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The mitigating effect of bank financing on shareholder value and firm policies following rating downgrades

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Abstract

We document that shareholders of high-yield firms are less sensitive to credit rating downgrades the higher the proportion of bank financing in the firm. This positive effect is linked to firm behavior. In the year after the downgrade, high-yield firms with large bank debt ratios i) need to reduce their leverage less, and ii) display higher capital expenditures, compared to peers that rely relatively more on other sources of debt. Bank financing thus helps alleviate the adverse effects of rating downgrades on shareholders and firms in the high-yield segment. As such, one may view our findings as new evidence of the "specialness" and flexibility of bank debt.

Keywords: Credit ratings, Bank financing, Shareholder value, Firm leverage, Firm investments

JEL Codes: G14, G24, G32

1. Introduction

The importance of credit ratings for firms is a well-established fact. Whether ratings represent a valuable source of information on the creditworthiness of the issuer or merely an indicator to

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comply with investors' regulatory requirements, managers seem to devote significant effort into targeting and maintaining a minimum rating level (Graham and Harvey, 2001), and a vast body of literature has focused on the negative consequences of rating downgrades.

We investigate whether the firm debt structure can act as a mitigating factor on the negative effects of rating downgrades on shareholders and firms. Specifically, we study how a firm's relative mix of bank and non-bank financing affects its market value, leverage, and investments following a downgrade.

Our research question is motivated by the benefits and drawbacks associated with bank-based financing. A well-consolidated strand of theoretical literature emphasizes the superior ability of banks over public investors to effectively monitor the borrower, to access private information and thereby perform internal credit assessment, and to lower coordination hurdles in case of restructuring or debt renegotiation (for a survey, see Boot, 2000). Empirically, the "specialness" of bank debt for shareholders has been supported by a number of early studies, stemming from the seminal work of James (1987), that link positive abnormal stock returns to loan announcements. More recent contributions document how bank financing can also impact firm choices: By focusing on relationship lending, Aslan (2016) shows that the existence of a relationship between borrower and lender has a positive and significant effect on firm leverage and investments.

Both theory and evidence agree that firms are better off replacing costly bank debt with non-bank debt as their credit quality improves (Diamond, 1991; Boot and Thakor, 1997; Bolton and Freixas, 2000; Rauh and Sufi, 2010). However, the benefits associated with bank financing can still outweigh the costs for firms of lower credit quality. If so, we would expect risky firms that rely relatively more on bank debt to be less sensitive to signals issued by rating agencies and,

therefore, less exposed to the negative consequences of a rating downgrade. This expectation rests mainly on the assumption that bank debt represents a reliable source of debt capital for risky firms, consistently with the interpretation of bank debt as a source of financial flexibility for the firm.[1] Such assumption may, however, be unwarranted for a number of reasons. In line with the theoretical predictions from Stiglitz and Weiss (1981), firms are likely to face credit rationing precisely when their credit quality deteriorates and their financing needs are high. Sufi (2009) argues that banks restrict firms' access to credit facilities in response to covenant violations. Credit rationing becomes more likely when banks themselves experience liquidity constraints, as in times of financial crisis (Campello, Graham, and Harvey, 2010), and are subject to rating-based capital requirements. Even if borrowers manage to preserve their credit lines, they will likely face an increase in borrowing costs, a shortening in debt maturity and a tightening of loan covenants, which may push them further into financial distress. In general, the changing nature of commercial banking and bank loans over the past two decades seems to have led to a substantial reduction in the benefits of bank financing for shareholders and firms.[2] As a result, the extent to which bank financing can mitigate the negative effects of a rating downgrade remains an empirical question.

We start by studying whether the impact of a rating downgrade on shareholder value is influenced by the firm's mix of bank and non-bank debt. Holthausen and Leftwich (1986), Hand, Holthausen, and Leftwich (1992), and Dichev and Piotroski (2001) were among the first to show

[1]Lins, Servaes, and Tufano (2010) survey Chief Financial Officers from 29 different countries and conclude that lines of credit are the dominant source of liquidity for companies around the world.

[2]Fields, Fraser, Berry, and Byers (2006) document an important resizing in the information content of loan announcements after the 1980s due to the wider availability of financial information on borrowers.

that downgrades translate into negative abnormal stock returns both in the short and in the long run. We consider all downgrades initiated by Standard and Poor's (S&P), Moody's, and Fitch for publicly traded non-financial U.S. firms covered by Compustat and Capital IQ from 2001 to 2013. As a measure of debt mix, we use the proportion of bank debt to total debt at the fiscal year-end prior to the downgrade. We employ a standard event study methodology to assess the impact of rating downgrades on stock returns over a three-day period surrounding the event. The analysis is performed separately on investment-grade and high-yield companies. We find that high-yield firms that rely relatively more on bank financing experience less negative abnormal stock returns than high-yield firms that use relatively less bank financing following a rating downgrade. Instead, a more intense recourse to bank debt does not seem to produce statistically significant effects for shareholders of investment-grade firms. Our results hence suggest that equity investors of risky firms attach a value to bank debt when credit quality deteriorates.

We next turn to investigate to what extent a higher recourse to bank debt can shield firm policies from the negative effects of rating downgrades and, therefore, explain the positive value assigned by shareholders to this source of financing in such instances. The existing evidence on the distortive effects of downgrades on firms is ample. Kisgen (2009) argues that firms reduce leverage and debt issuance following rating downgrades in an attempt to preserve their minimum target rating. Chernenko and Sunderam (2012) find that firms rated just below the speculative-grade cutoff make lower investments compared to firms that remain just above the cutoff. Tang (2009) and Almeida, Cunha, Ferreira, and Restrepo (2017) document a reduction in leverage and investments even when downgrades are mechanical and not driven by changes in firm fundamentals. Bongaerts and Schlingemann (2016) show evidence that firms respond to downgrades by selling assets

to avoid financial distress. We borrow from this literature to identify the three main firm policies that are known to be affected by downgrades, i.e. leverage, investments, and asset sales. At the univariate level, we observe that high-yield firms that borrow relatively more from banks report a smaller contraction in market leverage and higher capital expenditures (but no difference in asset sales) after the downgrade than high-yield firms that resort mainly to other sources of financing. Following this preliminary evidence, we validate our findings on leverage and investments in a multivariate setting.

With respect to firm leverage, we follow the empirical design suggested by Flannery and Rangan (2006) to model market leverage dynamics and we confirm that, within the high-yield segment, firms characterized by a higher recourse to bank debt need to resize their debt ratios less in the aftermath of a rating downgrade. Hence, bank financing helps alleviate the distorting effects of a downgrade on the capital structure of such firms that are able to retain more financial resources. With respect to firm investments, we confirm that bank financing has a positive effect on capital expenditures of high-yield firms in the year after a downgrade, once we control for standard determinants of firm investments in a multivariate framework.

All in all, we conclude that, for high-yield firms, a larger proportion of bank financing mitigates the negative effects of a credit rating downgrade on market value, market leverage, and capital expenditures. These findings suggest that bank debt is beneficial for these firms and is valued by stock investors. Instead, we find no significant evidence of positive effects of bank financing on investment-grade firms.

A concern with our empirical setting is that firms are not randomly assigned a high or low proportion of bank debt. In particular, it is well known that the firm debt structure strongly depends

upon its corporate credit rating. Denis and Mihov (2003) and Rauh and Sufi (2010) document that the proportion of bank financing tends to be very low for investment-grade firms and much higher for high-yield firms. If we merely looked at the mix between bank and non-bank debt in our analysis, we would simply be capturing the difference between firms of high and low credit quality. To address this issue, in all our specifications we investigate the role of debt composition separately for investment-grade and high-yield firms and, where possible, control for individual ratings (e.g., AA-, AA, AA+) or rating class (e.g., AA). To further mitigate endogeneity concerns, we always look at the pre-downgrade debt structure to avoid confounding effects on outcome variables post-downgrade. Finally, we validate our findings on high-yield firms by means of a propensity score matching: We derive a matched sample of firms with high and low recourse to bank debt based on their propensity scores and we re-estimate our main specifications for shareholder value, firm leverage and investments on the matched sample.

