Rating Agency Adjustments to GAAP Financial Statements and Their Effect on Ratings and Bond Yields

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Abstract

Rating agencies have been criticized for underestimating default risk (subprime mortgage crisis, Enron). Using a new dataset of U.S. GAAP and adjusted financial statements, I document that a major rating agency (Moody's) extensively modifies reported financial statements. The major quantitative adjustment incorporates off-balance-sheet financing activity (operating leases and securitizations), causing the adjusted leverage ratio for the median firm to increase by 14%. Assessments of off-balance-sheet debt (and more generally "hard adjustments") and of qualitative factors ("soft adjustments") are significantly associated with lower ratings and higher bond yields. Thus ratings can serve as a contracting device to incorporate off-balance-sheet debt adjustments and credit-risk increasing soft factors. The evidence is consistent

with the view that rating agencies are, for the most part, efficient processors of accounting information for corporate credit risk assessments. However, soft adjustments may be too conservative, relative to bond yields.

Keywords: Rating agency, off-balance-sheet finance, corporate credit risk

I   Introduction

Credit rating agencies have provided ratings for a century. Ratings are used for valuation purposes, in contracts, and in regulation (Beaver et al. (2006)). They reduce duplication of information-processing for investors (Wakeman (1984)). Bond investors rely on the rating agencies' reputation to produce accurate ratings.[1] Several studies find price reactions to rating downgrades that can be interpreted as evidence consistent with the view that ratings provide new information.[2] However, rating agencies collect fees from the very issuers they rate, creating a basic tension between providing accurate and upward biased ratings.[3] Upward biased ratings have been observed for structured finance products, such as mortgage-backed and asset-backed securities.[4] These concerns also relate to corporate ratings. Ratings have been found to be temporarily inflated because they do not reflect adverse events in a timely manner and they lag market prices.[5]

We know from their manuals that they claim to make "analytical adjustments to better portray reality" and "to better reflect the underlying economics of transactions and events" (Standard and Poor's (2008), Moody's (2006), respectively). Under the view that rating agencies are efficient information intermediaries, bond investors rely on the rating agencies' reputation. However, the analysis of financial statements and the gathering of private information requires unobservable effort, which results in a moral hazard problem (Gorton

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[1]White (2002), Klein and Leffler (1981), Shapiro (1983), Strausz (2005)

[2]Hand et al. (1992), Holthausen and Leftwich (1986), Dichev and Piotroski (2001) and Jorion et al. (2005)

[3]Partnoy (1999), Bolton et al. (2010), Becker and Milbourn (2010), Mason and Rosner (2007)

[4]Ashcraft et al. (2010), Benmelech and Dlugosz (2009)

[5]Beaver et al. (2006)

and Winton (2003), Leland and Pyle (1977)). For example, in the case of Enron, the SEC accused rating analysts of having been less than thorough in their review of Enron's public filings because they paid insufficient attention to detail, failed to probe opaque disclosures, and failed to take into account the overall aggressiveness of Enron's accounting practices (SEC (2003)). For structured finance products, incorrect model assumptions and optimistic subjective adjustments coupled with incentives to generate fee income may have resulted in inflated ratings.[6]

Motivated by this debate, this paper examines the rating process for corporate issuer ratings. Rating agencies assess both quantitative and qualitative factors to assess credit risk (Standard and Poor's (2008)). Following Petersen (2004) I define "soft" adjustments as credit risk assessments of qualitative risk factors, and "hard" adjustments as credit risk assessments of quantitative risk factors. Hard adjustments mostly comprise adjustments to numbers reported in financial statements (Moody's (2006)). Hard information can be reduced to numbers and is easy to transmit. Soft information is qualitative by nature. Soft assessments are supposed to incorporate factors such as management quality, aggressive accounting, weak controls, governance risk, industry structure, and managerial bondholder friendliness (Moody's (2007)). The rating agency assigns a numerical score to this information and thereby "hardens" it. This paper examines the scope of rating agency assessments of hard and soft factors, whether these assessments capture default risk and whether they are biased.

Using Moody's Financial Metrics ("*FM*"), I find that rating agency assessments capture substantial amounts of off-balance-sheet debt for non-financial firms during the period 2002 to 2008. As a result of the adjustments to reported numbers, the median leverage ratio increases by 14%, the median coverage ratio decreases by 18%, and the median operating cash flow to debt ratio decreases by 12%. For 95% of the observations, the amount of estimated gross debt increases. The estimates of off-balance-sheet debt are significantly associated

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[6]Benmelech and Dlugosz (2009), Coval et al. (2009), He et al. (2010), Griffin and Tang (2010)

with lower ratings. In addition, soft adjustments tend to lead to significantly lower ratings.[7] The rating agency estimates of off-balance-sheet debt are significantly associated with higher yield spreads. Models based on adjusted accounting numbers better explain both ratings and yield spreads than models based on reported numbers. Furthermore, soft and total adjustments are significantly associated with higher yield spreads. The evidence from the pricing regression implies that rating agency adjustments for off-balance-sheet debt, as well as for qualitative factors, capture aspects of credit risk.

In a regression of ratings on yield spreads and rating agency adjustments I find that soft adjustments and total adjustments are significantly associated with lower ratings. These results are consistent with downward bias in the more discretionary soft and total adjustments. In contrast, the yield spread fully subsumes the estimate of off-balance-sheet finance. For the subset of firms that have repeated rating agency interactions, I find no evidence of upward bias. However, fee revenue is strongly correlated with firm size, hence it is problematic to disentangle a size effect (the firm is inherently less risky) from a fee effect (catering to fee-paying customer).

The paper contributes to the debate about the role of rating agencies. I provide evidence consistent with the view that rating agencies are, for the most part, efficient processors of accounting information, at least for traditional credit risk assessments of corporate issuers. Consistent with Petersen (2004)'s conjecture, I show that the credit rating is a mapping of both hard and soft information; that is, while a large part of the rating is function of reported numbers, qualitative factors enter as well, and are associated with the market's assessment of default risk. My findings also imply that ratings can serve as a comprehensive contracting device to incorporate off-balance-sheet debt adjustments into rating-based covenants, such as rating-trigger clauses or performance-based pricing, as an alternative to contracting directly

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[7]In a related paper, Franco et al. (2011) find that the adjustments to income statement numbers are reflected in equity prices.

on accounting ratios.

Furthermore, the paper contributes to the literature on off-balance-sheet financing by providing new evidence on the widespread extent and magnitude of disclosed off-balance-sheet debt by utilizing the *FM* dataset.[8] The new proposed accounting rules on lease accounting as discussed in the joint project between FASB and IASB are likely to substantially increase leverage ratios, unless firms restructure their financings (Imhoff and Thomas (1988)).

II   Institutional background and hypothesis development

Rating agencies use financial statements to conduct credit risk assessments. We know from their manuals that they claim to make "analytical adjustments to better portray reality" and "to better reflect the underlying economics of transactions and events" (Standard and Poor's (2008), Moody's (2006), respectively). Under the view that rating agencies are efficient information intermediaries, bond investors rely on the rating agencies' reputation, and rating manuals sufficiently explain the types of adjustments rating analysts undertake under their optimal effort choice (Wakeman (1984), White (2002), Partnoy (1999), SEC (2003), Klein and Leffler (1981), Shapiro (1983), Strausz (2005)). However, the analysis of financial statements and the gathering of private information requires unobservable effort, which results in a moral hazard problem (Gorton and Winton (2003), Leland and Pyle (1977)). Furthermore, earnings management and balance sheet management by firms increases the information processing costs for rating agencies and may exacerbate conflicts of interest.[9]

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[8]The literature on off-balance-sheet finance activity has been restrained by a lack of data. Researchers use Compustat data to capitalize operating leases (Imhoff et al. (1993), Ely (1995)), focus on one type of hand-collected off-balance-sheet finance activity such as securitizations (Gorton and Souleles (2006), Landsman et al. (2006)) or R&D development vehicles (Beatty et al. (1995)), or analyze datasets of confidential tax returns (Mills and Newberry (2005)).

[9]Some firms engage in balance sheet management to give the appearance of lower leverage ratios based on numbers reported in the balance sheet, even if the information is disclosed elsewhere. Some firms attempt

Reputational concerns provide powerful incentives to engage in high-quality information production. However, other discipline-inducing mechanisms are weak in the rating agency industry. First, ex post performance is observable only with a long time lag, because the probability of default is very low for most issuers.[10] In addition, ex post monitoring is costly and voids the rationale for delegating information processing to an intermediary. Furthermore, the threat of litigation provides bond investors with limited recourse because, until 2010, courts have imposed a lower standard of care on rating agencies than on accountants and auditors (Husisian (1990), Partnoy (2006)).[11] Last, investors use ratings by certified rating agencies to comply with regulation. Regulatory benefits depend on the rating label, and not on the underlying informativeness, which distorts certified rating agencies' incentives (Opp et al. (2010), Partnoy (1999)).[12] Because levels of ratings correspond to relative rankings of default risk, they can be used to comply with regulation and as a contracting basis, even if they are of limited use in valuation.

Although ratings of corporate issuers have been found to contain new information (Hand et al. (1992), Holthausen and Leftwich (1986), Dichev and Piotroski (2001) and Jorion et al. (2005)), rating agencies are not immune from conflicts of interest in their traditional rating business (Becker and Milbourn (2010)).[13] Ratings have been found to be untimely

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to avoid consolidation or recognition of off-balance-sheet financing activity, such as operating leases, securitizations with recourse, and R&D limited partnerships, in order manage their balance sheets and to report low leverage ratios (Imhoff and Thomas (1988), Beatty et al. (1995), Mills and Newberry (2005), Engel et al. (1999)).

[10]For example the historical probability of an investment-grade-rated bond defaulting within three years is 0.780%, ranging from 0.000% for an AAA-rated bond to 1.186% for Baa-rated bond (Moody's (2009), February 2009, Exhibit 46).

[11]Under the Dodd-Frank Wall Street Reform and Consumer Protection Act, rating agencies are subject to the same legal liability as auditors and security analysts (Goel and Thakor (2010)). In response, certified rating agencies have refused to have their rating incorporated in public prospectuses for structured securities, citing legal liability concerns ("SEC gives asset-backed deals 6 months' grace", FT, July 23, 2010).

[12]From 1975 until September 2007, only three to five rating agencies were certified as full NRSROs at any given point in time. Ratings by certified rating agencies are valuable to regulated investors not for their information content but to comply with regulation such as investment restrictions (Opp et al. (2010), Partnoy (1999)).

[13]Press articles include "Credit raters face heat; Moody's is sued by a fund," WSJ, September 27, 2007; "Moody's, S&P answer critics over bond calls," WSJ, September 26, 2007; "Solving 'Official' Problem.

(Beaver et al. (2006), SEC (2003)). Similarly to auditors checking off lists to document their effort provision in case of potential litigation, rating agencies may make superficial adjustments to protect themselves from regulatory intrusion and litigation (Coates (2007)). Soft adjustments, such as an analyst's assessment of management credibility, can be used to reverse the impact of adverse hard adjustments because they are more difficult to verify.

If the rating agency, as a first approximation, calculates an accurate estimate of credit risk based on its adjustments, those adjustments should be associated with the market's assessment of default risk. If they are not, they do not capture credit risk. The market's assessment of default risk, such as bond yields, serves as a reasonable benchmark of the true measure of credit risk because, under the assumption of rational expectations, the market takes into account biases rating agencies may have. For example, AAA-rated structured finance securities traded at much higher yields than AAA-rated corporate bonds, as investors price-protected (JPMorgan (2006), Adelino (2009)).[14]

Adjustments include hard adjustments, which capture adjustments to financial statement items, as well as soft adjustments, which capture the rating agency's assessment of management quality, aggressive accounting, governance risk, financial policy, industry structure, and event risk (Moody's (2007)). Adjustments to financial statement items are the net line-by-line differences in reported and adjusted balance sheets, income statements and cash flow statements. Most adjustments impact the borrower's leverage ratio. Greater leverage is associated with greater risk (Merton (1974)). Under the assumption of market efficiency,

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Investors would fare better if government stops giving status to debt-rating agencies," WSJ, September 27, 2007; "Failing grades? Why regulators fear credit rating agencies may be out of their depth," FT, May 17, 2007.

