rating. This debt capacity specification holds by definition for investment-grade firms only and all firms have a common lower threshold for their rating. We call this specification the *investment-grade debt capacity*.

The structure of the results for the investment-grade debt capacity specification as shown in table 4 differs substantially from the previous results. The debt capacity is the smallest for BBB rated firms and increases with inclining ratings. Firms with a rating of A can afford to take on more debt than BBB firms because their credit score is substantially larger than μ_6. The debt capacity of firms in the top rating category (AAA) is fairly large (0.848) because, on the one hand, their firm characteristics allow them to take on much debt and, on the other hand, their current rating is far away from the rating threshold BBB. While the investment-grade debt capacity succeeds in providing an estimate that is substantially larger than the debt ratio in all rating categories, it is not obvious why the debt ratio and the debt capacity are negatively correlated over the rating categories and why firms forgo these substantial amounts of debt. For AAA rated firms the investment-grade debt capacity implicitly assumes that a firm is willing to tolerate a downgrade of three rating classes until it reaches its debt capacity. A downgrade from AAA to BBB could possible damage a firm's reputation, significantly increase its cost of debt, and is observed empirically only on rare occasions. Moreover, the investment-grade debt capacity comes at the disadvantage of being only applicable to a fraction of the observations in the sample. The results of the estimates imply that this version of the debt capacity is more closely related to a default threshold than to a debt capacity that results from financial constraints.

For the remainder of the paper, we work with the rating threshold debt capacity because, on the one hand, it is more closely related to financing decisions than the investment-grade debt capacity, and, on the other hand, the implied debt capacity is a result of observed financing decisions but not a variable to explain them in the first place. Nevertheless, it is reassuring that the resulting structure of the implied debt capacity across rating categories is consistent with the rating threshold debt capacity which highlights that rating thresholds are of major importance for financing decisions and provides further evidence that the debt capacity is related to the rating of a firm.

II Financial flexibility and financing decisions

Preserving financial flexibility means issuing debt if the unused debt capacity is sufficiently large and paying down debt to restoring unused debt capacities when having a financial surplus to gain flexibility back for future periods. Hence, a firm does not want to exhaust its debt capacity completely but rather retains a "buffer", so that the debt ratio is neither close to nor exceeds its debt capacity. In this section, we provide empirical evidence for the hypothesis that preserving financial flexibility is of first order importance in corporate financing decision by relating financing decisions, investments and changes in leverage to the firm's unused debt capacities.

II.1 The debt buffer

For the ease of notation, we suppress the argument i for the remainder of the paper ($y_t = y_{it}$ for any variable y). Using the firm-year specific debt capacities from section I, we calculate the debt buffer after the observed financial decision $DB_{\text{after},t}$ as the difference between the estimated debt capacity and the debt ratio at the end of the firm's fiscal year:

$$DB_{\text{after},t} = DC_t - dr_t \ . \tag{13}$$

This variable shows the firm's unused debt capacity at the end of the fiscal year. It combines all information from past financing activities and indicates whether the firm can issue additional debt to finance future projects as they arise.

This measure of financial flexibility indicates how much additional debt a firm can issue before it exceeds its debt capacity. If the debt buffer is sufficiently large, a firm is able to issue debt without facing future constraints in its access to external debt funds. In contrast, a firm which has only a small positive debt buffer has to use equity to maintain its rating. If the debt buffer is negative, then the debt ratio exceeds the debt capacity and the firm faces potential constraints as the current credit rating is threatened. If the firm reduces its debt ratio by issuing equity, paying down debt, or substituting debt with equity, it can increase its debt buffer, and hence, its financial flexibility.

To analyze if a firm could have afforded to fund its financing deficit of the current period in an alternative way, we calculate the debt buffer under two hypothetical financing scenarios. First, we calculate a firm's debt buffer that results if the firm had used equity as the sole external financing source during the last fiscal year. This debt buffer, $DB_{\text{equity},t}$, corresponds to the debt buffer after financing $DB_{\text{after},t}$ corrected by the firm's net debt issues $\Delta debt_t$ in the same period.

$$DB_{\text{equity},t} = DC_t - dr_t + \Delta debt_t \tag{14}$$

Adding the amount of debt issues to the debt buffer results in treating debt issues as equity issues.

Next, we calculate the corresponding debt buffer that results if the firm had used exclusively debt to settle its financing deficit in the last fiscal year. This debt buffer after debt financing $DB_{\text{debt},t}$ corresponds to the debt buffer after equity financing $DB_{\text{equity},t}$ less the financing deficit:

$$DB_{\text{debt},t} = DC_t - dr_t + \Delta debt_t - def \ . \tag{15}$$

This variable indicates whether the firm has enough unused debt capacity to settle the need for external capital completely with debt. If $DB_{\text{debt},t}$ is close to zero, then the firm faces potential financial constraints after issuing debt because it will no longer be able to fund future investments with debt. If $DB_{\text{debt},t}$ is negative, the firm exceeds its debt capacity and might lose the current rating. Hence, the firm should only rely solely on debt if $DB_{\text{debt},t}$ is sufficiently large. All three versions of the debt buffer serve as a management information tool that can be used for making capital issue and repurchase decisions. If the management has sufficient information on future investments and characteristics of the new assets, it can determine all three versions of the debt buffer before financing and investment decisions to analyze the situation.

Table 5 reports mean values and standard deviations of the debt buffers for each issuance and repurchase category separately. Since we employ rating specific rating thresholds and control for firm characteristics, we pool all observations into one sample and split the sample according to the issuance and repurchase type. The debt buffer after debt financing does not exactly coincide with the debt buffer after the actual financing decision even though the firm chose debt because, usually, firms issue and repurchase a small amount of equity in almost every period. To test the statistical significance of our results, we apply t-tests with standard errors clustered on the firm level to indicate that the debt buffer in the respective financing activity group is statistically larger than zero.

Using the rating threshold debt capacity, we find that debt issuing firms have a mean debt buffer DB_{debt} of 0.103 that enables the use of debt to settle the need for external capital without facing a potential loss of the credit rating. At the same time, the mean debt buffer after equity financing DB_{equity} is with 0.258 substantially larger for this issuance group indicating that the firm misses potential benefits of debt financing, such as tax benefits, possible reductions in agency costs, and low interest rates, if it had used equity. On the other hand, if equity issuing firms fund their deficit exclusively with debt, their debt buffer DB_{debt} will be negative and they lose the option of issuing debt in the future as well as facing potential costs of exceeding their debt capacity, such as a possible downgrade. To avoid these negative outcomes, these firms choose equity funding. The debt buffer after financing DB_{after} is larger for equity issuers than for debt issuers which reflects the financing decision of the recent period. Equity issuers push their debt ratio away from their debt capacity while debt issuers approach it. In this manner, they preserve financial flexibility because they choose their financing decision to use or restore unused debt capacities.

Table 5 reports as well the results of the debt buffer for firms that have a financial surplus and engage in capital repurchases. For debt repurchases the debt buffer DB_{equity} indicates that firms choose to pay down debt when share repurchases would bring them close to their debt capacity. Hence, they do not choose to repurchase equity but rather pay down debt. Strikingly, the debt buffer after financing decisions is almost identical for both repurchasing categories which suggests that firms tend to return to a certain level of their debt buffer. Once again, the size of the financing surplus does not seem to contain information about the repurchasing decisions and is comparable across the two categories. The results on capital repurchases document that firms do not repurchase capital randomly, but try to restore financial flexibility by increasing their debt buffer if the unused debt capacity is too low.