This paper contributes to several strands of the literature. First, our findings enrich the above-mentioned studies that investigate the impact of credit ratings on shareholder value and firm decisions, by showing how the recourse to bank debt can affect such an impact. Second, we contribute to the debate on whether bank debt is still special to shareholders and firms by focusing on a specific shock to the company's perceived credit quality, i.e. a rating downgrade. In this respect, our findings can also be interpreted in light of the financial flexibility literature. Agha and Faff (2014) document an asymmetric response to credit re-ratings in financially flexible and inflexible firms. While the financial flexibility of a firm has been traditionally measured as a function of its cash holdings or capital structure decisions (see Denis, 2011, for a survey), the recourse to bank financing may be interpreted as an additional measure of financial flexibility. Third, we add to the

research that emphasizes the importance of debt structure over and above capital structure (Rauh and Sufi, 2010; Colla, Ippolito, and Li, 2014).

The rest of the paper is organized as follows. We describe the data sample in Section 2. We explore the impact of the debt structure on the shareholders' response to rating downgrades in Section 3. We investigate how firm leverage and investments develop following a downgrade in Section 4. Section 5 provides an interpretation of our findings. Section 6 contains robustness tests and Section 7 concludes the paper.

2. Data

Our initial sample consists of rated U.S. firms traded on the American Stock Exchange (AMEX), Nasdaq, and New York Stock Exchange (NYSE), and covered by Compustat from 2001 to 2013. We measure a firm rating with the Long-Term Local Currency Issuer Rating for S&P, the Long-Term Estimated Senior Rating for Moody's, and the Long-Term Issuer Default Rating for Fitch. An issuer credit rating is generally set equal to its actual senior unsecured debt rating or, if there is none, by implying it on the basis of rated subordinated or secured debt. We use issuer ratings (as opposed to issue ratings) as they convey an opinion about the obligor's overall creditworthiness rather than its ability to repay a specific liability class.

Data on credit ratings and rating downgrades for our sample firms are from Bloomberg and Capital IQ. Table 1 displays how we convert the alphanumerical credit ratings from the three rating agencies into numerical codes using an ordinal scale ranging from 1 for the highest rated firms to 21 for the lowest rated firms.[3] Firms rated from 1 to 10 (from 11 to 21) constitute investment-

[3]Ratings indicating a firm in default or in selected default are assigned the value 22.

grade (high-yield) firms.[4] For part of the analysis that follows, we group the individual ratings of firms not in default into the following six rating classes, in descending order: i) prime and high grade, which include AAA, AA+, AA, and AA- ratings (Aaa, Aa1, Aa2, and Aa3 for Moody's); ii) upper medium grade, which include A+, A, and A- ratings (A1, A2, and A3 for Moody's); iii) lower medium grade, which include BBB+, BBB, and BBB- ratings (Baa1, Baa2, and Baa3 for Moody's); iv) speculative, which include BB+, BB, and BB- ratings (Ba1, Ba2, and Ba3 for Moody's); v) highly speculative, which include B+, B, and B- ratings (B1, B2, B3 for Moody's); and vi) substantial risks, extremely speculative, and default imminent, which include CCC+, CCC, CCC-, CC, and C ratings (Caa1, Caa2, Caa3, Ca, and C for Moody's).

Since we focus on the link between bank debt and credit ratings, we remove financial firms (SIC codes 6000 to 6999), whose debt structure is not comparable to those of other companies. We collect firm-level stock prices from the Center for Research in Security Prices (CRSP) and annual accounting data from Compustat. Firm-level yearly data on debt structure are from Capital IQ.[5] Following Colla, Ippolito, and Li (2014), we also remove i) firm-years with missing or 0 values for total assets and total debt, ii) firm-years with market or book leverage outside the unit interval, and iii) firm-years for which the total debt as reported by Capital IQ and Compustat differs by more

[4]This investment-grade cut off is current as of October 2017, see `https://www.spratings.com/en_US/understanding-ratings#secondPage` for S&P ratings, `https://www.fitchratings.com/site/definitions` for Fitch ratings, and `https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_79004` for Moody's ratings.

[5]Our sample period starts in 2001 because, for most firms, reliable data on debt structure are only available from Capital IQ since that year (Standard and Poor's, 2016). For the same reason, we use annual instead of quarterly financial statements.

than 10%. Finally, we winsorize all continuous variables at 1% and 99% to minimize the impact of potential outliers.

Table 2 documents the number of sample firms in each rating class from 2001 to 2013. In line with previous literature (Alp, 2013; Baghai, Servaes, and Tamayo, 2014), we observe a decrease in the proportion of firms rated investment-grade over the years and a corresponding increase in the proportion of firms rated high-yield. Unsurprisingly, the effect is stronger in the aftermath of the 2007–2009 recession period.[6]

The debt structure variable that we focus on throughout the analysis is the proportion of bank debt to total debt. Bank debt data are collected from Capital IQ and consist of the sum of all term loans and revolving credit facilities (amount withdrawn). Table 3 shows the distribution of bank debt to total debt across rating classes for our sample firms. Two aspects are worth emphasizing. First, the mean usage of bank debt varies from 5.3% for prime and high grade-rated firms to 31.9% for speculative firms, highlighting an important difference in debt structure across the rating spectrum. This finding is in line with both the theoretical predictions of Diamond (1991) and Bolton and Freixas (2000), and previous evidence documented by Denis and Mihov (2003) and Rauh and Sufi (2010): Firms of higher credit standing replace bank debt with public debt, while bank financing remains a key component of the debt structure for riskier firms. Second, starting from the lower medium investment-grade class (rating class 3) and moving down the rating scale, we observe an important variation in recourse to bank debt for firms that belong to the same rating class. We exploit this variation in our analysis to better identify the link between debt structure

[6]The overall size of our sample is about 20–25% smaller than the corresponding sample size of comparable studies, given that we require data availability and consistency from both Compustat and Capital IQ.

and credit ratings. As evident from Table 3, a concern that arises when simultaneously looking at corporate credit ratings and debt structure is that the latter strongly depends upon the former. To address this issue, throughout our analysis we investigate the role of debt composition separately for investment-grade and high-yield firms and, where possible, control for the firm's individual rating or rating class.

We focus on rating downgrades and discard upgrades for the following reasons. Previous literature finds that shareholder value and firm policies are not significantly impacted by rating improvements (see e.g. Holthausen and Leftwich, 1986; Hand, Holthausen, and Leftwich, 1992; Kisgen, 2009). A number of explanations are consistent with those findings. Ederington and Goh (1998) suggest that upgrades are normally a response to information that the market has already incorporated in stock prices because companies may voluntarily release good news but are reluctant to release bad news, or because rating agencies are more timely in detecting credit deterioration than improvement. With respect to firm policies, Kisgen (2009) posits that a rating upgrade is not expected to trigger changes in capital structure since it is beneficial to the firm, and the firm will not seek to reverse it. Even though the overall effect of upgrades on shareholder value and firm policies may be insignificant, rating improvements may still have an asymmetric impact on firms based on their recourse to bank financing. Given that we ask whether debt structure can have a mitigating effect following downgrades, it seems reasonable to ask whether it may also have an amplifying effect following upgrades. However, this is unlikely to be the case in our sample. A total of 2,882 upgrades occurred during our sample period, of which 74% related to high-yield firms. As discussed by Agha and Faff (2014), highly levered firms are unlikely to increase leverage and investments following an upgrade, as most of the benefits from undertaking new projects will

go to creditors rather than shareholders. We posit that this is especially likely to be the case for high-yield firms that rely more on bank debt, as banks exert strong monitoring and impose tight covenants on those borrowers. We conduct supplementary analyses on upgrades which confirm that the recourse to bank debt does not have a significant impact on shareholder value and firm policies following a rating improvement. These untabulated results are available from the authors upon request.

