Rating-Sensitive Bonds

Tim Adam and Constantin Reigber*

Humboldt University Berlin

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Abstract

Many debt contracts contain so called performance-pricing provisions, which specify an automatic coupon increase should some performance measure of the issuer deteriorate. One motivation for using such provision is as a signal about the issuer's future performance. We test this hypothesis at the example of rating-sensitive bonds (RSB). We find that upon announcement the issuer's stock and bond prices increase significantly, while the issuer's CDS spread declines. Firms subject to higher information asymmetries and firms just above the IG/non-IG threshold are more likely to issue RSB, especially during periods of market distress. RSB issuers are ex-post more likely to experience a credit rating improvement relative to regular bond issuers. These results are consistent with RSBs being a credible signaling device.

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1 Introduction

Loan contracts frequently contain so called performance-pricing provisions, which cause the loan spread to increase as some performance measure of the borrower deteriorates and vice versa. Manso et al. (2010) argue that such provisions can be used as a signal about the borrower's credit quality because a performance-pricing provision implies a higher default probability and thus higher expected default costs compared to regular debt. In their model, high growth firms issue performance-sensitive debt to distinguish themselves from low growth firms. Empirically, Manso et al. (2010) find that firms, which issue performance-sensitive debt subsequently experience earnings improvements on average. This result, however, is not conclusive as it is also consistent with other theories of performance-pricing such as those based on agency costs, e.g., Tchistyi (2016). We conduct an alternative test of the signaling hypothesis by examining the announcement returns of public bonds, which contain performance-pricing provisions. Since the performance measure in these bonds is always the issuer's credit rating we refer to them as rating-sensitive bonds (RSB).[1] We focus on public bonds rather than corporate loans because Maskara and Mullineaux (2011) argue that the self-selection in loan announcements significantly biases the empirical results in loan announcement research. Furthermore, the performance-pricing provision is a more costly signal in the public than in the private market because public bonds are almost impossible to renegotiate.[2]

Our main tests consist of calculating the announcement returns of RSBs in the equity, bond and CDS markets. If the performance-pricing provision is indeed a

[1] The literature also refers to these bonds as step-up or variable coupon bonds.

[2] A further benefit is that the announcement date for a public bond, i.e., its registration with the SEC, is more precisely identified than the announcement of a loan. Companies have up to four business days to report material information such as a new corporate loan. Gande and Saunders (2012) use the first date of trading of a loan in the secondary market in their analysis. While this date identifies secondary market trading it is too imprecise to identify the origination of the loan in the primary market.

positive signal about a firm's credit quality, then both equity and bond prices of the issuer should increase upon the announcement of a RSB. Analogously, the credit spread of the issuer's outstanding CDS should decline. Next we examine what type of firms issue RSBs compared to plain-vanilla bonds. The value of the signal should be relatively high for issuers subject to more information asymmetries and issuers with ratings close to the investment grade / non-investment grade (IG/non-IG) threshold. This is because the discontinuity in bond prices at the IG/non-IG threshold makes it particularly beneficial for a firm just above the threshold to signal that a downgrade is unlikely.[3] Therefore, BBB-rated firms and firms subject to more information asymmetries in general should exhibit the largest propensities to issue RSBs. Finally, we examine the ex-post performance of RSB issuers relative to issuers of plain-vanilla bonds. If the RSB is a credible signal then RSB issuers should on average perform better than issuers of plain-vanilla bonds.

Our sample consists of 225 RSB tranches issued by public firms in the U.S. market between 1989 and 2019. Using standard event study methodology, our results show that both equity and bond prices react positively around the announcement of RSBs. The cumulative average abnormal stock return over the [-5,+5] event window is 1.4%, while the cumulative average abnormal bond return over the same event window is 0.4%. In contrast, the CARs of our propensity score matched control group of regular bond issuers are indistinguishable from 0. The CDS spread of RSB issuers declines by 3.8% in the [-5,+5] event window around the announcement of a RSB. In contrast, we find no impact on CDS spreads around the announcement of regular bonds. Next, we find that smaller firms, firms with fewer tangible assets, and firms with high bid-ask spreads are more likely to issue RSBs than regular bonds, especially during times of market distress. These firms are likely to be subject

[3] Kisgen (2006) discusses the institutional constraints, which give rise to this discontinuity.

to larger information asymmetries, which supports the assumptions of Manso et al. (2010)'s signaling model. We also find that firms with ratings just above the IG/non-IG threshold have the largest propensity to issue RSBs, which is consistent with the notion that at this threshold signaling carries the largest benefit for the issuer. Finally, we find that over the first three years after a bond issue RSB issuers are more likely to be upgraded and less likely to be downgraded than issuers of plain-vanilla bonds. Consistent with the prior literature we also find that RSB issuers experience a general performance improvement (RoA) relative to issuers of plain-vanilla bonds. Overall, these results support the prediction that firms use performance-pricing provisions as a signal of their credit quality.