The results on capital substitutions are shown in lower part of table 5. DB_{equity} explores the financial situation before the capital substitution because this debt buffer is corrected for the debt issues or reductions in the current fiscal year. We do not report DB_{debt} because it does not contain information since the deficit of these observations is close to zero by definition. The economic difference of the debt buffer before substitutions between firms that substitute debt with equity and those that do vice versa is large. Firms that engage in a debt-to-equity substitution operate close to their debt capacity before the substitution which motivates these firms to reduce their debt outstanding to improve their financial situation. In contrast, a large debt buffer can be reduced through equity-to-debt substitutions to profit from benefits to leverage. Again, our results suggest that preserving financial flexibility is the goal of financing decisions because firms try to restore or use their debt buffer.

Firms that do not engage in external financing activities exhibit a debt buffer DB_{after} which is economically similar to various other categories. This again indicates that a given level of the debt buffer is desirable for most companies. To sum up, the results support the hypothesis that firms actively engage in capital issuing and repurchasing decisions to preserve financial flexibility indicated by the debt buffer which gives them the option to engage in future debt issues to pursue investment opportunities timely.

II.2 Flexibility, investments, and financial constraints

To provide further evidence on the hypothesis that financing activities are driven by concerns over financial flexibility, we take a closer look at those firms that are perceived to be financially flexible and test whether they make use of their superior situation or not. First, we identify financially flexible firms and then we explore systematic differences across firms that are flexible and those that are not.

To identify financially flexible firms, we make use of the debt buffer after financing decisions and divide our sample into terciles of this debt buffer at the end of the last fiscal year, $DB_{\text{after},t-1}$. Even though the choice of terciles is arbitrary, it does not influence the results. We obtain a similar pattern if we work with quartiles or quintiles. Panel (a) of table 6 shows that firms in the first tercile have a negative debt buffer while firms in the second and third terciles have a positive debt buffer. Hence, firms in the first tercile are not financially flexible due to their inability of issuing debt without jeopardizing their credit rating. In contrast, the second and third terciles consist of financially flexible firms that have an easier access to external debt funds.

Panel (a) of table 6 takes a look at the mean values of realized investments, the firm's investment opportunity set, a financial constraints index, and capital issue volumes. Following Denis and McKeon (2012), we define investments from the statement of cash flows by adding capital expenditures, acquisitions, changes in investments, and other use of funds and scaling the sum by total assets; for a more precise definition see the appendix. The market-to-book ratio is used to measure the firm's investment opportunity set (Adam and Goyal (2008)) and lagged by one period. As expected, a large debt buffer enables these firms to realize a larger fraction of their investment opportunity set and to finance the new assets with debt. This can be seen through the ratio of realized investments and the market-to-book ratio and in the change of the debt ratio and in the volume of the net debt issues. Moreover, investments, the change in the debt ratio, as well as the volume of net debt issues are all positively correlated with the debt buffer at the end of the last fiscal year. However, we do not find a relationship between net equity issues and the terciles.

The negative debt buffer of firms in the first tercile indicates that these firms face financial constraints. To provide evidence that a negative debt buffer is indeed associated with constraints, we compare our results to the Whited and Wu (2008) financial constraints index. The index is constructed out of factors associated with investments and external financing constraints.[5] Firms in the first tercile exhibit the highest average value of the index which indicates that they are more constrained than the other firms, which coincides with the lowest average debt buffer. The correlation between the index and the debt buffer is negative which corresponds to the view that a high debt buffer and a low value of the constraints index yield financial flexibility. Hence, our approach of financial flexibility is consistent with Whited and Wu's (2008) approach of measuring financial constraints.

In panel (b) of the same table, we take a closer look at the distribution of financing activities conditioned on the debt buffer terciles. For each tercile, we calculate the distribution of financing decisions in the current fiscal year by listing the frequency of each financing activity as the percentage of the respective tercile. We test the choice of debt issues against equity issues, debt repurchases against equity repurchases, and either substitution against no external financing by applying a likelihood-χ^2-test. The test indicates whether there are systematic differences in the frequency of the financing activities across the three terciles. By doing so, the investment set and the size of the deficit or surplus are treated as given, so that the firm has only to choose between the different kinds of securities.

Debt issues are the most common for firms in the third tercile supporting our previous finding that the option of issuing debt depends on a firm's debt buffer. In comparison to

[5]White and Wu's (2008) financial constraint index is calculated as -0.091 operating cash flow $-$ 0.062 dividend dummy + 0.021 long-term debt $-$ 0.077 log(assets) + 0.102 3-digit industry sales growth $-$ 0.035 sales growth. The coefficients are estimated using the generalized method of moments (GMM) of an investment Euler equation. The dividend dummy equals one if the firm paid cash dividends. All variables in levels are scaled by total assets. The value of the index is positively correlated with financial constraints.

firms in the other terciles, firms in the third tercile do not face financing constraints, and hence, have more discretion over financing choices. Firms in the first tercile are constrained by their low debt buffer which results in less frequent debt issues. The observed pattern for capital repurchases is similar and even more pronounced. Firms with a high debt buffer pay down debt less often than firms with a low debt buffer. Finally, firms in the third tercile are slightly more active as these firms tend to use and restore their debt buffer more often.

There are two additional systematic differences in the frequency of financing activities that are noteworthy. First, the frequency of debt issues in the first tercile is not zero which indicates that some firms issue debt even though they operate close to or beyond their debt capacity. Denis and McKeon (2012) document similar financing behavior of firms that intentionally deviate from their target debt ratios. These firms do not return to their old leverage levels but keep operating at high downgrading risk. In combination with the volume of net debt issues in the first tercile, we can infer that most of the debt issues are rather small and have only a minor effect on the debt ratio. Second, firms in the third tercile issue equity more frequently than firms in the first tercile. Most of these firms consistently operate at a low leverage ratio which is challenging to explain with standard corporate finance theory, often referred to as the low-leverage puzzle (Strebulaev and Yang (2013)). Excluding firms that keep leverage below 10% of their assets for at least two subsequent years from the sample reduces the frequency of equity issues in the third tercile more heavily than in the others. However, the zero- or low-leverage mystery is less present in our sample as it only contains firms that have a long-term credit rating, and hence, are more likely to have publicly traded long-term debt outstanding.

Consistent with the hypothesis on financial flexibility, firms that are identified as financially flexible by our measure have a better access to capital markets and can pursue investment opportunities as they arise. These firms exhibit traits such as high investments, a high volume of debt issues, and a low financial constraints index. Debt issues are more common for those firms that were able to establish a high debt buffer in prior year whereas firms with a low debt buffer visit external debt markets less frequently but pay down debt more often.

II.3 Capital repurchase decisions and the debt buffer

To show that firms actively restore their debt buffer, and hence, their financial flexibility after they have gotten close to their debt capacity, we employ the approach of Korajczyk and Levy (2003) of estimating the debt-equity repurchase choice. The probability that a firm repurchases debt is modeled through a probit specification in which the dependent variable equals one if a firm pays down debt or substitutes equity with debt and equals zero if the firm repurchases equity or substitutes debt with equity. The repurchase choice is explained through Frank and Goyal's (2009) determinants of capital structure decisions and additionally with the firm's lagged debt buffer $DB_{\text{after},t-1}$ and a dummy variable that indicates a previous debt issue.