3. Credit Rating Downgrades and Shareholder Value

In this section we test to what extent bank financing shields shareholder value from the effect of a downgrade in the credit rating of a firm. In line with the literature (Holthausen and Leftwich, 1986; Hand, Holthausen, and Leftwich, 1992; Jorion, Liu, and Shi, 2005), we employ a standard event study methodology to assess the impact of rating downgrades on stock prices. We estimate normal (i.e., expected) returns by means of a one-factor market model where the market is represented by the daily return on the value-weighted NYSE/AMEX/NASDAQ market index. The market model is estimated on a window from -210 to -15 days relative to the event date.[7] We obtain daily abnormal stock returns for each company as the difference between the raw return and the return estimated from the market model. The abnormal returns are aggregated over the three days centered on the announcement date of the rating change into cumulative abnormal returns (CARs). We retain CARs only for issuers with non-missing returns for all three days.

[7]Our results are robust to longer estimation windows of nine and 12 months. We opt for a simple specification, such as the standard market model, since Kothari and Warner (2007) show that short-horizon event studies are not very sensitive to the benchmark specification.

Table 4 presents univariate statistics of *CAR*s around the downgrades that involve our sample firms. As expected, rating downgrades are associated with negative and significant abnormal returns and the effect is significantly stronger for high-yield firms than for investment-grade companies. We then investigate whether the stock price reaction to the downgrade differs according to the firm debt structure. In doing so, we need to control for the firm credit quality, given that, as discussed before, it is correlated with the debt structure. To distinguish between firms that rely less or more on bank financing, we use an indicator variable that equals 0 if the ratio of bank debt to total debt of the firm at the year-end before the downgrade is below the median value of the ratio for the corresponding rating class that year and 1 otherwise. The firm rating class is determined with respect to the rating before the downgrade and follows the six classes in Table 1. We take the debt structure and rating class of the firm at year-end before the downgrade to exclude confounding effects due to changes induced by the rating action. We compute medians across rating classes instead of individual ratings to ensure a sufficient sample size on a yearly basis. We adopt yearly medians to account for the significant time variation in bank financing over our sample period.[8]

We find that debt structure does not seem to produce statistically significant effects for investment-grade companies, whereas in high-yield firms the negative stock return following a downgrade is significantly stronger for those firms that rely less on bank financing. These preliminary findings seem to be consistent with our hypothesis that bank financing could be useful in mitigating the

[8]One may argue that our indicator variable is biased if all low bank debt (high bank debt) firms of a given rating class are clustered into specific individual ratings: For example, if all low bank debt firms in rating class 3 had rating BBB- and all high bank debt firms had rating BBB+. This is not the case, since we compute that the proportion of firms categorized as high bank debt in each rating code ranges between 35% and 67%.

distortive effects of a firm's downgrade for risky companies.

While the univariate findings provide interesting insights, we need to control for a number of variables that could also affect the *CAR*s following rating changes. Table 5 displays the results from multivariate regressions of the *CAR*s surrounding credit rating downgrades:

$$CAR_{i,t} = \gamma_t + \delta X_{i,t-1} + \epsilon_{i,t} \tag{1}$$

where X is a vector of controls that includes two subsets of variables. The first group includes variables that relate directly to the nature of the downgrade (Holthausen and Leftwich, 1986; Hand, Holthausen, and Leftwich, 1992; Jorion and Zhang, 2007), that is: i) the numerical value of the firm rating before the downgrade (as in Table 1), as downgrades may have a stronger impact for riskier firms; ii) the magnitude of the downgrade in notches, as stronger stock price reactions are typically associated with rating changes of larger magnitude; iii) a fallen angel dummy that takes a value of 1 if the rating changes from investment-grade to high-yield, as downgrades that move the issuer out of the investment-grade segment may trigger a stronger response; iv) a dummy that takes a value of 1 if the downgrade was preceded by a negative watch, as rating actions preceded by a rating watch may have a weaker impact on stock prices, given the anticipation effect; v) the natural logarithm of the reciprocal of the number of days between the date of the last rating downgrade performed by another rating agency and the event date. This controls for the possibility that rating changes that follow similar actions undertaken by other rating agencies may have a stronger information content. The second group of variables includes a number of firm characteristics that should be already encompassed in the previous rating i), but are added to address potential omitted

variables concerns, namely: vi) firm size; vii) profitability; viii) tangibility; ix) capital expenditures; x) research and development expenses; xi) interest coverage ratio; xii) market-to-book ratio; xiii) depreciation. All firm-specific variables are taken at year-end $t-1$ prior to the downgrade and are computed as defined in Appendix A. We include year fixed effects, γ_t, to account for the impact that financial market conditions could have on investors' reactions to negative news such as a downgrade. Standard errors are corrected for heteroskedasticity.

In the first three columns of Table 5, we regress *CAR*s around downgrades on this set of variables. The first column shows the results for all downgrades while the second and third columns display results conditional on whether the rating prior to the downgrade was investment-grade or high-yield, respectively. In all cases, we observe that the stock price response to the downgrade is negatively associated with the starting credit quality of the firm: The better the original rating, the less negative the abnormal returns following the downgrade. On the contrary, downgrades that push risky firms closer to default are associated with a larger loss in shareholder value. Subsequent downgrades from different rating agencies seem to have a compounding effect and trigger a stronger investor response. In high-yield firms, we observe that the stock price reaction is also stronger for downgrades of more notches and milder for larger firms or if the rating action was anticipated by a negative watch.

From the fourth column of Table 5 onward, we add to the baseline specification our variable of interest, that is, the firm's ratio of bank debt to total debt at the year-end prior to the downgrade. If, as indicated by the univariate findings, bank financing can mitigate the negative effects of a rating downgrade on stock prices for firms of low credit quality, we expect a positive coefficient associated with this variable in high-yield firms. To control for the possibility that any findings

are not genuinely due to the different nature of debt sources but instead simply mirror the different maturity structure of bank and bond debt, we also add to our set of explanatory variables the proportion of short-term debt to total debt of the firm at the year-end prior to the downgrade, where short-term debt is all debt due within one year. Our main explanatory variable is positive and statistically significant on the entire sample with a coefficient of 0.021. When looking at the split according to the credit quality of firms, we observe that the effect is statistically significant only in high-yield firms, with a coefficient of 0.018 (significant at the 5% confidence level). The economic interpretation of this coefficient can be understood in the following way: A 10-percentage-point higher ratio of bank debt to total debt translates into an increase of 18 basis points in *CAR*s for high-yield firms. This corresponds to an increase of 16% in *CAR*s for a one standard deviation increase in the relative proportion of bank debt.[9]

The above specification rests on the assumption that the firm's proportion of bank debt adequately reflects its debt structure before a downgrade takes place. This may not be the case when multiple downgrades occur in the same fiscal year and the debt structure could change during the year as a result of repeated downgrades. To control for this possibility, we re-estimate our specification on a subsample that includes only the *CAR*s on the first rating change of the firm in the fiscal year and report the findings in Table 6. While the sample size is reduced to about 55% of the original sample, we note that the coefficient estimates are similar to those reported in Table 5: The effect of the debt structure on the stock price response to downgrades for high-yield firms remains significant (at the 10% confidence level) with a coefficient of 0.018. Taken together, the

[9]The standard deviation of the bank debt to total debt ratio for high-yield firms is equal to 0.296 and the average effect of rating downgrades on stock prices for these firms is −3.4%.

results presented in Tables 4 to 6 suggest that, for risky companies, the negative impact of a corporate rating downgrade on shareholder value is mitigated in firms that rely relatively more on bank financing.

4. Credit Rating Downgrades and Firm Policies

We now turn to investigate to what extent a higher recourse to bank debt can shield firm policies from the negative effects of rating downgrades and, therefore, explain the positive value assigned by shareholders to this source of financing.

The related literature on the consequences of re-ratings on firm behaviour has documented: i) a reduction in leverage (Kisgen, 2009; Agha and Faff, 2014); ii) a reduction in investments (Agha and Faff, 2014); iii) asset sales (Bongaerts and Schlingemann, 2016) in the aftermath of a downgrade. Borrowing from these studies, we analyze whether the debt structure can play a role in mitigating these negative consequences for the firm.