Our results contribute to several strands of the literature. First, using standard event study methodology we test and support Manso et al. (2010)'s signaling hypothesis of why firms issue debt with performance-pricing provisions. Other theories of why firms use performance-sensitive debt are based on debt renegotiation costs (Asquith et al., 2005; Adam & Streitz, 2016), agency conflicts (Tchistyi, 2016), asset substitution concerns (Koziol & Lawrenz, 2010), and managerial motives (Tchistyi et al., 2011; Adam et al., 2020). The empirical literature has found that the use of performance-sensitive debt is associated with debt renegotiation and moral hazard costs, CEO equity incentives, the presence of a lending relationship, and managerial biases. Following the issuance of performance-sensitive debt the issuing firms experience performance improvements on average (e.g. Manso et al., 2010; Adam & Streitz, 2016). Bannier and Wiemann (2014) finds that this performance improvement is stronger the more sensitive performance-pricing is to the underlying performance measure.[4] While these results are consistent with the signaling hypothesis, they are also consistent with agency and transaction cost theories. Our main contribution is

[4]Consistent with this result, Begley (2012) finds that the sensitivity of the performance-pricing grid is negatively correlated with the issuer's probability of financial distress.

to offer an alternative test of the signaling hypothesis.

Our second contribution is to examine why firms issue rating-sensitive bonds. While a few studies focus on the pricing of step-up bonds (e.g. Houweling et al., 2004; Das & Tufano, 1995; Acharya et al., 2002; Lando & Mortensen, 2003), to the best of our knowledge, ours is the first paper, which examines why firms issue these types of bonds. Our results indicate that the use of RSBs is relatively rare during normal market conditions. This may be due to adverse selection as firms subject to significant information asymmetries tend to borrow from banks rather than borrow from the public market. However, during adverse market conditions the use of RSBs increases dramatically, especially for opaque firms rated BBB or BBB-.

Finally, we contribute to the literature examining announcement returns of bond issuances. Most studies find no significant announcement returns of corporate bond issuances (e.g. Dann & Mikkelson, 1984; Eckbo, 1986; Mikkelson & Partch, 1986; Shyam-Sunder, 1991). While our results do not contradict these results, we show that for a particular subset of bonds the announcement returns can be significantly positive.

2 Theory and Hypotheses

Manso et al. (2010) argue that a simple trade-off theory can not explain the existence of PSD because a performance-pricing provision increases the likelihood and thus the expected costs of financial distress, while the expected tax benefits of debt remain the same. Therefore, regular debt dominates PSD. In the presence of information asymmetries, however, the use of PSD can act as a valuable signal about the credit worthiness of the issuer.

Manso et al. (2010) develop a screening model in which lenders offer borrowers a menu of fixed-rate debt and PSD contracts. They show that a separating equilibrium exists, in which the high-type borrower (high growth opportunities, good credit quality) choose the PSD contract, while the low-type borrower (low growth opportunities, poor credit quality) choose the fixed-rate debt contract. Since PSD implies higher default related costs (higher coupon payments if performance deteriorates) the low-type borrower would not mimic the high-type borrower. Given this separating equilibrium, markets should update their beliefs about the growth opportunities / credit quality of the issuer if they see the issuance of a bond with a performance-pricing provision. This gives rise to the following hypothesis:

Hypothesis 1: *The market reacts positively to the announcement of a RSB.*

Since the issuance of a RSB is to signal that the issuer's credit risk is lower than what the market expects, we expect positive returns in both the stock and bond markets and a reduction in the issuer's CDS spread.