The results of the probit estimation in table 7 show that firms are more likely to pay down debt if they exhibit a low debt buffer at the end of the last fiscal period and if they have previously issued debt. The negative marginal effect of $DB_{\text{after},t-1}$ on the debt repurchasing probability indicates that a low debt buffer increases the chances of observing debt repurchases. The positive marginal effect of debt issue$_{t-1}$ shows that debt repurchases are more likely after debt issues. Hence, restoring the debt buffer is an answer to previous debt issues that results in a low debt buffer so that a firm is able to issue debt in the future. This financing behavior indicates that firms actively use their financial flexibility to pursue investment projects and subsequently restore their financial flexibility. The findings are consistent with DeAngelo, DeAngelo and Whited's (2011) capital structure model in which firms have the option to issue debt at the cost of being unable to borrow in the future.

To rule out alternative explanations such as a mechanical mean reversion of the debt ratio whenever it gets close to the boundaries zero and one, we include the dummy variables low dr$_{t-1}$ and high dr$_{t-1}$ that equal one if the debt ratio is in the bottom or top decile of the distribution of debt ratios, respectively. To capture patterns of capital repurchases across the business cycle (Covas and Den Haan (2011)), we include year dummies. We report the probit model without the variables for high and low debt ratios and without the year dummies but instead with the term spread to capture fluctuations in macroeconomic risk in column 2. Column 3 reports the probit regression using only Frank and Goyal's (2009) determinants of capital structure decisions. A comparison of all three columns shows that the estimated marginal effects remain stable when introducing the new variables.

The pattern of capital issuance and repurchase decisions paints a picture of firms that actively use and restore their financial flexibility to able to pursue investment opportunities in a timely manner. To preserve this flexibility, firms avoid to exceed their debt capacity by paying down debt instead of equity.

II.4 The buffer and leverage regressions

In this section, we show that our measure of financial flexibility, the debt buffer, has explanatory power for firms' financing decisions even after controlling for factors that are commonly associated with capital structure decisions. We present a linear regression framework which is commonly used to test the explanatory power of economic forces on capital structure decisions (Rajan and Zingales (1995), Baker and Wurgler (2002)) and enhance the testing equations with the three versions of the debt buffer.

Prior studies relate changes in a firm's debt ratio to firm characteristics which serve as proxies for the influence of the most predominant capital structure theories. Frank and Goyal (2009) propose a set of control variables which they consider as the most reliable determinants. Among these variables are firm size, profitability, characteristics of assets, market-timing, tax shield substitutes, target debt ratios, and macroeconomic conditions. Firm size, profitability, and the characteristics of assets are measured with the variables defined in equations (2), (3), and (6). In the market-timing theory (Baker and Wurgler (2002)), firms use "windows of opportunities" and issue equity when their market values are high relative to their book values. The market-to-book ratio, defined as the market value of assets divided by the book value of assets captures this effect. DeAngelo and Masulis (1980) show that firms with high non-debt tax shields, such as depreciation expenses, are less levered because depreciation expenses reduce tax payments in the same manner as interest payments. Tax shield substitutes are measured by the ratio of depreciation over total assets.

Empirical evidence indicates that firms follow a dynamic trade-off theory and actively adjust their debt ratio to an optimal or target debt ratio (Flannery and Rangan (2006)). We use the median debt ratio within each Fama-French industry year as a target debt ratio and the distance to the target debt ratio as an explanatory variable to measure target adjustment behavior. When interpreting the coefficient, one has to keep in mind that the debt ratio is bounded between zero and one which implies a technical reversion if the debt ratio is near these boundaries (Chang and Dasgupta (2009)). Macroeconomic risk is measured with the term spread defined as the difference in yields on a ten year US government bond and a three month US treasury bill. The summary statistics of all variables presented in table 1 match the results of prior studies, and hence, a further discussion will be omitted.

Since we are interested in explaining financing decisions but not in explaining the level of the debt ratio, the dependent variable in our regression approach is the change in the debt ratio over time $\Delta dr_t = dr_t - dr_{t-1}$. Furthermore, all control variables are denoted in annual changes. To receive consistent estimates, we apply a fixed effects linear regression approach (Gormley and Matsa (2014)) and control for heteroskedasticity such as the correlation of standard errors over time and across firms by using two-dimensional standard error clustering as proposed by Petersen (2009). In line with Korajczyk and Levy (2003), we exclude all observations that are classified as "no external financing", however, including the residual observations does not change the results.

Table 8 explores the results of four different regression specifications. First, we add the debt buffer after financing decision at the beginning of the fiscal year $DB_{\text{after},t-1}$ to the regression. The debt buffer is lagged by one year to test if the financial flexibility that was established at the end of the last fiscal year can explain financing decisions in the upcoming fiscal year. The estimated coefficient is positive which means that a high debt buffer is related to an increase in leverage. In detail, one standard deviation in $DB_{\text{after},t-1}$ increases the debt ratio by 3.1 percentage points.[6] Economically, this increase is significant, especially when comparing it to the other control variables such as tangibility.

In column two of table 8, we use the $DB_{\text{equity},t}$ as the explanatory variable. Knowing its investment set at the beginning of the fiscal year, the firm can predict this value for the end of the year and base its decision on it. The positive sign of the estimate indicates that a high value of this variable is most likely to increase the debt ratio. A high value for $DB_{\text{equity},t}$ is consistent with the view that the firm could have financed its assets differently to gain possible benefits from debt financing. The economic size of the effect is somewhat weaker because the estimated coefficient is smaller but still of a relevant size. In contrast, the estimated coefficient of $DB_{\text{debt},t}$ in column three is negative which is not consistent with theory, however, economically its effect is negligible as it only amounts to 0.7 percentage points for one standard deviation in $DB_{\text{debt},t}$.

The last column explores the regression of changes of the debt ratio on the control variables. Most importantly, adding the different versions of the debt buffer to the regression increases the explained variation as measured by the adjusted R^2. Especially, $DB_{\text{after},t-1}$ and $DB_{\text{equity},t}$ add explanatory power to the empirical models. All estimated coefficients of the set of control variables are in line with prior literature. The significant coefficient of the deviation from the industry median gives some evidence of target adjustment behavior as predicted by the trade-off theory. Substituting the target debt ratio with other target specifications (Flannery and Rangan (2006) or Denis and McKeon (2012)) does not change the results on the debt buffer. However, we do not find statistically significant results for a correlation of the debt ratio with the macroeconomic risk (term spread). This finding could be driven by the fact that highly rated firms perform better during economic harsh times. Nevertheless,

[6] The 3.1 percentage points are the product of the estimated coefficient of 0.158 and the standard deviation of the debt buffer after financing decisions which amounts to 0.196 as shown in the last line of table 5.

the results are stable across all regression specifications which indicates that the results on the debt buffer are not driven by multicollinearity. Especially, the estimated coefficient of the deviation from the industry median is not affected by the debt capacity estimates which points at structural differences between the trade-off theory and the approach of explaining financing decisions with the debt capacity.