We start by presenting in Table 7 univariate statistics of changes in market leverage, investments, and asset sales for our sample firms in the year after a downgrade has occurred. We measure market leverage (MDR) as short-term debt plus long-term debt, divided by total debt plus the market value of equity, investments as capital expenditures over the year after the downgrade divided by total assets at the beginning of the year, and asset sales as the logarithmic growth of total assets over the year after the downgrade (i.e. a positive value denotes asset growth, while a negative value indicates asset sales). As before, we report separate statistics for investment-grade and high-yield firms. We label a firm as high-yield if at least one rating agency among S&P, Moody's, and Fitch rates the company at speculative or lower before the downgrade. Conversely,

to be labeled as investment-grade, all credit rating agencies must give the firm a rating of lower medium or above. This restrictive approach is in line with the literature (e.g., Ellul, Jotikasthira, and Lundblad, 2011). Again, we distinguish between firms with low and high bank debt by using an indicator variable that equals 0 if the ratio of bank debt to total debt of the firm at the year-end before the downgrade is below the median value of the ratio for the corresponding rating class (of the six rating classes in Table 1) in the year, and 1 otherwise.

In line with previous literature, we document a contraction in market leverage following a downgrade for both investment-grade and high-yield firms. As expected, the contraction is stronger for the latter than for the former group of firms. While bank financing does not seem to matter for investment-grade companies, within high-yield firms the reduction in leverage post-downgrade is significantly stronger for companies that rely less on bank debt. Similar findings can be observed for firm investments: In the year after a downgrade, capital expenditures are larger in investment-grade firms than in high-yield firms. Within the high-yield segment, however, firms that have a relatively larger proportion of bank debt have higher capital expenditures. As far as asset sales are concerned, we observe a significant difference between safer firms, whose assets grow post-downgrade, and riskier firms that engage instead in asset sales. However, the debt structure does not seem to play a role in asset growth for either investment-grade or high-yield companies.

Our univariate results suggest two channels (capital structure and firm investments) through which bank financing can add value to the firm and to shareholders following a negative credit shock. In what follows, we take these preliminary findings to a multivariate setting.

4.1. Rating Downgrades and Firm Leverage

Our empirical model for leverage builds upon the work of Flannery and Rangan (2006) and Kisgen (2009). We model the dynamics of market leverage according to the partial adjustment approach proposed by Flannery and Rangan (2006). In their framework, a firm's target market debt ratio (MDR^*) can be determined as a linear combination of various capital structure determinants X, as follows:

$$MDR^*_{i,t+1} = \beta X_{i,t} \tag{2}$$

where the variables X include: i) profitability; ii) depreciation; iii) tangibility; iv) research and development expenses; v) market-to-book ratio; vi) firm size; and vi) the yearly median market leverage for the industry the company belongs to (based on the 2-digit SIC code). All variables are computed as defined in Appendix A. To account for the possibility that a firm may be unable to fully adjust its leverage to the target leverage due to adjustment costs, Flannery and Rangan (2006) propose a partial adjustment model, which Kisgen (2009) extends as follows to examine the incremental effects of rating changes on market leverage:

$$MDR_{i,t+1} - MDR_{i,t} = \lambda\beta X_{i,t} - \lambda MDR_{i,t} + \Phi_1 Downgrade_{i,t} + \Phi_2 Upgrade_{i,t} + \epsilon_{i,t+1} \tag{3}$$

where MDR is the actual level of market leverage, λ is the speed of adjustment to the target leverage and $Downgrade$ and $Upgrade$ are, respectively, dummy variables equal to 1 if the firm was downgraded or upgraded in the previous year t. Kisgen (2009) documents asymmetric changes in leverage following rating actions—market leverage is reduced after a downgrade but does not

change significantly after an upgrade—interpreting this as consistent with the intuition that firms also target minimum rating levels to secure future access to funding at an affordable cost.

We further refine the specification in (3) by examining whether the adjustment in market leverage, conditional on the firm being downgraded in the previous period, is affected by its relative mix of bank and non-bank financing:

$$(MDR_{i,t+1} - MDR_{i,t})|Downgrade_{i,t} = \gamma_{t+1} + \lambda\beta X_{i,t} - \lambda MDR_{i,t} + \eta B_{i,t-1} + \kappa N_{i,t} + \epsilon_{i,t+1} \quad (4)$$

In addition to the determinants X suggested by Flannery and Rangan (2006), we include in B our variable of interest, bank debt over total debt, as well as the ratio of short-term debt to total debt, both computed at fiscal year-end before the downgrade (i.e., in $t-1$). We directly add the extra factors linked to the debt structure to the adjustment equation, consistently with the approach adopted by Flannery and Rangan (2006) and Kisgen (2009) when testing extended versions of the baseline specification. Consistent with our hypothesis that a higher recourse to bank debt can shield firm policies from the negative effects of rating downgrades, we expect a positive coefficient for bank debt over total debt for high-yield firms. We add year fixed effects γ_{t+1} to control for general market conditions. To avoid double counting, we combine all downgrades that refer to the same firm within the fiscal year into one observation. We then include N, the net magnitude of the rating changes that affect the firm in the year of the downgrade (in notches), computed across all rating agencies, to control for the intensity of the rating change. Given the heterogeneity of debt structure across rating classes, we re-estimate model (4) separately on investment-grade and high-yield firms.

The estimates are shown in Table 8.[10] In the first three columns, we estimate the equation without debt structure variables, while in columns 4 to 6, we include the ratio of bank debt to total debt and control for debt maturity and the intensity of the downgrade. In line with the literature, we find that the starting level of market leverage is the main explanatory factor of its change: The higher the current level of MDR, the larger the reduction in leverage is following a downgrade. A larger reduction in MDR also characterizes firms with R&D expenses and high-yield firms with large depreciation. A large size and, for riskier firms, a high market-to-book ratio are, instead, associated with a smaller reduction in market leverage post downgrade.

Our key variable, bank debt to total debt, is positive and statistically significant on the entire sample, with a coefficient of 0.029. The effect, however, is only statistically significant for firms that were rated high-yield before the downgrade, while it is not statistically significant for investment-grade firms. The statistical effect translates into a sizeable economic effect for high-yield firms. For these firms, a one standard deviation increase in the relative proportion of bank debt implies a 17% lower reduction in MDR following a downgrade. Taken together, the results from Tables 7 and 8 provide evidence that high-yield firms that rely relatively more on bank debt can reduce their market leverage less than high-yield firms that rely on other debt sources following a credit rating downgrade.

[10] It is worth noting that the sample is not a panel, since it only includes firms that experienced a downgrade during the sample period and only for the year following the downgrade. We therefore do not add firm fixed effects to our specification.

4.2. Rating Downgrades and Firm Investments

The above findings on firm leverage seem consistent with the univariate statistics reported in Table 7 which document that high-yield firms that rely relatively more on bank debt engage in higher investments following a downgrade than high-yield firms with a lower proportion of bank financing. To validate our results in a multivariate setting, we look at firms that experienced a downgrade in the previous year t and investigate whether capital expenditures in the year after the downgrade ($Capex_{t+1}$) are affected by the firm's relative mix of bank and non-bank financing:

$$Capex_{i,t+1}|Downgrade_{i,t} = \gamma_{t+1} + \beta X_{i,t} + \eta B_{i,t-1} + \kappa N_{i,t} + \epsilon_{i,t+1} \tag{5}$$

As before, B includes our variable of interest, i.e. the ratio of bank debt over total debt, as well as the ratio of short-term debt to total debt, both computed at fiscal year-end before the downgrade (in $t-1$), and N represents the net magnitude of the rating changes that affect the firm in the year of the downgrade (in notches). If bank debt has a mitigating effect on firm investments in the aftermath of a rating downgrade, we expect a positive coefficient for the ratio of bank debt over total debt. Year fixed effects γ_{t+1} control for general market conditions. The vector X includes a set of control variables that are expected and known (Chernenko and Sunderam, 2012) to have an impact on firm investments, namely: i) market-to-book ratio; ii) cash flows; iii) tangibility; iv) sales growth; v) firm size; vi) market leverage; vii) cash ratio. Cash flows and sales growth are computed over the year following the downgrade, consistently with the $Capex$ measure, whereas the other variables are taken at fiscal year-end of the downgrade. All variables are computed as defined in Appendix A. Again, we estimate model (5) on all firms as well as separately on

investment-grade and high-yield firms.

