Have Rating Agencies Become More Conservative?

Implications for Capital Structure and Debt Pricing

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February 2012

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Abstract

We document that rating agencies have become more conservative in assigning credit ratings to corporations over the period 1985 to 2009. Holding firm characteristics constant, average ratings have dropped by 3 notches (e.g., from A+ to BBB+) over time. Consistent with the view that this increase has not been fully warranted, we find that defaults for both investment grade and non-investment grade firms have declined over time. This increased stringency has also affected capital structure and debt spreads. Firms that suffer most from this conservatism issue less debt and have lower leverage. However, their debt spreads are lower compared to the spreads of firms that have not suffered from this conservatism, which implies that the market partly undoes the impact of conservatism on debt prices. This evidence suggests that firms and capital markets do not perceive the increase in conservatism to be fully warranted.

In the wake of the financial crisis, rating agencies have come under increasing scrutiny. They have been accused of peddling to the companies and institutions that issue the securities they rate, because the issuers pay their fees in most instances. According to some observers, this conflict of interest has led the agencies to relax their standards, leading to ratings that were too generous relative to the default risk of the securities.[1] Given that many financial institutions made capital allocation decisions based on these ratings, and ultimately failed, the rating agencies have, in fact, been accused of lying at the basis of the crisis (see, for example, Partnoy, 2009).

In this paper, we shed light on the standards employed by rating agencies. We study corporate debt ratings, not the ratings of mortgage backed securities or collateralized debt obligations. For corporate debt ratings, we do not find any evidence that rating agencies have reduced their standards. On the contrary, we find that rating agencies have become more conservative over time. This phenomenon was first documented by Blume, Lim, and MacKinlay (1998) over the period 1978-1995. We show that this trend has continued until at least 2009. This increased conservatism is not only important statistically, but is also large economically. For example, a firm with a AAA rating in 1985 would only qualify for a AA- rating by 2009, holding all the determinants of the ratings constant, while a firm with a BBB rating in 1985 would have lost its investment grade rating 20 years later.

We conduct a variety of tests to show that these results are robust. First, our results are not due to the entry of new firms; holding the sample of companies constant in 1985, we still find that standards have increased, and, as a consequence, ratings have worsened. In addition, our findings are

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[1] A paper articulating this theme is Mason and Rosner (2007), who argue that conflicts of interest may have led to lax rating standards for structured finance products in the years leading up to the recent financial crisis. In fact, Griffin and Tang (2012) report that one of the top rating agencies frequently made positive adjustments to ratings beyond its main quantitative model. In related work, Becker and Milbourn (2011) argue that increased competition led rating agencies to adopt more issuer-friendly ratings over time. Empirical support for the alternative view that reputational concerns of bond rating agencies motivate them to issue "accurate" ratings is provided in Covitz and Harrison (2003).

robust to the inclusion or exclusion of various potential explanatory variables. Finally, our results hold, even after estimating the ratings model with firm fixed effects. Thus, holding a firm and its characteristics constant, its credit rating worsens over time. Therefore, if our findings are caused by firm-specific omitted variables, they have to be time-varying to explain the observed trend in ratings.

In the second part of the paper, we study the implications of this increased conservatism. It is entirely possible that the increased stringency applied by rating agencies is warranted given changes in the macroeconomic environment and their effects on default risk. If this were the case, we would not observe a change in default rates over time for firms with the same credit rating. On the other hand, if the increased conservatism is unwarranted and does not represent increased default risk, we would see a decline in defaults by rating category. This is what we observe. Studying default rates across Moody's ratings categories, we find a significant decline in defaults over our sample period for both investment grade and non-investment grade issuers.

We also investigate two additional implications of increased ratings conservatism. First, we study whether firms take it into account in their capital structure decisions. If the change in ratings standards over time is deemed unwarranted by companies, then those companies that suffered the most from increased conservatism should issue less debt and have lower leverage over time. To examine this implication, we employ the ratings model estimated over the period 1985-1996 to predict ratings over the period 1997-2009, and compute the difference between the firm's actual and predicted rating as our measure of conservatism. We find that this difference explains capital structure decisions: if actual ratings are below predicted ratings by one notch (where a notch is a one-step change in the rating, say from BBB to BBB-), firms' debt issuances decrease by 8 percentage points relative to the sample average. Such firms then end up with lower leverage. This, to our knowledge, previously undocumented impact of increased ratings stringency on firms' capital structure choices adds to our understanding of why a considerable number of firms appear to have insufficient leverage, given the large tax benefits of debt (see, for example, Graham, 2000).

Second, we study whether firms' debt spreads reflect this conservatism. We estimate regression models of debt yield spreads for the firms in our sample over the period 1997-2009. Not surprisingly, debt yields increase as actual bond ratings worsen. Interestingly, however, the difference between actual and predicted issuer ratings also matters for bond yields: firms whose ratings were affected most by the increased ratings conservatism have lower spreads, holding the actual rating constant. Of course, if capital markets completely undid the ratings conservatism effect, firms would have little need to take it into account in their financing decisions. We find that this is not the case; capital markets only *partially* internalize the increased ratings stringency by demanding significantly lower compensation for debt issued by firms that were most affected by the increased conservatism.

Overall, our evidence is consistent with the view that the increased conservatism of rating agencies is not fully warranted, and affects default rates, capital structure decisions, and debt pricing. These findings are in sharp contrast to the work on the ratings of asset-backed securities which suggests that the ratings have become more inflated over time (see, for example, Pagano and Volpin, 2010). Both the work on ratings inflation and our work on conservatism suggest that there may be problems in the way credit ratings are assigned that require further investigation. This theme is also discussed by Bolton, Freixas, and Shapiro (2012), who show theoretically how various conflicts of interest between issuers, rating agencies and investors can lead to distortions in the assignment of ratings.

Our paper contributes to the growing literature on the role of rating agencies. Jorion, Shi, and Zhang (2008), and, in contemporaneous work, Alp (2010) also show that rating standards have tightened over time. However, they do not explore the consequences of this result for default rates, capital structure and debt spreads. Becker and Milbourn (2011) find that S&P and Moody's relaxed their ratings standards as Fitch gained market share over the period 1995-2006. While this finding may appear at odds with our results, this is not the case because Becker and Milbourn include year dummies in all specifications, thereby eliminating the effect of conservatism from their findings. Thus, their findings are complementary to ours. Finally, Kisgen (2006) shows that firms pay close attention to credit ratings in their capital structure decisions; those firms close to a downgrade or upgrade issue less debt than firms not near a change in ratings. He takes the rating as given, however, and does not explore the impact of changes in ratings standards over time.

The remainder of this paper is organized as follows. In the next section we describe the data employed in this study. In Section II, we discuss the variables employed in our ratings models, estimate our basic models and document that the ratings have become more conservative over time. Sections III, IV, and V study the impact of this increased conservatism on default rates, firms' capital structure decisions, and debt spreads respectively. In Section VI, we show that our findings are robust when we decompose our measure of conservatism. Section VII concludes.

I. Data

From the Compustat Ratings File, we gather monthly data on debt ratings issued by Standard & Poor's over the period 1985-2009 for all rated firms. We employ the domestic long-term issuer credit rating, which is the rating typically employed in prior work (see, for example, Sufi, 2007, and the references therein). We remove financials (SIC 6000-6999), utilities (SIC 4900-4999), and governmental and quasi-governmental enterprises (SIC 9000 and above) from the sample. Because we do not employ data on ratings by Moody's and Fitch, the other two large rating agencies, there may be generalizability concerns. However, there is a high correlation between ratings of various agencies, and the incidence of so-called split ratings, where the agencies issue different ratings, is relatively modest (see, for example, Jewell and Livingston, 1998, and Bongaerts, Cremers, and Goetzmann, 2012), which alleviates these concerns.

S&P's ratings fall into 21 categories: AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, B-, CCC+, CCC, CCC-, CC, and C. The lower the rating, the higher the expected default risk. Firms rated BBB- and above are often called investment grade firms, while firms rated below BBB- are called non-investment grade or junk-rated firms.

We match the ratings data with annual financial statement data from Compustat. To make sure that these data are available to the rating agencies at the time the rating is issued, we match the rating with financial statement data lagged by 3 months (our findings are unaffected if we apply different lags or match with contemporaneous accounting data). We keep one observation per firm-year, namely the one that corresponds to the first rating available 3 months after the fiscal year-end. Table I contains the distribution of ratings in our sample on an annual basis. For ease of presentation, we combine all the "+" and "–" ratings with the middle rating; for example, the AA category contains firms rated AA+, AA, and AA-. Note that there has been a substantial decline in the fraction of firms with AAA, AA, or A ratings, while the fraction of firms with BBB, and BB ratings has increased. This trend appears to suggest that the credit quality of U.S. corporate debt issuers has worsened over time. As we propose in this paper, a complementary explanation for this trend is that the rating agencies have become more conservative.

To estimate regression models, we translate the alphanumeric ratings into a numerical scale by adding one for each rating notch. Thus, a AAA rating becomes 1, AA+ becomes 2, AA becomes 3, etc., up to a score of 21 for a rating of C. While a higher score implies a worse rating, it is not clear that the gaps between different rating categories should be considered equal in magnitude. To take this into account, we estimate ordered logit models in addition to OLS regressions.

For our analysis of the relation between ratings and credit spreads, we obtain monthly data on debt yield spreads for various maturities for the firms in our sample whose bonds are included in the

Merrill Lynch Corporate Master Index or the Merrill Lynch Corporate High Yield Index over the period 1997-June 2009. These indices contain the majority of rated U.S. public corporate bond issues.

II. Ratings Results

A. Variables employed in the ratings model

The first step in our analysis is to estimate a ratings model. In selecting the explanatory variables, we rely on the prior literature as well as industry practice (see the description of the variables employed in the ratings process followed by Standard and Poor's, 2008). In our base case model, we employ the following explanatory variables: (1) Long-term and short-term debt divided by total assets (*Book_Lev*), (2) Convertible debt divided by total assets (*ConvDe/Assets*), (3) Rental payments divided by total assets (*Rent/Assets*), (4) Cash and marketable securities divided by total assets (*Cash/Assets*), (5) Long-term and short-term debt divided by EBITDA (*Debt/EBITDA*), (6) EBITDA to interest payments (*IntCov*), (7) profitability, measured as EBITDA divided by sales (*Profit*) (8) the volatility of profitability (*Vol*), (9) the log of the book value of assets, in constant 2005 dollars (*Size*), (10), tangibility, measured as net property, plant & equipment divided by total assets *(PPE/Assets)*, (11) capital expenditures divided by total assets *(CAPEX/Assets)*, (12) the firm's beta (*Beta*), which is the stock's Dimson beta computed using a market-model regression with daily returns estimated annually using the CRSP value weighted index, (13) the firm's idiosyncratic risk, computed annually as the root mean squared error from a regression of daily stock returns on the CRSP value weighted index returns. As in Blume et al. (1998), we standardize beta and idiosyncratic risk each year by dividing them by their sample averages.[2]

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[2] Our results are very similar if we do not standardize beta and idiosyncratic risk, except that we observe a modest decline in conservatism at the end of our sample period. This is due to the increase in share price volatility around the financial crisis. All other findings reported in the paper continue to hold using these alternative measures of beta and volatility.