Combining the results of the regressions, we conclude that the debt buffer adds new information to the dispersion of changes in debt ratios. The results are consistent with the view that firms aim for preserving unused debt capacities. $DB_{\text{after},t-1}$ and $DB_{\text{equity},t}$ are important indicators for the funding choice as they are able to explain the change in the debt ratio. Unused debt capacities provide financial flexibility as they enable the funding of future investments. After controlling for other factors that are correlated with financing decisions, our measure of financial flexibility yields explanatory power for funding decisions.

III Ruling out alternative explanations

After providing evidence in favor of the hypothesis that unused debt capacities provide financial flexibility and influence financing decisions, we present additional evidence to rule out that our results are driven by alternative capital structure theories or parameter choices.

III.1 Differences to the trade-off theory

The concept of explaining financing decisions with a firm's target of preserving financial flexibility as presented in this paper depicts a new approach in the literature on capital structure choices. This approach can partly be integrated into capital structure models, such as the trade-off theory, in which firms choose an optimal mix of debt and equity to maximize the value of the levered firm by balancing cost and benefits associated with debt financing. Kisgen (2006) introduces the discrete costs and benefits of rating levels into a trade-off model of optimal capital structure and finds that optimal debt ratios are most likely to be reached at the favorable side of rating boundaries. The highest firm value is reached just before the downgrade so that a firm has incentives to increase leverage to move towards these thresholds. If capital structure adjustments are costly, then firms aim for ranges of optimal debt ratios on the favorable side of the rating boundaries. Ones a firm operates within this optimal range it remains inactive because the costs of adjusting the debt ratio outweigh the benefits.

While moving toward the rating boundary is consistent with the concept of a firm that uses its financial flexibility to take on investments, the implications do not coincide for firms that are within the optimal range and close to the rating boundary. Consider a firm that is close to its debt capacity and has cash in excess of all its investment outlays, i.e. a financial surplus. In the dynamic trade-off theory with credit ratings, the firm will not use the cash to buy back securities because it operates already within the optimal range of debt ratios, in which the costs of adjustments exceed potential benefits. In contrast, under the financial flexibility hypothesis, the firm will use the excess cash to pay down debt to increase its debt buffer and preserve unused debt capacities for future investments.

We test these deviating implications by identifying firms that are close to their debt capacity but have excess funds. To identify a treatment sample of firms that can be used to test these predictions, we use the following two conditions. First, the firm has to be close to its debt capacity at the beginning of the fiscal year. We classify firms to be close to their debt capacity if their debt buffer is between 0 and 0.05:

$$0 < DB_{\text{after},t-1} = DC_{t-1} - dr_{t-1} < 0.05 \ . \tag{16}$$

We do not include firms that operate beyond their debt capacity because for those both approaches have the same implications. A variation of this 5% cutoff does not change the tenor of the results.

The second condition focuses on a firm's cash holdings. Following Denis and McKeon

(2012), we define excess cash, $xCash_t$, as the amount of cash that a firm has left after investments, funding the change in working capital excluding cash, and paying dividends:

$$xCash_t = cash_{t-1} + ofc_t - dividends_t - \Delta wc_t - investments_t \tag{17}$$

where $cash_{t-1}$ denotes the firm's cash at the beginning of the fiscal year, ofc_t the cash flow from operations, $dividends_t$ the dividends paid out to shareholders, Δwc_t the change in working capital excluding changes in cash and equivalents, and $investments_t$ all capital expenditures and new investments of the current period. For more details on the definition of the variables see the appendix. Since it is quite common for firms to have cash holdings due to precautionary savings or other motives (Bates, Kahle, and Stulz (2009)), we require firms in the treatment group to have excess cash in the top quartile of the distribution of all observations which has a lower threshold of 0.141.

Table 9 shows the descriptive statistics of our treatment sample and two control samples. We identify 230 treatment firms that have an average debt buffer of 0.027 at the beginning of the fiscal year. In the current fiscal year they have excess cash of 0.228 which can potentially be used to buy back securities. The first control group consists of all other firms that are close to their debt capacity but do not have excess cash and in the second control group are all other firms in the sample that do not fulfill any of the conditions for the treatment sample. The third column indicates that the average firm has excess cash of 8.1%, which can be regarded as a precautionary savings level to provide liquidity. If the average precautionary savings are representative for the whole sample, then treatment firms are more likely not to use all of their excess cash to pay down debt.

Panel (b) of table 9 shows the frequency of financing activities for the three subsamples. We test for structural differences between the samples with a χ^2-test. As predicted by our approach, most firms (38.7%) pay down debt. Capital issues, equity repurchases, and capital substitutions are in contrast rather uncommon. Nevertheless, 41.3% of the firms do not engage in any financing actions at all. To quantify the results, we compare the observed frequencies with the control groups. Firms in the treatment sample pay down debt more often than firms in any other control group which clearly favors the financial flexibility hypothesis. In contrast, the frequency of firms without external financing is somewhat lower than in the control samples but economically it does differ substantially and it can be thought of as the frequency for any independently drawn sample. Under the dynamic trade-off theory, we would expect the number of inactive firms to be higher than in the sample average.

As a next step, we will take a look at the results of the treatment. Panel (c) of table 9 shows the change in the debt buffer, $\Delta DB_{\text{after},t}$, the resulting debt buffer, $DB_{\text{after},t}$, and the change in the debt ratio, Δdr_t. Treatment firms manage to increase their debt buffer by 0.038, which differs substantially from the values in the control groups. The new debt buffer is 0.064 and therefore substantially higher as the debt buffer of 0.027 before the treatment. This result is achieved through a reduction of the debt ratio by 0.045. Note that using cash to pay down debt affects the numerator and the denominator of the debt ratio as well as the debt capacity.

The analysis of our treatment sample yields that firms with excess cash and a low debt buffer engage in debt repurchases more often than the other firms do. This behavior exhibits evidence in favor of the financial flexibility explanation and is not consistent with a strict dynamic trade-off theory. Nevertheless, we do not find that all firms behave in the expected manner, however, the observed pattern differs substantially from the rest of the sample. Hence, the financial flexibility approach provides an alternative explanation for financing decisions that can enhance other capital structure models. The results are robust to alternative definitions of a financial surplus (Frank and Goyal (2003)) as well as alternative levels for a small debt buffer and excess cash.

III.2 Robustness to the choice of p

The debt capacity and debt buffer are functions of the exogenous probability p of exceeding the given rating threshold. A variation in p changes the size of the debt capacity, but it never changes the cross-sectional order of estimates. For example, if two firms F_1 and F_2 have the same debt ratio, but, due to different firm characteristics, firm F_1 has a higher credit score than firm F_2. Then, independent of the choice of p, firm F_1 will have a higher debt capacity because p enters equation (9) as a logarithmic factor in a linear term. From equations (13), (14), and (15) we can infer that the debt buffer is strictly increasing in p as well because it is a linear function of the debt capacity. The debt ratio dr itself is not influenced by the choice of p so that the marginal influence of p on the different versions of the debt buffer is identical.

We provide an alternative approach to calibrate p by using rating migration statistics provided by Standard & Poor's. The empirical average rating migration rate of losing the current rating within the next three years as reported in Standard & Poor's "2012 Annual Global Corporate Default Study And Rating Transitions"[7] is roughly 40.0%. Since this estimate neither accounts for the level of the ratings nor for changing firm characteristics, we set $p = 0.40$ as a first benchmark scenario. Furthermore, we present the results for p equal to 0.30 and 0.50.