The estimates are reported in Table 9. In line with existing literature, we find that capital expenditures are positively related to the market-to-book ratio, cash flows, sales growth, asset tangibility and cash, and negatively related to firm leverage. With respect to the impact of the debt structure on firm investments in the aftermath of a downgrade, our findings confirm the univariate results. Within the high-yield segment, firms with a larger proportion of bank debt over total debt display higher capital expenditures in the year following a downgrade than firms that rely relatively more on other sources of debt. The coefficient for bank debt over total debt is equal to 0.012, significant at the 5% confidence level. In economic terms, this implies that a one standard deviation increase in the relative proportion of bank debt translates into an 8% higher *Capex* for high-yield firms following the downgrade. These findings are consistent with the availability of a larger debt capacity for risky firms that resort more to bank debt, as documented in Section 4.1, and the two findings, taken together, are in line with the evidence provided in Section 3 on the smaller loss in shareholder value for those firms in the aftermath of a downgrade.

5. The Shielding Effects of Bank Debt

In this section we explore which mechanism inherent in bank debt is most likely to explain its shielding effects on shareholder value and firm policies in high-yield firms following a downgrade. We also provide an interpretation of the benefits associated with bank financing in terms of financial flexibility.

5.1. The Stability of Bank Debt

We start by investigating why bank financing can mitigate the negative effects of a downgrade. The most obvious channel that comes to mind is the greater stability of bank debt compared to other sources of financing in the aftermath of a credit shock. Given the superior ability of banks over public debtholders to effectively monitor the borrower (Diamond, 1984) and to access private information and provide internal credit assessment (Ramakrishnan and Thakor, 1984), banks are more likely to stand by their clients. In the words of S&P: "Bank credit generally is a company's most reliable source for debt capital. When a company loses access to the commercial paper and public debt markets, banks are often the lenders of last resort" (Standard & Poor's, 2008, p. 51).

Building upon this argument, we investigate to what extent the reliability of bank debt can explain our results by analyzing how the components of capital structure evolve around firm downgrades, in line with the method adopted by Rauh and Sufi (2010). We consider the year before the downgrade, the year of the downgrade and the year after. For these years we look at: i) net debt issuance, defined as the amount of long-term debt issued in the year minus long-term debt reduction in the year plus change in current debt, all divided by total assets at the beginning of the year; ii) net equity issuance, defined as the sale of common and preferred stock in the year minus the purchase of common and preferred stock, divided by total assets at the beginning of the year; iii) the ratio of bank debt to total debt; iv) the ratio of bonds to total debt. In Table 10 we present estimates from regressions of these capital structure components on year and firm fixed effects as well as indicator variables for time relative to the downgrade, conditional on whether the firm was rated investment-grade or high-yield before the downgrade. We set the year before the downgrade as base year. Thus, the time indicator variables *Year of downgrade* and *Year after*

downgrade represent the average within-firm change in each outcome variable in the year of the downgrade and the year after, relative to the year before the downgrade.

We find that both groups of firms reduce their net debt issuance and increase their equity issuance after a downgrade. For high-yield firms, the proportion of bank debt over total debt increases in the year after the downgrade. This provides evidence that banks do not pull out their funding from risky corporate borrowers, which helps shield those firms from the negative consequences associated to a downgrade.

Interestingly, the proportion of bank debt over total debt increases also for investment-grade firms following a downgrade, suggesting that a similar channel may be at work for safer firms. This, however, is not associated with significant benefits from the viewpoint of shareholder value and firm policies as discussed in Sections 3 and 4. We argue that the reason why the channel remains latent is linked to the limited recourse to bank debt financing in investment-grade firms, as shown in Table 3. Essentially, the proportion of bank debt may simply be too small in absolute terms for it to matter for shareholders and to make a significant impact on firm policies in case of a downgrade.

5.2. Bank Debt as a Source of Financial Flexibility

The above results suggest that bank debt can be interpreted as a source of financial flexibility for high-yield firms. Financial flexibility, which refers to the ability of a firm to respond in a prompt manner to unexpected changes in cash flows or investment opportunities, is seen by managers as the most important determinant of corporate capital structure (Graham and Harvey, 2001). Traditionally, financial flexibility has been measured as a function of a firm's cash holdings or cap-

ital structure (Denis, 2011). Hence, it is natural to ask how our results compare and contribute to more standard measures of financial flexibility.

To this aim, we draw a comparison with the findings of Agha and Faff (2014), who investigate the benefits of financial flexibility on firm policies around credit rating changes. In their setting, financial flexibility is measured as the deviation of the firm's annual leverage ratio from its long-run target. The long-run target is computed as a function of median industry leverage, market-to-book ratio, tangibility, profitability, and size. Financially flexible (inflexible) firms are defined as those having a market leverage ratio at least 3% below (above) their target leverage, with the remainder being labeled as financially neutral. By applying their method to our sample, we find a significant overlap between the financial flexibility measure and our firm classification into investment-grade and high-yield. Specifically, we observe that about 70% of high-yield firms are classified as financially inflexible and about 60% of investment-grade firms as financially flexible. Since we control for the investment-grade and high-yield status of firms in all our specifications, the intensity of the recourse to bank debt adds an additional layer of financial flexibility to the existing measures, which is particularly valuable to high-yield firms. In this respect, a higher recourse to bank debt represents a source of financial flexibility for firms that would be considered financially inflexible in the traditional sense.[11]

[11] We note that our measure of financial flexibility from bank debt is not embedded in the Agha and Faff (2014) measure, as firms with a low (high) proportion of bank debt to total debt represent about 50% of financially inflexible (flexible) firms.

6. Propensity Score Matching

Throughout our analysis we attempt to address potential endogeneity concerns in a variety of ways. First, we look at the lagged debt structure of firms, i.e. before the downgrade takes place, to avoid confounding effects on firm leverage, investments, and shareholder value post-downgrade. Second, we perform the analysis separately for investment-grade and high-yield firms, given that credit quality is the most prominent determinant of the recourse to bank debt versus other sources of financing. Third, were possible, we refine our control for credit quality by including the credit rating or the rating class.

However, one may argue that our measures are not sufficient to adequately control for selection bias. Firms are not randomly assigned a high or low proportion of bank debt: To the extent that firm characteristics that explain the recourse to bank debt are also significant determinants of our outcome variables, our previous findings may be biased. To address this issue, we use the propensity score matching approach first proposed by Rosenbaum and Rubin (1983).

We start by classifying firms that experience a downgrade into high bank debt and low bank debt using our usual indicator variable that equals 0 if the ratio of bank debt to total debt at the year-end before the downgrade is below the median value of the ratio for the corresponding rating class that year, and 1 otherwise. The firm rating class is determined as illustrated in Table 1. Within each of the six rating classes we match firms with high bank debt (treated) to firms with low bank debt (control) based on their propensity scores. The propensity score represents the probability that a firm has high bank debt given a set of standard determinants of bank financing, which include firm size, market leverage, profitability, tangibility, market-to-book ratio, and R&D

expenses, all taken at year-end before the downgrade, consistently with the bank debt ratio. We use a standard nearest neighbor matching with replacement, where each downgraded firm with high bank debt is matched with the closest (in terms of its propensity score) firm with low bank debt. Given that the intensity of bank financing is strictly related to the credit quality of the firm, we choose to match within the individual rating classes instead of over the entire sample in order to ensure a sufficient overlap in the propensity scores and, hence, a superior matching.

To assess the validity of our matching exercise, we report in Table 11, Panel A, average values of firm characteristics for treated and control firms and t-tests for difference in means. For the sake of conciseness, we only report statistics for high-yield firms, given that our main results concern this segment. We observe that firm characteristics in the treated and control groups are aligned, which confirms the quality of the matching.

Finally, we re-run our main specifications for shareholder value, change in leverage and capital expenditures on the sample made of treated and control firms, and report the estimates in Table 11, Panel B. We only report our main coefficient of interest, i.e. for being in the high bank debt group, but include all control variables. Our estimates on the matched sample confirm that firms with relatively high bank debt are partly shielded from the negative effects of a rating downgrade on shareholder value, firm leverage, and investments.