[14]Studies on stock price are consistent with the interpretation that stock prices reflect disclosed information. For example, the market price reflects the distinction between securitizations with risk transfer and those without risk transfer (Landsman et al. (2006)). Incorporating unrecognized but disclosed liabilities improves explanations of risk with respect to disclosures on leasing activity (Bowman (1980), Imhoff et al. (1993), Ely (1995), Lim et al. (2003), Altamuro et al. (2009)) and pensions (Dhaliwal (1986)). In contrast, rating and bond yield models in the finance literature generally rely on issuers' reported GAAP numbers and ignore adjustments to balance sheet debt (Kaplan and Urwitz (1979), Blume et al. (2006), Chen et al. (2007), Campbell and Taksler (2003)).

greater leverage should be reflected in higher bond yields, regardless of whether the additional debt is recognized on the face of the balance sheet or whether it is disclosed in the footnotes (Bernard and Schipper (1994)).

Hypothesis 1a: The rating agency estimates of off-balance-sheet debt are associated with higher bond yields.

Hard and soft adjustments are estimated as differences in indicated ratings produced by Moody's rating matrix. Moody's assigns ratings in two steps, assessing both quantitative and qualitative factors. First, Moody's calculates an indicated rating from a matrix of unadjusted numbers. Then Moody's calculates an indicated rating from a matrix of numbers from adjusted financial statements and other mainly quantitative factors. I define the difference between these two indicated ratings as hard adjustments because they capture the impact on credit risk by quantitative factors, such as measures of profitability, leverage, cash-flow metrics, and scale and diversity. Next, the rating agency assesses qualitative factors to estimate the actual rating. I define the soft adjustment as the difference between the actual rating and the indicated rating based on adjusted numbers. The soft adjustments capture the rating agency's assessment of management quality, aggressive accounting, governance risk, financial policy, industry structure, and event risk (Moody's (2007)). Appendix A provides a general illustration and Appendix B provides an example of Moody's rating process for 3M. I expect those adjustments to be associated with the market's assessment of default risk. If they are not, they do not capture credit risk.

Hypothesis 1b: The rating agency assessments of credit risk from hard and soft information are associated with higher bond yields.

The frictions rating agencies face may result in upward or downward bias. In case of rating inflation, rating agencies may underestimate credit risk because they face a trade-off

between issuing an independent and unbiased opinion versus issuing a favorable opinion to cater to the firm and certain regulated investors (Becker and Milbourn (2010), Bolton et al. (2010), Partnoy (1999), Opp et al. (2010)). The catering incentive is aggravated by the fact that bond issuers pay the rating agency. Less than 1% of Moody's ratings are unsolicited (Partnoy (2006)). While most investors desire an accurate, unbiased assessment of default risk for valuation purposes, in order to comply with regulation, certain regulated investors desire favorable ratings (Beaver et al. (2006)).

Evidence on ratings of structured finance products is consistent with rating inflation (Mason and Rosner (2007), Benmelech and Dlugosz (2009)). Ashcraft et al. (2010) find that although ratings of mortgage backed securities contain useful information, ratings exhibit time-variation in their risk adjustments, consistent with general rating inflation for the time period from 2005 to 2007 and, cross-sectionally, for high-risk and low-documentation loans. The current debate centers on whether rating inflation is due to active catering for business reasons or whether credit risk is underestimated because of erroneous judgments for non-traditional products. Coval et al. (2009) point out that CDOs' ratings are highly unreliable because the models used to generate them are highly sensitive to even small errors in economic projections and they also underestimate the correlation of risks across various debt securities. Griffin and Tang (2010) find evidence of upward bias in subjective adjustments on AAA-rated CDO tranches relative to their own model. He et al. (2010) find that rating agencies rate large structured product issuers more favorably.

Hypothesis 2a: The rating agency estimates of off-balance-sheet debt are associated with higher ratings after controlling for bond yields.

Hypothesis 2b: The rating agency assessments of credit risk from hard and soft information are associated with higher ratings after controlling for bond yields.

On the other hand, rating agencies may overestimate credit risk because they themselves

are subject to regulation and quasi-governmental oversight. Thus SEC-certified rating agencies act as quasi-regulators and are subject to an asymmetric loss function (Beaver et al. (2006)). Under the quasi-regulatory view, regulators and quasi-regulators have an asymmetric loss function because they are more likely to be blamed for visible bad outcomes than for equally undesirable but less obvious outcomes (Watts and Zimmerman (1986)). Anticipating investors' wrath and potential government intervention, rating agencies are expected to produce ex ante "conservative bond ratings as a result of their regulatory responsibilities" (Beaver et al. (2006)) and rating agencies are predicted to err on the side of overestimating default risk.

Hypothesis 2c: The rating agency estimates of off-balance-sheet debt are associated with lower ratings after controlling for bond yields.

Hypothesis 2d: The rating agency assessments of credit risk from hard and soft information are associated with lower ratings after controlling for bond yields.

The tension between the desire of raters to please fee-paying customers and the raters' need to maintain the overall precision and informativeness of credit ratings can result in rating inflation (Becker and Milbourn (2010)). Ratings of structured finance products have underestimated credit risk in certain time periods, but have generated large fee incomes for rating agencies. In particular, rating agencies have been found to rate large structured product issuers more favorably (He et al. (2010)). Hence I hypothesize that the underestimation in credit risk, if any, is increasing in fee income.

Hypothesis 3: The rating agency underestimates credit risk in its adjustments for large fee-generating firms relative to small fee-generating firms.

III Data

Sample selection and description

Adjustments include hard adjustments, which capture adjustments to financial statement items, as well as soft adjustments, which capture the rating agency's assessment of management quality, aggressive accounting, governance risk, financial policy, industry structure, and event risk (Moody's (2007)). Adjustments to financial statement items are the net line-by-line differences in reported and adjusted balance sheets, income statements and cash flow statements, collected from *FM* for 2002 through 2008 for U.S.-domiciled, non-financial issuers.[15] According to Moody's manual, financial statements are adjusted with respect to defined benefit pensions, operating leases, hybrid securities, securitizations, capitalized interest, employee stock compensation, inventory valued at LIFO, and unusual and nonrecurring items (Moody's (2006)). Operating leases are capitalized and a related debt obligation is recognized. Securitizations that do not fully transfer risk are treated as collateralized borrowings. Any under- or unfunded portion of defined benefit pensions is treated as debt. Hybrids are reclassified and split into their debt and equity components with weights assigned according to the hybrids' placement on Moody's debt-equity continuum classification scheme. Moody's de-recognizes capitalized interest by expensing it. Last, Moody's expenses stock-based compensation and revalues LIFO inventory on a FIFO basis.[16]

Hard and soft adjustments are estimated as differences in indicated ratings produced by Moody's rating matrix (see Appendix A). First, Moody's calculates an indicated rating from a matrix of unadjusted numbers. Then Moody's calculates an indicated rating from a matrix of numbers from adjusted financial statements and other mainly quantitative factors. I define

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[15]A few observations with zero reported revenues as well as those that are classified as financial conduits and captive finance companies are excluded because the traditional measures of leverage do not apply.

[16]Moody's adjusts inventory recorded on a LIFO basis to FIFO on the balance sheet but does not adjust cost of goods sold.

the difference between these two indicated ratings as hard adjustments because they capture the impact on credit risk by quantitative factors, such as measures of profitability, leverage, cash-flow metrics, and scale and diversity. Next, the rating agency assesses qualitative factors to estimate the actual rating. I define the soft adjustment as the difference between the actual rating and the indicated rating based on adjusted numbers. The soft adjustments capture the rating agency's assessment of management quality, aggressive accounting, governance risk, financial policy, industry structure, and event risk (Moody's (2007)). Appendix B provides an example of Moody's rating process for 3M.

The pricing tests require bond-specific information, such as offering yield spreads (the difference between the issue's offering yield and the yield of the benchmark treasury issue), size of the offering, offering date, level of seniority, and whether the bond is secured. The financial statement information from *FM* is matched at the firm level by issuer CUSIP and firm name with bond data from the *Mergent Fixed Income Securities Database* (*FISD*). In order to be matched with an issuer-year, the bond must be issued within the twelve-month period beginning at least three months after the end of the fiscal year, to ensure the financial statements are available to outside investors via the SEC.

The sample consists of 1,210 firm-year-bond observations.[17] Panels A and B in Table 1 report the sample breakdown by year and rating. Observations are spread almost evenly over all years, with fewer observations for the final year. Most issuers have A, Baa, Ba, or B ratings around the investment-grade/speculative-grade cutoff of Baa/Ba. The majority of bonds issued by the sample firms have yield spreads between 50 and 400 basis points, maturities between five and fifteen years, and offering sizes of less than USD500 million (Table 1 Panel C).

Firm characteristics are based on reported financial statements (Table 1 Panel D.) The

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[17]Out of 1,963 bond issues with required data, I eliminate additional bond issues for each issuer-year and retain only one randomly chosen bond issue for each issuer-year, which leaves a sample of 1,210 unique firm-year bond issues.

firms have average (median) total assets of USD12.7 billion (USD5.4 billion). They have average leverage of 0.35, coverage ratio of 10.0, operating margin of 0.14, return on assets of 0.09, and asset tangibility of 0.55. Leverage is calculated as the ratio of debt to total assets. Operating margin equals the ratio of operating profit to revenues (winsorized at -0.5). Coverage equals the ratio of EBIT to interest expense (winsorized at 0 and 100). Return on assets equals the ratio of operating profit to total assets. Tangibility equals the ratio of inventory and net PPE to total assets (winsorized at the first and 99th percentile). On average, a firm issues six bonds in the prior five years. Frequent bond issuers are those that issue more than six bonds in the prior five years, the sample median. They are larger than infrequent bond issuers, yet are similar in terms of leverage, profitability and tangibility.

INSERT TABLE 1 HERE

Rating agency's adjustments to financial statements

Table 2 Panel A documents the extent of the rating agency's adjustments to financial statements and the impact of those adjustments on leverage, profitability and cash flow ratios. The table reports the scaled net adjustment, that is, the difference between the as-reported and the adjusted account, divided by total reported assets. In addition, the table reports the frequency of adjustments as a proportion of firm-year observations that experience a change. Overall, these findings provide new evidence on the widespread extent and magnitude of disclosed off-balance-sheet debt. For 96% of the sample, long-term debt increases as a result of the recognition of off-balance-sheet debt and the reclassification within the balance sheet of on-balance-sheet hybrids. The median increase for net long-term debt amounts to 6% of total assets, despite the fact that some long-term debt is reclassified as short-term debt. The median increase of total liabilities amounts to 5% of total assets, which is primarily caused by increases in net long-term debt and recognition of obligations from operating leases. The

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average effects are even greater because for a number of firms the adjustments are substantial. Compared with the adjustments to debt and liabilities, the impact on shareholders' equity is small. Although for 55% of the sample shareholders' equity decreases, the amount is small (the median change in shareholders' equity amounts to 0.1% of total assets). For 89% of all firm-year observations, total assets are increased by the adjustments, mainly due to the recognition of additional property, plant and equipment (PPE). The median increase in total assets amounts to 4%. PPE is adjusted upward for 95% of all observations. Inventory and accounts receivable are adjusted upward for 15% and 10% of the sample, respectively, as a result of inventory revaluation and the reversing of securitizations with recourse.[18] The frequency and magnitude of the adjustment to goodwill and other intangibles is negligible (untabulated).

Due to the recognition of additional debt the rating agency reclassifies certain operating expenses as interest expense and depreciates adjusted PPE. As a result of the reclassification, gross profit and operating profit increase for 68% and 70% of all observations, respectively, but pre-tax income decreases for 67% of the sample. In terms of the bottom line, net income is adjusted downward for 67% of the sample. For most firms, the consolidation of operating leases leads to increases in operating cash flows and decreases in investing cash flows, which reflects the reclassification of the principal portion of rent expense as non-operating and the simulation of capital expenditures for assets under operating leases, respectively.

INSERT TABLE 2 HERE

The rating agency's adjustments to financial statements significantly impact leverage, coverage and cash flow ratios. As reported in the bottom panel of Table 2, as a result of the rating agency's adjustments, leverage and coverage ratios show higher levels of indebtedness. The total debt leverage ratio (total debt divided by total assets) experiences a median

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[18]Note that adjustments for securitizations only affect the balance sheet but not net income because gains on sale from securitizations with recourse are not automatically reversed in the income statement.

increase of 14%, the net long-term debt ratio (net long-term debt divided by total assets) experiences a median increase of 15%, and the coverage ratio experiences a median decrease of 18%. Figure 1 Graphs 1 and 2 present scatter plots of leverage and interest coverage, respectively, with reported ratios on the horizontal axis and adjusted ratios on the vertical axis. Most observations are above (below) the 45-degree line: With a few exceptions, the adjusted leverage ratios exceed reported leverage ratios (and vice versa for the coverage ratio). If the rating agencies' adjustments proxy for economic off-balance-sheet financing, book leverage ratios are significantly understated for a majority of the observations. Furthermore, the cash flow to debt ratios deteriorate as well, due to the overall increase of indebtedness (Figure 1 Graphs 5 and 6). The adjustments are leverage-increasing, which is the result of 1) internal reclassification within the balance sheet (e.g., preferred stock is treated as debt but there is no change in total assets) and 2) the recognition of additional assets and assumed debt, rather than equity, financing. In contrast, the impact of adjustments on return on assets (ROA) and operating margin are more symmetrical (Figure 1 Graphs 3 and 4).