Table 10 shows the results of a variation in p regarding the three versions of the debt buffer. We only show the estimated mean values for the respective category as the standard deviations, the financing deficit, and the number of observations are identical to table 5. Independent of the choice of p, the debt buffer DB_{debt} is largest for debt issuers and significantly smaller for equity issuers. In the most conservative setting with p equal to 0.30, debt issuers have a small but positive debt buffer while equity issuers would exceed their debt capacity through debt issues. If firms are willing to tolerate a downgrading probability of 50%, then the debt buffer estimates are somewhat larger but still negative for equity issuers.

[7]The report is accessible via https://www.globalcreditportal.com.

Similar results hold for DB_{equity} and DB_{after}. Hence, we come to the conclusion that the economic implications remain the same if we use different values for p.

IV Conclusion

On a broad sample of US firms with bond and stock market access we show that firms issue debt and repurchase equity if their unused debt capacity, i.e. the amount of debt a firm can issue before they are threatened to be downgraded in creditworthiness, is sufficiently large. Else, they pay down debt or issue equity if alternative financing activities exceed their debt capacity. Capital issuance and repurchase decisions are driven by the goal of preserving financial flexibility which corresponds to maintaining unused debt capacity for possible future financing activities. The results are robust to different specifications of the debt capacity, various definitions of debt ratio, and different estimation techniques.

We find strong evidence that financing policies are associated with the availability of external debt funds and investment opportunities. Leverage ratios emerge from the constant process of issuing debt to finance investments and paying down debt to restore financial flexibility. This evidence is consistent with capital structure models in which firms have the option to issue transitory debt to finance investments (DeAngelo, DeAngelo, and Whited (2011)). However, we find economically and statistically significant differences to models in which firms follow target debt ratios (Leary and Roberts (2005)).

Financial flexibility is one of the missing links that helps to explain the cross-sectional variation of financing decisions. Traditional models of capital structure such as the pecking order theory, the market timing theory, and the trade-off theory are based on information asymmetries, market valuations, and benefits and costs of debt financing. However, they do not take managers' preferences for preserving financial flexibility into account (Graham and Harvey (2001), Bancel and Mittoo (2004), Brounen, de Jong, and Koedijk (2004)). Our financial flexibility measure enhances empirical and theoretical research by providing a higher explanatory power in common approaches of explaining differences in financial policies. Furthermore, company valuation models can benefit from using this tool to obtain a more precise picture of the distribution of future financing activities.

Besides corporate finance, flexibility plays an important role in other fields of economics and business administration. In contracting theory, the contracting parties face a trade-off between commitment and flexibility as inflexible contracts can harm the benefits of all involved parties. These effects can be found in labor contracts, workers' compensation, and covenants of securities. Moreover, the organizational structure and manufacturing strategies are a fruitful source for operational flexibility meaning that a firm gains utility by being able to adjust its operations to changing market conditions and pursue investment opportunities in a timely manner. Hence, the notion of preserving flexibility can be deeply rooted in the corporate culture of a firm and can be a major determinant for the success in business. The connection between different sources of flexibility and their impact on performance and financing decisions forms a promising field of future research.

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A. Appendix

This appendix describes the definition of excess cash $xCash$. We follow Denis and McKeon (2012) to define excess cash but exclude cash from the change in working capital because this is the component we want to isolate.

$$xCash_t = cash_{t-1} + ofc_t - dividends_t - \Delta wc_t - investments_t \tag{18}$$

where

$$dividends_t = dvc_t - dvc_{t-1} \ . \tag{19}$$

For COMPUSTAT format codes (scf) 1, 2, and 3, the remaining variables are defined as:

$$ofc_t = ibc_t + xidoc_t + txdc_t + esubc_t + sppiv_t + fopo_t + fsrco_t \tag{20}$$

$$investments_t = capx_t + aqc_t + ivch_t + fuseo_t - sppe_t - siv_t \tag{21}$$

$$\Delta wc_t = wcapc_t \tag{22}$$

For format codes 2 and 3 the sign of $wcapc_t$ is reversed. For format code 7, we use the following definition:

$$ofc_t = oancf_t - recch_t - invch_t - apalch_t - txach_t - aoloch_t + exre_t \tag{23}$$

$$investments_t = capx_t + aqc_t + ivch_t - sppe_t - siv_t - ivaco_t \tag{24}$$

$$\Delta wc_t = -recch_t - invch_t - apalch_t - txach_t - aoloch_t - ivstch_t - fiao_t \tag{25}$$

All variables are scaled by total assets of the current period.

Table 1: Summary statistics of firms with credit ratings.
The table reports mean values (standard deviation in parentheses) of our variables split up into the different rating categories. The sample consists of annual COMPUSTAT and CRSP data from 1985 to 2012 of 2,461 different firms with a S&P long-term credit issuer rating excluding financial firms and utilities. The debt ratio in market values equals book debt over market assets. Size is measured as log(sales) and profitability is EBITDA over total assets. Liquidity ratio$_1$ is retained earnings scaled by total assets and liquidity ratio$_2$ is working capital scaled by total assets. Tangibility is defined as property, plant, and equipment over total assets and depreciation is depreciation scaled by assets. The financing deficit equals the change in book assets less the change in retained earnings and scaled by total assets at the beginning of the period. Net debt issues $\Delta debt$ are defined as the change in book debt and net equity issues $\Delta equity$ are the change in book equity less the change in retained earnings. Both variables are scaled by total assets. Term spread is the difference between the yield on a 3 month US treasury bill and a 10 year US government bond. N denotes the number of observations.

Variables	all	AAA	AA	A	BBB	BB	B	CCC−D
debt ratio	0.473	0.218	0.270	0.345	0.422	0.487	0.600	0.820
	(0.233)	(0.142)	(0.138)	(0.163)	(0.176)	(0.211)	(0.240)	(0.198)
size	7.762	9.833	9.071	8.816	8.340	7.420	6.635	6.387
	(1.481)	(1.210)	(1.308)	(1.230)	(1.138)	(1.108)	(1.201)	(1.353)
profitability	0.136	0.219	0.193	0.168	0.145	0.133	0.104	0.052
	(0.077)	(0.074)	(0.054)	(0.062)	(0.061)	(0.071)	(0.082)	(0.093)
liquidity ratio$_1$	0.111	0.485	0.453	0.354	0.248	0.081	-0.171	-0.465
	(0.399)	(0.203)	(0.197)	(0.200)	(0.221)	(0.288)	(0.458)	(0.620)
liquidity ratio$_2$	0.148	0.129	0.126	0.140	0.132	0.168	0.174	0.027
	(0.177)	(0.131)	(0.160)	(0.149)	(0.158)	(0.175)	(0.193)	(0.263)
tangibility	0.389	0.367	0.437	0.395	0.399	0.382	0.369	0.420
	(0.241)	(0.214)	(0.216)	(0.221)	(0.247)	(0.251)	(0.240)	(0.252)
depreciation	0.077	0.078	0.083	0.077	0.070	0.072	0.084	0.110
	(0.056)	(0.046)	(0.039)	(0.042)	(0.045)	(0.058)	(0.064)	(0.098)
financing deficit	0.007	0.021	0.012	0.015	0.000	0.005	0.012	-0.025
	(0.132)	(0.080)	(0.076)	(0.097)	(0.114)	(0.136)	(0.171)	(0.147)
$\Delta debt$	0.004	0.034	0.023	0.021	0.005	-0.002	-0.003	-0.028
	(0.120)	(0.069)	(0.070)	(0.083)	(0.098)	(0.123)	(0.159)	(0.149)
$\Delta equity$	0.002	-0.013	-0.011	-0.006	-0.005	0.007	0.015	0.004
	(0.083)	(0.056)	(0.045)	(0.057)	(0.062)	(0.089)	(0.112)	(0.091)
term spread	0.018							
	(0.011)							
N	14,577	176	770	2,380	3,501	3,777	3,430	543