The use of PSD arises only in the presence of information asymmetries. Therefore, firms subject to larger information asymmetries have a higher likelihood of issuing RSBs. This gives rise to our second hypothesis:

Hypothesis 2: *Firms issuing RSBs are subject to more information asymmetries than firms issuing plain-vanilla bonds.*

The purpose of signaling for the high-type borrower is to distinguish herself from the low-type borrower, and thus to obtain cheaper financing terms compared to a pooling equilibrium. The larger the price differential between the debt securities issued by high-type and low-type borrowers in a separating equilibrium, the larger is the value of the signal. Empirically, the largest price differences occur between the debt securities issued by firms rated BBB- and BB+, i.e., just around the IG/non-IG threshold. As an example of this discontinuity we plot the yields of U.S. Industrial Bond Indices in figure 3. This discontinuity can result from institutional constraints, which forbid some institutions to invest in non-IG rated debt securities (see Kisgen (2006)). Therefore, firms just above the IG/non-IG threshold should benefit the most from signaling that a downgrade is unlikely by issuing RSBs.[5] This gives rise to our third hypothesis:

Hypothesis 3: *Firms rated just above the IG/non-IG threshold are more likely to issue RSBs than firms with other ratings.*

If firms were to issue RSB to address agency concerns then we would not expect a discontinuity at the IG/non-IG threshold. Therefore this third hypothesis also helps us separating the signaling hypothesis from the agency cost hypothesis.

If the issuance of a RSB is a credible signal and succeeds in separating the high-type borrowers from the low-type borrowers, then RSB issuers should perform better relative to issuers of regular bonds after the bond issue. This gives rise to our fourth hypothesis:

Hypothesis 4: *Post bond issue, issuers of RSBs perform better than issuers of regular bonds.*

3 Empirical Strategy

In order to test Hypothesis 1, we examine how the stock, bond, and CDS markets react to the announcements of RSBs using the short-window methodology laid out by

[5] In principle, firms just below the IG/non-IG threshold would benefit the most from signaling that an upgrade is likely. However, rating-sensitive bonds feature almost exclusively rate-increasing pricing grids, which would be inappropriate for signaling a rate improvement.

MacKinlay (1997). For the baseline stock market event study, we estimate predicted returns using the five-factor model of Fama and French (2015):

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i}(R_{mt} - R_{ft}) + \beta_{2i}SMB_t + \beta_{3i}HML_t + \beta_{4i}RMW_t + \beta_{5i}CMA_t + \epsilon_{it} \quad (1)$$

where R_{it} are the daily stock returns of firm i over 150 trading days before the event window, R_{ft} is the risk-free return as measured by the one-month Treasury bill rate, R_{mt} is the return on the value-weighted (VW) market portfolio, SMB_t is the return differential between diversified portfolios of small and large stocks, HML_t is the return differential between diversified portfolios of high B/M and low B/M stocks, RMW_t is the difference between the returns on diversified portfolios of stocks with robust and weak profitability, and CMA_t is the difference between the returns on diversified portfolios of stocks of low and high investment rates (Fama & French, 2015).

The estimated parameters from equation (1) are used to calculate predicted stock returns. We calculate abnormal stock returns during the event window as the differences between the actual and the predicted returns. Finally, abnormal returns are cumulated over the event window and averaged across all events, yielding cumulated average abnormal returns (CAR).

In order to examine the market reaction in the bond market, we estimate the five-factor bond model of Fama and French (1993):

$$BR_{it} - R_{ft} = \alpha_i + \beta_{1i}(R_{mt} - R_{ft}) + \beta_{2i}SMB_t + \beta_{3i}HML_t + \beta_{4i}TERM_t + \beta_{5i}DEFAULT_t + \epsilon_{it} \quad (2)$$

where BR_{it} are the daily, weighted average returns of firm i's outstanding bonds over the 150 trading days before the event window. The weights are given by the outstanding notional of a particular bond relative to the total outstanding notional of all bonds of firm i. R_{ft}, R_{mt}, SMB_t and HML_t are defined as in equation (1). $TERM_t$ is defined as the slope of the treasury yield curve measured as the rate of return on the Barclays Long-Term Treasury Bond index minus the one month T-Bill rate. $DEFAULT_t$ is the default premium measured as the difference between the returns on the Barclays Long-Term Corporate Bond and Barclays Long-Term Treasury Bond indices.[6]

The estimated parameters from equation (2) are used to calculate predicted firm-level, daily bond returns during the event window. The differences between the actual and the predicted bond returns are the abnormal bond returns, which are cumulated over the event window and averaged across all events, yielding cumulated average abnormal bond returns (CABR).

To examine the impact of RSBs on the issuers' CDS spreads, we follow the CDS market methodology laid out by Callen et al. (2009), Loon and Zhong (2014), and Andres et al. (2021), and estimate the following model:

$$SC_{it} = \alpha_i + \beta_i SC_{mt} + \epsilon_{it} \tag{3}$$

where SC_{it} are the daily relative CDS spread changes of firm i over the 150 trading days before the event window, and SC_{mt} are the daily relative spread changes on the Markit North American Investment Grade index over the same period.