When the ratio of long-term and short-term debt to EBITDA is negative, we set it equal to zero, but include a dummy variable set equal to one if this ratio is negative, and zero otherwise (*Neg. Debt/EBITDA)*. We follow this approach because large ratios of debt to EBITDA increase default risk while small ratios decrease default risk. When EBITDA is negative, the ratio becomes negative, while default risk actually increases further. It is therefore important to take this discontinuity at zero into account. Some firms with zero interest payments do have a debt rating and are included in our analysis. For these firms we set the ratio of EBITDA to interest payments equal to the 99th percentile of the distribution. Finally, the volatility of profitability is computed using the current year's data as well as the four previous years' data. It is set equal to missing if we have less than two observations available.

All explanatory variables are winsorized at the 99th percentile; profitability, interest coverage, the volatility of profitability, beta, and idiosyncratic risk are also winsorized at the 1st percentile (the minimum of the other explanatory variables is zero). Beta and idiosyncratic risk are winsorized prior to standardizing to mitigate the impact of outliers. Table II contains the annual means of the ratings variable and our explanatory variables over the sample period for firms with available ratings data. We do not include beta or idiosyncratic risk as they are both standardized to average 1 for each year in our sample. Average ratings worsen over the sample period, increasing from 8.66 (close to BBB) in 1985 to 11.31 (close to BB+) in 2009. In terms of the explanatory variables, we find an increase in interest coverage and cash holdings over time (see also Bates, Kahle, and Stulz, 2009), and a decline in asset tangibility, capital expenditures, and convertible debt.

B. Estimation of ratings models

Panel A of Table III contains the base case regression model specifications estimated over the entire 1985-2009 sample period. In addition to the explanatory variables described above, we include in some specifications industry dummies defined at the three digit SIC code level. These are the historical

SIC codes as reported in Compustat. When historical SIC codes are not available, we backfill the data with the first available SIC code. The standard errors in all models are clustered at the firm level and are robust to heteroscedasticity and autocorrelation.

We first estimate models using only the explanatory variables obtained from Compustat to maximize the number of observations available for estimation. Model (1) is estimated using OLS, while model (2) is estimated using ordered logit. The benefit of ordered logit is that it does not assume that each rating notch represents the same increase in a firm's rating. Higher numbers are considered to be worse ratings, but the exact magnitude of the ratings number is irrelevant. We also report OLS models, however, because some of our subsequent models employ firm fixed effects to control for unobservable firm specific heterogeneity, and estimating ordered response models with firm fixed effects would result in biased and inconsistent point estimates (due to the incidental parameter problem). In addition, it is more straightforward to study economic significance based on OLS models.

All the explanatory variables are statistically significant and have the expected sign, with the exception of the cash ratio. Firms have worse credit ratings when they have more debt of various kinds, pay higher rents, have lower interest cover, are less profitable, have more volatile profits, are smaller, hold more cash, have fewer tangible assets, lower capital expenditures, and when their ratio of debt to EBITDA is negative. These findings are broadly consistent with the prior literature. While the impact of cash holdings on debt ratings appears counter-intuitive, it is consistent with the theoretical and empirical work in Acharya, Davydenko, and Strebulaev (2011), who argue that firms with higher default risk in the long-run are more likely to save cash.[3]

From our perspective, the key variables are the year dummies. We have removed the indicator for the year 1985 from the analysis, so the year dummies measure the increase in the ratings variable

[3] In addition, the impact of cash becomes insignificant when we control for beta and idiosyncratic risk as well as in models estimated with firm fixed effects (discussed subsequently).

(the decline in ratings quality) with respect to that year. All the year dummies are positive, statistically significant and increase over time, implying a worsening of credit ratings over our sample period.

In models (3) and (4), we add beta and idiosyncratic risk as explanatory variables. As not all Compustat firms are covered by CRSP, we lose approximately 5,000 firm-years in this estimation. Both sources of risk have a positive and significant coefficient, implying that higher levels of risk lead to worse credit ratings. However, their impact on the magnitude of the year dummies is minor: the year dummies remain statistically significant and economically large. Based on model (3), there is an immediate decline in credit ratings in 1986 when ratings worsen by 0.35 notches compared to 1985. The effect generally increases over time to approximately 1 notch by 1995, 2 notches by 2001, 3 by 2006, and 3.12 by 2009, the final year in our sample period. Thus, holding a firm's characteristics constant, a AAA firm in 1985 would be rated AA- by 2009; a BBB rated firm in 1985 would have lost its investment grade rating by 2009. For the ordered logit regression in model (4), we illustrate the economic significance by computing the probability that a firm whose characteristics are at the sample means obtains various ratings in 1985 and in 2009. These numbers are reported in Panel B of Table III. There is a dramatic shift in the distribution of predicted ratings. For example, the probability that an average firm received an A rating declines from 9.6% in 1985 to only 0.6% in 2009. On the other hand, the same firm only had an 18.4% chance of being non-investment grade in 1985 (computed by summing all non-investment grade probabilities); by 2009, the likelihood of being non-investment grade increases to 81.4% for the average firm.[4]

While the explanatory variables employed in models (1) through (4) are quite comprehensive, rating agencies stress the fact that ratings are also based on qualitative criteria, which we are unable to

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[4] These probabilities are computed by setting all the explanatory variables, including the industry dummies, equal to their sample means over the entire sample period. As such, they refer to the average firm over the sample period. Such characteristics were obviously unknown in 1985. Using the characteristics of the average firm in 1985 yields similar insights.

observe. One way of assessing whether omitted firm-specific variables are driving our findings is to include firm fixed effects in our models. Such a specification assumes that any unobserved firm specific factors are constant over the sample period. We report two specifications (models (5) and (6) in Panel A of Table III), both estimated using OLS with firm fixed effects. Model (5) excludes beta and idiosyncratic risk as explanatory variables while both measures of risk are included in model (6). In general, the explanatory variables have the same sign as in the models estimated with industry fixed effects, although the magnitude and statistical significance of some of the coefficients is reduced. Interestingly, the magnitude of the coefficients on the year dummies is very similar in the fixed effects models compared to the models with industry dummies. We continue to find that the debt ratings have become more conservative over time for the average firm. In 2009, ratings are more than three notches worse than in 1985, holding everything else constant. Also note that the explanatory power of the models estimated with firm fixed effects is considerably higher than in specifications with industry dummies.

Figure 1 plots the coefficients on the year dummies from our OLS model specifications (1), (3), (5) and (6); the upward trend in the coefficients on the annual intercepts, implying more stringent rating standards over the sample period, is strikingly evident.

In recent papers Jorion et al. (2008) and Alp (2010) also show that ratings standards have tightened over time. However, Jorion et al. (2008) find that this phenomenon is only present for investment grade firms, while Alp (2010) finds that the tightening of standards for non-investment grade firms occurs after 2001. When we estimate separate models for non-investment grade firms *without* firm fixed effects, we find results similar to Alp. However, for models estimated *with* firm fixed effects, ratings become significantly stricter for non-investment grade firms starting in 1986, the same year as for investment-grade firms. Hence, increased ratings conservatism applies to firms throughout the ratings spectrum.[5]

C. Robustness of the ratings model

We have estimated a variety of additional specifications of the basic ratings model without materially affecting the economic and statistical significance of any of the findings that show a time trend in the ratings. In this section, we briefly describe some of the alternative specifications. For sake of brevity, these findings are not reported in a table.

First, we employ only the variables used by Blume et al. (1998): (1) the operating margin, computed as operating income to sales, (2) long term debt to assets, (3) total debt to assets, (4) the log of the inflation-adjusted market value of the firm, (5) the firm's beta, (6) the standard error from the market model, and (7) the firm's interest coverage ratio, computed as EBIT divided by interest expenses.[6] The year dummies based on this model are very similar to those reported in Table III.

Second, we include a dummy for the first observation of each firm in the time series to identify newly rated firms. We find that although newly rated firms' ratings are, on average, 0.3 notches (based on model specification (3)) worse than those of other firms, the inclusion of this variable has little effect on the year dummies.

Third, we study whether the effect persists if we focus only on those firms present in the sample in 1985, or whether our findings are due to the entry of new firms. Our results persist if we eliminate new entrants, and also if we study only those firms that enter the sample after 1985.

[5] All the other findings reported later in the paper continue to hold when we split the sample into investment grade and non-investment grade rated firms.

[6] As in Blume et al. (1998), we allow the effect of the coverage ratio on the ratings to depend on the magnitude of the coverage ratio, and split the ratio into four pieces: (a) coverage between 0 and 5, (b) coverage between 5 and 10, (c) coverage between 10 and 20, and (d) coverage between 20 and 100; coverage ratios exceeding 100 are set to 100.

Fourth, Gu and Zhao (2006) show that debt ratings are significantly better for firms with more earnings management. As in Gu and Zhao (2006), we follow Jones (1991) in constructing a time-varying, firm-level discretionary accrual component which serves as a proxy for earnings management. Although we find that more discretionary accruals are correlated with better ratings in some of our specifications, the increased ratings conservatism persists.

Fifth, we include the square and cube terms of all explanatory variables to allow for non-linearities. The improvement in explanatory power of the ratings model relative to the base case is very minor. For example, the adjusted r-squared of the model with all explanatory variables and firm fixed effects (model (6) of Panel A of Table III) increases by only 0.01 when squares and cubes are added. More importantly, the magnitudes of the year dummies remain virtually unchanged.

Sixth, we include market leverage (total interest bearing debt divided by the sum of the market value of equity and total interest bearing debt) and the market value of the firm's equity instead of book leverage and the book value of the firm, again with very similar results. Similarly, our results are robust to the inclusion of the average spread across all of the firm's bonds as an additional explanatory variable in the ratings model.[7]

Seventh, we include several macro-economic variables in our regression specifications: (a) the rate of inflation, (b) gdp growth, (c) the slope of the term structure, computed as the yield on the constant maturity 10 year Treasury bond minus the yield on the constant maturity 3 month T bills, (d) the TED spread, computed as the 3 month LIBOR minus the 3 month T-bill rate, (e) the aggregate price earnings ratio, and (f) the market volatility index (VIX). Due to the multicollinearity resulting from the high correlation between the year dummies and the macro variables, several of the coefficients on the year dummies are no longer identified. As such, it becomes impractical to interpret the coefficients on

[7] The sample period for this test is 1997-2009, the period for which we have data on credit spreads.

the remaining year dummies. To address this problem, we include a linear time trend instead of year dummies. The coefficients on the macroeconomic variables are not statistically significant while the coefficient on the time trend is positive and significant, ranging from 0.137 to 0.166, indicating a decline in ratings of approximately 0.15 notches per year. This annual decline yields magnitudes very similar to the year dummies discussed in Table III.