Table 2: Credit score regression.
This table shows the estimated coefficients, robust standard errors in parenthesis, odds ratios in brackets, and estimated cutoffs of the ordered logit regression (1), as well as the estimated cutoffs. The first and second column are ordered logit regressions while the third column is an instrumental variable regression in which the debt ratio is instrumented with Baker and Wurgler's (2002) external finance weighted-average market-to-book ratio, Graham's (1996) marginal before financing tax rate, firm size, profitability, tangibility, and industry dummies. The first stage is estimated via OLS but the results are not reported. The debt ratio in market values equals book debt over market assets and size is measured as log(sales). Profitability is EBITDA, liquidity ratio_1 is retained earnings, liquidity ratio_2 is working capital, and tangibility is property, plant, and equipment, all scaled by total assets. Age dummies indicate the age of the rating with a maximum of 10 years. Year dummies are included for every year. Industry dummies are based on the Fama-French 38 industries which are reduced to 33 categories due to the exclusion of financial firms and utilities. Robust standard errors (Huber (1967)) are reported in parentheses and *** indicates significance at the 1% level. For each dummy variable category, the number of significant variables at the 10% level is reported. Error is the difference between the estimated and the observed rating. The last line reports the fraction of investment-grade firms that are estimated to have an investment-grade rating.

explanatory variables	(1)	(2)	(3)
debt ratio	−7.989***	−6.685***	−9.624***
	(0.104)	(0.087)	(0.374)
	[0.00034]	[0.00125]	[0.00027]
size	1.075***	0.894***	0.751***
	(0.019)	(0.015)	(0.024)
	[2.929]	[2.446]	[2.119]
profitability	3.349***	2.922***	−10.504***
	(0.277)	(0.263)	(0.526)
	[28.463]	[18.581]	[0.000]
liquidity ratio_1	2.052***	2.264***	2.676***
	(0.069)	(0.068)	(0.110)
	[7.782]	[9.624]	[14.532]
liquidity ratio_2	−1.380***	−1.047***	−1.582***
	(0.159)	(0.128)	(0.224)
	[0.252]	[0.351]	[0.206]
tangibility	0.425***	0.593***	1.401***
	(0.112)	(0.081)	(0.156)
	[1.530]	[1.810]	[4.060]
significances of age dummies	9 out of 9		8 out of 9
significances of year dummies	23 out of 27		21 out of 27
significances of industry dummies	30 out of 33		18 out of 33
pseudo R^2	0.347	0.278	0.291
observations	14,575	14,575	7,427
estimation method	ordered logit	ordered logit	1st stage OLS
			2nd stage ordered logit
estimated cutoffs			
μ_1 (C)	−12.303	−10.746	−13.552
μ_2 (CC)	−12.294	−10.737	–
μ_3 (CCC)	−12.011	−10.453	−13.183
μ_4 (B)	−10.274	−8.768	−11.402
μ_5 (BB)	−6.086	−4.947	−7.907
μ_6 (BBB)	−3.636	−2.819	−5.888
μ_7 (A)	−1.312	−0.878	−3.751
μ_8 (AA)	1.219	1.241	−1.211
μ_9 (AAA)	3.577	3.315	1.258
correctly estimated ratings in %			
error $= 0$	54.4	47.9	49.3
$\lvert\text{error}\rvert \leq 1$	94.5	92.5	93.4
$\lvert\text{error}\rvert > 1$	5.5	7.5	6.6
fraction of investment-grade firms			
with credit score $> \mu_6$	86.1	85.9	85.3

Table 3: Debt capacity estimates.
This table shows the results for the rating threshold debt capacity in equation (9). For each rating category, we report mean values (and standard deviations in parenthesis) of the debt capacity estimates and the debt ratio. The parameter p is rating-specifically calibrated to fit observed downgrades in each respective rating category. N is the number of observations. The sample consists of annual COMPUSTAT data from 1985 to 2012 of 2,461 different firms with a S&P long-term credit issuer rating excluding financial firms and utilities. The debt ratio in market values equals book debt over market assets. Book debt is calculated as total liabilities plus preferred stock less deferred taxes and convertible debt. Book equity equals book assets less book debt and the market value of assets equals book assets less equity debt plus market equity. ***, **, * correspond to a significance at the 1% , 5%, or 10% level, respectively, in a t-test of mean$(DC - dr) > 0$.

rating	DC	dr	p	N
all	0.589***	0.473	0.436	14,422
	(0.246)	(0.233)		
AAA	0.201	0.218	0.844	176
	(0.134)	(0.142)		
AA	0.276*	0.270	0.701	770
	(0.163)	(0.138)		
A	0.443***	0.345	0.635	2,380
	(0.184)	(0.163)		
BBB	0.531***	0.422	0.492	3,501
	(0.194)	(0.176)		
BB	0.619***	0.487	0.438	3,777
	(0.204)	(0.211)		
B	0.779***	0.600	0.137	3,430
	(0.206)	(0.240)		
CCC−C	0.842***	0.820	0.098	388
	(0.216)	(0.198)		

Table 4: Alternative debt capacity specifications.
This table presents the results for the implied debt capacity, the investment-grade debt capacity, and the rating threshold debt capacity from table 3. The reported figures are mean values and standard deviations in parenthesis for the respective rating categories. The implied debt capacity (Leary and Roberts (2010)) is defined in equations (10) and (11) and the investment-grade debt capacity (de Jong, Verbeek, and Verwijmeren (2011)) is defined in equation (12).The debt ratio equals book debt over market assets. N is the number of observations. The sample consists of annual COMPUSTAT data from 1985 to 2012 of 2,461 different firms with a S&P long-term credit issuer rating excluding financial firms and utilities.

	implied debt capacity		investment-grade	rating threshold	
rating	$DC_{\min}$	$DC_{\max}$	debt capacity	debt capacity	debt ratio
all	0.449	0.622	0.613	0.589	0.473
	(0.232)	(0.272)	(0.207)	(0.246)	(0.233)
AAA	0.226	0.370	0.848	0.201	0.218
	(0.184)	(0.240)	(0.172)	(0.134)	(0.142)
AA	0.229	0.305	0.763	0.276	0.270
	(0.112)	(0.165)	(0.161)	(0.163)	(0.138)
A	0.338	0.429	0.662	0.443	0.345
	(0.170)	(0.202)	(0.185)	(0.184)	(0.163)
BBB	0.411	0.527	0.535	0.531	0.422
	(0.172)	(0.205)	(0.194)	(0.194)	(0.176)
BB	0.474	0.598		0.620	0.487
	(0.207)	(0.227)		(0.205)	(0.211)
B	0.600	0.745		0.779	0.600
	(0.229)	(0.258)		(0.206)	(0.240)
CCC−C	0.868	0.956		0.842	0.820
	(0.159)	(0.292)		(0.134)	(0.198)
N	2,759	2,774	6,827	14,422	14,422