The estimated parameters of equation (3) are used to predict spread changes during the event window. The differences between the actual and the predicted spread changes are the abnormal spread changes, which are cumulated over the

[6]This model is chosen due to its widespread use in the bond market event study literature (see Bessembinder et al., 2008).

event window and averaged across all events, yielding cumulated average abnormal spread changes (CASC)

Hypothesis 2 states that firms issuing RSBs are subject to more information asymmetries than firms issuing regular bonds. We test this hypothesis by estimating the following logit model of the choice of issuing a RSB vs. a regular bond and various measures of information asymmetries.

$$P(RSB_{it} = 1 \mid x) = G(\alpha + \mu_t + \beta_{IA} * \mathbf{IA}'_{it} + \beta_{AS} * \mathbf{AS}'_{it} + \beta_{CQ} * \mathbf{CQ}'_{it} + \beta_{DC} * \mathbf{DC}'_{it}) \quad (4)$$

The dependent variable RSB_{it} is a binary variable, which equals 1 in the case of a RSB and 0 in the case of a regular bond issue. $\mathbf{IA}'_{it}$ is a vector of proxies for information asymmetries. Following the literature we use tangibility, measured as the ratio of tangible assets to total book assets, firm size, measured as the logarithm of total book assets, and the market-to-book ratio of assets. Firm size and the market-to-book ratio of assets are perhaps not the best measures of information asymmetries because these variables proxy for a range of different things. We therefore include two further variables in our regressions. The first is the bid-ask spread, a market microstructure proxy for information asymmetries, where a larger spread indicates higher levels of asymmetry. The second is the number of equity analysts covering the firm at the time of bond issuance. Greater analyst coverage is generally associated with reduced information asymmetries, as it enhances the availability and dissemination of firm-specific information.

The impact of information asymmetries may also vary over time. For example, when markets are in distress risk premia rise, possibly coinciding with a rise in information asymmetries. As a measure of market distress, we therefore include the

TED spread in some of our regressions.[7]

In order to disentangle the signaling hypothesis from the agency cost hypothesis, we include $\mathbf{AS}'_{it}$, a vector of proxies for asset substitution concerns, in the regressions. These include leverage, measured as total debt over total assets, the debt maturity ratio, measured as short-term debt over long-term debt, and R&D spending, measured as R&D expenses over sales.

Hypothesis 3 states that firms rated just above the IG/non-IG threshold are more likely to issue RSBs than firms with other ratings. To test this hypothesis, we include $\mathbf{CQ}'_{it}$, a vector of initial credit rating dummies in the above regression. Finally, $\mathbf{DC}'_{it}$ is a vector of proxies controlling for debt characteristics, such as deal size, and deal maturity. All proxies based on balance sheet information are lagged by one year. We include year fixed effects in some regressions and cluster the robust standard errors at the firm level to account for non-independent observations within firms.

Hypothesis 4 states that issuers of RSBs perform better after the bond issue than issuers of regular bonds. To test this hypothesis we examine the post-issue performance of our sample firms for up to ten years using the same methodology as Manso et al. (2010) and Adam and Streitz (2016). Since the performance measure in our sample of bonds - the issuers' credit rating - is an ordinal variable, we estimate the following ordered probit model

$$\Delta Performance_{i,t+k} = \alpha + \beta_1 * RSB_{it} + \gamma * \mathbf{X}'_{it} + \delta * \mathbf{Y}'_{it} + \mu_t + \epsilon_{it}, \qquad (5)$$

where $\Delta Performance_{i,t+k}$ is the change in issuer's i credit rating in year k after the

[7]The TED spread is defined as the spread between the 3-Month U.S. dollar LIBOR and the 3-Month U.S. Treasury Bill rate. We obtain the TED spread from the Federal Reserve Bank of St. Louis (2023).

bond issue ($k = 1 - 10$). Given the ordinal nature of credit ratings, the dependent variable takes the value of 1 if the credit rating improved, -1 if the credit rating declined, and 0 if the credit rating remained unchanged. We control the performance analysis for borrower characteristics, denoted by the vector $\mathbf{X}'_{it}$, and bond characteristics, denoted by $\mathbf{Y}'_{it}$, which could be correlated with performance, i.e., firm size, leverage, market-to-book ratio, profitability, tangibility, and the initial credit rating. Characteristics based on balance sheet information are lagged by one year. is a vector of bond characteristics: deal size and deal maturity. The Appendix contains the definitions of all variables used in our analysis.