In sum, our finding that the debt ratings have become more conservative over time appears to be very robust to the inclusion of additional explanatory variables in our ratings model or to the exclusion of variables not employed in earlier work.

Before proceeding to the implications of increased ratings conservatism for default rates, a final note on the ratings model: one could argue that rating agencies are relying more on soft information over time, which is not captured by our explanatory variables. While we cannot fully dismiss this possibility, the fact that the explanatory power of the model does not decline over time when estimated annually (untabulated results) alleviates this concern.[8] Moreover, the soft information would need to be mainly of a negative nature to explain the documented increase in conservatism.

III. Implications for default rates

As we pointed out previously, our findings of increased conservatism are consistent with two non-mutually exclusive interpretations. One possibility is that rating agencies have simply adjusted their criteria over time to correspond to changes in the macroeconomic environment; it is entirely possible that holding financial characteristics constant, default risk has increased over time, for example, because of increased product market competition or deregulation in certain industries. The alternative is that

[8] While the explanatory power of the model remains virtually constant over time at around 80%, we find a decreased emphasis on the level of debt relative to assets and an increased emphasis on negative profitability.

the more stringent ratings criteria are not reflected in increased default probabilities, which implies that firms obtain ratings that are worse than the ones they merit based on historical standards.

One way of distinguishing between these two interpretations is to examine default rates by rating category over time. If firms obtain worse ratings than implied by their default risk, we expect to see default rates decline over time. We report on such an analysis in this section.

To investigate defaults, we have obtained data on corporate default rates by ratings category from Moody's (2010).[9] Moody's computes cumulative issuer-weighted default rates over various periods for annual cohorts. For example, for all bonds rated A at the start of 2000, Moody's reports defaults over the following 1 year, 2 years, etc. We employ 5-year defaults as a base case – this allows for sufficient time for the bonds to mature, but also allows us to follow bonds issued up to 2005. Figure 2 shows default rates for the following rating classes over our sample period: Aaa, Aa, A, Baa, Ba B, and Caa through C. Panel A shows investment grade defaults and Panel B shows non-investment grade defaults. If the ratings conservatism were unwarranted, we would expect to observe a downward trend in the data. While a lot of the variation in defaults over time is due to the business cycle, there appears to be a decline in default rates for the weaker investment grade categories and for the stronger non-investment grade categories. We do not see a decline in defaults for the worst credits (Caa through C), but that is not surprising. These firms already had low ratings to begin with and cannot suffer from further downgrades due to increased conservatism.

[9] While the main analyses in the paper rely on ratings from Standard and Poor's, both agencies have similar ratings as discussed previously. However, Moody's employs slightly different categorizations; instead of "+" and "-" signs to further refine ratings within a category, Moody's employs a 1, 2, and 3. In addition, the second letter in the Moody's ratings categories is always an "a". For example, BBB+ in S&P corresponds to Baa1 for Moody's, BBB corresponds to Baa2 and BBB- to Baa3.

To determine whether the observed decline in default rates is statistically significant, we estimate a time series regression of 5-year default rates over our sample period (1985-2005)[10] against a linear trend variable. Because default rates for subsequent cohorts are overlapping, we report Newey-West standard errors for 4 lags. We do not estimate regressions for Aaa firms because the 5-year default rate for these bonds is zero over our sample period. Table IV contains the results for the other ratings categories. The results confirm the conclusions from Figure 2. The linear trend specification shows declines in default rates for all but the worst rating categories, and the effect is significant for firms rated Aa, Ba, and B, and marginally significant for firms rated Baa. Economically, the effects are also substantial. For example, the coefficient of -0.8 on the time trend for Ba firms indicates that 5-year defaults have declined by 0.8 percentage points per year over the period 1985-2005. Not surprisingly, the effects are smaller for the higher rating categories.[11]

Overall, these findings are consistent with the view that the increased conservatism in debt ratings documented in Table III is not warranted. In what follows we study the impact of ratings conservatism on capital structure and debt spreads.

IV. Implications for capital structure decisions

If ratings are indeed not a fair representation of the true default risk of a firm, this could have implications for firms' capital structure decisions. Given that ratings are an important determinant of the cost of debt, we would expect firms that are disadvantaged by this ratings conservatism to use less debt than predicted by models that ignore this factor. This is what we investigate in this section of the paper.

[10] The analysis ends in 2005 so that we can observe defaults for that year and the subsequent four years.
[11] We have also repeated our analysis for 4-year and 3-year default rates and our findings are similar.

To measure ratings conservatism, we estimate the ratings model over the period 1985-1996 and use the estimated coefficients to predict ratings for firms over the period 1997-2009.[12] Conservatism is defined as the difference between the firm's actual rating and this predicted rating. Thus, for each firm *i* and for each year *t*, starting in 1997, we compute:

$$Rat\_Diff_{i,t} = Actual\ Firm\ Rating_{i,t} - Predicted\ Firm\ Rating_{i,t,85\text{-}96}. \quad (1)$$

We employ two models to estimate the predicted rating, one based on industry fixed effects (model (3) of Panel A of Table III without the year dummies) and one based on firm fixed effects (model (6) of Panel A of Table III without the year dummies), resulting in two measures of conservatism: *Rat_Diff_Ind*, and *Rat_Diff_Firm*.

To determine whether firms take ratings conservatism into account in their capital structure decisions, we estimate two sets of regression models. In the first set we study firms' debt issuance decisions. We estimate models of new debt issues to assets as a function of a number of variables that have been employed in the prior literature (see, for example, Titman and Wessels, 1988; and Berger, Ofek, and Yermack, 1997), as well as the firm's actual rating and our measure of ratings conservatism. In the second set, we estimate models of leverage as a function of ratings conservatism and control variables. We lag our measure of conservatism to attenuate endogeneity concerns (conservatism may be a function of the firm's leverage ratio and therefore is not exogenous).

Summary statistics on the variables employed in this part of the analysis are presented in Table V (we do not report data on book leverage because this information was included in Table II). The sample period for the capital structure regressions is 1997-2009. The dependent variables are gross and net debt issues divided by total assets, book leverage (*Book_Lev*), the ratio of long-term debt to assets (*Ltde / Assets*) and market leverage (*Mkt_Lev*). Book leverage is computed as total interest bearing debt

[12] Predicted ratings smaller than 1 (AAA) are set equal to 1 and predicted ratings larger than 21 (C) are set equal to 21.

divided by total assets, and market leverage is computed as total interest bearing debt divided by the sum of total interest bearing debt and market equity. From 1997 to 2009, gross debt issues average 14.9% of assets, while net debt issues (net of debt retired) average 2.6%. Book and market leverage average 39.7% and 34.7% respectively, and long-term debt to assets averages 35.5%. There are no apparent patterns in these variables over time.

The key explanatory variables are *Rat_Diff_Ind*, and *Rat_Diff_Firm*, the measures of conservatism. As illustrated in Table V, their means are both positive and increasing over time. The average difference between the actual and predicted rating is 0.937 when the ratings model is estimated with firm fixed effects and 1.695 when it is estimated with industry fixed effects. By 2009, these differences increase to 1.825 and 2.429 respectively. Moreover, 70% to 80% of the observations are positive over the 1997-2009 period (not reported in the table).

The control variables are: (1) the asset market-to-book ratio, as a proxy for growth opportunities, (2) net PPE divided by total assets, as a proxy for asset tangibility, (3) EBITDA to sales, as a proxy for profitability, (4) investment tax credits to assets, to proxy for non-debt tax shields, (5) net operating loss carryforwards to assets, to proxy for tax-paying status, (6) R&D to sales, to proxy for asset uniqueness, growth opportunities, and asymmetric information, and (7) firm size, measured as the log of the book value of assets in constant 2005 dollars.[13] Summary statistics on the control variables are reported in Table V (unless previously reported in Table II).[14]

In addition, we include the level of the ratings variable itself as a control variable, which allows us to compare capital structure decisions of firms with the same rating, but different degrees of ratings

[13] Titman and Wessels (1988) and Berger et al. (1997) also include Selling, General, and Administrative expenses, divided by assets, as an additional measure of asset uniqueness. Our results continue to hold when we include this measure as a control variable; we did not include it in our base-case specification because it is missing for a substantial fraction of the firms in our sample.

[14] Note that investment tax credits are important for a few firms only so that their average is close to zero.

conservatism. In the models where we study changes in debt, we also control for the level of debt, and we lag all explanatory variables one year,[15] except for the difference between the actual and predicted rating, which is lagged two years to address endogeneity. In the models where we study levels, all explanatory variables are measured contemporaneously, except for the difference between the actual and the predicted rating, which is lagged by one year to attenuate endogeneity concerns.

Tables VI and VII contain the findings. In Table VI, we study debt issuance decisions. In Columns (1) and (2), we present results based on ratings predicted using models with industry fixed effects (*Rat_Diff_Ind*), while in Columns (3) and (4), we present results based on ratings predicted using models with firm fixed effects (*Rat_Diff_Firm*). We have fewer observations in Columns (3) and (4) because we cannot estimate a firm fixed effect in the ratings model for firms that were not in the sample during the 1985-1996 estimation period.

Our findings suggest that ratings conservatism affects capital structure decisions. Firms generally issue less debt when their ratings are worse than predicted (Table VI). This effect is strongest for net debt issues (columns (1) and (3)), but the result also obtains in one of the specifications employing gross debt issues (column (4)). The effect is also large economically. For instance, based on the coefficient estimate from column (1), increasing the ratings disadvantage by one notch reduces net debt issues by 0.2% of total assets. Since average net debt issues over the sample period are 2.6% of assets, this implies a decline in issuance of close to 8 percentage points.

In terms of the control variables, we find that firms issue more debt when they have higher market-to-book ratios, more tangible assets, fewer non-debt tax shields, lower R&D expenses, and when they are more profitable and smaller. These findings are broadly consistent with the prior literature.

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[15] We lag the explanatory variables because we expect changes during year t to be mainly a function of characteristics observed at the end of year t-1, and not the characteristics at the end of year t. However, our findings continue to hold if we do not lag the variables.

In Table VII, we show that the ratings disadvantage also influences the level of debt: the larger the (lagged) difference between the actual and predicted rating, the lower the level of debt is. For every notch of difference between the actual and predicted rating, firms reduce their leverage as a fraction of the book value of assets by between 0.5 and 6 percentage points, depending on the leverage measure employed. This effect is large compared to the average ratio of long-term total debt to assets of 39.4%.[16]

Overall, the findings in this section indicate that the increased ratings stringency has had a substantial impact on firms' capital structure decisions. They may also add to our understanding of why a considerable number of firms seem to be under-levered despite the tax benefits of debt (see, for example, Graham, 2000). Of course, our findings cannot explain the zero leverage puzzle (see, for example, Strebulaev and Yang, 2007) nor can they explain why firms had low leverage at the start of our sample period when rating agencies were lenient compared to later years.