Table 5: Debt buffer, capital issues, repurchases, and substitutions.
We report mean values for the three versions of the debt buffer (13), (14), and (15) and the debt capacity as defined in equation (9). We perform t-tests to test if the mean value of the respective debt buffers differs from zero. ***, **, * correspond to a significance at the 1% , 5%, or 10% level, respectively. The financing deficit *def* is the change in book assets less the change in retained earnings. Financing activities correspond to observations where the respective financing activity exceeds 5% of firm's assets from the beginning of the fiscal year. The frequency is measured in percent of all relevant observations and N denotes the absolute number of observations. The sample consists of annual COMPUSTAT data from 1985 to 2012 of 2,461 different firms with a S&P long-term credit issuer rating excluding financial firms and utilities.

Financing activity	DB_{debt}	DB_{equity}	DB_{after}	*def*	freq. in %	N
full sample	0.121	0.128	0.123	0.007	100.0	9,780
	(0.209)	(0.228)	(0.196)	(0.131)		
debt issue	0.103***	0.258***	0.107***	0.155	19.1	1,870
	(0.197)	(0.230)	(0.193)	(0.138)		
equity issue	−0.006	0.192***	0.189***	0.198	5.5	534
	(0.269)	(0.248)	(0.213)	(0.179)		
debt repurchase	0.118***	0.003	0.116***	−0.115	21.8	2,131
	(0.206)	(0.218)	(0.203)	(0.068)		
equity repurchase	0.246***	0.141***	0.142***	−0.104	6.5	637
	(0.229)	(0.220)	(0.202)	(0.061)		
debt-to-equity substitution		0.027*	0.153***	−0.003	2.0	197
		(0.228)	(0.190)	(0.026)		
equity-to-debt substitution		0.250***	0.139***	0.004	2.3	221
		(0.193)	(0.188)	(0.027)		
no external financing			0.121***	−0.004	42.8	4,190
			(0.189)	(0.027)		

Table 6: Investments and financing activities.
Panel (a) lists the mean value for a list of variables split up by terciles for the financial flexibility measure DB_{after} at time t-1, defined in equation (13). Investments are defined using the statements of cash flows as described in the appendix, and the market-to-book ratio is defined as market value over book value of assets. The financial constraints index by Whited and Wu (2008) equals -0.091 operating cash flow $-$ 0.062 dividend dummy $+$ 0.021 long-term debt $-$ 0.077 log(assets) $+$ 0.102 three digit industry sales growth $-$ 0.035 sales growth. The debt ratio dr is book debt divided by market assets, net debt issues $\Delta debt$ are defined as the change in book debt, and net equity issues $\Delta equity$ are the change in book equity less the change in retained earnings. All variables are scaled by total assets. The last column denotes the correlation of the respective variable with $DB_{\text{after},t-1}$. ***, **, * correspond to a significance at the 1% , 5%, or 10% level, respectively in a test of the correlation with standard errors clustered in the firm and in the time dimension (Petersen (2009)).
In Panel (b), all frequencies are expressed in percent of all relevant observations. Financing activities correspond to observations where the respective financing activity exceeds 5% of firm's assets of the last period. We perform likelihood-ratio-χ^2 tests if the financing choices vary across the terciles of DB_{after}. ***, **, * correspond to a significance at the 1% , 5%, or 10% level, respectively. The sample for both panels consists of annual COMPUSTAT data from 1985 to 2012 of 2,461 different firms with a S&P long-term credit issuer rating excluding financial firms and utilities.

Panel (a): Mean values across $DB_{\text{after},t-1}$ terciles				
Terciles of $DB_{\text{after,t}-1}$	1st	2nd	3rd	Correlation with $DB_{\text{after},t-1}$
$DB_{\text{after},t-1}$	−0.086	0.125	0.327	1.000***
investments$_t$	0.056	0.064	0.080	0.114***
market-to-book$_{t-1}$	1.348	1.496	1.678	0.177***
investments$_t$/market-to-book$_{t-1}$	0.044	0.045	0.054	0.054***
Whited/Wu constraints index$_{t-1}$	−0.631	−0.666	−0.682	−0.165***
Δdr_t	−0.012	−0.003	0.010	0.105***
$\Delta debt_t$	−0.005	0.004	0.017	0.099***
$\Delta equity_t$	0.000	−0.001	0.001	0.018

Panel (b): Distribution of financing activities in t				
Frequency of financing activity at time t in %				χ^2−test
debt issue	17.8	19.1	20.5	11.1***
equity issue	3.8	4.8	6.6	
debt repurchase	25.5	21.6	18.1	42.4***
equity repurchase	5.6	6.2	8.1	
debt-to-equity	1.7	2.0	1.7	10.8**
equity-to-debt	1.6	2.4	2.7	
no external financing	43.9	44.0	42.2	

Table 7: Using and restoring of the debt buffer.

The table presents estimated marginal effects of a probit regression of the decision to repurchase debt on various independent variables. The reported figures are the marginal effects at the mean value of the respective independent variable (∂ Pr(debt repurchase)/∂ variable) and the estimated standard deviation in parenthesis using the Huber-White-Sandwich estimator. The sample consists of all firms that have a financial surplus in the current period and choose either to repurchase debt or equity. The dependent variable equals one if the firm's debt repurchases exceed more than 5% of its assets in last fiscal year and zero if it repurchases equity. $DB_{\text{after},t-1}$ is defined in equation (13). Debt issue$_{t-1}$ is a dummy variable that equals one if the firm exhibited a debt issue in the last fiscal period. Low dr$_{t-1}$ and high dr$_{t-1}$ are dummy variables, that equal one if the firm's debt ratio in the last fiscal year is in the bottom or top 10% of the sample's distribution, respectively. Profitability$_{t-1}$ is defined in equation (3), size$_{t-1}$ in (2), and tangibility$_{t-1}$ in (6). Market-to-book$_{t-1}$ equals market assets divided by book assets and depreciation$_{t-1}$ is depreciation divided by total assets. Deviation from industry median$_{t-1}$ is the deviation of the firm's debt ratio from the median the respective Fama-French 38 industry. Term spread is measured as the difference between a long-term (10 years) US government bond yield and a short term (3 month) treasury bill rate. ***, **, * correspond to a significance at the 1% , 5%, or 10% level, respectively. N denotes the number of observations.