7. Conclusion

We document that, in high-yield firms, bank financing has a mitigating effect on shareholder value and firm policies in the aftermath of a rating downgrade. Specifically, looking at a sample of non-financial U.S. rated firms over the years 2001 to 2013, we find that high-yield firms that

rely relatively more on bank debt experience: i) less negative abnormal stock returns; ii) a milder reduction in leverage; iii) higher capital expenditures following a downgrade compared to high-yield firms that primarily tap other debt sources. By contrast, we do not observe any significant shielding effect of bank financing for investment-grade firms.

The dynamics of capital and debt structure around downgrades reveals that the relative stability of bank debt is the most likely channel behind our findings. In high-yield firms, the proportion of bank debt over total debt increases in the year after the downgrade. This suggests that banks do not pull out their funding from risky corporate borrowers, which helps shield those firms from the negative consequences associated to a downgrade.

Even though the changing nature of commercial banking over the past two decades may have led to a substantial reduction in the benefits of bank debt, we provide evidence that this form of financing still proves valuable to risky firms and their shareholders. In our context, the "specialness" of bank debt stems from the financial flexibility associated with it. In particular, we argue that the intensity of the recourse to bank debt adds an additional layer of financial flexibility to the existing measures, which are normally associated with the firm's general level of indebtedness. In this respect, a higher recourse to bank debt represents a source of financial flexibility for firms that would be considered financially inflexible in the traditional sense.

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Table 1: Mapping of alphanumerical credit ratings into numerical codes

This table reports the mapping of the alphanumerical credit ratings from Moody's, S&P, and Fitch into numerical codes and rating classes.

Main classification	Rating	Moody's	S&P	Fitch	Code	Rating class
Investment-grade	Prime	Aaa	AAA	AAA	1	1
	High	Aa1	AA+	AA+	2	
		Aa2	AA	AA	3	
		Aa3	AA-	AA-	4	
	Upper medium	A1	A+	A+	5	2
		A2	A	A	6	
		A3	A-	A-	7	
	Lower medium	Baa1	BBB+	BBB+	8	3
		Baa2	BBB	BBB	9	
		Baa3	BBB-	BBB-	10	
High-yield	Speculative	Ba1	BB+	BB+	11	4
		Ba2	BB	BB	12	
		Ba3	BB-	BB-	13	
	Highly speculative	B1	B+	B+	14	5
		B2	B	B	15	
		B3	B-	B-	16	
	Substantial risks	Caa1	CCC+	CCC+	17	6
		Caa2	CCC	CCC	18	
		Caa3	CCC-	CCC-	19	
	Extremely speculative	Ca	CC	CC	20	
	Default imminent	C	C	C	21	
In default	In default		D	DDD/DD/D	22	-

Table 2: Credit rating distribution over time

This table displays the yearly rating distribution of our sample firms, classified according to the six rating classes defined in Table 1. The sample includes rated non-financial U.S. issuers with valid data available from CRSP, Compustat, and Capital IQ.

Rating class	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	33	29	26	22	23	24	23	23	22	22	18	17	19
2	139	140	137	136	131	118	116	106	104	102	107	108	117
3	247	269	258	261	253	244	239	239	250	261	264	268	268
4	229	283	291	288	285	279	272	254	225	234	259	257	258
5	160	171	168	181	175	198	209	197	209	225	208	220	220
6	26	28	17	13	13	14	10	14	27	9	10	9	9
Total	834	920	897	901	880	877	869	833	837	853	866	879	891

Table 3: Bank debt to total debt: Summary statistics

This table reports summary statistics for the proportion of bank debt to total debt in our sample firms, classified according to the six rating classes defined in Table 1. The sample includes rated non-financial U.S. issuers with valid data available from CRSP, Compustat, and Capital IQ.

Rating class	Mean	Std. dev.	10th	25th	50th	75th	90th	# Obs
1	0.053	0.150	0.000	0.000	0.000	0.037	0.124	301
2	0.053	0.113	0.000	0.000	0.002	0.054	0.175	1,561
3	0.136	0.222	0.000	0.000	0.030	0.177	0.421	3,321
4	0.319	0.323	0.000	0.005	0.231	0.530	0.887	3,414
5	0.309	0.326	0.000	0.000	0.197	0.540	0.888	2,541
6	0.255	0.270	0.000	0.039	0.162	0.396	0.612	199

Table 4: Stock price response to rating downgrades: Univariate

This table reports the univariate results for issuers' *CAR*s surrounding downgrades based on whether the issuer was rated investment-grade (IG) or high-yield (HY) prior to the rating downgrades. The *CAR*s are market-adjusted stock returns aggregated over the three-day event window (-1, 1), where day 0 is the date of a rating change. The rating changes include downgrades of non-financial U.S. issuers by S&P, Moody's, and Fitch. Firms are split into low and high bank debt, depending on whether the firm's ratio of bank debt to total debt at the year-end before the rating change is below or above, respectively, the median value of the ratio for the corresponding rating class in the year. Rating classes are as defined in Table 1. The t-Test column reports the results for a two-sample t-test for the difference in means. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Mean	Std. err.	# Obs	t-Test
IG: Downgrades	-0.011***	0.002	1,653	7.50***
HY: Downgrades	-0.034***	0.003	2,564	
IG low bank debt/total debt: Downgrades	-0.012***	0.003	875	-0.61
IG high bank debt/total debt: Downgrades	-0.010***	0.003	778	
HY low bank debt/total debt: Downgrades	-0.038***	0.003	1,360	-1.79*
HY high bank debt/total debt: Downgrades	-0.029***	0.004	1,204	

Table 5: Stock price response to rating downgrades: Multivariate

This table reports regression results for issuers' *CAR*s surrounding rating downgrades. The *CAR*s are market-adjusted stock returns aggregated over the three-day event window (-1, 1), where day 0 is the date of a downgrade. The downgrades by S&P, Moody's, and Fitch refer to non-financial U.S. issuers. All explanatory variables are described in Appendix A. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	All Firms	IG	HY	All Firms	IG	HY
Previous rating	-0.003***	-0.004***	-0.006***	-0.004***	-0.004***	-0.006***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
# notch changes	-0.009***	0.004	-0.017***	-0.008**	0.004	-0.014***
	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)
From IG to HY	-0.000	-0.007		-0.001	-0.008	
	(0.005)	(0.006)		(0.005)	(0.006)	
Preceded by neg. watch	0.008**	0.003	0.009*	0.008**	0.002	0.010*
	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)
Days	-0.006***	-0.006**	-0.006*	-0.006***	-0.006**	-0.006*
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Size$_{t-1}$	0.003*	-0.004**	0.006***	0.003*	-0.004*	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Profitability$_{t-1}$	0.038	0.072*	0.031	0.025	0.075*	0.023
	(0.034)	(0.043)	(0.042)	(0.034)	(0.043)	(0.042)
Tangibility$_{t-1}$	-0.002	0.002	-0.005	0.003	0.003	0.003
	(0.010)	(0.012)	(0.015)	(0.010)	(0.012)	(0.014)
Capex$_{t-1}$	-0.007	0.005	-0.027	-0.022	-0.006	-0.050
	(0.049)	(0.062)	(0.058)	(0.047)	(0.064)	(0.057)
R&D$_{t-1}$	-0.032	-0.074	-0.002	-0.016	-0.078	0.032
	(0.071)	(0.077)	(0.109)	(0.071)	(0.077)	(0.110)
Interest coverage$_{t-1}$	0.000	-0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
M/B$_{t-1}$	-0.000	0.002	0.001	0.001	0.002	0.002
	(0.004)	(0.004)	(0.008)	(0.004)	(0.004)	(0.008)
Depreciation$_{t-1}$	0.050	-0.141	0.149	0.021	-0.115	0.103
	(0.084)	(0.104)	(0.105)	(0.083)	(0.103)	(0.105)
(Bank debt/total debt)$_{t-1}$				0.021***	0.021	0.018**
				(0.007)	(0.014)	(0.009)
(Short-term debt/total debt)$_{t-1}$				-0.025**	0.010	-0.041**
				(0.011)	(0.009)	(0.017)
Constant	-0.047**	-0.008	-0.015	-0.044**	-0.014	-0.022
	(0.020)	(0.022)	(0.034)	(0.020)	(0.022)	(0.034)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,150	1,630	2,520	4,129	1,628	2,501
Adj. R-squared	0.043	0.067	0.037	0.044	0.069	0.037