INSERT FIGURE 1 HERE

Table 2 Panel B reports the frequency and magnitude of adjustments for operating leases and additions to long-term debt by industry. Industry sectors are based on Moody's industry classification. Electric utilities, energy and retail are the largest industry concentrations. Across all industries, long-term debt is adjusted upward, with median amounts ranging from around 2% for products processors and homebuilding to over 40% for restaurants and postal and express delivery. A major contributor to the off-balance-sheet debt adjustment is the conversion of operating leases to capital leases. The role of leases varies across industries. However, all industries exhibit high frequency of leases: Moody's analysts capitalize leases for 80% to 100% of sample observations in each industry, except for one of the industries with one observation only (natural food processor). The median amounts of capitalized

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leases as percentage of total assets range from 1-2% for some utilities, metals/mining/steel and tobacco to 50% for restaurants and around 30% for airlines and construction. Under the proposed accounting rules on lease accounting as discussed in the joint project between FASB and IASB, leverage ratios are likely to increase substantially, unless firms restructure their financings (Imhoff and Thomas (1988)).

Hard and soft adjustments

Figure 2 documents that the rating agency's adjustments represent increases in credit risk: actual ratings tend to be lower than ratings as indicated by adjusted financials, which in turn tend to be lower than ratings indicated by reported financials.[19] On average, both hard and soft adjustments lower the rating. The average hard adjustment lowers the rating by 0.38 notches, the average soft adjustment lowers the rating by 0.40 notches, and the average total adjustment lowers it by 0.78 notches. Rating agencies conservative assessment seem to indicate that firms' GAAP numbers understate credit risk.

INSERT FIGURE 2 HERE

IV Multivariate results

Rating and bond yield regressions (Hypothesis 1)

First, I establish that the major line-by-line adjustments by the rating agency capture increases in credit risk from higher leverage due to off-balance-sheet finance and that hence, they are associated with ratings. Following the rating prediction literature, I estimate the default risk model with the following the specification.[20]

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[19]Information on indicated ratings is available for a sample of 2,398 firm-year observations.

[20]Early papers in that literature employ linear regression and discriminant analysis, whereas later papers use an ordered probit approach. In general, firm-specific variables include financial ratios measuring prof-

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$$Rating_{t,i} = \alpha + \beta ADJ_{t,i} + \sum_{n} \gamma_n FirmChar_{n,t,i} + \epsilon_{t,i} \tag{1}$$

The dependent variable, *Rating*, is Moody's long-term issuer rating on the filing date, converted into numerical values from 1 (AAA) to 21 (C). *ADJ* is the net adjustment as calculated by the rating agency to various major line items reported in the financial statements, scaled by total assets. The most important one is off-balance-sheet-debt, which is the net adjustment to debt as reported on the balance sheet, scaled by total assets. Adjusted debt differs from reported debt because the rating agency includes off-balance-sheet debt. The net adjustment to debt includes various specifications: adjustments to total debt, long-term debt, total liabilities, and the capitalized operating lease obligation. Furthermore, I include adjustments to cash flows and profits. HARD is the difference between the indicated (adjusted) rating and the indicated (reported) rating. SOFT is the difference between the actual rating and the indicated (adjusted) rating. TOTAL is the difference between the actual rating and the indicated (reported) rating. Greater values of hard, soft and total adjustments imply greater credit risk. Firm characteristics (*FirmChar*) control for firm size (logarithm of revenues), profitability (operating margin and return on assets), leverage (leverage and coverage), and asset tangibility. These controls are based on recognized amounts. Fixed effects for regulated industries are included. Year fixed effects control for changes in the macroeconomic environment.[21]

The rating will not be associated with the rating agency's line-by-line adjustments if the adjustments are made mechanically in the first stage and then reversed by soft adjustments

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itability, leverage, and interest coverage as well as size. Later models include measures of equity risk (market beta and unsystematic risk). Rating predictions models are estimated in Horrigan (1966), West (1970), Pogue and Soldofsky (1969), Pinches and Mingo (1973), Kaplan and Urwitz (1979), Ederington (1985), and Blume et al. (2006).

[21]No other control variables, such as equity beta or equity volatility, are included because the objective is to test for the association between adjustments and default risk, rather than to maximize the explanatory power of the default risk model per se, and because those variables are likely to be a function of the off-balance-sheet debt estimates.

in the second stage, or if the line-by-line adjustments are not material in capturing credit risk. Otherwise, higher levels of rating agency estimates of off-balance-sheet debt as well as unfavorable soft adjustments are expected to be associated with lower ratings.

To test whether the rating agency's adjustments are associated with higher bond yields (Hypothesis 1), the *YieldSpread*, a market-based measure of default risk, is regressed on the rating agency adjustments in addition to issue-specific variables acting as controls. This regression tests whether variation in the rating agency's adjustments to financial statements explains variation in bond investors' assessment of default risk. The yield spread on public bonds measures bond investors' assessment of default risk. Issue-specific variables in prior research include subordination and issue size. Recent models of bond yields, such as in Campbell and Taksler (2003) and Chen et al. (2007), build on results from the rating prediction literature, in particular the rating model in Blume et al. (2006).

$$Spread_{t+1,i} = \alpha + \beta ADJ_{t,i} + \sum_n \gamma_n FirmChar_{n,t,i} + \sum_m \delta_m IssueSpec_{m,t+1,i} + \epsilon_{t,i} \qquad (2)$$

The Spread is the difference between the issue's yield to maturity and the yield on a treasury bond with a comparable maturity, measured on the date the bond is issued.[22] Its natural logarithm is included in the yield regression. The firm characteristics are measured at fiscal year-end. To ensure that bond holders have the information contained in the financial statements, bonds are required to be issued during the twelve-month period three months after fiscal year-end. The issue-specific control variables (*IssueSpec*) are time to maturity, issue size (logarithm of offering amount), and a dummy variable equal to one if the bond is senior and secured. Bond yield is expected to be an increasing function of business risk and leverage, the ratio of debt to firm value ratio (Merton (1974)).

The correlation matrix in Table 3 shows that yield spread and rating are highly correlated

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[22]This is subject to the caveat that in addition to default risk the spread reflects compensation for taxes and a systematic risk premium (Elton et al. (2001)) and a premium for liquidity (Chen et al. (2007)).

(Pearson coefficient of 0.66). The major adjustments of balance sheet accounts, namely additions to total debt, obligation from capitalizing operating leases, long-term debt, and total liabilities, are correlated with lower ratings and higher yield spreads. Soft and total adjustments are correlated with lower ratings and higher bond yields. All of these correlations are significant at 5%.

Increases in CFO, decreases in CFI, and increases in gross profits arising from rating agency adjustments are associated with lower ratings and higher yield spreads, as these adjustments indirectly reflect the impact of off-balance-sheet debt adjustments. The rating agency's hard adjustments and total adjustments are significantly and highly correlated with adjustments to book-debt, operating cash flow, investing cash flow, free cash flow and gross profit. The adjustments to CFO and CFI, as well as those to gross profit and operating profit, largely reflect the recognition of off-balance-sheet debt. The correlations between soft adjustments and adjustments to financial statements (book-debt, CFO, CFI and gross profit) are also significant, but are substantially smaller, which suggests that soft adjustments capture other factors than the amount of off-balance-sheet debt.

The univariate correlations of the control variables with rating and spread have the expected sign. Greater profitability and size are correlated with higher ratings and lower yield spreads. Leverage based on book debt is correlated with lower ratings and higher yield spreads.

INSERT TABLE 3 HERE

Table 4 Panel A documents that adjustments for off-balance-sheet debt are significantly associated with lower ratings. Increases in total debt, the capitalized operating lease obligation, increases in long-term debt, and increases in total liabilities are significantly associated with lower ratings (columns 1-4). Increases in CFO, decreases in CFI, and increases in gross profits arising from rating agency adjustments are associated with lower ratings, as these

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adjustments indirectly reflect the impact of off-balance-sheet debt adjustments (columns 5-8). The results for the restricted model (column 9) are consistent with the findings in the rating prediction model literature. Because rating is an ordered categorical variable, the ordered probit specification is conceptually more appealing (Ederington (1985)). However, as a practical matter, the empirical results from the ordered probit specification do not differ from the results obtained in the OLS regressions (column 10). Overall, the footnote-based estimates of off-balance-sheet debt are associated with lower ratings.

As seen in Table 4 Panel B, the results for the model using yield spread as the dependent variable are similar to the results from the rating regressions. Increases in total debt from the rating agency adjustments are significantly associated with higher yield spreads (column 11). For a one-unit increase in the scaled increase in total debt, the yield spread increases by 58%. Similarly, the capitalized operating lease obligation, increases in long-term debt, and increases in total liabilities are all significantly associated with higher yield spreads (columns 12-14). Increases in CFO, decreases in CFI, and increases in gross profits – which primarily reflect the adjustment for off-balance-sheet debt – are associated with higher yield spreads. The control variables have the expected signs: the bigger and more profitable the firm, the lower the yield spread (and the higher the rating); the more levered, the higher the yield spread (the lower the rating). The footnote-based estimates of off-balance-sheet debt are priced in the bond market. Hence, I fail to reject that the rating agency adjustments to recognized numbers are associated with higher bond yields (Hypothesis 1a).

INSERT TABLE 4 HERE

Furthermore, I conduct a non-nested J-test as a misspecification test (Davidson and MacKinnon (1981), Maddala (2001)) and compare the default risk model based on adjusted ratios to one based on reported ratios and test which model should be accepted or rejected

given the other specification. The two specifications are:

$$ADJ : DefaultRisk = \lambda AdjustedFirmChar + \delta IssueSpec + \epsilon \qquad (3)$$

$$REP : DefaultRisk = \lambda ReportedFirmChar + \delta IssueSpec + \epsilon \qquad (4)$$

Firm characteristics ($FirmChar$) include size, profitability, coverage, leverage and tangibility.

$ReportedFirmChar$ refers to those characteristics measured by accounting ratios based on numbers as recognized in financial statements, whereas $AdjustedFirmChar$ refers to those accounting numbers based on the numbers as adjusted by the rating agency. To test whether financials adjusted by the rating agency is the correct default risk model, the predicted default risk ($\widehat{DefaultRisk}$) is estimated by running the alternative specification, the REP model, which is then included as an additional explanatory variable in the estimation of the ADJ model.

In column 1 of Table 4 Panel C, the coefficient of $\widehat{Rating}$ is insignificant with a t-stat of 0.97. Because $\widehat{Rating}$ has no significant explanatory power beyond what the explanatory variables in the ADJ model contribute, I cannot reject that adjusted numbers explain the rating, if the alternative is to use reported numbers. The process is reversed in column 2, which reports the results from the test of a default risk model based on reported numbers against a model based on adjusted numbers. Here, the coefficient of the predicted value of the rating is significant with a t-stat of 5.21; hence, I reject the model specification based on reported numbers. According to the non-nested J-test, the rating model based on adjusted firm characteristics provides a better fit than a model based on the reported firm characteristics. Rating agency adjustments to recognized GAAP numbers improve the explanatory power of rating prediction models.

The same conclusion holds for the yield spread models: Compared with reported ratios, financial ratios adjusted by the rating agencies better explain default risk. In column 3 of Table 4 Panel C, the coefficient of $ln(\widehat{Spread})$ is insignificant with a t-stat of 0.83. Because $ln(\widehat{Spread})$ has no significant explanatory power beyond what the explanatory variables in the ADJ model contribute, I reject that adjusted numbers do not explain the yield spread if the alternative is to use reported numbers. Column 4 reports the results from the test of a default risk model based on reported numbers against a model based on adjusted numbers. Here, the coefficient of the predicted value of the spread is significant with a t-stat of 4.59; hence, I reject the model specification based on reported numbers. According to the non-nested J-test, the default spread model based on adjusted firm characteristics provides a better fit than a model based on the reported firm characteristics. Rating agency adjustments to recognized GAAP numbers significantly improve the explanatory power of default pricing models.