To make our results comparable to those by Manso et al. (2010) and Adam and Streitz (2016) we also use the RoA as a performance measure and define the dependent variable analogously.

4 Data Description

We identify RSB tranches by searching for the covenant flag "Step-up/down rating change" on Bloomberg between 1989, when Enron issued the first ever rating-sensitive bond, and 2019. We restrict the search to bonds offered in the United States denoted in US Dollars, which returns 616 tranches. After deleting duplicates 487 RSB tranches remain. Next, we obtain bond prospectuses from Bloomberg or CapitalIQ, and delete all bond tranches, which Bloomberg erroneously flagged as containing step-up provisions, or for which we could not obtain the prospectus. This step reduces the sample to 314 RSB tranches, which we merge with the Mergent Fixed Income Securities Database (FISD) using bond tranche-level CUSIPS and with CRSP using (historical) issuer CUSIPs. This procedure results in 225 bond tranches, which we aggregate into 146 bond deals.

To create a control group of regular bond issues we first select all corporate debentures and MTNs in Mergent FISD issued between 1989 and 2019 with information on the offering amount, offering date, and maturity date present.[8] We drop canadian, yankee, convertible, and rating-sensitive bonds. Finally, we create a matched control group by matching with the treatment group sample on issue date, deal amount / total book assets, bond deal maturity, the S&P rating, the market-to-book ratio, and firm leverage using nearest-neighbor propensity score matching.

We obtain financial information of the bond issuers from Compustat, and bond transaction-level data from the Trade Reporting and Compliance Engine (TRACE).[9] The initial issue credit ratings are from Mergent FISD. If initial issue credit ratings are unavailable we use issuer credit ratings from Bloomberg (for RSB sample only). Historical issuer credit ratings are also obtained from Bloomberg.

Daily dividend and stock split adjusted stock returns, the bid-ask spread, as well as the CRSP value-weighted index returns are from CRSP. We follow Maskara and Mullineaux (2011) and Chung and Zhang (2014) in order to calculate the bid-ask spread as the moving average of the ratio of the difference between the daily ask and bid closing prices to the midpoint of the ask and bid closing prices, taken over the two months preceding the bond issuance. We require at least 40 observations in order to calculate the spread. Daily five-year mid CDS quotes are from Thomson Reuters Datastream, and the Markit North American Investment Grade Index is from Thomson Reuters EIKON.[10] In addition, we use Thomson Reuters EIKON to

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[8] We restrict our attention to corporate debentures and MTNs because only these two bond types are present in our RSB sample.

[9] TRACE started publicly reporting bond trades in 2002, and has increased its coverage to nearly complete transaction data of bonds trading at least once per day (Bessembinder et al., 2006).

[10] We follow Hull et al. (2004) and use five-year CDS quotes due to their liquidity and availability. There are two sources of CDS information within Datastream: CMA Datavision and Thomson Reuters CDS. While the CMA time series go back further than the Thomson Reuters series, they are no longer updated after 2008. To have a complete historical series, we combine the Thomson Reuters CDS spread histories with those from CMA.

download I/B/E/S data on the number of equity analysts following the issuers in the period preceding the emission of the bond.

To calculate daily bond returns of a bond issuer's outstanding bonds we first identify all outstanding bond tranches of an issuer at the time of a new bond announcement from Thomson Reuters EIKON. Next, we obtain the history of daily bond prices from the enhanced TRACE file using bond tranche CUSIPs. Following the suggestions of Dick-Nielsen (2009, 2014), and Bessembinder et al. (2008) and Ederington et al. (2015), we delete corrected, canceled, reversed, and duplicate trades, and eliminate transactions under $100,000 in volume. We calculate single daily prices for each bond by weighting each transaction price by the dollar amount of its trade divided by the total dollar amount of activity on that day. Finally, we compute firm-level raw bond returns (from "clean" prices) by value weighting the daily prices of all bonds of each firm by their respective amounts outstanding.

We obtain the risk-free rate (one month T-Bill rate), the excess market return, the Fama-French SMB, HML, RMW, and the CMA factors from French's data library (French, 2022). In addition, we obtain the Barclays Long-Term Corporate Bond and Barclays Long-Term Treasury Bond indices from Bloomberg in order to compute the default premium and treasury yield curve factors of the five-factor bond model of Fama and French (1993).

Variable definitions and data sources are summarized in the appendix.