Probit regression of debt repurchases	(1)	(2)	(3)
$DB_{\text{after},t-1}$	−0.156***	−0.153***	
	(0.058)	(0.057)	
debt issue$_{t-1}$	0.079***	0.078***	
	(0.027)	(0.027)	
low dr$_{t-1}$	−0.258***		
	(0.081)		
high dr$_{t-1}$	−0.091		
	(0.060)		
profitability$_{t-1}$	−0.386**	−0.277	0.100***
	(0.171)	(0.169)	(0.026)
size$_{t-1}$	−0.026***	−0.024***	−0.382**
	(0.008)	(0.008)	(0.177)
market-to-book$_{t-1}$	−0.002	−0.026	−0.031***
	(0.018)	(0.018)	(0.008)
tangibility$_{t-1}$	−0.068	−0.066	−0.026
	(0.051)	(0.051)	(0.020)
depreciation$_{t-1}$	0.018	−0.002	−0.035
	(0.224)	(0.225)	(0.051)
deviation from industry median$_{t-1}$	0.667***	0.658***	0.309
	(0.061)	(0.059)	(0.223)
term spread$_{t-1}$			0.641***
			(0.059)
year dummies	yes	no	no
pseudo R^2	0.176	0.170	0.121
N	2,132	2,132	2,132

Table 8: Debt buffer and control variables.
We report the estimated coefficients of a fixed effects linear panel regression of the change in the debt ratio Δdr_t on control variables in changes and the debt buffer in the three different versions. The three versions of the debt buffer are defined in the equations (13), (14), and (15). Financing activities correspond to observations where the respective financing activity exceeds 5% of firm's assets at the beginning of the fiscal year. The sample consists of annual COMPUSTAT data from 1985 to 2012 of 2,461 different firms with a S&P long-term credit issuer rating excluding financial firms and utilities. The debt ratio in market values equals book debt over market assets. Book debt is calculated as total liabilities plus preferred stock less deferred taxes and convertible debt. Profitability is EBITDA over assets, size equals log of assets, and the market-to-book ratio is defined as market value over book value of assets. Tangibility equals proberty, plant, and equipment of total assets. Depreciation is depreciation and amortization over total assets and deviation from industry median is the difference between the debt ratio and the median of the respective Fama-French industry debt ratio. Term spread is measured as the difference between a long-term (10 years) US government bond yield and a short term (3 month) treasury bill rate. All coefficients are calculated via OLS. We control for two dimensional standard error clustering by using the standard errors proposed by Petersen (2009). ***, **, * correspond to a significance at the 1% , 5%, or 10% level, respectively. N denotes the number of observations.

Dependent variable: Δdr	(1)	(2)	(3)	(4)
$DB_{\text{after},t-1}$	0.158***			
	(0.028)			
$DB_{\text{equity},t}$		0.085***		
		(0.019)		
$DB_{\text{debt},t}$			−0.058**	
			(0.027)	
Δprofitability$_t$	−0.507***	−0.519***	−0.535***	−0.559***
	(0.063)	(0.066)	(0.060)	(0.065)
Δsize$_t$	0.059**	0.034	0.063**	0.062**
	(0.027)	(0.030)	(0.030)	(0.029)
Δmarket-to-book$_t$	−0.077***	−0.081***	−0.077***	−0.079***
	(0.022)	(0.023)	(0.023)	(0.023)
Δtangibility$_t$	0.103**	0.131**	0.125**	0.110**
	(0.051)	(0.051)	(0.053)	(0.052)
Δdepreciation$_t$	0.184**	0.218**	0.156*	0.146
	(0.091)	(0.092)	(0.092)	(0.093)
deviation from industry median$_{t-1}$	−0.119***	−0.115***	−0.126***	−0.126***
	(0.016)	(0.016)	(0.017)	(0.016)
Δterm spread$_t$	0.105	0.112	0.080	0.082
	(0.446)	(0.439)	(0.457)	(0.451)
adj. R^2	0.317	0.303	0.296	0.292
N	3,607	3,607	3,607	3,607

Table 9: Financial flexibility and the trade-off theory.
This table shows results for the treatment and control groups. A firm enters the treatment group if its debt buffer is between 0 and 0.05 and its excess cash is in the top quartile of the distribution. Panel (a) shows the number of observations N, mean values and standard deviations in parenthesis. The debt buffer after financing decisions at the beginning of the fiscal year $DB_{\text{after},t-1}$ is defined in equation (13) and excess cash $xCash_t$ is defined in the appendix. Panel (b) shows the distribution of financing activities as percentage of the respective subsample. Financing activities correspond to observations where the respective financing activity exceeds 5% of firm's assets at the beginning of the fiscal year. The χ^2-test tests for structural differences between the respective control sample and the treatment group. Panel (c) shows mean values and standard deviations of the variables in parenthesis. *** indicates a significance at a 1% level in a test whether the mean value of the respective control sample differes from the treatment sample. The number of observations N is identical in all panels.

Panel (a): Summary statistics of treatment and control firms

variables	treatment sample	control sample low $DB_{\text{after},t-1}$	control sample all other firms
N	230	661	9,284
$DB_{\text{after},t-1}$	0.027	0.026	0.125
	(0.013)	(0.015)	(0.195)
$xCash_t$	0.228	0.034	0.081
	(0.094)	(0.086)	(0.137)

Panel (b): Distribution of financing activities in %

financing activity in period t	treatment sample	control sample low $DB_{\text{after},t-1}$	control sample all other firms
debt issue	7.0	22.4	19.4
equity issue	2.6	4.8	5.1
debt repurchase	38.7	17.3	21.2
equity repurchase	7.4	4.7	6.6
debt-to-equity substitution	1.3	1.4	1.8
equity-to-debt substitution	1.7	2.4	2.3
no external financing	41.3	47.1	43.5
χ^2-test		54.5***	63.7***

Panel (c): Results of treatment

variables	treatment sample	control sample low $DB_{\text{after},t-1}$	control sample all other firms
$DB_{\text{after},t}$	0.064	0.035***	0.125***
	(0.101)	(0.097)	(0.197)
$\Delta DB_{\text{after},t}$	0.037	0.009***	0.000***
	(0.101)	(0.095)	(0.112)
Δdr_t	−0.045	0.000***	−0.001***
	(0.102)	(0.097)	(0.103)

Table 10: Debt buffer and robustness in p.
We report mean values for the three versions of the debt buffer from the equations (13), (14), and (15) for different values of the exogenous probability p chosen as a uniform parameter for across all rating levels. The debt capacity corresponds to the rating threshold debt capacity in equation (9) Financing activities correspond to observations where the respective financing activity exceeds 5% of firm's assets at the beginning of the period. The sample consists of annual COMPUSTAT data from 1985 to 2012 of 2,461 different firms with a S&P long-term credit issuer rating excluding financial firms and utilities. The standard deviations, financing deficit, and number of observations are identical to table 5, and hence, are not reported.

variable	DB_{debt}			DB_{equity}			DB_{after}		
choice of p	0.30	0.40	0.50	0.30	0.40	0.50	0.30	0.40	0.50
debt issue	0.034	0.080	0.121	0.189	0.235	0.276	0.038	0.084	0.125
equity issue	−0.038	0.009	0.052	0.160	0.207	0.250	0.156	0.204	0.247
debt repurchase	0.082	0.127	0.165	−0.032	0.012	0.051	0.081	0.125	0.164
equity repurchase	0.171	0.220	0.266	0.066	0.116	0.161	0.067	0.116	0.162
debt-to-equity substitution				0.000	0.046	0.088	0.125	0.172	0.213
equity-to-debt substitutions				0.152	0.201	0.246	0.041	0.090	0.135
no external financing	0.049	0.095	0.136	0.044	0.090	0.132	0.045	0.091	0.132

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2005

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