V. Implications for debt spreads

In this section we study the impact of the increased ratings stringency on debt spreads. The goal of this analysis is to determine whether capital markets take into account the increase in conservatism over time when determining the cost of debt. To this end, we estimate models of debt spreads as a function of a number of control variables, the firm's debt rating, as well as our measure of ratings conservatism (i.e., the difference between the actual and predicted rating). If capital markets take the

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[16] All the leverage models are estimated with industry fixed effects (Tables VI and VII). The results in Table VII continue to hold when we estimate these models with firm fixed effects. These findings are not presented in a table for the sake of brevity, but they are available from the authors upon request. Estimating the leverage change regressions (Table VI) with firm fixed effects is not economically meaningful because the change already captures the difference between two consecutive years for the same firm.

increased strictness of the ratings into account, we would expect debt spreads to narrow for firms with debt ratings that are *too* strict.

As mentioned previously, we obtain data on debt yields and maturities for all bonds included in the Merrill Lynch Corporate Master Index or the Merrill Lynch Corporate High Yield Index over the period 1997 - June 2009.[17] These indices contain the majority of rated U.S. public corporate bond issues. For the firms in our sample, we have monthly data on 6,680 bonds. We merge this dataset with our measure of conservatism for the month for which we have the S&P issuer rating; the conservatism measure is then held constant for one year until next year's observation is available. For the sake of brevity, we focus on the measure based on the ratings model estimated with firm fixed effects, which also has the highest explanatory power (model (6) of Panel A of Table III estimated without year dummies). The resulting data set yields approximately 200,000 observations, covering 4,864 bonds issued by 701 companies. Table VIII contains summary statistics for this sample.

We subtract the yield on the five-year U.S. government bond from the yield of each bond to calculate the debt spreads.[18] To remove the influence of outliers, we winsorize bond yields at the 99th percentile. We then estimate the following regression model for the entire panel:

$$Spread_{j\rightarrow i,t} = \alpha + \beta_1(Actual\ Bond\ Rating_{j\rightarrow i,t}) + \beta_2(Rat\_Diff\_Firm_{i,t}) + \beta_3(Control\ Variables_{j\rightarrow i,t}) + \varepsilon_{j\rightarrow i,t} \quad (2)$$

where j refers to the bond issue, i to the issuer (company), and t to the month, and *Rat_Diff_Firm*, our measure conservatism, is defined in equation (1). The following control variables are included in consecutive specifications: (1) the natural logarithm of the number of days to maturity, and (2) equity volatility (Equity_Vol), computed as the daily stock price volatility over the previous 12 months (see Campbell and Taksler, 2003) (winsorized at the 1st and 99th percentiles). We include dummies for each

[17] We are grateful to Ilya Strebulaev and Stephen Schaefer for giving us access to these data.
[18] Our results are essentially unchanged if we employ ten-year U.S. Treasury bonds instead.

bond to control for time-invariant bond-specific characteristics such as the size of the issue, its covenants and imbedded options[19]; we also include monthly time dummies to control for any macro-economic factors. All standard errors are clustered at the bond level and adjusted for heteroscedasticity and autocorrelation.

Table IX contains the results. As expected, debt spreads increase as ratings worsen. In model (1), which only includes the bond's actual rating and the difference between the actual and predicted rating, spreads increase by 74 basis points for each decline in ratings by one notch.[20] However, the difference between the actual and predicted issuer rating (our measure of conservatism) also matters. Holding the actual rating constant, firms whose actual rating is one notch worse than predicted have spreads that are 9.5 basis points lower than those firms for which the predicted and actual ratings coincide. Based on this specification, capital markets undo over 12% (9.5/74) of the ratings conservatism. The effect of conservatism nearly doubles in model (2) where we replace the firm dummies with dummies for each bond. In particular, spreads tighten by more than 20 basis points when predicted ratings exceed actual ratings by 1 notch.

In subsequent models we add debt maturity (models (3) and (4)) and equity volatility (models (5) and (6)) as additional control variables. Both controls have a positive influence on debt spreads. However, the effect of conservatism persists, ranging from 11.5 basis points to 19.8 basis points per notch. Based on model (6), which includes bond dummies and all controls, we find that capital markets undo almost one quarter of the increased ratings conservatism.[21] The fact that the impact is not

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[19] In some specifications, we include firm instead of bond dummies.

[20] It is unlikely that the increase in spreads is a linear function of the rating. As an alternative specification, we include dummies for each rating category instead of the rating. Our findings generally persist; that is, the difference between the actual and predicted rating (*Rat_Diff_Firm*) continues to be negatively related to debt spreads in these models, and the magnitude of the coefficients is virtually unaffected.

[21] These results persist when we replace equity volatility by a measure of asset volatility, computed as the product of equity volatility and market leverage.

completely offset justifies our findings in the previous section that firms take the ratings conservatism into account when setting their capital structure.

In sum, the findings reported in this section indicate that ratings conservatism impacts debt spreads. Holding a firm's actual rating constant we find that an increase in conservatism leads to a considerable tightening of its spreads.

VI. A decomposition of the conservatism measure

In the previous two sections, we show that ratings conservatism, captured by the difference between a firm's actual rating during the period 1997-2009 and its predicted rating using a model estimated over the period 1985-1996, affects capital structure and debt spreads.

An alternative explanation for our findings is that they are not caused by increased conservatism; rather, some firms may simply not deem their current rating to be a fair reflection of their underlying risk, and may issue less debt as a result. If capital markets have a similar view, such firms may also have narrower spreads. These phenomena are not necessarily related to changes in conservatism over time, and they might exist even without conservatism.

To make sure that this alternative explanation is not driving our results, we split our measure of ratings conservatism defined in equation (1) into two components: (a) the residual from the ratings model estimated over the 1997-2009 period and (b) the difference between the predicted rating based on the 1997-2009 model and the predicted rating based on the 1985-1996 model. That is:

$$\begin{aligned} Rat\_Diff_{i,t} = {} & (Actual\ Firm\ Rating_{i,t} - Predicted\ Firm\ Rating_{i,t,97\text{-}09}) + \\ & (Predicted\ Firm\ Rating_{i,t,97\text{-}09} - Predicted\ Firm\ Rating_{i,t,85\text{-}96}) \end{aligned} \quad (3)$$

The first part, which we call *Rat_Diff_New*, captures the difference between the actual debt rating and the predicted rating based on the (new) model estimated over the 1997-2009 period. The second part, which we call *Rat_Diff_Predictions*, captures the change in predicted debt ratings due to increased conservatism over time. If increased conservatism is responsible for the capital structure decisions and the debt spread behavior documented previously, then the coefficient on the second component should be significant. On the other hand, if deviations from the current model drive the results, we should observe a significant coefficient on the first component only. [22]

The following simple example helps illustrate our point. Suppose that a firm has a debt rating of BBB- in 2005. Based on the ratings model estimated over the period 1985-1996, its predicted rating is A-. Hence, *Rat_Diff*, our measure of conservatism, is equal to 3 notches. However, suppose that based on the ratings model estimated over the period 1997-2009, the firm's predicted rating is BBB+. In that case, the difference between the two predicted ratings, *Rat_Diff_Predictions*, is 1 notch and the residual from the current model, *Rat_Diff_New*, is 2 notches. In the models estimated in this section, we include both *Rat_Diff_Predictions* and *Rat_Diff_New*.

Table X contains regression models that include both of these variables. As in Table IX, we only show the results for the ratings model estimated with firm fixed effects given that this model has the highest explanatory power. Hence, the explanatory variables of interest are *Rat_Diff_Predictions_Firm* and *Rat_Diff_New_Firm*.

In Panel A of Table X, we report the debt issuance regressions. The dependent variables in columns (1) and (2) are net debt issues and gross debt issues respectively. In terms of net debt issues, both components of the prediction error are negative and significant. This suggests that firms issue less debt not only when their rating is worse than predicted by the current model, but also when the current model appears too conservative relative to the old model. For gross debt issues, the coefficient on the difference between the two predictions is also negative and statistically significant, while the coefficient on the residual from the current model is insignificant. In Panel B of Table X, we perform the same analysis for leverage levels. Both the difference between predictions and the residual from the current model affect leverage.

[22] We are especially grateful to Craig MacKinlay for suggesting these tests.

Interestingly, the coefficients on the difference between predictions in both Panels A and B are generally similar to the coefficients in Tables VI and VII, suggesting that the economic importance of our results is not affected by the use of an alternative measure of conservatism. Overall, the findings of Panels A and B of Table X support the view that increased ratings conservatism has had a negative effect on firms' debt issuance decisions and leverage ratios.

Finally, in Panel C of Table X, we re-estimate our main regression model for debt spreads. Both the difference between the predictions as well as the residual from the current (1997-2009) model are significant. For every notch difference between the two predictions, debt spreads are 17.5 basis points lower. In addition, if the firm's current rating is one notch worse than predicted by the current model, spreads also decline by 13.3 basis points. This compares to an increase in spreads of 55.3 basis points per ratings notch decline. According to this specification, the market undoes 32% (17.5 / 55.3) of the effect of ratings conservatism on debt spreads.

In sum, using an alternative measure of ratings conservatism based on the difference between the predictions of the ratings models estimated over the periods 1985-1996 and 1997-2009, we continue to find that firms that have suffered from a tightening of ratings standards issue less debt, have lower leverage, and lower debt spreads.

VII. Conclusion

Over the period 1985-2009, we find that debt ratings have become more conservative: holding firm characteristics constant, the rating of the average firm declined by three notches. We then explore whether this increased conservatism is warranted. We start by documenting a decline in default rates over time for both investment grade and non-investment grade bonds, which suggests that ratings have become too stringent over time. Next, we find that firms take the increased conservatism into account when determining capital structure. In particular, firms that obtain a rating worse than predicted by our ratings model issue less debt and have lower leverage than other companies. This may partially explain why some firms appear to have less debt than warranted by the tax savings that can be obtained from levering up.

Interestingly, capital markets also take this increased stringency into account: while debt spreads increase as ratings decline, part of the increase is undone when the rating is worse than predicted. Thus, while the phenomenon we document increases firms' interest costs, capital markets partially offset some of this cost. The fact that managers still shy away from issuing debt when their ratings seem too conservative suggests that, in their view, the adjustment to interest costs is insufficient.

Our findings also imply that the conflict of interest argument that has been proposed to explain what appeared to be inflated ratings for mortgage backed securities may not apply to corporate bonds. This does not mean that conflicts of interest are not present, but the argument has to be more involved; it needs to explain alleged leniency in the MBS market and conservatism in the corporate market.