4.1 Sample Description

Table 1 presents descriptive statistics for the entire sample of bond issues (before matching) consisting of 11,440 corporate bond deals issued by 2,287 firms between 1989 and 2019. Variables are winsorized at the 1st and 99th percentile. The mean/-

median deal amounts in our sample are \$649/\$314 million, while the average deal maturity is about 10 years. The average deal offering yield is 663 basis points. Only 1% of bond deals have a performance-pricing provision. In 37% of bond deals, Mergent FISD did not have information on the initial issue rating. If a rating does exist, it tends to be around the investment grade threshold.

[Table 1 here]

Table 2 focuses on the sub-sample of 146 rating-sensitive bond deals issued by 101 firms between 1989 and 2019. The mean/median deal amounts in our sample are \$913/\$525 million, which implies that RSBs are somewhat larger than regular corporate bonds on average. The mean/median deal maturities are 10/9 years. While RSBs tend to be rated around the investment grade threshold also, the average offering yield of 582 bps is lower than the average offering yield of 663 bps of regular bonds.

[Table 2 here]

Table 3 provides summary statistics of the entire sample of bond issues, the matched control sample, and the sample of rating-sensitive bonds. By construction the means of the matched variables do not differ significantly from each other. However, the means of various unmatched variables also do not differ significantly from each other. This suggests that the matching process has been successful in balancing a wide range of observable characteristics.

[Table 3 here]

Figure 1 depicts the pricing grid of a RSB issued by Hexcel Corp in 2017. Every rating decline increases the coupon rate by 50 bps per rating notch until the B+ rating is reached. While there was more heterogeneity in the pricing grids in the early 1990s, most pricing grids are similar to the one depicted in figure 1. Thus, the pricing steps are typically defined over the non-investment grade region, and most RSB issues are rate-increasing only.

[Figure 1 here]

As shown in figure 2, the initial rating of most RSB deals is either BBB or BBB-, i.e., just above the IG/non-IG threshold. This is in stark contrast to the initial rating distribution of regular corporate bonds, which covers a much larger range of IG and non-IG rated bond issues. This finding suggests that the benefit of issuing RSBs is particularly large for firms just above the IG/non-IG threshold.

[Figure 2 here]

One potential reason for this is the discontinuity in bond prices around the IG/non-IG threshold. Kisgen (2006) discusses that some institutions are not able to hold non-investment grade rated debt obligations, which can give rise to this discontinuity. We illustrate the discontinuity in bond prices by graphing the yields of U.S. industrial bond indices as a function of their respective rating categories on Feb 27, 2017 in figure 3. Between BBB- and BB+, the yield change is the largest between any rating category.

[Figure 3 here]

Figure 4 depicts the total notional value of RSBs issued per year. While there were occasional issues in the 1990s, most RSBs in our sample were issued after 2000. The issuances are highly cyclical with a peak during the global financial crisis of 2008-2009. Figure 4 also depicts the TED spread as a measure of market distress. The graph shows that RSBs are issued more frequently in times of market distress, perhaps because during distress periods information asymmetries have larger pricing impacts.

[Figure 4 here]

5 Results

This section discusses the event study results, the selection analysis of what firm characteristics are associated with the issuance of rating-sensitive bonds, and the post-issue analysis.

5.1 Event Study

In this section we examine the announcement effects of the issuance of rating-sensitive bonds in the equity, bond and CDS markets. The event is defined as the first public record of a bond offering. This is either the bond registration date with the SEC (referred to as the offering date in the Mergent FISD database), or the first mentioning of the bond deal in a broad selection of business and news publications, e.g., The Wall Street Journal, Financial Times, Reuters News, obtained from Factiva. We estimate the CARs for the sample of rating-sensitive bonds and the matched control group over four event windows (-1 to +1, -5 to +5, -10 to +10, and -20 to +20).

The results are presented in table 4. For our treatment group, we find a significantly positive CAR in the stock market of 0.6% over the [-1,+1] event window. Over the longer event windows, the CARs rise to 1.4% - 3.2%. The pronounced drift may be due to the risk of bond issue cancellations, which declines as time passes.[11] These results are consistent with the signalling hypothesis, and also suggest that RSBs are not used to reduce risk-shifting. If firms use RSBs to mitigate risk-shifting incentives, this would improve credit quality, but also reduce the value of equity in some cases. Consistent with the literature on the market reaction to plain-vanilla bonds (e.g. Dann & Mikkelson, 1984; Eckbo, 1986; Mikkelson & Partch, 1986; Shyam-Sunder, 1991) we find no significant announcement returns over any event window for the matched control group.