Table 6: Stock price response to the first rating downgrades of the year: Multivariate

This table reports the regression results for issuers' *CAR*s surrounding the first rating downgrade in a year, in the case of multiple downgrades for the same firm. The *CAR*s are market-adjusted stock returns aggregated over the three-day event window (-1, 1), where day 0 is the date of a downgrade. The downgrades by S&P, Moody's, and Fitch refer to non-financial U.S. issuers. All explanatory variables are described in Appendix A. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	All Firms	IG	HY	All Firms	IG	HY
Previous rating	-0.002**	-0.003**	-0.005**	-0.003***	-0.003**	-0.005**
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
# notch changes	-0.003	0.006	-0.010	-0.002	0.006	-0.008
	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)	(0.007)
From IG to HY	0.010*	0.008		0.009	0.008	
	(0.006)	(0.007)		(0.006)	(0.007)	
Preceded by neg. watch	0.005	0.005	0.004	0.004	0.005	0.003
	(0.004)	(0.003)	(0.006)	(0.004)	(0.003)	(0.006)
Days	-0.018	-0.022	-0.013	-0.008	-0.022	0.004
	(0.020)	(0.018)	(0.026)	(0.019)	(0.018)	(0.025)
Size$_{t-1}$	0.005***	-0.000	0.008***	0.005***	0.000	0.009***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
Profitability$_{t-1}$	0.063	0.113**	0.031	0.046	0.113**	0.017
	(0.043)	(0.051)	(0.055)	(0.042)	(0.052)	(0.056)
Tangibility$_{t-1}$	-0.004	0.003	-0.008	-0.000	0.002	-0.001
	(0.012)	(0.013)	(0.018)	(0.012)	(0.013)	(0.018)
Capex$_{t-1}$	0.001	0.037	-0.025	-0.024	0.033	-0.065
	(0.055)	(0.074)	(0.070)	(0.055)	(0.076)	(0.070)
R&D$_{t-1}$	-0.137	-0.058	-0.191	-0.125	-0.059	-0.169
	(0.090)	(0.086)	(0.141)	(0.090)	(0.085)	(0.141)
Interest coverage$_{t-1}$	-0.000	-0.000	0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
M/B$_{t-1}$	-0.000	0.002	-0.003	0.001	0.002	-0.002
	(0.004)	(0.005)	(0.009)	(0.004)	(0.005)	(0.009)
Depreciation$_{t-1}$	0.040	-0.056	0.115	0.014	-0.052	0.078
	(0.102)	(0.119)	(0.132)	(0.102)	(0.120)	(0.132)
(Bank debt/total debt)$_{t-1}$				0.020**	0.010	0.018*
				(0.008)	(0.012)	(0.010)
(Short-term debt/total debt)$_{t-1}$				-0.036**	-0.003	-0.060**
				(0.015)	(0.009)	(0.028)
Constant	-0.120	-0.106	-0.066	-0.070	-0.104	-0.002
	(0.085)	(0.078)	(0.114)	(0.082)	(0.078)	(0.111)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,288	976	1,312	2,277	975	1,302
Adj. R-squared	0.036	0.030	0.027	0.042	0.029	0.033

Table 7: Firm policies response to rating downgrades: Univariate

This table reports the univariate results for change in *MDR*, *Capital expenditures*, and *Asset sales* following a downgrade in the previous year based on whether the issuer was rated investment-grade (IG) or high-yield (HY) prior to the downgrade. All variables are described in Appendix A. The downgrades by S&P, Moody's, and Fitch refer to non-financial U.S. issuers. The firms are categorized as having low and high bank debt, depending on whether the firm's ratio of bank debt to total debt at the year-end before the rating change is below or above the median value of the ratio for the corresponding rating class in the year. Rating classes are as defined in Table 1. The t-Test column reports the results for a two-sample t-test for the difference in means. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Mean	Std. err.	# Obs	t-Test
Panel A: ΔMDR				
IG: Downgrades	-0.014***	0.004	769	5.53***
HY: Downgrades	-0.048***	0.005	969	
IG low bank debt/total debt: Downgrades	-0.012**	0.006	386	0.41
IG high bank debt/total debt: Downgrades	-0.015***	0.005	383	
HY low bank debt/total debt: Downgrades	-0.057***	0.007	493	-1.72*
HY high bank debt/total debt: Downgrades	-0.040***	0.007	476	
Panel B: Capital expenditures				
IG: Downgrades	0.051***	0.002	768	2.07**
HY: Downgrades	0.046***	0.002	968	
IG low bank debt/total debt: Downgrades	0.051***	0.002	386	-0.55
IG high bank debt/total debt: Downgrades	0.052***	0.002	382	
HY low bank debt/total debt: Downgrades	0.042***	0.002	492	-2.14**
HY high bank debt/total debt: Downgrades	0.050***	0.003	476	
Panel C: Asset sales				
IG: Downgrades	0.033***	0.006	769	5.71***
HY: Downgrades	-0.013**	0.006	969	
IG low bank debt/total debt: Downgrades	0.039***	0.009	386	1.18
IG high bank debt/total debt: Downgrades	0.026***	0.007	383	
HY low bank debt/total debt: Downgrades	-0.014*	0.008	493	-0.04
HY high bank debt/total debt: Downgrades	-0.013	0.008	476	

Table 8: Market leverage following rating downgrades: Multivariate

This table reports the regression results for changes in market leverage (ΔMDR), defined as the book value of debt divided by the book value of debt plus the market capitalization of equity for all non-financial U.S. firms downgraded in the previous year, as well as for downgraded firms conditional on whether they were rated investment-grade (IG) or high-yield (HY) before the downgrade. All explanatory variables are described in Appendix A. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	All firms	IG	HY	All firms	IG	HY
MDR_t	-0.101***	-0.164***	-0.070***	-0.102***	-0.164***	-0.078***
	(0.017)	(0.029)	(0.024)	(0.018)	(0.032)	(0.025)
$Depreciation_t$	-0.384***	-0.276	-0.468***	-0.411***	-0.240	-0.487***
	(0.118)	(0.187)	(0.156)	(0.119)	(0.192)	(0.158)
$Profitability_t$	0.064	-0.045	0.153**	0.051	-0.077	0.150*
	(0.060)	(0.090)	(0.072)	(0.062)	(0.086)	(0.078)
$Tangibility_t$	-0.002	-0.015	0.018	-0.002	-0.014	0.017
	(0.015)	(0.020)	(0.022)	(0.015)	(0.020)	(0.022)
$Size_t$	0.006***	0.006**	0.009***	0.008***	0.006*	0.010***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
M/B_t	0.011	-0.003	0.038**	0.011	-0.003	0.037**
	(0.009)	(0.008)	(0.017)	(0.009)	(0.008)	(0.017)
$R\&D_t$	-0.204*	-0.232*	-0.125	-0.198*	-0.246*	-0.101
	(0.113)	(0.134)	(0.156)	(0.114)	(0.135)	(0.159)
R&D $dummy_t$	0.016**	0.017*	0.017*	0.016**	0.018*	0.018*
	(0.007)	(0.009)	(0.010)	(0.007)	(0.009)	(0.010)
Median industry $debt_t$	0.058*	0.029	0.085**	0.054*	0.022	0.081*
	(0.030)	(0.045)	(0.042)	(0.030)	(0.045)	(0.042)
$(\text{Bank debt/Total debt})_{t-1}$				0.029**	-0.010	0.028**
				(0.012)	(0.020)	(0.014)
$(\text{Short-term debt/Total debt})_{t-1}$				-0.025*	0.019	-0.054**
				(0.014)	(0.017)	(0.024)
$(\text{Size rating change})_t$				-0.000	-0.003	0.004
				(0.002)	(0.003)	(0.003)
Constant	-0.083***	0.005	-0.081*	-0.074***	0.011	-0.089**
	(0.026)	(0.036)	(0.042)	(0.027)	(0.036)	(0.042)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,729	765	964	1,725	764	961
Adj. R-squared	0.298	0.265	0.320	0.298	0.260	0.323