What remains unexplored in our study is *why* rating agencies have become more conservative. It may be the case that pressure on rating agencies increased after some well known defaults at the start of the century (for example, Enron). However, this cannot be the whole explanation because the effect dates back to at least 1986. Alternatively, conservatism may just be the outcome of rating agencies learning about the correct model over time. As such, conservatism is not unwarranted, but rather a correction of previous leniency. However, although this interpretation can explain firms' capital structure decisions, it cannot explain the results on debt spreads and defaults. If the old model is not useful anymore, it should not be able to predict debt spreads, while we find that it does. A final possibility is that, notwithstanding the documented decline in default rates over time, the rating agencies are actually correct in their assignment of the ratings, while firms (through their capital structure decisions) and capital markets (through the pricing of debt securities) are making a mistake. Exploring the exact cause of the conservatism is therefore an important avenue for future research.

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Table I
Number of Companies by Year and S & P Rating Category

This table contains the distribution of ratings for our sample firms over time. The ratings have been obtained from the Compustat Ratings File.

	Rating									
Year	AAA	AA	A	BBB	BB	B	CCC	CC	C	Total
1985	26	98	166	104	100	129	5	1	0	629
1986	30	110	201	150	165	253	42	0	0	951
1987	32	111	194	142	183	284	44	1	0	991
1988	35	88	208	146	167	293	32	0	0	969
1989	36	84	199	149	166	273	33	0	1	941
1990	34	86	194	158	151	206	38	3	1	871
1991	33	87	200	163	158	171	34	10	0	856
1992	32	85	200	193	183	170	27	8	0	898
1993	29	84	204	207	232	195	14	1	0	966
1994	28	83	200	227	254	216	17	0	1	1026
1995	30	75	225	241	269	234	18	0	0	1092
1996	28	86	227	279	296	267	16	3	0	1202
1997	26	84	232	319	334	323	12	2	0	1332
1998	25	82	240	351	379	368	30	7	0	1482
1999	18	69	216	374	385	421	36	9	0	1528
2000	14	51	237	378	374	422	45	7	0	1528
2001	13	47	221	389	375	375	61	12	0	1493
2002	11	41	214	381	390	337	72	16	0	1462
2003	11	38	201	376	407	382	60	6	0	1481
2004	9	37	198	371	431	376	42	4	0	1468
2005	9	34	197	355	416	363	46	2	0	1422
2006	9	34	170	342	391	393	36	2	0	1377
2007	7	32	162	321	363	359	25	4	0	1273
2008	7	31	152	314	324	328	50	12	0	1218
2009	5	32	147	316	303	330	43	4	0	1180
Total	*537*	*1689*	*5005*	*6746*	*7196*	*7468*	*878*	*114*	*3*	*29636*

Table II
Summary Statistics – Rating Regressions

This table presents annual averages of the variables employed in the ratings regressions. *Rating*, the dependent variable, is the numerical equivalent of the rating where AAA is 1, AA- is 2, AA is 3, etc. *IntCov* is computed as EBITDA/Interest Expenses, *Profit* is computed as EBITDA divided by sales, *Book_Lev* is computed as long-term and short-term debt divided by total assets, *Size* is the log of the book value of assets, in constant 2005 dollars, *Debt/EBITDA* is long-term and short-term debt divided by EBITDA, *Neg. Debt/EBITDA* is an indicator variable set equal to one if EBITDA is negative and zero otherwise, *Vol* is the volatility of profitability, computed using the current year's data as well as the four previous years'; at least two years of data are required in its computation, *Cash/Assets* is cash and marketable securities divided by total assets, *ConvDe/Assets* is convertible debt divided by total assets, *Rent/Assets* is rental payments divided by total assets, *PPE/Assets* is net property, plant and equipment divided by total assets, *CAPEX/Assets* is capital expenditures divided by total assets. When the ratio of long-term debt and short-term debt to EBITDA is negative, it is set equal to zero. For firms with zero interest payments we set *IntCov* equal to the 99th percentile of its distribution. All explanatory variables except for Size and Neg. Debt/EBITDA are winsorized at the 99th percentile; profitability, interest coverage, and the volatility of profitability are also winsorized at the 1st percentile.

Year	Rating	IntCov	Profit	Book_Lev	Size	Debt / EBITDA	Neg. Debt / EBITDA	Vol	Cash / Assets	ConvDe / Assets	Rent / Assets	PPE / Assets	CAPEX / Assets
1985	8.658	7.328	0.172	0.326	7.469	3.611	0.034	0.036	0.077	0.043	0.018	0.475	0.087
1986	9.830	6.865	0.151	0.366	7.177	3.825	0.057	0.049	0.088	0.057	0.020	0.422	0.080
1987	10.085	6.594	0.165	0.387	7.224	3.773	0.045	0.046	0.088	0.062	0.020	0.406	0.075
1988	10.029	6.124	0.169	0.400	7.387	4.004	0.031	0.045	0.075	0.053	0.021	0.406	0.077
1989	10.020	5.684	0.165	0.417	7.500	3.827	0.039	0.047	0.069	0.047	0.021	0.413	0.075
1990	9.742	5.735	0.167	0.411	7.629	3.792	0.030	0.040	0.064	0.042	0.021	0.420	0.076
1991	9.586	5.690	0.162	0.399	7.649	3.995	0.030	0.036	0.064	0.041	0.022	0.430	0.070
1992	9.561	6.769	0.160	0.389	7.632	3.893	0.027	0.033	0.064	0.043	0.023	0.435	0.069
1993	9.637	7.607	0.165	0.378	7.621	3.698	0.025	0.037	0.070	0.045	0.022	0.433	0.072
1994	9.844	8.144	0.169	0.381	7.605	3.675	0.031	0.041	0.064	0.040	0.021	0.425	0.075
1995	9.864	7.998	0.177	0.386	7.624	3.429	0.030	0.046	0.066	0.033	0.021	0.414	0.078
1996	10.010	8.183	0.172	0.386	7.626	3.545	0.039	0.047	0.066	0.031	0.020	0.413	0.080

Table II (continued)

Year	Rating	IntCov	Profit	Book_Lev	Size	Debt / EBITDA	Neg. Debt / EBITDA	Vol	Cash / Assets	ConvDe / Assets	Rent / Assets	PPE / Assets	CAPEX / Assets
1997	10.232	8.585	0.178	0.404	7.605	3.646	0.047	0.057	0.072	0.035	0.019	0.404	0.085
1998	10.489	7.666	0.159	0.437	7.636	4.018	0.052	0.060	0.068	0.031	0.020	0.392	0.084
1999	10.837	6.713	0.162	0.451	7.629	4.391	0.062	0.066	0.070	0.032	0.020	0.375	0.072
2000	10.923	7.252	0.164	0.431	7.752	3.826	0.076	0.072	0.073	0.034	0.020	0.366	0.071
2001	10.967	7.700	0.163	0.423	7.799	4.166	0.060	0.060	0.075	0.032	0.021	0.368	0.066
2002	11.060	8.390	0.169	0.414	7.822	3.950	0.043	0.053	0.081	0.030	0.022	0.366	0.054
2003	11.158	9.616	0.174	0.397	7.879	3.963	0.029	0.049	0.089	0.032	0.022	0.359	0.050
2004	11.103	12.158	0.185	0.375	7.980	3.370	0.012	0.045	0.096	0.031	0.021	0.341	0.052
2005	11.127	13.000	0.187	0.358	8.029	3.306	0.016	0.042	0.096	0.027	0.020	0.326	0.057
2006	11.250	13.062	0.191	0.355	8.095	3.159	0.015	0.038	0.091	0.025	0.019	0.328	0.063
2007	11.186	11.717	0.191	0.362	8.250	3.285	0.023	0.038	0.086	0.024	0.018	0.330	0.065
2008	11.363	11.867	0.175	0.383	8.303	3.388	0.049	0.045	0.086	0.024	0.020	0.338	0.067
2009	11.305	10.457	0.171	0.366	8.322	3.761	0.048	0.049	0.106	0.022	0.020	0.344	0.051
Mean	*10.526*	*8.688*	*0.171*	*0.394*	*7.762*	*3.733*	*0.039*	*0.048*	*0.079*	*0.035*	*0.020*	*0.382*	*0.069*
N	*29636*	*29046*	*29274*	*29352*	*29447*	*29206*	*29206*	*28911*	*29419*	*29446*	*29447*	*29361*	*29000*

Table III
Panel A: Rating Regressions

This panel reports the coefficients for regression models of credit ratings. Models (1) and (3) are OLS regressions with industry dummies based on 3-digit SIC codes, models (2) and (4) are ordered logit regressions with industry dummies, and models (5) and (6) are OLS regressions with firm dummies. *Beta* is the stock's Dimson-adjusted beta (one lead and lag term) computed based on daily returns, *Idio. Risk* is the root mean squared error from a regression of daily stock returns on CRSP value weighted index returns. The latter two variables are standardized by dividing the variables by their annual cross-sectional means. *Beta* and *Idio. Risk* are winsorized at their 1st and 99th percentiles prior to standardization. All other variables are described in Table 2. Standard errors are clustered at the firm level and adjusted for heteroscedasticity and autocorrelation. P-values are reported in parentheses next to the coefficients.

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation Method	OLS	Ord. Logit	OLS	Ord. Logit	OLS	OLS
IntCov	-0.034 (0.00)	-0.024 (0.00)	-0.032 (0.00)	-0.026 (0.00)	-0.017 (0.00)	-0.017 (0.00)
Profit	-1.620 (0.00)	-1.655 (0.00)	-0.635 (0.07)	-0.962 (0.00)	-0.617 (0.05)	-0.672 (0.05)
Book_Lev	3.548 (0.00)	3.409 (0.00)	2.538 (0.00)	2.706 (0.00)	2.965 (0.00)	2.685 (0.00)
Size	-1.246 (0.00)	-1.058 (0.00)	-1.144 (0.00)	-1.055 (0.00)	-1.028 (0.00)	-0.976 (0.00)
Debt / EBITDA	0.131 (0.00)	0.132 (0.00)	0.090 (0.00)	0.105 (0.00)	0.058 (0.00)	0.040 (0.00)
Neg. Debt / EBITDA	1.255 (0.00)	1.473 (0.00)	0.617 (0.00)	0.983 (0.00)	0.901 (0.00)	0.469 (0.00)
Vol	2.385 (0.00)	2.597 (0.00)	1.392 (0.00)	1.920 (0.00)	0.803 (0.05)	0.635 (0.14)
Cash / Assets	0.664 (0.06)	0.556 (0.06)	0.189 (0.58)	0.307 (0.32)	-0.198 (0.50)	-0.028 (0.93)
ConvDe / Assets	1.778 (0.00)	1.236 (0.00)	1.648 (0.00)	1.619 (0.00)	0.672 (0.06)	0.505 (0.13)
Rent / Assets	5.131 (0.00)	5.666 (0.00)	4.330 (0.00)	5.278 (0.00)	2.568 (0.18)	1.832 (0.34)
PPE / Assets	-1.718 (0.00)	-1.288 (0.00)	-0.500 (0.06)	-0.420 (0.09)	-0.768 (0.02)	-0.944 (0.01)
CAPEX / Assets	-2.538 (0.00)	-2.816 (0.00)	-3.189 (0.00)	-3.456 (0.00)	-4.804 (0.00)	-3.910 (0.00)
Beta			0.362 (0.00)	0.243 (0.00)		0.079 (0.00)
Idio. Risk			1.806 (0.00)	2.203 (0.00)		1.165 (0.00)