Table 5 reports the estimates of the default risk model for total, soft and hard adjustments. Hard adjustments are correlated with lower ratings, but not significant. Soft adjustments and total adjustments are significantly associated with lower ratings (columns 1-3). The results for the regression of yield spread on hard, soft and total adjustments are consistent with the results in the rating regression. Hard adjustments are correlated with higher yield spreads, but not statistically significant (column 4). Soft adjustments and total adjustments are significantly correlated with higher yield spreads (columns 5-6). Hence, I fail to reject that the rating agency assessment of qualitative risk factors are associated with higher bond yields (Hypothesis 1b).

Ratings are more than a mechanical mapping of firm characteristics, instead, they also incorporate the rating agency's qualitative assessment of credit risk arising from soft factors. Furthermore, the rating agency's total adjustments and its qualitative assessment of credit risk arising from soft factors seem to capture true default risk given that they are priced in

the public debt market.

General bias in adjustments (Hypothesis 2)

Table 6 reports whether rating agency adjustments are biased upwards or downwards, by testing whether footnote-based adjustments are associated with the rating after controlling for the yield spread.

$$Rating_{t,i} = \alpha + \rho Spread_{t+1,i} + \beta ADJ_{t,i} + \epsilon_{t,i} \tag{5}$$

After controlling for the yield spread, I find that the rating agency's adjustment for off-balance-sheet debt is not associated with the rating (columns 1-4). The market assessment of default risk largely subsumes the estimate for off-balance-sheet financing. However, soft and total adjustments are significantly associated with lower ratings, after controlling for the yield spread. I reject the hypothesis that the rating agency underestimates the amount of off-balance-sheet debt as estimated from footnote disclosures. However, I fail to reject the hypothesis that the rating agency underestimates the credit risk arising from soft factors based on qualitative information. The evidence suggests that for soft and total adjustments, the rating agency assessment is too pessimistic, relative to the bond yield.

As a robustness test, I estimate the regression with a set of firm controls and as an ordered probit specification. The results remain unchanged. Soft and total adjustments are correlated with lower ratings, after controlling for the bond yield.

Catering to large fee-generating firms (Hypothesis 3)

To test whether the rating agency's adjustments are biased for a subset of firms with repeated interactions with rating agencies, the yield spread is regressed on rating agency adjustments, a proxy for the firm's relationship with the agency and interaction terms. The proxy for the issuer's relationship with the rating agency captures whether the firm has substantial public bond issuance activity. *NofBHigh* equals one if the number of bonds issued in the prior five years (NofB) is greater than the sample median, and zero otherwise.

$$
\begin{aligned}
Spread_{t+1,i} \;=\; & \alpha + \beta ADJ_{t,i} + \kappa NofBHigh_{t,i} + \lambda NofBHigh_{t,i} * ADJ_{t,i} \\
& + \sum_n \gamma_n FirmChar_{n,t,i} + \sum_m \delta_m IssueSpec_{m,t+1,i} + \epsilon \qquad (6)
\end{aligned}
$$

The results are presented in Table 7. Rating agency estimates for off-balance-sheet debt and soft and total adjustments are associated with higher yield spreads. However, the coefficients of the interaction between the rating agency adjustment and the relationship variable are not significant. The evidence is not consistent with the hypothesis that the rating agency caters to firms with frequent bond offerings (Hypothesis 3).

A limitation of the proxy is that the number of past bond offerings is highly correlated with firm size (correlation between indicator for frequent bond issuance and firm size of 0.34). Rating agencies assess bigger firms as less risky. Estimating the above model without firm size as control results in significant negative coefficients for some of the interaction terms for the adjustments (untabulated), which is consistent with the view that the interaction term between *NofBHigh* and the rating agency estimate of off-balance-sheet debt captures the risk differential arising from size.

INSERT TABLE 7 HERE

Robustness test to address circularity problem

Archival pricing studies suffer from the circularity problem (Bernard and Schipper (1994), Holthausen and Watts (2001)). "One can assume market efficiency and test whether the disclosed item is relevant for valuation. Alternatively, one can assume that the disclosed item is relevant, and test whether the market efficiently processes the disclosed item" (Bernard and Schipper (1994)). Whereas prior research has varied the mix of recognition and disclosure, this study varies the level of market efficiency by partitioning firms into a rich information environment and a poor information environment. The rich information environment serves as the default setting as discussed above. In contrast, in the poor information environment the market efficiency assumption is relaxed. Using the rating agency's estimates as proxy for disclosed off-balance-sheet debt activity, I test whether the market efficiently processes footnote-based off-balance-sheet disclosures. In the poor information environment, book-debt and off-balance-sheet debt (that is disclosed) should be equivalently priced (Merton (1974)). However market participants may fail to fully impound information due to irrationality or information processing costs. Although empirical pricing studies largely support the irrelevancy of information location, they do not always provide full support for the equivalence of recognized and disclosed items (Beattie et al. (2000)). With respect to the pricing of soft and hard information, Rajan et al. (2010) find an overreliance on hard factors at the expense of soft information for the pricing of subprime mortgage loans.

Hence in an untabulated robustness test I investigate whether the market efficiently processes credit risk relevant information disclosed 10-K's footnotes. To proxy for differences in firms' information environments, the sample is partitioned into public and private firms to measure rich and poor information settings, respectively. Sample observations are categorized as public if they have public equity outstanding; otherwise, they are classified as

private.[23]

Firms with public equity outstanding are part of a rich information setting because a dispersed group of shareholders and other information intermediaries, such as equity research analysts and the press, process and disseminate information (Burgstahler et al. (2006), Ball and Shivakumar (2005), Ball and Shivakumar (2008)). However, it is possible that public firms have lower financial reporting quality as a result of more earnings management than private firms, because public firms are subject to more capital market pressures (Givoly et al. (2010), Beatty et al. (2002)). Nevertheless, public firms' overall public information environment is likely to be richer because private firms mainly provide public disclosures to their existing and potential bond holders following SEC disclosure requirements (Bartlett (2008)), and rely on private communication channel with their owners. The identifying assumption that private firms operate in a poorer information setting than public firms is supported by evidence based on secondary debt pricing: Loans of public issuers trade at lower bid-ask spreads than loans of private issuers. To be more specific, facilities of publicly reporting firms experience spreads that are an economically and statistically significant 13.6 cents lower than spreads on facilities of private firms (Wittenberg-Moerman (2008)). Furthermore, private firms tend to be smaller than public firms, and smaller size is correlated with a poorer information environment. I find that private firms tend to be smaller than public firms in terms of revenues and total assets, but have similar leverage and profitability (untabulated).

For the subsets of the firms in the rich and poor information settings, the extent and magnitude of the adjustments do not differ substantially across the two subsets (untabulated). However, the impact of the adjustments to firms' financial statements reveals a substantial larger amount of off-balance-sheet financing for public firms. The impact on profitability ratios is similar for public and private firms, perhaps mitigating concerns about differences

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[23]Using this partition has not been feasible in prior studies whose pricing tests are based on equity price (Bowman (1980), Imhoff et al. (1993), Ely (1995), Dhaliwal (1986), Franco et al. (2011)).

in earnings quality, to the extent that rating agencies successfully reverse earnings management. The results for public firms are substantially equivalent to the results presented for the full sample. For private firms, I find that increases in total debt, the capitalized operating lease obligation, increases in long-term debt, and increases in total liabilities are significantly associated with lower ratings. In addition, I find that adjustments for off-balance-sheet debt are significantly associated with higher yield spreads: Increases in total debt, the capitalized operating lease obligation, increases in long-term debt, and increases in total liabilities are significantly associated with higher yield spreads. Increases in CFO and decreases in CFI arising from rating agency adjustments are associated with higher yield spreads. The evidence from the regressions is consistent with the view that the market efficiently processes footnote-based off-balance-sheet financing disclosures.

V Conclusion

This study investigates how a major rating agency uses accounting information to rate bond issuers' creditworthiness and finds that the agency makes extensive adjustments to GAAP balance sheets, income statements and cash flow statements based on publicly available disclosures as well as soft adjustments. Using bond yields as a benchmark to capture the market's assessment of default risk, I find the estimates of off-balance-sheet debt, as well as soft adjustments, are associated with higher bond yields. The evidence is consistent with the view that the rating agency's adjustments for off-balance-sheet debt and its qualitative assessment of credit risk (soft adjustments) are not merely window dressing in order to protect rating agencies from regulatory intervention, but that they generate more accurate estimates of default risk.

Most adjustments by the rating agency are related to additions to debt, primarily from the capitalization of operating leases and to a smaller extent from re-recognizing securitiza-

tions. The rating agency's adjustments substantially increase leverage ratios. Lower reported leverage ratios represent a financial reporting benefit for which firm engage in off-balance-sheet financing arrangements. With respect to off-balance-sheet economic activity, the SEC's 2005 Report states the concern that "many of the areas dealing with off-balance-sheet arrangements involve significant use of accounting-motivated structured transactions" (SEC (2005)). To the extent that the rating agency's adjustments capture economic off-balance-sheet financing, leverage ratios based on reported GAAP numbers significantly understate default risk for a majority of the observations in my sample, given that find that on-balance-sheet debt understates economic debt for more than 96% of the sample observations. This cosmetic financial reporting benefit is questionable, however, because users can estimate the magnitude of such arrangements to the extent that those arrangements are disclosed. The evidence in this paper shows that rating agencies are not fixated on bright-line recognition criteria but incorporate these arrangements into their ratings.

Although the paper provides evidence consistent with the view that rating agencies are, for the most part, efficient processors of accounting information, at least for traditional credit risk assessments of corporate issuers, soft adjustments may be too conservative relative to bond yields.

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Appendix A

Rating process (Moody's Financial Metrics)

TOTAL

HARD

SOFT

Indicated rating (reported)	Indicated rating (adjusted)	Actual rating

- Reported financial statements
- Nonfinancial statement data

- Adjusted financial statements
- Nonfinancial statement data

- Adjusted financial statements
- Nonfinancial statement data
- Qualitative factors
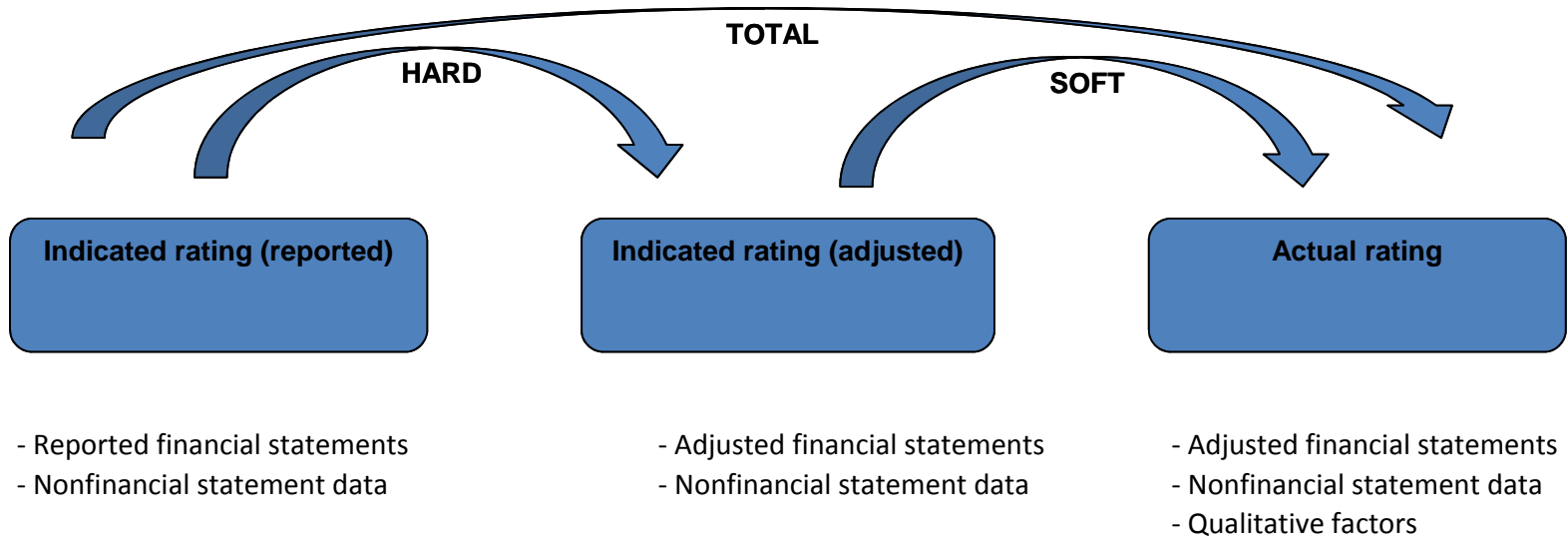
Appendix B
Illustration of rating process