The CABR over the [-1,+1] event window is insignificant. However, due to the general illiquidity of bonds, Bessembinder et al. (2008) suggest to focus on longer event windows. Over the [-5,+5] event window we find a significantly positive CABR of 0.4% for our treatment group. Over longer event windows the CABR rises to 0.6% - 0.7%, significant at the 5% and 10%-level, respectively. This results is consistent with the signalling hypothesis. If RSBs were used to reduce renegotiation costs however, it is unclear why there would be any price impact on outstanding bonds of the issuing firm. For the matched control group we find no significant announcement returns over any event window.

Regarding the impact of an RSB issue on the issuer's CDS spread, we find a marginally significant negative CASC of 3.8% over the [-5,+5] event window. Over the [-10,+10] event window the CASC rises to -6.4%, significant at the 5%-level. Since CDS quotes are given in basis points, a CASC of -6.4% implies that an issuer's CDS spread of 80 bps prior to the announcement for example would drop by 5 bps

[11] We also note a pre-event drift, which may be due to information leakage during the book-building process.

after the announcement. For the matched control group, we find no significant announcement returns over any event window. These results show that consistent with the signaling hypothesis equity, bond, and CDS markets react positively around the announcement of a rating-sensitive bond.

[Table 4 here]

5.2 Selection Analysis

In this section we estimate equation (4) to evaluate the propensity to issue RSBs rather than plain-vanilla bonds. The logit regression results are presented in table 5, while estimations from probit and linear probability models are reported in the Appendix.

Consistent with the signaling hypothesis, we find that firms with fewer tangible assets are more likely to issue a RSB instead of a regular bond. Firms with more intangible assets are subject to greater information asymmetries and thus would gain more from signaling. A decrease in tangibility by one standard deviation over the estimation sample (0.28) increases the unconditional probability of an RSB issue from 2% to 2.252% ($0.009 \times 0.28 = 0.252\%$). Smaller firms are also more likely to issue RSBs, but the results are not robust.

In the regressions excluding year fixed effects, we find a significant quadratic relationship between the bid-ask spread and the likelihood of issuing a RSB. Most RSB issues occur if the bid-ask spread is regular and if the bid-ask spread is particularly high. This last result is consistent with the signaling hypothesis, because firms with higher bid-ask spreads may be subject to more information asymmetries than firms with lower bid-ask spreads. The number of equity analysts following a firm, on the other hand, does not seem to impact the likelihood of issuing an RSB.

In all regressions the TED spread at the time of bond issue, a measure of market distress, is significantly positively related with the probability of an RSB issue.[12] A increase in the TED spread by one standard deviation over the estimation sample (0.28) increases the unconditional probability of an RSB issue from 2% to 2.168% ($0.006 \times 0.28 = 0.168\%$). This result also supports the signalling hypothesis. In periods of market distress information asymmetries are generally more significant or the uncertainty about the actual credit risk demands a higher risk premium. Both would increase the benefit of signaling.[13]

Finally, we examine the relation between the likelihood of issuing a RSB and the issuer's initial credit rating. The statistical significance of all rating dummies indicates that firms with ratings of B and below have the lowest probability of issuing a RSB among all firms. The highest likelihood of issuing RSBs occurs among BBB rated firms. When we partition the BBB rating dummy into its BBB+, BBB, and BBB- subcategories in regressions (2), (4), and (6), we find the highest likelihood of issuing RSBs for BBB-rated firms, i.e., firms just above the IG/non-IG threshold. In fact, the rating distributions of RSB and regular bond issuers in figure 2 shows, that most RSB issuers are rated BBB and BBB-. Given that the value of signaling is highest for firms just above the IG/non-IG threshold, due to the discontinuity in yields at this point, this result also supports the signaling of Manso et al. (2010).

Furthermore, the strong concentration of RSB issuers among BBB/BBB- rated firms is inconsistent with renegotiation costs motivating the use of RSB. This is

[12] We exclude year fixed effects when including pure time-series variables in the regressions. Including year fixed effects reduces the significance of the coefficient on the TED spread, while the coefficient remains statistically significant. In addition, we exclude the credit rating dummies in columns (5) and (6) as they are highly correlated with leverage.

[13] In a robustness check we control our regression for the Michigan Consumer Sentiment Index. This sentiment index is negatively correlated with the propensity to issue RSBs, which indicates that firms are more likely to issue RSBs when consumer sentiment is low.

because the likelihood of debt renegotiation increases inversely with the credit rating, which would imply that firms with lower ratings should generally have higher probabilities of using RSBs.