Table III, Panel A (continued)

1986	0.334 (0.00)	0.232 (0.00)	0.345 (0.00)	0.357 (0.00)	0.163 (0.02)	0.228 (0.00)
1987	0.565 (0.00)	0.416 (0.00)	0.539 (0.00)	0.536 (0.00)	0.368 (0.00)	0.437 (0.00)
1988	0.614 (0.00)	0.485 (0.00)	0.427 (0.00)	0.462 (0.00)	0.521 (0.00)	0.474 (0.00)
1989	0.728 (0.00)	0.557 (0.00)	0.495 (0.00)	0.509 (0.00)	0.597 (0.00)	0.497 (0.00)
1990	0.760 (0.00)	0.591 (0.00)	0.482 (0.00)	0.476 (0.00)	0.703 (0.00)	0.619 (0.00)
1991	0.705 (0.00)	0.509 (0.00)	0.385 (0.00)	0.322 (0.00)	0.712 (0.00)	0.638 (0.00)
1992	0.736 (0.00)	0.540 (0.00)	0.492 (0.00)	0.456 (0.00)	0.694 (0.00)	0.656 (0.00)
1993	0.841 (0.00)	0.648 (0.00)	0.693 (0.00)	0.643 (0.00)	0.685 (0.00)	0.730 (0.00)
1994	1.047 (0.00)	0.818 (0.00)	0.927 (0.00)	0.855 (0.00)	0.802 (0.00)	0.876 (0.00)
1995	1.101 (0.00)	0.875 (0.00)	1.027 (0.00)	0.959 (0.00)	0.900 (0.00)	0.983 (0.00)
1996	1.242 (0.00)	0.986 (0.00)	1.150 (0.00)	1.097 (0.00)	0.989 (0.00)	1.084 (0.00)
1997	1.378 (0.00)	1.069 (0.00)	1.347 (0.00)	1.255 (0.00)	1.024 (0.00)	1.159 (0.00)
1998	1.379 (0.00)	1.045 (0.00)	1.435 (0.00)	1.308 (0.00)	1.062 (0.00)	1.209 (0.00)
1999	1.570 (0.00)	1.204 (0.00)	1.605 (0.00)	1.446 (0.00)	1.220 (0.00)	1.347 (0.00)
2000	1.938 (0.00)	1.517 (0.00)	1.976 (0.00)	1.801 (0.00)	1.547 (0.00)	1.687 (0.00)
2001	2.092 (0.00)	1.621 (0.00)	2.058 (0.00)	1.849 (0.00)	1.788 (0.00)	1.875 (0.00)
2002	2.303 (0.00)	1.783 (0.00)	2.194 (0.00)	1.980 (0.00)	2.005 (0.00)	2.060 (0.00)
2003	2.574 (0.00)	2.037 (0.00)	2.436 (0.00)	2.230 (0.00)	2.197 (0.00)	2.233 (0.00)
2004	2.912 (0.00)	2.342 (0.00)	2.712 (0.00)	2.479 (0.00)	2.429 (0.00)	2.449 (0.00)
2005	3.097 (0.00)	2.520 (0.00)	2.878 (0.00)	2.645 (0.00)	2.624 (0.00)	2.609 (0.00)
2006	3.341 (0.00)	2.749 (0.00)	3.117 (0.00)	2.892 (0.00)	2.822 (0.00)	2.798 (0.00)
2007	3.409 (0.00)	2.811 (0.00)	3.155 (0.00)	2.944 (0.00)	2.889 (0.00)	2.841 (0.00)
2008	3.486 (0.00)	2.860 (0.00)	3.288 (0.00)	3.091 (0.00)	3.039 (0.00)	3.002 (0.00)
2009	3.354 (0.00)	2.791 (0.00)	3.124 (0.00)	2.967 (0.00)	2.927 (0.00)	2.869 (0.00)
Constant	18.546 (0.00)		15.589 (0.00)		16.296 (0.00)	14.796 (0.00)
Industry dummies	Y	Y	Y	Y	N	N
Firm dummies	N	N	N	N	Y	Y
Observations	28092	28092	22705	22705	28092	22705
Number of firms	3612	3612	2906	2906	3612	2906
Adjusted R-squared	0.704	--	0.741	--	0.902	0.903
Pseudo R-squared	--	0.2347	--	0.2688	--	--

Table III (continued)
Panel B: Marginal Effects of Ordered Logit Model

This table reports the marginal effects for the ordered logit regression in specification (4) of Panel A. We compute the probability that a firm obtains various ratings in 1985 and in 2009, setting all its characteristics equal to the sample mean.

Rating	Probability in 1985	Probability in 2009
AAA	0.24%	0.01%
AA+	0.14%	0.01%
AA	0.79%	0.04%
AA-	1.18%	0.06%
A+	3.38%	0.19%
A	9.61%	0.61%
A-	11.54%	0.93%
BBB+	17.42%	2.08%
BBB	22.64%	5.51%
BBB-	14.66%	9.15%
BB+	7.47%	10.98%
BB	6.39%	22.46%
BB-	3.29%	28.33%
B+	1.06%	16.16%
B	0.15%	2.74%
B-	0.03%	0.59%
CCC+	0.01%	0.10%
CCC	0.00%	0.03%
CCC-	0.00%	0.01%
CC	0.00%	0.00%
C	0.00%	0.00%

Table IV: Multi-Year Default Rates by Moody's Rating

The dependent variable in the table below is the cumulative issuer-weighted five-year default rate by annual cohort and Moody's rating category. The data are from Moody's Investors Services' report on "Corporate Default and Recovery Rates, 1920-2009." *Linear Trend* takes the value of 0 in the year 1985; it is 1 in 1986, 2 in 1987, 3 in 1988 etc. The sample covers bond cohorts from 1985 to 2005. The p-values reported below the coefficients are based on Newey-West standard errors estimated with four lags, which we use to account for the overlap in five-year default rates.

	(1)	(2)	(3)	(4)	(5)	(6)
Rating:	Aa	A	Baa	Ba	B	Caa-C
Dependent Variable:	Cumulative Five-Year Default Rate (in %)					
Linear Trend	-0.040	-0.039	-0.103	-0.800	-1.008	0.744
	(0.02)	(0.40)	(0.15)	(0.00)	(0.00)	(0.21)
Constant	0.640	1.099	3.142	19.123	37.562	39.443
	(0.00)	(0.10)	(0.01)	(0.00)	(0.00)	(0.00)
Observations	21	21	21	21	21	21
Adjusted R-squared	0.421	0.054	0.112	0.476	0.330	0.058

Table V
Summary Statistics for Capital Structure Regressions

This table presents annual averages of the variables employed in the capital structure regressions (variables not reported here were already described in Table 2). *Rat_Diff_Firm* is the difference between the actual S&P rating and the rating predicted by regression model (6) in Panel A of Table 3; the credit rating regression is estimated using data from 1985 to 1996, and the predicted rating (where the ratings regression employs all the variables from model (6), including firm dummies, but excluding year dummies) is obtained for 1997 to 2009; *Rat_Diff_Ind* is based on ratings regression (3) in Panel A of Table 3, and is computed analogously. *Net Debt Issues* are long-term debt issues minus long-term debt reductions, scaled by total assets. *Gross Debt Issues* are long-term debt issues scaled by total assets. *Ltde / Assets* is long-term debt divided by assets. *Mkt_Lev* is total interest bearing debt divided by the sum of total interest bearing debt and market equity. *Market-to-Book* is the ratio of (book value of assets plus market value of equity minus book value of common equity minus balance sheet deferred taxes) to the book value of assets. *Carryforwards / Assets* is tax loss carryforwards divided by total assets; missing values of carryforward tax losses are replaced by zero. *Taxshield* is the ratio of investment tax credits to total assets; missing investment tax credits are replaced by zero. *R&D / Sales* is the ratio of R&D expenditures to total sales; missing values of R&D are replaced by zero. All explanatory variables (except *Rat_Diff_Firm* and *Rat_Diff_Ind*) are winsorized at the 99th percentile; *Net Debt Issues* and *Market-to-Book* are also winsorized at the 1st percentile.

Year	Rat_Diff_Firm	Rat_Diff_Ind	Net Debt Issues	Gross Debt Issues	Ltde / Assets	Mkt_Lev	Market-to-Book	Carryforwards / Assets	Taxshield	R & D / Sales
1997	0.183	0.661	0.059	0.184	0.361	0.332	1.772	0.029	0.000	0.017
1998	0.177	0.648	0.067	0.196	0.387	0.378	1.708	0.032	0.000	0.016
1999	0.248	0.847	0.042	0.159	0.400	0.380	1.793	0.037	0.000	0.015
2000	0.525	1.238	0.026	0.138	0.375	0.401	1.688	0.041	0.000	0.018
2001	0.781	1.338	0.025	0.152	0.373	0.383	1.590	0.045	0.000	0.020
2002	0.941	1.500	0.003	0.127	0.366	0.391	1.458	0.055	0.000	0.021
2003	1.101	1.797	0.008	0.141	0.358	0.333	1.596	0.061	0.000	0.021
2004	1.351	2.128	0.013	0.156	0.338	0.289	1.669	0.063	0.000	0.019
2005	1.511	2.289	0.013	0.136	0.321	0.280	1.697	0.069	0.000	0.019
2006	1.720	2.480	0.024	0.141	0.321	0.275	1.725	0.075	0.000	0.019
2007	1.728	2.493	0.034	0.150	0.325	0.293	1.737	0.067	0.000	0.019
2008	1.861	2.552	0.025	0.125	0.340	0.419	1.327	0.073	0.000	0.020
2009	1.825	2.429	-0.006	0.118	0.335	0.355	1.436	0.080	0.000	0.020
Mean	*0.937*	*1.695*	*0.026*	*0.149*	*0.355*	*0.347*	*1.634*	*0.055*	*0.000*	*0.019*
N	*7574*	*14238*	*16767*	*17274*	*18146*	*15890*	*14659*	*18152*	*18152*	*18122*

Table VI
Capital Structure Regressions: Leverage Changes

This table reports the coefficients for regression models of leverage changes. L.(.) denotes the lag-operator. Standard errors are clustered at the firm level and adjusted for heteroscedasticity and autocorrelation. P-values are reported in parentheses below the coefficients. The variables are defined in Tables 2 and 4.