3M as of 12/31/2007	Weight	As reported	As adjusted
Factor 1: Business profile			
Product Diversity	5.0%	Aa	Aa
Customer Diversity	5.0%	Aaa	Aaa
Regional Diversity	5.0%	Aa	Aa
Market Position	5.0%	Aaa	Aaa
End-Market Diversity	5.0%	Aaa	Aaa
Factor 2: Size and stability			
Revenues (billions USD)	5.0%	$24.46	$24.46
Stability of Revenue Growth (STDEV)	5.0%	1.76%	1.76%
Factor 3: Cost position and profitability			
EBITA Margin (3-year Average)	5.0%	25.03%	22.49%
ROA (EBITA / Av. Assets) (3-year Average)	5.0%	26.61%	24.11%
Factor 4: Financial policy			
Debt / Book Capital (3-yr average)	5.0%	24.82%	37.40%
Debt / EBITDA (3-yr average)	10.0%	0.53x	0.95x
Liquidity Assessment	10.0%	A	A
Factor 5: Financial strength			
EBITDA / Interest Expense (3-year Average)	10.0%	46.28x	18.78x
FFO / Debt (3-year Average)	10.0%	120.28%	71.09%
FCF / Debt (3-year Average)	10.0%	48.50%	30.13%
Indicated Rating (reported)		Aa1	
Indicated Rating (adjusted)			Aa2

Rating	Letter	Numeric
Indicated Rating (reported)	Aa1	2
Indicated Rating (adjusted)	Aa2	3
Actual rating	Aa1	2
HARD		1
SOFT		-1
TOTAL		0

Source: Moody's Financial Metrics

Figure 1
Scatter Plots of Reported versus Adjusted Leverage and Profitability Ratios

The leverage ratio is the ratio of total debt to total assets. Total debt is the sum of long-term and short-term debt. The coverage ratio is the ratio of EBIT to total interest expense. ROA is the ratio of operating profit to total assets. Operating Margin is the ratio of operating profit to revenues. Cash flow debt ratio is the ratio of debt to total debt. CFO is operating cash flow. FCF is free cash flow which equals the sum of operating cash flow and investing cash flow. Reported indicates the ratio is calculated from amounts as reported in the financial statements. Adjusted indicates the ratio is calculated from amounts as adjusted by the rating agency. The 45 degree line is shown for reference.

Leverage and interest coverage ratios (Graphs 1 and 2)   **Profitability ratios (Graphs 3 and 4)**   **Cash flow ratios (Graphs 5 and 6)**
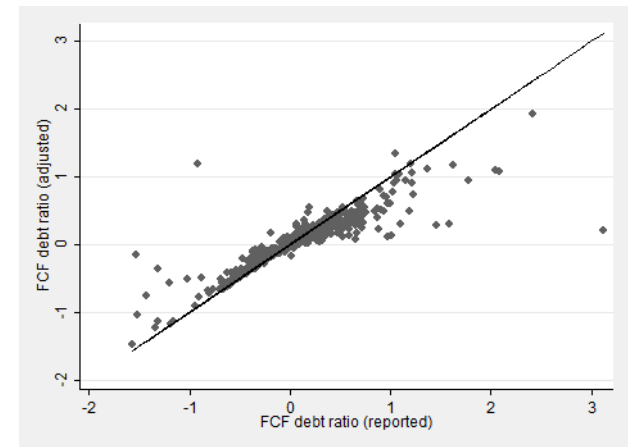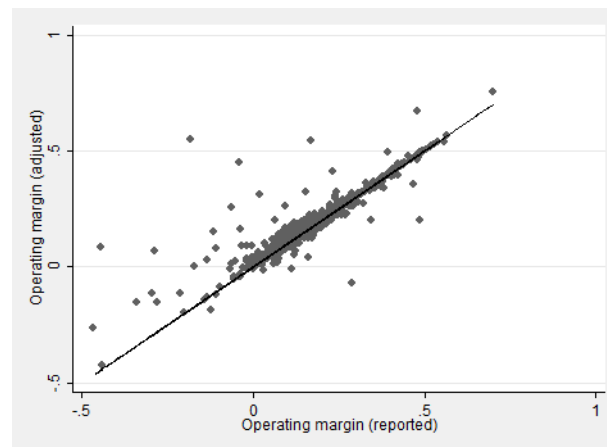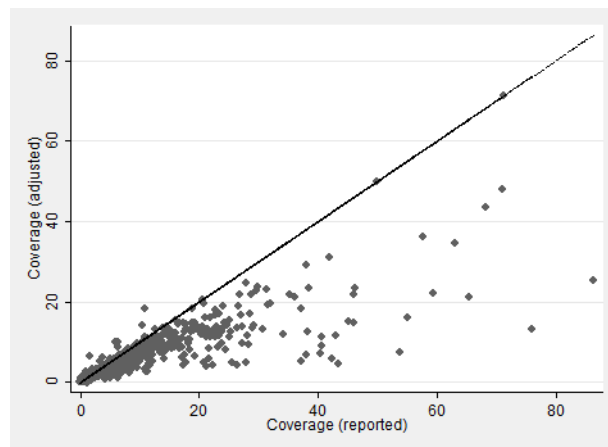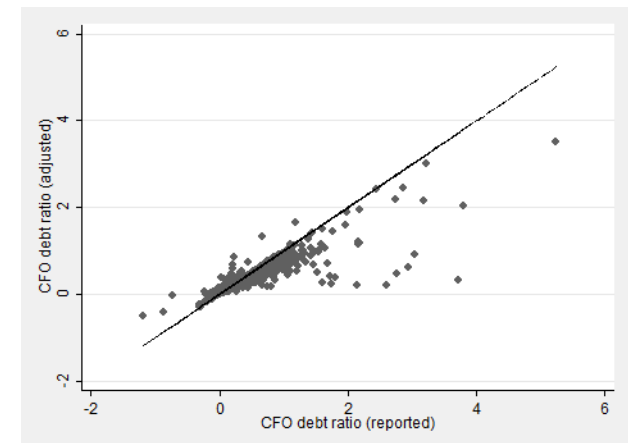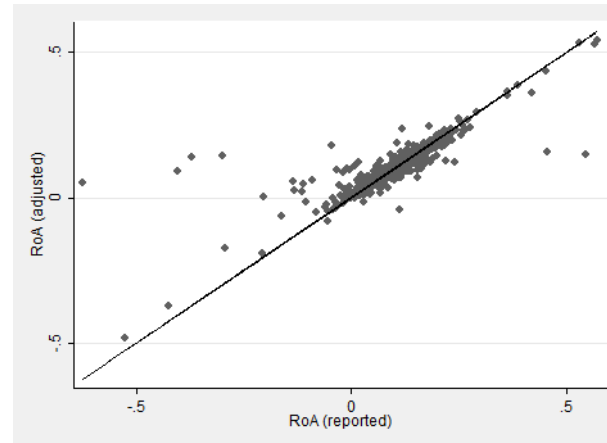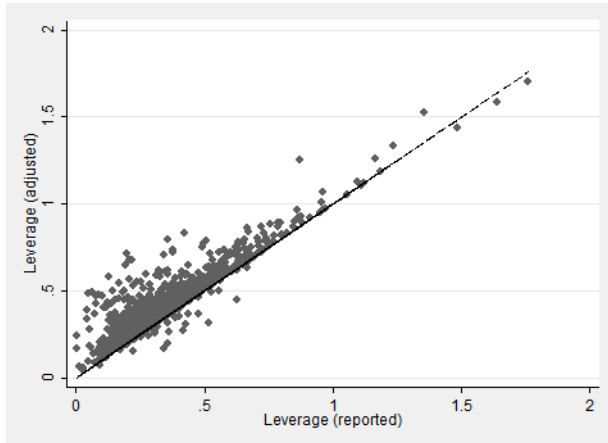
Figure 2
Frequency Distribution of Actual and Indicated Ratings

The actual rating is the rating agency's issuer rating as published in its reports. The indicated rating (reported F/S) is the rating implied by a matrix of firm characteristics based on GAAP financials, using the rating agency's industry-specific model. The indicated rating (adjusted F/S) is the rating implied by a matrix of firm characteristics based on financials as adjusted by the rating agency. Rating is assigned a number from 1 (for Aaa) to 21 (for C). The sample consists of 2,398 firm-year observations with available information on actual and indicated ratings.
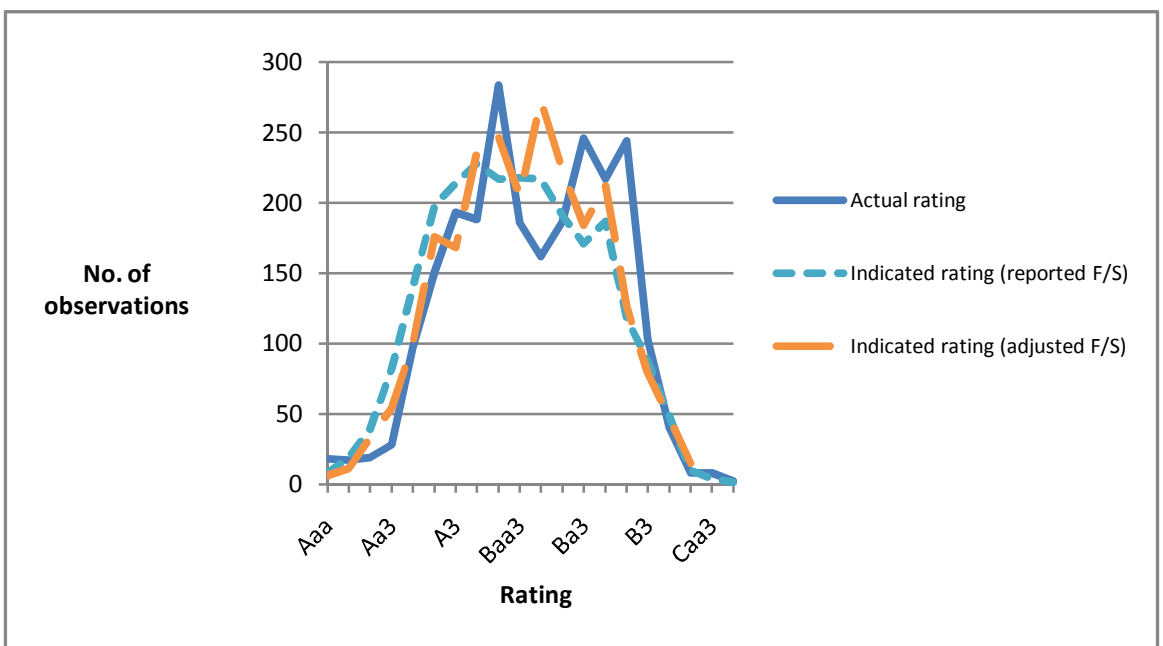
Table 1
Sample Description

The table reports descriptive statistics. Panels A and B report the breakdown of the two samples by year and rating. Panels C and D report bond and firm characteristics, respectively. Yield spread equals the difference between offering yield and yield on a comparable treasury security in basis points. Leverage is the ratio of debt to total assets. Operating margin equals the ratio of operating profit to revenues. Coverage equals the ratio of EBIT to interest expense. Return on assets equals the ratio of operating profit to total assets. Tangiblity equals the ratio of inventory and net PPE to total assets. NofB is the number of bonds issued in the prior five years. Year refers to the fiscal year that ends during the twelve months three months before the bond issue. N refers to the number of observations.