Table 9: Capital expenditures following rating downgrades: Multivariate

This table reports the regression results for capital expenditures, defined as the capital expenditures over the year divided by beginning of the year total assets, for all non-financial U.S. firms downgraded in the previous year, as well as for downgraded firms conditional on whether they were rated investment-grade (IG) or high-yield (HY) before the downgrade. All explanatory variables are described in Appendix A. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	All firms	IG	HY	All firms	IG	HY
M/B_t	0.005	-0.012***	0.018**	0.005	-0.013***	0.017*
	(0.005)	(0.005)	(0.009)	(0.005)	(0.005)	(0.009)
Cash flow$_{t+1}$	0.094***	0.233***	0.062*	0.091***	0.238***	0.056
	(0.028)	(0.038)	(0.034)	(0.028)	(0.038)	(0.034)
Tangibility$_t$	0.134***	0.109***	0.147***	0.134***	0.110***	0.147***
	(0.007)	(0.009)	(0.010)	(0.007)	(0.009)	(0.011)
Sales growth$_{t+1}$	0.025***	0.007	0.027***	0.023***	0.006	0.025**
	(0.008)	(0.008)	(0.010)	(0.008)	(0.008)	(0.010)
Size$_t$	-0.002***	-0.001	-0.001	-0.001*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MDR$_t$	-0.028***	-0.038***	-0.025***	-0.028***	-0.039***	-0.025***
	(0.006)	(0.010)	(0.008)	(0.006)	(0.010)	(0.008)
Cash$_t$	0.042***	0.001	0.046**	0.049***	0.002	0.059***
	(0.013)	(0.016)	(0.018)	(0.014)	(0.016)	(0.020)
(Bank debt/Total debt)$_{t-1}$				0.012**	0.006	0.012**
				(0.005)	(0.009)	(0.006)
(Short-term debt/Total debt)$_{t-1}$				-0.007	0.008	-0.014**
				(0.004)	(0.006)	(0.006)
(Size rating change)$_t$				-0.001	0.000	-0.001
				(0.001)	(0.001)	(0.001)
Constant	-0.002	0.018	-0.028*	-0.007	0.016	-0.029**
	(0.008)	(0.011)	(0.014)	(0.009)	(0.010)	(0.015)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,736	768	968	1,732	767	965
Adj. R-squared	0.410	0.452	0.418	0.413	0.452	0.422

Table 10: Debt composition following rating downgrades

This table presents estimates from regressions of net debt issuance, net equity issuance, the ratio of bank debt to total debt, and the ratio of bonds to total debt on indicator variables for time relative to the downgrade for all non-financial U.S. firms conditional on whether they were rated investment-grade (IG) or high-yield (HY) before the downgrade. The omitted time indicator is the year prior to the downgrade. All variables are described in Appendix A. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Net debt issuance		Net equity issuance		Bank debt/Total debt		Bonds/Total debt	
	IG	HY	IG	HY	IG	HY	IG	HY
Year before downgrade				Omitted base year				
Year of downgrade	0.023***	0.009	0.004**	0.004**	0.007	0.003	0.001	0.002
	(0.005)	(0.006)	(0.002)	(0.002)	(0.006)	(0.008)	(0.009)	(0.009)
Year after downgrade	-0.009*	-0.024***	0.008***	0.006***	0.029***	0.018**	-0.030***	-0.014
	(0.005)	(0.005)	(0.002)	(0.002)	(0.007)	(0.009)	(0.009)	(0.009)
Constant	-0.004	0.033***	-0.009***	-0.002	-0.009	0.022	0.811***	0.422
	(0.019)	(0.005)	(0.003)	(0.002)	(0.010)	(0.017)	(0.032)	(0.321)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,361	3,348	2,361	3,348	2,494	3,797	2,494	3,797
Adj. R-squared	0.120	0.183	0.473	0.263	0.557	0.623	0.523	0.611

Table 11: Propensity score matching

This table reports summary statistics and regression results for a propensity score matching procedure for all non-financial U.S. firms downgraded in the previous year conditional on being rated high-yield before the downgrade. Firms are classified as high bank debt (treated) or low bank debt (control) using an indicator variable that equals 0 if the ratio of bank debt to total debt at the year-end before the downgrade is below the median value of the ratio for the corresponding rating class (as determined by Table 1) that year, and 1 otherwise. Within each of the six rating classes firms with high bank debt are matched to firms with low bank debt based on their propensity score using a standard nearest neighbor matching with replacement. Panel A presents average values of firm characteristics for treated and control firms. The t-Test column reports the results for a two-sample t-test for the difference in means between the two groups. Panel B presents coefficients of being in the high bank debt group from regressions on the sample of treated and control firms. The outcome variables CAR, ΔMDR, and $Capex$, and the control variables are the same as in Tables 6, 8, and 9, respectively. Robust standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A	Low bank debt			High bank debt			t-Test
	Mean	Std. dev.	# Obs	Mean	Std. dev.	# Obs	
MDR	0.547	0.213	469	0.570	0.236	476	-1.52
Depreciation	0.049	0.032	469	0.051	0.035	476	-0.89
Profitability	0.029	0.071	469	0.034	0.067	476	-1.26
Tangibility	0.341	0.229	469	0.357	0.250	476	-1.05
Size	6.287	1.451	469	6.368	1.485	476	-0.85
M/B	1.182	0.352	469	1.167	0.347	476	0.65
R&D	0.009	0.026	469	0.007	0.020	476	1.14
Sales growth	0.025	0.234	469	0.035	0.215	476	-0.69

Panel B	CAR	ΔMDR	Capex
High bank debt	0.022***	0.014**	0.007***
	(0.005)	(0.006)	(0.002)
Control variables	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adj. R-squared	0.035	0.333	0.446

Appendix A: Description of Variables

# notch changes	The unit increase in the numerical rating code following the downgrade.
Asset sales	The natural logarithm of end-of-year total assets divided by beginning-of-year total assets.
Bank debt/Total debt	Bank debt (credit lines, amount drawn, plus term loans) divided by total debt.
Bonds/Total debt	The amount of bonds outstanding divided by total debt.
Cash	Sum of cash and short-term investments, divided by beginning-of-year total assets.
Cash flow	Income before extraordinary items plus depreciation divided by beginning-of-year total assets.
Capex	Capital expenditures divided by beginning-of-year total assets.
Days	The natural logarithm of the reciprocal of the number of days between the date of the last rating downgrade performed by another rating agency and the event date. In line with Holthausen and Leftwich (1986), the number of days is set equal to 60 if both agencies change on the same date, if the previous change by the other agency was in the opposite direction, or if the previous change by the other agency was more than 60 days earlier.
Depreciation	Depreciation divided by beginning-of-year total assets.
From IG to HY	A dummy variable that equals 1 if, following the downgrade, the issuer has lost investment-grade status.
Interest coverage	Operating income after depreciation plus interest expenses, divided by interest expenses.
MDR	Market leverage defined as the book value of debt divided by the book value of debt plus the market capitalization of equity.
Median industry debt	The median market leverage calculated yearly based on 2-digit SIC codes.
M/B	Market-to-book ratio measured as the book value of assets minus the book value of equity plus the market value of equity, all divided by the book value of assets.
Net equity issuance	The sale of common and preferred stock in the year minus the purchase of common and preferred stock, divided by total assets at the beginning of the year.
Net debt issuance	The amount of long-term debt issued in the year minus long-term debt reduction plus change in current debt, all divided by total assets at the beginning of the year.
R&D	R&D expenses divided by total assets, set to 0 if data are missing.
R&D dummy	A dummy variable equal to 1 for missing R&D expenses.
Preceded by neg. watch	A dummy variable that equals 1 if the issuer was put under a negative watch before the downgrade.
Previous rating	The numerical rating code prior to the downgrade.
Profitability	Earnings before interests and taxes divided by beginning-of-year total assets.
Sales growth	The natural logarithm of end-of-year total sales divided by beginning-of-year total sales.
Short-term debt/Total debt	The proportion of short-term debt (due within one year) divided by total debt.
Size	The natural logarithm of market capitalization.
Size rating change	The net magnitude of the rating change (in notches) across all rating agencies.
Tangibility	Property, plant, and equipment, divided by total assets.