	(1)	(2)	(3)	(4)
Dependent Variable	Net Debt Issues	Gross Debt Issues	Net Debt Issues	Gross Debt Issues
L2.(Rat_Diff_Ind)	-0.002	0.002		
	(0.01)	(0.26)		
L2.(Rat_Diff_Firm)			-0.003	-0.006
			(0.00)	(0.01)
L.Rating	0.002	0.004	0.001	0.008
	(0.01)	(0.01)	(0.07)	(0.00)
L.Book_Lev	-0.073	0.128	-0.066	0.092
	(0.00)	(0.00)	(0.00)	(0.00)
L.(Market-to-Book)	0.013	0.011	0.011	0.009
	(0.00)	(0.00)	(0.00)	(0.04)
L.(PPE/Assets)	0.014	0.027	0.004	0.042
	(0.09)	(0.28)	(0.71)	(0.25)
L.Profit	0.030	0.067	0.031	0.091
	(0.02)	(0.00)	(0.08)	(0.00)
L.Size	-0.003	-0.010	-0.005	-0.008
	(0.02)	(0.00)	(0.00)	(0.04)
L.Taxshield	-5.842	-13.241	-4.634	-8.746
	(0.00)	(0.00)	(0.01)	(0.00)
L.(Carryforwards / Assets)	-0.013	-0.032	-0.002	-0.052
	(0.19)	(0.41)	(0.87)	(0.08)
L.(R&D/Sales)	-0.042	-0.301	-0.046	-0.163
	(0.27)	(0.00)	(0.44)	(0.32)
Constant	0.007	0.110	0.011	-0.059
	(0.73)	(0.15)	(0.64)	(0.24)
Industry dummies	Y	Y	Y	Y
Year dummies	Y	Y	Y	Y
Observations	9769	10026	6001	6150
Number of firms	1754	1774	887	900
Adjusted R-squared	0.070	0.130	0.072	0.180

Table VII
Capital Structure Regressions: Leverage Levels

This table reports the coefficients for regression models of leverage levels. L.(.) denotes the lag-operator. Standard errors are clustered at the firm level and adjusted for heteroscedasticity and autocorrelation. P-values are reported in parentheses below the coefficients. The variables are defined in Tables 2 and 4.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Ltde / Assets	Book_Lev	Mkt_Lev	Ltde / Assets	Book_Lev	Mkt_Lev
L.(Rat_Diff_Ind)	-0.052	-0.059	-0.040			
	(0.00)	(0.00)	(0.00)			
L.(Rat_Diff_Firm)				-0.012	-0.011	-0.005
				(0.00)	(0.00)	(0.03)
Rating	0.053	0.059	0.057	0.030	0.032	0.039
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Market-to-Book	0.014	0.016	-0.093	0.005	0.008	-0.083
	(0.00)	(0.00)	(0.00)	(0.47)	(0.28)	(0.00)
PPE / Assets	0.137	0.142	0.101	0.026	0.018	-0.003
	(0.00)	(0.00)	(0.00)	(0.43)	(0.61)	(0.92)
Profit	0.129	0.141	0.055	0.001	0.005	-0.074
	(0.00)	(0.00)	(0.01)	(0.98)	(0.92)	(0.03)
Size	0.034	0.050	0.059	-0.002	0.008	0.032
	(0.00)	(0.00)	(0.00)	(0.59)	(0.11)	(0.00)
Taxshield	-0.894	1.974	7.617	-2.205	1.041	8.532
	(0.88)	(0.73)	(0.03)	(0.77)	(0.89)	(0.07)
Carryforwards / Assets	0.047	0.064	0.070	0.072	0.108	0.110
	(0.08)	(0.01)	(0.00)	(0.23)	(0.06)	(0.00)
R & D / Sales	-0.290	-0.305	-0.351	-0.201	-0.209	-0.299
	(0.00)	(0.00)	(0.00)	(0.21)	(0.22)	(0.02)
Constant	-0.623	-0.769	-0.550	-0.084	-0.171	-0.158
	(0.00)	(0.00)	(0.00)	(0.17)	(0.01)	(0.03)
Industry dummies	Y	Y	Y	Y	Y	Y
Year dummies	Y	Y	Y	Y	Y	Y
Observations	11832	11831	11831	6730	6729	6729
Number of firms	1999	1999	1999	935	935	935
Adjusted R-squared	0.588	0.627	0.696	0.544	0.529	0.672

Table VIII
Summary Statistics for Credit Spread Regressions

This table presents annual averages of the variables employed in the credit spread regressions. The sample consists of 701 unique issuers and 4864 unique bonds over the sample period January 1997 to June 2009. *Issue Rating* is the issue-specific rating from S&P. *Rat_Diff_Firm* is the difference between the actual S&P rating and the rating predicted by regression model (6) in Panel A of Table 3 (excluding year dummies); the credit rating regression is estimated using data from 1985 to 1996, and the predicted rating is obtained for 1997 to 2009. *Bond Yield* is the yield-to-maturity on the corporate bond (based on Merrill Lynch calculations). *Treasury Yield* is the yield on the five year U.S. Treasury bond. *Yield Spread* is the difference between *Bond Yield* and *Treasury Yield*. *Ln(Days to Maturity)* is the natural logarithm of the number of days to maturity of a given bond. *Equity_Vol* is the standard deviation of daily stock returns computed over the past 12 months. *Bond Yield* and *Equity_Vol* is winsorized at the 99^{th} percentile, while *Equity_Vol* is additionally winsorized at the 1^{st} percentile.

Year	Issue Rating	Rat_Diff_Firm	Bond Yield	Treasury Yield	Yield Spread	Ln(Days to Maturity)	Equity_Vol
1997	8.260	0.500	7.351	6.123	1.228	8.107	0.019
1998	8.119	0.519	6.869	5.074	1.796	8.103	0.021
1999	8.177	0.558	7.646	5.559	2.087	8.098	0.027
2000	8.532	0.666	8.956	6.084	2.872	8.054	0.030
2001	8.723	0.857	7.990	4.432	3.558	7.982	0.030
2002	8.974	1.160	7.304	3.659	3.645	7.946	0.027
2003	9.170	1.340	5.942	2.922	3.019	7.910	0.027
2004	9.340	1.624	5.645	3.419	2.226	7.862	0.018
2005	9.291	1.959	5.856	4.047	1.809	7.811	0.016
2006	9.306	2.022	6.450	4.732	1.718	7.838	0.016
2007	9.236	2.026	6.403	4.347	2.057	7.839	0.016
2008	8.997	1.955	7.919	2.753	5.166	7.895	0.025
2009	9.200	2.064	8.729	2.081	6.648	7.845	0.043
Mean	*8.841*	*1.258*	*7.072*	*4.334*	*2.738*	*7.955*	*0.024*
N	*197838*	*197838*	*197662*	*197838*	*197662*	*197837*	*197838*

Table IX
Credit Spread Regressions with Ratings Difference Based on Firm Dummies

This table reports the coefficients for panel regression models of credit spreads (dependent variable in all specifications: *Yield Spread*). The explanatory variables are defined in Table 7. P-values (based on standard errors clustered by bond and adjusted for heteroscedasticity and autocorrelation) are reported in parentheses below the coefficients.

	(1)	(2)	(3)	(4)	(5)	(6)
Rat_Diff_Firm	-0.095	-0.201	-0.115	-0.198	-0.153	-0.136
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Issue Rating	0.741	0.848	0.750	0.846	0.576	0.554
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln(Days to Maturity)			0.626	0.646	0.636	0.682
			(0.00)	(0.00)	(0.00)	(0.00)
Equity_Vol					132.584	129.525
					(0.00)	(0.00)
Constant	-4.403	-5.300	-9.618	-10.890	-10.686	-11.358
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Firm dummies	Y	N	Y	N	Y	N
Bond dummies	N	Y	N	Y	N	Y
Year-Month dummies	Y	Y	Y	Y	Y	Y
Observations	197662	197662	197662	197662	197662	197662
Number of firms	701	701	701	701	701	701
Number of bonds	4864	4864	4864	4864	4864	4864
Adjusted R-squared	0.637	0.728	0.663	0.730	0.716	0.767

Table X
Panel A: Debt Issuance – Robustness

This table reports the coefficients for regression models of leverage changes. L.(.) denotes the lag-operator. *Rat_Diff_New_Firm* is the difference between the actual S&P rating and the rating predicted by regression model (6) in Panel A of Table 3 (excluding year dummies); the credit rating regression is estimated using data from 1997 to 2009, and the predicted rating is obtained for 1997 to 2009. *Rat_Diff_Predictions_Firm* is the difference between the predicted rating based on estimating the ratings model over 1997-2009 and the predicted rating based on estimating the ratings model over 1985-1996; the ratings model employed is based on regression (6) in Panel A of Table 3. The other explanatory variables are the same as in Table 5. Standard errors are clustered at the firm level and adjusted for heteroscedasticity and autocorrelation. P-values are reported in parentheses below the coefficients.

	(1)	(2)
Dependent Variable	Net Debt Issues	Gross Debt Issues
L2.(Rat_Diff_Predictions_Firm)	-0.002	-0.007
	(0.02)	(0.01)
L2.(Rat_Diff_New_Firm)	-0.005	-0.004
	(0.00)	(0.21)
L.Rating	0.002	0.008
	(0.02)	(0.00)
L.Book_Lev	-0.067	0.093
	(0.00)	(0.00)
L.(Market-to-Book)	0.011	0.009
	(0.00)	(0.05)
L.(PPE/Assets)	0.004	0.041
	(0.70)	(0.27)
L.Profit	0.033	0.088
	(0.06)	(0.00)
L.Size	-0.005	-0.008
	(0.00)	(0.03)
L.Taxshield	-4.574	-8.885
	(0.01)	(0.00)
L.(Carryforwards / Assets)	-0.004	-0.051
	(0.77)	(0.08)
L.(R&D/Sales)	-0.047	-0.161
	(0.43)	(0.32)
Constant	0.007	-0.054
	(0.77)	(0.30)
Industry and Year dummies	Y	Y
Observations	5994	6143
Number of firms	881	894
Adjusted R-squared	0.073	0.180

Table X
Panel B: Debt Levels – Robustness

This table reports the coefficients for regression models of leverage levels. L.(.) denotes the lag-operator. *Rat_Diff_New_Firm* is the difference between the actual S&P rating and the rating predicted by regression model (6) in Panel A of Table 3 (excluding year dummies); the credit rating regression is estimated using data from 1997 to 2009, and the predicted rating is obtained for 1997 to 2009. *Rat_Diff_Predictions_Firm* is the difference between the predicted rating based on estimating the ratings model over 1997-2009 and the predicted rating based on estimating the ratings model over 1985-1996; the ratings model employed is based on regression (6) in Panel A of Table 3. The other explanatory variables are the same as in Table 6. Standard errors are clustered at the firm level and adjusted for heteroscedasticity and autocorrelation. P-values are reported in parentheses below the coefficients.