Panel A			*Panel B*	
Year	**N**		**Rating**	**N**
2002	273		Aaa	9
2003	187		Aa	41
2004	157		A	275
2005	148		Baa	429
2006	172		Ba	269
2007	176		B	174
2008	97		Caa	13
Total	1,210		Total	1,210

Panel C
Bond characteristics

Yield spread (basispoints)	**N**		**Security level**	**N**
YS<100bps	218		None	1
100bps<YS<150bps	237		Junior subordinate	4
150bps<YS<200bps	141		Senior subordinate	108
200bps<YS<400bps	378		Senior	952
400bps<YS<600bps	161		Senior secured	145
600bps<YS	75		Total	1,210
Total	1,210			
			Maturity (years)	**N**
Offering amount (USD million)	**N**		maturity<1	0
amt<250	383		1<maturity<5	38
250<amt<500	506		5<maturity<10	453
500<amt<750	201		10<maturity<15	548
750<amt<1,000	45		15<maturity<20	9
1,000<amt	75		20<maturity	162
Total	1,210		Total	1,210

Table 1
Sample Description

Panel D						
Firm characteristics (as reported)	**Mean**	**p25**	**p50**	**p75**	**SD**	**N**
Full Sample						
Total assets (USD million)	12,763	2,137	5,414	15,267	22,441	1,210
Revenues (USD million)	10,245	1,255	3,476	9,252	25,844	1,210
Leverage (total debt)	0.35	0.24	0.33	0.42	0.18	1,210
Coverage	10.00	2.10	4.00	8.20	26.00	1,210
Operating margin	0.14	0.08	0.13	0.20	0.12	1,210
Return on assets	0.09	0.06	0.08	0.12	0.09	1,210
Tangibility	0.55	0.36	0.59	0.75	0.24	1,210
NofB	6.21	3.00	4.00	7.00	14.22	1,118
Frequent bond issuers						
Total assets (USD million)	19,135	4,749	12,372	23,150	27,533	424
Revenues (USD million)	13,853	2,446	6,530	12,702	31,264	424
Leverage (total debt)	0.37	0.26	0.35	0.44	0.17	424
Coverage	11.00	2.10	3.90	7.70	27.00	424
Operating margin	0.15	0.09	0.14	0.21	0.12	424
Return on assets	0.08	0.05	0.08	0.11	0.07	424
Tangibility	0.55	0.35	0.61	0.77	0.25	424
NofB	11.00	7.00	8.00	11.00	22.00	424
Infrequent bond issuers						
Total assets (USD million)	7,283	1,453	3,019	7,252	13,922	694
Revenues (USD million)	5,955	939	2,060	5,289	13,319	694
Leverage (total debt)	0.35	0.23	0.31	0.42	0.19	694
Coverage	9.80	2.00	4.00	8.20	24.00	694
Operating margin	0.14	0.07	0.12	0.19	0.12	694
Return on assets	0.09	0.06	0.08	0.12	0.09	694
Tangibility	0.55	0.36	0.58	0.74	0.23	694
NofB	3.00	2.00	3.00	4.00	1.30	694

Table 2
Rating Agency's Adjustments to Reported Financial Statements

Panel A reports adjustments for the full sample and Panel B reports adjustments for leases and to debt by industry. Industries are classified according to Moody's scheme. Net adjustment is the difference between the adjusted and reported account. Net adjustment in % of total assets is the net adjustment divided by total reported assets. Total frequency of adjustments is the number of observations with a non-zero net adjustment divided by the total number of observations. Up (down) is the number of observations with a positive (negative) net adjustment divided by the total number of observations. Net adjustment in % of account is the net adjustment of an account divided by its reported amount. The leverage ratio is the ratio of debt to total assets. The coverage ratio is the ratio of EBIT to total interest expense. EBIT is pre-tax income plus interest expense plus other non-recurring expenses (gains). ROA is the ratio of operating profit to total assets. Operating Margin is the ratio of operating profit to revenues. Cash flow debt ratio is the ratio of debt to total debt. CFO is operating cash flow. CFI is investing cash flow. CFF is financing cash flow. FCF is free cash flow which equals the sum of CFO and CFI. The change is calculated as (adjusted ratio - reported ratio) / reported ratio. The impact is calculated as adjusted ratio - reported ratio. N is the number of firm-year observations.

Panel A - Full sample

Net Adjustments to selected items	Frequency of adjustments			% of Total Assets				
	Total	Up	Down	Mean	p25	p50	p75	N
Adjustment to Assets								
A/C Receivable - trade (net)	10.7%	10.5%	0.2%	0.3%	0.0%	0.0%	0.0%	1,210
Inventories	17.1%	15.4%	1.7%	0.3%	0.0%	0.0%	0.0%	1,210
PPE (gross)	96.5%	94.9%	1.7%	8.5%	1.5%	3.9%	8.2%	1,210
Total assets	97.1%	88.8%	8.3%	8.4%	1.2%	3.7%	8.8%	1,210
Adjustment to L&SE								
Capitalized lease obligation	95.6%	95.5%	0.1%	8.6%	1.6%	4.0%	8.4%	1,210
Long-term debt (gross)	97.7%	95.9%	1.8%	10.9%	2.6%	6.1%	12.1%	1,210
Current portion of long-term debt	93.4%	0.0%	93.4%	-0.7%	-0.7%	-0.3%	-0.1%	1,210
Long-term debt (net)	97.7%	95.8%	1.9%	10.2%	2.4%	5.8%	11.4%	1,210
Total liabilities	97.6%	93.6%	4.0%	9.2%	1.9%	4.6%	9.6%	1,210
Shareholders' equity	77.4%	22.4%	55.0%	-0.8%	-1.2%	-0.1%	0.0%	1,210
Adjustment to Income Statement								
Revenues	1.8%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	1,210
Gross profit	78.0%	68.3%	9.7%	0.9%	0.0%	0.3%	1.0%	1,210
Operating profits	98.2%	70.2%	28.0%	0.9%	-0.1%	0.2%	0.7%	1,210
Pre-tax income	92.4%	24.9%	67.5%	-0.4%	-0.9%	-0.2%	0.0%	1,210
Net income	92.5%	25.3%	67.2%	-0.2%	-0.6%	-0.2%	0.0%	1,210
Adjustment to Cash flows								
CFO	97.5%	80.0%	17.6%	1.0%	0.1%	0.4%	1.3%	893
CFI	96.8%	14.3%	82.4%	-0.7%	-0.9%	-0.4%	-0.1%	893
CFF	59.1%	20.8%	38.3%	-0.1%	-0.2%	0.0%	0.0%	893

	Mean	p50	p10	p25	p75	p90	N
Change in leverage ratios							
Total debt	72.7%	14.3%	1.3%	5.4%	30.9%	62.8%	1,210
Long-term debt (net)	343.0%	14.8%	1.3%	5.3%	33.2%	73.4%	1,209
Long-term debt (gross)	329.2%	14.6%	1.1%	5.1%	34.4%	79.2%	1,207
Total liabilities	4.7%	2.7%	0.0%	0.7%	5.9%	11.4%	1,210
Change in coverage ratio							
Coverage	-25.9%	-17.8%	-57.8%	-33.9%	-7.1%	0.0%	1,197
Change in profitability ratios							
ROA	-9.4%	-2.4%	-22.1%	-8.1%	1.0%	10.8%	1,210
Operating margin	-2.6%	1.7%	-10.1%	-1.9%	6.7%	19.8%	1,210
Change in cash flow debt ratios							
CFO / Debt	-17.4%	-12.0%	-44.7%	-26.3%	-3.4%	2.7%	893
CFI / Debt	-17.6%	-10.9%	-41.1%	-23.5%	-3.0%	7.1%	893
CFF / Debt	-19.4%	-16.0%	-54.3%	-31.3%	-5.3%	0.0%	890
FCF / Debt	-22.9%	-16.1%	-57.8%	-34.2%	-5.2%	1.6%	891

Table 2
Rating Agency's Adjustments to Reported Financial Statements

Panel B - Adjustments by industry

		Frequency of adjustments		% of Total Assets				Change in leverage ratios (total debt)	
		Long-term debt (net)	Capitalized lease obligation	Long-term debt (net)	Long-term debt (net)	Capitalized lease obligation	Capitalized lease obligation		
	N	Up	Up	Mean	p50	Mean	p50	Mean	p50
Electric Utilities	250	95.2%	90.4%	4.2%	2.9%	2.6%	1.3%	11.8%	8.7%
Energy	191	97.4%	96.3%	4.9%	2.8%	4.0%	2.2%	14.4%	6.4%
Retail	66	100.0%	100.0%	44.6%	29.0%	46.2%	27.2%	119.4%	47.9%
Media	61	91.8%	93.4%	9.7%	7.8%	7.4%	4.4%	634.0%	17.5%
Manufacturing	57	98.2%	100.0%	12.0%	9.9%	7.8%	6.4%	463.7%	38.5%
Chemicals	51	98.0%	98.0%	11.8%	10.7%	7.3%	5.8%	39.1%	35.7%
Consumer Products	51	100.0%	100.0%	10.7%	9.8%	7.7%	7.1%	28.4%	22.7%
Services	44	100.0%	100.0%	16.9%	13.1%	15.4%	10.6%	60.4%	26.5%
Telecommunications	34	88.2%	91.2%	8.5%	7.5%	6.7%	5.3%	10.6%	8.5%
Homebuilding	33	100.0%	100.0%	3.0%	2.3%	3.0%	2.5%	6.0%	4.8%
Gaming / Lodging	31	87.1%	90.3%	8.9%	3.4%	8.9%	4.2%	16.3%	3.5%
Technology	31	71.0%	100.0%	-0.9%	3.0%	5.8%	5.9%	36.3%	11.2%
Rail Roads & Trucking	29	100.0%	100.0%	13.4%	12.4%	11.2%	11.3%	41.8%	37.2%
Aerospace / Defense	26	100.0%	100.0%	11.6%	10.1%	6.3%	6.2%	68.0%	49.9%
Healthcare	26	100.0%	100.0%	10.3%	8.0%	10.9%	8.1%	19.7%	12.7%
Pharmaceutical	26	100.0%	100.0%	6.5%	5.5%	4.1%	2.7%	40.6%	36.4%
Public Utility	26	92.3%	96.2%	3.1%	3.1%	2.0%	2.0%	7.3%	7.3%
Metals, Mining & Steel	22	90.9%	81.8%	3.4%	3.5%	2.5%	1.5%	14.2%	8.1%
Wholesale Power	22	95.5%	86.4%	5.7%	5.5%	3.6%	2.4%	16.4%	7.5%
Automotive	16	81.3%	81.3%	17.9%	12.7%	8.1%	7.6%	60.6%	34.4%
Forest Products	16	93.8%	100.0%	6.3%	6.9%	4.6%	4.2%	15.1%	13.7%
Soft Beverage	13	100.0%	100.0%	7.2%	5.8%	4.4%	4.2%	26.4%	18.6%
Leisure & Entertainment	10	100.0%	100.0%	21.2%	10.9%	20.1%	5.5%	14.6%	15.9%
Agriculture	9	100.0%	100.0%	10.9%	8.4%	10.0%	7.6%	54.8%	54.8%
Restaurants	8	100.0%	100.0%	50.3%	49.3%	52.5%	51.3%	52.7%	60.1%
Packaging	7	85.7%	100.0%	14.5%	13.7%	9.2%	8.4%	39.0%	10.0%
Alcoholic Beverage	7	100.0%	100.0%	6.5%	5.9%	4.6%	5.0%	17.3%	11.8%
Building Materials	7	100.0%	100.0%	8.5%	7.8%	7.6%	7.6%	22.7%	20.3%
Tobacco	6	100.0%	100.0%	6.4%	5.3%	3.1%	1.7%	13.4%	12.1%
Waste Management	5	100.0%	100.0%	3.6%	3.8%	3.9%	4.0%	4.2%	4.7%
Wholesale Distribution	5	100.0%	100.0%	32.4%	10.6%	31.6%	7.9%	33.5%	17.6%
Apparel	5	100.0%	100.0%	21.9%	12.7%	19.8%	10.8%	52.1%	77.1%
Communications Equipment	4	100.0%	100.0%	6.5%	7.1%	3.9%	4.0%	43.3%	39.6%
Airlines	3	100.0%	100.0%	25.9%	26.4%	27.7%	28.4%	119.0%	114.5%
Postal & Express Delivery	3	100.0%	100.0%	44.7%	41.9%	36.2%	20.9%	216.7%	90.2%
Shipping	3	100.0%	100.0%	28.1%	11.2%	28.8%	10.0%	17.1%	15.1%
Environmental Services	2	100.0%	100.0%	31.4%	31.4%	17.1%	17.1%	54.8%	54.8%
Construction	2	100.0%	100.0%	28.5%	28.5%	30.6%	30.6%	85.1%	85.1%
Natural Products Processor	1	100.0%	0.0%	1.6%	1.6%	0.0%	0.0%	29.2%	29.2%
Textiles	1	100.0%	100.0%	2.6%	2.6%	2.9%	2.9%	6.5%	6.5%

Table 3
Correlation Matrix
The table reports the pairwise Pearson correlation coefficients. Rating equals Moody's long-term issuer rating on filing date, converted into numerical values from 1 (AAA) to 21 (C). Spread is ln(yield spread). Yield spread equals the difference between offering yield and yield on a comparable treasury security in basis points. OffBS_total debt equals the difference between adjusted total debt and reported total debt, divided by reported total assets. OffBS_leases equals the difference between adjusted capitalized lease obligation and reported capitalized lease obligation, divided by reported total assets. OffBS_long-term debt equals the difference between adjusted long-term debt and reported long-term debt, divided by reported total assets. Adj_Item equals the difference between the adjusted item and the reported item, divided by reported total assets. HARD equals indicated (adjusted) rating minus indicated (reported) rating. SOFT equals actual rating minus indicated (adjusted) rating. TOTAL equals actual rating minus indicated (reported) rating. Size is ln(revenues). Coverage equals the ratio of EBIT to interest expense. Operating margin equals the ratio of operating profit to revenues. Leverage is the ratio of debt to total assets. Return on assets equals the ratio of operating profit to total assets. Tangiblity equals the ratio of inventory and net PPE to total assets. NofB is the number of bonds issued in the prior five years. * denotes significance at the 5% significance level.

	Rating	Spread	OffBS_total debt	OffBS_leases	OffBS_long-term debt	Adj_Liabilities	Adj_CFO	Adj_CFI	Adj_FCF	Adj_GrossProfit	HARD	SOFT	TOTAL	Size (ln)	Leverage	Coverage	Operating margin	RoA	Tangiblity
Rating	1.0000																		
Spread	0.6584*	1.0000																	
OffBS_total debt	0.1660*	0.1664*	1.0000																
OffBS_leases	0.1718*	0.1687*	0.9547*	1.0000															
OffBS_long-term debt	0.1618*	0.1645*	0.9940*	0.9579*	1.0000														
Adj_Liabilities	0.1913*	0.1793*	0.9792*	0.9688*	0.9773*	1.0000													
Adj_CFO	0.1431*	0.1307*	0.6950*	0.7131*	0.6910*	0.6794*	1.0000												
Adj_CFI	-0.1949*	-0.1658*	-0.7455*	-0.7749*	-0.7404*	-0.7463*	-0.7253*	1.0000											
Adj_FCF	-0.0636*	-0.0419*	-0.0418*	-0.0561*	-0.0404*	-0.0642*	0.4019*	0.3389*	1.0000										
Adj_GrossProfit	0.1730*	0.1581*	0.6132*	0.6290*	0.6150*	0.6250*	0.4629*	-0.5170*	-0.0551*	1.0000									
HARD	-0.0949*	0.0107	0.3639*	0.2860*	0.3684*	0.3447*	-0.0492*	-0.1608*	-0.2116*	0.2061*	1.0000								
SOFT	0.3466*	0.2252*	-0.0773*	-0.0887*	-0.0871*	-0.0691*	0.0267	-0.0218	-0.0028	0.0133	-0.0891*	1.0000							
TOTAL	0.2736*	0.2154*	0.1391*	0.0999*	0.1320*	0.1405*	0.0317	-0.1115*	-0.0957*	0.0970*	0.3519*	0.9010*	1.0000						
Size (ln)	-0.5124*	-0.2719*	0.0333*	0.0271*	0.0363*	0.0042	0.0194	0.0321*	0.0692*	0.0209*	0.1393*	0.0011	0.0768*	1.0000					
Leverage	0.5014*	0.3559*	0.0184	0.0319*	0.0236*	0.0420*	0.0159	-0.0420*	-0.0342*	0.0212*	-0.1705*	-0.0369	-0.1270*	-0.3927*	1.0000				
Coverage	-0.1673*	-0.0986*	0.0147	0.0389*	0.0189	0.0246*	-0.0483*	0.1171*	0.0896*	-0.0205*	0.0224	0.0772*	0.2046*	-0.2060*	1.0000				
Operating margin	-0.1747*	-0.2033*	-0.2314*	-0.2074*	-0.2259*	-0.2107*	-0.2285*	0.2066*	-0.0375*	-0.2408*	-0.0573*	-0.1029*	-0.1320*	-0.1047*	-0.0648*	0.1088*	1.0000		
RoA	-0.2456*	-0.1898*	-0.0116	-0.0026	-0.0069	-0.0106	-0.0268*	0.0278*	0.0003	-0.0228*	0.1678*	0.2391*	0.3067*	0.1685*	-0.2062*	0.3014*	0.5746*	1.0000	
Tangiblity	0.0410*	-0.0476*	-0.0672*	-0.0531*	-0.0649*	-0.0267*	-0.1638*	0.1230*	-0.0603*	-0.1221*	-0.0179	-0.2360*	-0.2225*	-0.1901*	0.0412*	0.0478*	0.1782*	-0.0186	1.0000
NofB	0.0101	-0.0240*	-0.0456*	-0.0490*	-0.0465*	-0.0476*	-0.0922*	0.0883*	-0.0082	-0.0537*	-0.0308	-0.0515*	-0.0721*	0.1470*	0.0473*	-0.0035	-0.0119	-0.0405*	0.0006

Table 4
Panel A - Rating Regressions

The table reports the estimates for coefficients and test statistics for the default risk regressions. In Panel A (models 1-10), the issuer rating is regressed on the adjustment divided by total assets and firm characteristics. In Panel B (models 11-19), ln(Yield Spread) is regressed on the adjustment divided by total assets, firm characteristics, and issue-specific characteristics. All models employ OLS, except for model 11, which estimates an oprobit specification. Fixed effects for industry and year are included. Rating equals Moody's long-term issuer rating on filing date, converted into numerical values from 1 (AAA) to 21 (C). Yield spread equals the difference between offering yield and yield on a comparable treasury security in basis points. OffBS_total debt equals the difference between adjusted total debt and reported total debt, divided by reported total assets. OffBS_leases equals the difference between adjusted capitalized lease obligation and reported capitalized lease obligation, divided by reported total assets. OffBS_long-term debt equals the difference between adjusted long-term debt and reported long-term debt, divided by reported total assets. Adj_Item equals the difference between the adjusted item and the reported item, divided by reported total assets. Size is ln(revenues). Leverage is the ratio of debt to total assets. Coverage equals the ratio of EBIT to interest expense. Operating margin equals the ratio of operating profit to revenues. Return on assets equals the ratio of operating profit to total assets. Tangiblity equals the ratio of inventory and net PPE to total assets. Maturity equals the time till maturity in years. Offering amount equals the par value of debt initially offered. Senior and secured equals one if the bond is senior and secured. Robust t statistics are in brackets. Standard errors are clustered by firm. +, * and ** denote significance at the 10%, 5% and 1% levels, respectively.

	1	2	3	4	5	6	7	8	9	10
	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating	Rating (oprobit)
OffBS_total debt	1.748**									0.811**
	[3.35]									[3.36]
OffBS_leases		1.842**								
		[3.49]								
OffBS_long-term debt			1.821**							
			[3.25]							
Adj_Liabilities				1.930**						
				[3.61]						
Adj_CFO					15.193**					
					[3.79]					
Adj_CFI						-18.118**				
						[5.07]				
Adj_FCF							-2.959			
							[0.48]			
Adj_GrossProfit								14.304**		
								[2.98]		
Size	-0.973**	-0.973**	-0.975**	-0.968**	-0.990**	-0.973**	-1.003**	-0.975**	-0.986**	-0.419**
	[10.31]	[10.35]	[10.34]	[10.24]	[10.79]	[10.57]	[10.85]	[10.35]	[10.44]	[9.39]
Leverage	5.460**	5.416**	5.444**	5.419**	5.293**	5.332**	5.245**	5.425**	5.418**	2.468**
	[7.68]	[7.69]	[7.68]	[7.67]	[7.26]	[7.22]	[7.11]	[7.68]	[7.77]	[7.17]
Coverage	-0.003	-0.003	-0.003	-0.003	-0.001	0.000	-0.002	-0.003	-0.003	-0.002
	[0.59]	[0.67]	[0.61]	[0.63]	[0.20]	[0.05]	[0.34]	[0.59]	[0.72]	[0.72]
Operating margin	-3.758**	-3.807**	-3.786**	-3.722**	-2.210+	-2.114+	-2.878*	-3.731**	-4.439**	-1.719**
	[2.82]	[2.87]	[2.85]	[2.80]	[1.84]	[1.75]	[2.45]	[2.82]	[3.50]	[2.97]
RoA	-2.616	-2.585	-2.614	-2.646	-6.405**	-6.582**	-5.829**	-2.624	-2.145	-1.057
	[0.87]	[0.87]	[0.87]	[0.88]	[2.76]	[2.77]	[2.61]	[0.89]	[0.76]	[0.77]
Tangiblity	0.584	0.586	0.589	0.528	0.927*	0.843+	0.895*	0.746+	0.720+	0.263
	[1.41]	[1.41]	[1.42]	[1.27]	[2.09]	[1.91]	[1.97]	[1.79]	[1.71]	[1.46]
Constant	23.338**	23.401**	23.392**	23.313**	23.342**	23.048**	23.801**	23.371**	23.772**	
	[15.01]	[15.15]	[15.08]	[15.04]	[14.57]	[14.34]	[14.79]	[15.01]	[15.40]	
Observations	1,210	1,210	1,210	1,210	893	893	893	1,210	1,210	1,210
R-squared	0.510	0.510	0.510	0.510	0.530	0.540	0.520	0.500	0.500	0.135

Table 4 (continued)
Panel B - Yield Regressions

	11	12	13	14	15	16	17	18	19
	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)
OffBS_total debt	0.457**								
	[5.21]								
OffBS_leases		0.450**							
		[5.24]							
OffBS_long-term debt			0.475**						
			[5.04]						
Adj_Liabilities				0.470**					
				[5.38]					
Adj_CFO					4.054**				
					[5.14]				
Adj_CFI						-3.634**			
						[4.36]			
Adj_FCF							1.118		
							[0.93]		
Adj_GrossProfit								3.504**	
								[3.98]	
Size	-0.250**	-0.250**	-0.251**	-0.249**	-0.235**	-0.232**	-0.239**	-0.251**	-0.253**
	[12.44]	[12.41]	[12.45]	[12.38]	[11.02]	[10.84]	[11.06]	[12.47]	[12.43]
Leverage	0.872**	0.860**	0.868**	0.862**	0.827**	0.831**	0.811**	0.862**	0.860**
	[7.25]	[7.23]	[7.22]	[7.18]	[6.94]	[6.85]	[6.70]	[7.20]	[7.26]
Coverage	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000
	[0.42]	[0.30]	[0.40]	[0.35]	[1.05]	[1.31]	[0.66]	[0.53]	[0.40]
Operating margin	-1.207**	-1.226**	-1.215**	-1.208**	-0.944**	-0.965**	-1.113**	-1.212**	-1.383**
	[4.95]	[5.06]	[5.00]	[4.97]	[4.12]	[4.18]	[4.89]	[5.03]	[5.89]
RoA	-0.175	-0.163	-0.175	-0.176	-0.738+	-0.738+	-0.583	-0.168	-0.054
	[0.34]	[0.32]	[0.34]	[0.34]	[1.67]	[1.66]	[1.35]	[0.34]	[0.11]
Tangiblity	-0.026	-0.024	-0.024	-0.038	0.088	0.069	0.087	0.016	0.010
	[0.31]	[0.29]	[0.29]	[0.45]	[0.97]	[0.75]	[0.94]	[0.19]	[0.12]
Maturity	0.000	0.000	0.000	0.000	0.003	0.003	0.003	0.000	-0.001
	[0.22]	[0.26]	[0.25]	[0.21]	[1.43]	[1.42]	[1.35]	[0.20]	[0.36]
Offering amount	0.159**	0.156**	0.159**	0.157**	0.107**	0.105**	0.104*	0.160**	0.157**
	[4.32]	[4.26]	[4.32]	[4.29]	[2.70]	[2.61]	[2.58]	[4.32]	[4.28]
SeniorSecured	0.133*	0.138*	0.132*	0.135*	0.127*	0.132*	0.130*	0.140*	0.137*
	[2.33]	[2.40]	[2.31]	[2.35]	[2.07]	[2.12]	[2.06]	[2.44]	[2.30]
Constant	6.751**	6.793**	6.765**	6.764**	8.349**	8.344**	8.524**	6.757**	6.876**
	[16.46]	[16.61]	[16.49]	[16.51]	[19.37]	[19.16]	[19.76]	[16.45]	[16.87]
Observations	1,210	1,210	1,210	1,210	893	893	893	1,210	1,210
R-squared	0.520	0.520	0.520	0.520	0.580	0.570	0.560	0.520	0.510

Table 4 (continued)
Panel C - Non-nested Model Test

Non-nested J-Test

M0: Default risk = f (Adjusted firm characteristics)

M1: Default risk = f (Reported firm characteristics)

In columns 1 and 3, the default risk variable is regressed on the explanatory variables of M0 together with the predicted default risk, the estimated dependent variable from the regression associated with M1. If the predicted default risk has some explanatory power beyond what the explanatory variables in M0 contribute, then M0 is rejected. In columns 2 and 4, default risk is regressed on the explanatory variables of M1 together with the predicted default risk, the estimated dependent variable from the regression associated with M0. If predicted default risk has some explanatory power beyond what the explanatory variables in M1 contribute, then M1 is rejected. All four models employ OLS. Robust t-statistics are in brackets. Standard errors are clustered by firm. Fixed effects for industry and year are included. +, * and ** denote significance at the 10%, 5% and 1% levels, respectively.