	(1)	(2)	(3)
Dependent Variable	Ltde / Assets	Book_Lev	Mkt_Lev
L.(Rat_Diff_Predictions_Firm)	-0.011	-0.009	-0.002
	(0.00)	(0.01)	(0.53)
L.(Rat_Diff_New_Firm)	-0.014	-0.017	-0.012
	(0.00)	(0.00)	(0.00)
Rating	0.030	0.032	0.040
	(0.00)	(0.00)	(0.00)
Market-to-Book	0.005	0.009	-0.082
	(0.44)	(0.23)	(0.00)
PPE / Assets	0.027	0.019	-0.001
	(0.43)	(0.59)	(0.97)
Profit	0.003	0.009	-0.067
	(0.95)	(0.85)	(0.05)
Size	-0.003	0.008	0.032
	(0.55)	(0.12)	(0.00)
Taxshield	-1.879	1.691	9.459
	(0.80)	(0.83)	(0.05)
Carryforwards / Assets	0.071	0.105	0.104
	(0.24)	(0.07)	(0.00)
R & D / Sales	-0.202	-0.211	-0.302
	(0.21)	(0.21)	(0.02)
Constant	-0.078	-0.175	-0.166
	(0.21)	(0.01)	(0.02)
Industry and Year dummies	Y	Y	Y
Observations	6725	6724	6724
Number of firms	930	930	930
Adjusted R-squared	0.544	0.530	0.673

Table X
Panel C: Credit Spreads – Robustness

This table reports the coefficients for a panel regression model of credit spreads. *Rat_Diff_ New_Firm* is the difference between the actual S&P rating and the rating predicted by regression model (6) in Panel A of Table 3 (excluding year dummies); the credit rating regression is estimated using data from 1997 to 2009, and the predicted rating is obtained for 1997 to 2009. *Rat_Diff_Predictions_Firm* is the difference between the predicted rating based on estimating the ratings model over 1997-2009 and the predicted rating based on estimating the ratings model over 1985-1996; the ratings model employed is based on regression (6) in Panel A of Table 3. The other explanatory variables are the same as in Table 8. P-values (based on standard errors clustered at the bond level and adjusted for heteroscedasticity and autocorrelation) are reported in parentheses below the coefficients.

Dependent Variable	Yield Spread
Rat_Diff_Predictions_Firm	-0.175
	(0.07)
Rat_Diff_New_Firm	-0.133
	(0.00)
Issue Rating	0.553
	(0.00)
Ln(Days to Maturity)	0.682
	(0.00)
Equity_Vol	129.918
	(0.00)
Constant	-11.303
	(0.00)
Bond dummies	Y
Year-Month dummies	Y
Observations	197527
Number of firms	686
Number of bonds	4841
Adjusted R-squared	0.767

Figure 1: Plot of Coefficients on Year Dummies

This figure plots over time the coefficients of the year dummies from models (1), (3), (5) and (6) of Panel A of Table 3.

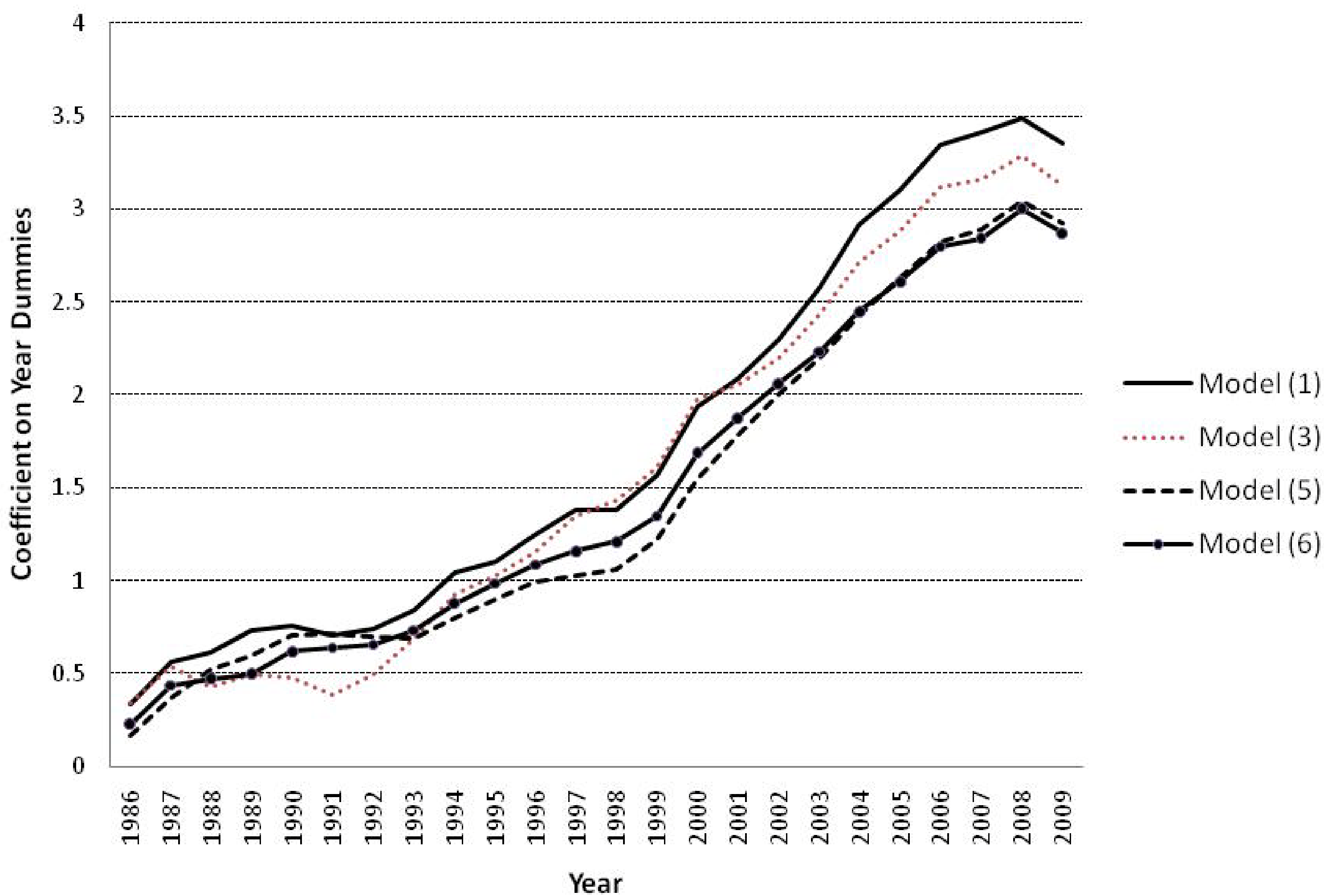
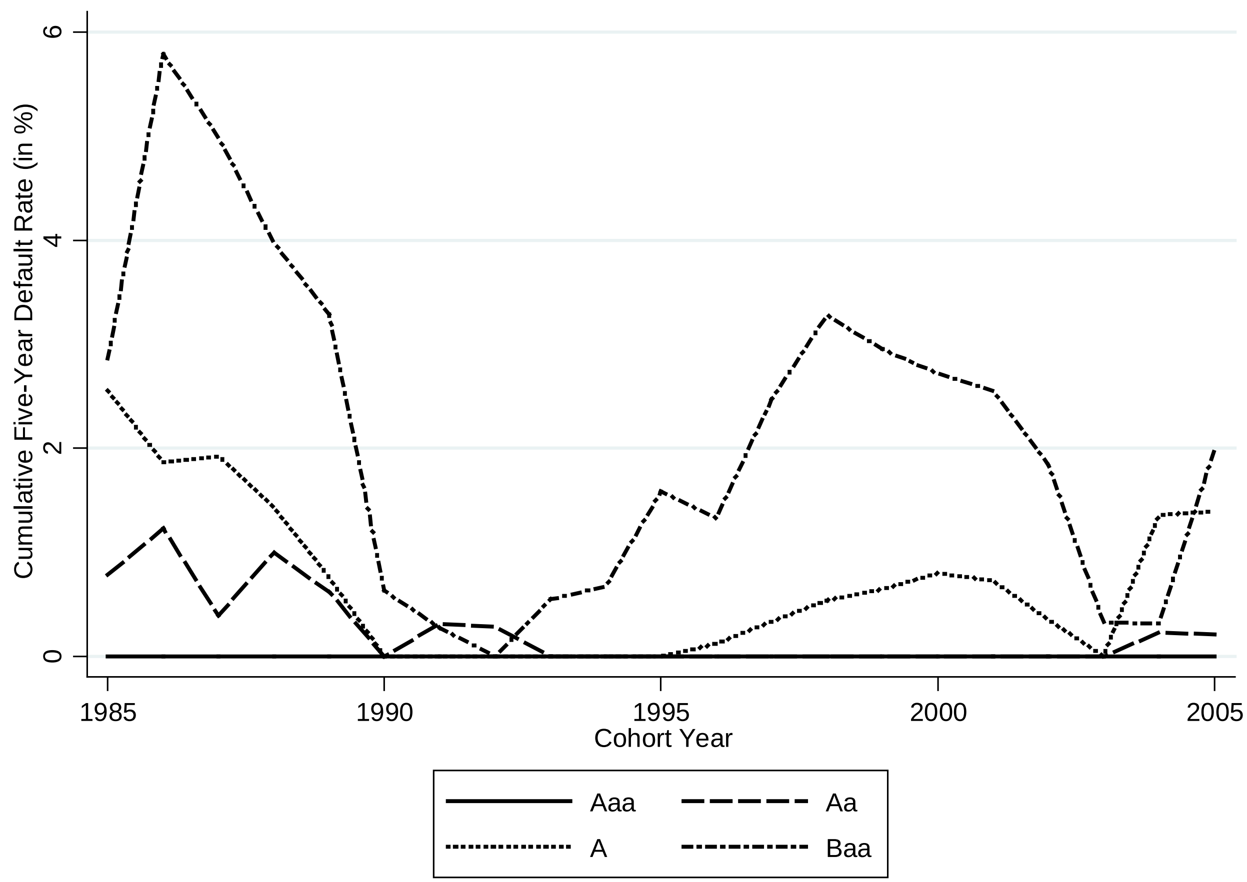


Figure 2: Plot of Five-Year Cumulative Default Rates by Rating Category

Panel A: Investment grade defaults

This figure plots cumulative five-year issuer-weighted default rates by annual cohort and Moody's rating category. We start the sample with cohorts formed in 1985, the first available year of data in the ratings regressions, and we end the sample with the last available observation of the five-year default rate, which is for the 2005 cohort. The data is from Moody's Investors Services' report on "Corporate Default and Recovery Rates, 1920-2009."



Panel B: Speculative grade defaults