| | 1 | 2 | 3 | 4 |
	Rating	**Rating**	**Ln(Spread)**	**Ln(Spread)**
Predicted rating	0.253	0.885**		
	[0.97]	[5.21]		
Predicted ln(spread)			0.244	0.875**
			[0.83]	[4.59]
Size as ln(TA)	-0.738*	-0.080	-0.211*	-0.038
	[2.54]	[0.39]	[2.42]	[0.64]
Leverage	4.547**	1.191	0.793**	0.121
	[3.23]	[1.19]	[3.14]	[0.63]
Coverage	0.020	-0.002	0.007**	0.000
	[1.53]	[0.51]	[2.72]	[0.36]
Operating margin	2.548*	-0.813	0.196	-0.180
	[2.13]	[0.75]	[0.94]	[0.92]
ROA	-16.989**	0.490	-3.172**	-0.034
	[4.64]	[0.20]	[4.19]	[0.07]
Tangibility	0.411	0.060	-0.009	-0.021
	[0.94]	[0.14]	[0.10]	[0.26]
Maturity			0.000	0.000
			[0.03]	[0.02]
Offering amount			0.156*	0.032
			[2.30]	[0.58]
SeniorSecured			0.077	0.015
			[1.08]	[0.25]

	1	2	3	4
t-test of predicted rating	Fail to reject M0			
		Reject M1		
t-test of predicted ln(spread)			Fail to reject M0	
				Reject M1

	1	2	3	4
Observations	1,210	1,210	1,210	1,210
R-squared	0.530	0.530	0.550	0.550

Table 5
Rating and Yield Regressions for Hard, Soft and Total Adjustments

The table reports the estimates for coefficients and test statistics for the default risk regressions. In models 1-3 (4-6), the issuer rating (yield spread) is regressed on adjustments and firm characteristics (and issue-specific characteristics). All models employ OLS and include fixed effects for industry and year. Rating equals Moody's long-term issuer rating on filing date, converted into numerical values from 1 (Aaa) to 21 (C). HARD equals indicated (adjusted) rating minus indicated (reported) rating. SOFT equals actual rating minus indicated (adjusted) rating. TOTAL equals actual rating minus indicated (reported) rating. The indicated (reported) rating is the rating implied by a matrix of firm characteristics based on GAAP financials, using the rating agency's industry-specific model. The indicated (adjusted) rating is the rating implied by a matrix of firm characteristics based on financials as adjusted by the rating agency. Size is ln(revenues). Leverage is the ratio of debt to total assets. Coverage equals the ratio of EBIT to interest expense. Operating margin equals the ratio of operating profit to revenues. Return on assets equals the ratio of operating profit to total assets. Tangiblity equals the ratio of inventory and net PPE to total assets. Maturity equals the time until maturity in years. Offering amount equals the par value of debt initially offered. Senior and secured equals one if the bond is senior and secured. Robust t-statistics are in brackets. The sample consists of firm-year observations with available information on actual and indicated (both reported and adjusted) ratings. Standard errors are clustered by firm. +, * and ** denote significance at the 10%, 5% and 1% levels, respectively.

	1	2	3	4	5	6
Dependent variable	Rating	Rating	Rating	Ln(Spread)	Ln(Spread)	Ln(Spread)
HARD	0.017			0.008		
	[0.09]			[0.23]		
SOFT		0.771**			0.089**	
		[8.72]			[5.23]	
TOTAL			0.738**			0.087**
			[8.65]			[5.06]
Size	-1.223**	-1.109**	-1.138**	-0.260**	-0.244**	-0.246**
	[7.70]	[8.50]	[8.43]	[7.92]	[8.42]	[8.52]
Leverage	4.304*	2.950*	3.629*	0.270	0.135	0.242
	[2.54]	[2.20]	[2.61]	[0.93]	[0.51]	[0.91]
Coverage	0.000	-0.003	0.001	0.001	0.001	0.001
	[0.00]	[0.55]	[0.19]	[0.81]	[0.75]	[1.40]
Operating margin	-4.872*	-2.341	-1.824	-1.609**	-1.276**	-1.211**
	[2.41]	[1.57]	[1.23]	[4.83]	[4.10]	[3.82]
ROA	-4.454	-11.587**	-13.021**	-0.173	-1.003	-1.195
	[1.02]	[3.42]	[3.44]	[0.22]	[1.45]	[1.62]
Tangibility	1.500+	2.594**	2.249**	0.230	0.357*	0.322*
	[1.73]	[3.46]	[3.14]	[1.34]	[2.19]	[2.04]
Maturity				0.000	0.002	0.001
				[0.08]	[0.69]	[0.29]
Offering amount				0.183*	0.164*	0.162*
				[2.20]	[2.34]	[2.34]
SeniorSecured				0.660*	0.594*	0.540*
				[2.24]	[2.34]	[2.04]
Constant	25.193**	25.287**	25.594**	6.308**	6.505**	6.556**
	[8.36]	[10.55]	[10.48]	[7.02]	[8.27]	[8.37]
Observations	197	197	197	197	197	197
R-squared	0.530	0.690	0.680	0.570	0.620	0.620

Table 6
Modified Rating Regressions

The table reports the estimates for coefficients and test statistics for the OLS regressions. Rating is regressed on the ln(Yield Spread), the adjustment divided by total assets and firm characteristics. Fixed effects for industry and year are included. Rating equals Moody's long-term issuer rating on filing date, converted into numerical values from 1 (AAA) to 21 (C). Yield spread equals the difference between offering yield and yield on a comparable treasury security in basis points. OffBS_total debt equals the difference between adjusted total debt and reported total debt, divided by reported total assets. OffBS_leases equals the difference between adjusted capitalized lease obligation and reported capitalized lease obligation, divided by reported total assets. OffBS_long-term debt equals the difference between adjusted long-term debt and reported long-term debt, divided by reported total assets. Adjustment to liabilities equals the difference between adjusted total liabilities and reported total liabilities, divided by reported total assets.HARD equals indicated (adjusted) rating minus indicated (reported) rating. SOFT equals actual rating minus indicated (adjusted) rating. TOTAL equals actual rating minus indicated (reported) rating. Size is ln(revenues). Leverage is the ratio of debt to total assets. Coverage equals the ratio of EBIT to interest expense. Operating margin equals the ratio of operating profit to revenues. Return on assets equals the ratio of operating profit to total assets. Tangiblity equals the ratio of inventory and net PPE to total assets. Robust t-statistics are in brackets. Standard errors are clustered by firm. +, * and ** denote significance at the 10%, 5% and 1% levels, respectively.

	1	2	3	4	5	6	7
Dependent variable	Rating	Rating	Rating	Rating	Rating	Rating	Rating
Ln(Spread)	3.861**	3.855**	3.861**	3.850**	4.556**	4.320**	4.394**
	[32.27]	[32.26]	[32.26]	[32.17]	[17.79]	[16.72]	[16.98]
OffBS_total debt	0.088						
	[0.25]						
OffBS_leases		0.239					
		[0.65]					
OffBS_long-term debt			0.094				
			[0.26]				
Adj_Liabilities				0.322			
				[0.90]			
HARD					-0.190		
					[1.33]		
SOFT						0.285**	
						[3.65]	
TOTAL							0.207**
							[2.97]
Constant	-9.740**	-9.723**	-9.740**	-9.705**	-14.237**	-12.502**	-13.020**
	[14.61]	[14.60]	[14.60]	[14.57]	[9.44]	[8.10]	[8.63]
Observations	1,210	1,210	1,210	1,210	197	198	197
R-squared	0.690	0.690	0.690	0.690	0.700	0.720	0.710

Table 7
Differences in Adjustments for Firms with Repeated Rating Agency Interactions

The table reports the estimates for coefficients and test statistics for the default risk regressions. Ln(Yield Spread) is regressed on the adjustment divided by total assets, a dummy equal to 1 if the firm is a frequent bond issuer, interaction term, firm characteristics, and issue-specific characteristics. All models employ OLS. Fixed effects for industry and year are included. Yield spread equals the difference between offering yield and yield on a comparable treasury security in basis points. OffBS_total debt equals the difference between adjusted total debt and reported total debt, divided by reported total assets. OffBS_leases equals the difference between adjusted capitalized lease obligation and reported capitalized lease obligation, divided by reported total assets.OffBS_long-term debt equals the difference between adjusted long-term debt and reported long-term debt, divided by reported total assets. HARD equals indicated (adjusted) rating minus indicated (reported) rating. SOFT equals actual rating minus indicated (adjusted) rating. TOTAL equals actual rating minus indicated (reported) rating. NofBHigh equals 1 if the number of bonds issued in the prior five years (NofB) is greater than the sample median, and 0 otherwise. Size is ln(revenues). Leverage is the ratio of debt to total assets. Coverage equals the ratio of EBIT to interest expense. Operating margin equals the ratio of operating profit to revenues. Return on assets equals the ratio of operating profit to total assets. Tangiblity equals the ratio of inventory and net PPE to total assets. Maturity equals the time till maturity in years. Offering amount equals the par value of debt initially offered. Senior and secured equals one if the bond is senior and secured. Robust t statistics are in brackets. Standard errors are clustered by firm. +, * and ** denote significance at the 10%, 5% and 1% levels, respectively.

	1	2	3	4	5	6	7
	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)	Ln(Spread)
OffBS_total debt	0.431**						
	[4.86]						
OffBS_leases		0.427**					
		[4.99]					
OffBS_long-term debt			0.446**				
			[4.73]				
Adj_Liabilities				0.457**			
				[5.15]			
HARD					-0.017		
					[0.32]		
SOFT						0.072**	
						[3.66]	
TOTAL							0.067**
							[3.22]
NofBHigh*OffBS_total debt	0.009						
	[0.04]						
NofBHigh*OffBS_leases		-0.075					
		[0.24]					
NofBHigh*OffBS_long-term debt			0.012				
			[0.04]				
NofBHigh*Adj_Liabilities				-0.124			
				[0.45]			
NofBHigh*HARD					0.052		
					[0.69]		
NofBHigh*SOFT						0.037	
						[1.15]	
NofBHigh*TOTAL							0.040
							[1.29]
NofBHigh	-0.020	-0.018	-0.020	-0.011	0.016	-0.010	-0.016
	[0.41]	[0.38]	[0.42]	[0.23]	[0.19]	[0.15]	[0.22]
v80_ln	-0.259**	-0.258**	-0.260**	-0.258**	-0.254**	-0.232**	-0.234**
	[10.77]	[10.67]	[10.79]	[10.68]	[6.47]	[6.85]	[6.76]
leverage	0.889**	0.881**	0.885**	0.879**	0.263	0.221	0.286
	[6.62]	[6.63]	[6.60]	[6.58]	[0.89]	[0.83]	[1.04]
coverage_w	0.000	0.000	0.000	0.000	0.001	0.001	0.001
	[0.47]	[0.35]	[0.46]	[0.38]	[0.68]	[0.97]	[1.49]
opmargin_w	-1.274**	-1.298**	-1.282**	-1.282**	-1.541**	-1.158**	-1.136**
	[4.71]	[4.81]	[4.75]	[4.76]	[4.59]	[3.54]	[3.40]
roa	-0.270	-0.258	-0.271	-0.263	-0.182	-1.136	-1.319
	[0.44]	[0.42]	[0.44]	[0.43]	[0.23]	[1.50]	[1.59]
tangy_w	-0.029	-0.025	-0.027	-0.036	0.202	0.311+	0.282+
	[0.33]	[0.29]	[0.31]	[0.42]	[1.12]	[1.85]	[1.68]
TimeLeft	0.000	0.000	0.000	0.000	0.000	0.002	0.001
	[0.19]	[0.15]	[0.16]	[0.19]	[0.07]	[0.78]	[0.31]
LN_offering_amt	0.171**	0.169**	0.172**	0.170**	0.148+	0.140*	0.136+
	[4.53]	[4.47]	[4.53]	[4.50]	[1.74]	[2.03]	[1.95]
SeniorSecured	0.150*	0.156**	0.149*	0.154**	0.654*	0.566*	0.523+
	[2.54]	[2.62]	[2.52]	[2.59]	[2.15]	[2.05]	[1.86]
Constant	7.986**	8.025**	7.999**	8.001**	8.428**	8.156**	8.233**
	[16.73]	[16.85]	[16.77]	[16.78]	[8.71]	[9.49]	[9.65]
Observations	1,118	1,118	1,118	1,118	191	192	191
R-squared	0.490	0.490	0.490	0.490	0.560	0.620	0.610