Our results are also inconsistent with the hypothesis that RSBs are issued to mitigate asset substitution concerns. If this were the case, we would expect the likelihood of using RSB to increase with firms' leverage. Our results show that while moderate leverage increases the likelihood of issuing an RSB, high leverage reduces this likelihood. Thus, RSBs do not seem to be used to mitigate debt overhang problems. R&D investments are generally riskier, involving innovation with uncertain outcomes. A High R&D expenditure indicates a firm's propensity for high-risk, high-reward projects. If RSBs were used to reduce asset substitution concerns, we would expect R&D expenditure to have a positive association with the likelihood of issuing a RSB, which we do not find. Furthermore, a higher proportion of short-term debt increases refinancing risk, pressuring firms into riskier projects to meet obligations, potentially leading to asset substitution. If RSBs were used to mitigate asset substitution, we would expect a positive association between the debt maturity ratio and the likelihood of issuing a RSB, which we do not observe. Finally, a higher market-to-book ratio suggests market expectations of high growth potential, often involving riskier projects, capturing the market's perception of the firm's risk profile. If asset substitution concerns motivate the use of RSBs, we would expect a positive relationship between the market-to-book ratio and the likelihood of issuing a RSB, which we fail to observe.

[Table 5 here]

5.3 Ex-Post Issuer Performance

In this section we examine the ex-post performance of bond issuers for up to ten years after a bond issue. The regression results of estimating equation (5) are presented in tables 6 and 7.

Consistent with Hypothesis 4, we find that in the first three years after a bond issue an RSB issuer is more likely to experience a rating improvement than a regular bond issuer. In particular, in the first year after a bond issuance, RSB issuers are 7.3% more likely to be upgraded and 6.5% less likely to be downgraded than regular bond issuers. In the second and third years after a bond issue these percentages rise to 16% and -14% respectively. These results imply that RSB issuers perform better than issuers of regular bonds on average, consistent with the signaling hypothesis.

To compare our ex-post performance results with those by Manso et al. (2010), we repeat our analysis using a firm's RoA as the performance measure. We find that RSB issuers are more likely to experience RoA improvements, specifically in years 4-7 following a RSB issue. While this result is consistent with the signaling hypothesis it is also consistent with other theories of performance-pricing such as those based on agency costs, e.g., Tchistyi (2016).

In conclusion, all of our results support Manso et al. (2010)'s signaling hypothesis of why firms issue rating-sensitive bonds.

[Tables 6 and 7 here]

5.4 Robustness

In this subsection, we present further checks to test the robustness of our event study analysis.

5.4.1 Return Predictions

One concern is that our event study results hinge on the type of model used to calculate abnormal stock returns. To alleviate this concern, we recalculate abnormal returns $Ra_{i,t}$ using the following three alternative models and rerun our stock market event study:

Constant Mean Model

$$Ra_{i,t} = R_{i,t} - \bar{R}_i \tag{6}$$

where $R_{i,t}$ and $\bar{R}_i$ are the actual returns and the simple mean return over the estimation window respectively.

Single Index Market Model

$$Ra_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t} \tag{7}$$

where $R_{m,t}$ is the CRSP value-weighted index, and the parameters α and β are estimated by linear regression over the estimation window.

Fama and French (1992) 3-Factor Model

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i}(R_{mt} - R_{ft}) + \beta_{2i} SMB_t + \beta_{3i} HML_t \tag{8}$$

The results of the alternative model specifications, equations (6) to (8), are presented in table 8. Across all three specifications, the CARs over the [-1,1] event window remain qualitatively and quantitatively unchanged at 0.6% at the 5% statistical significance level. Over the [-5,+5] event window, the CARs partially increase in statistical significance, and are quantitatively similar (1.3%-1.7%) to our baseline results (1.4%).

[Table 8 here]

We also use equation (6) to estimate the CASC using the constant mean model. The results are presented in table 9. When looking at the [-1,+1] event window, our results increase in statistical significance to the 5%-level, and stay quantitatively similar at 1.6%. Over the longer [-5,+5] event window, our results are statistically significant at the 5% level, with a CASC of 4,9%.

[Table 9 here]

5.4.2 Removing Confounding Events

Another concern could be that confounding events took place during the event window. For example, any announcement of material information such as earnings, dividend policy, mergers, and other security offerings may impact stock returns. To address this concern, we search on Factiva for earnings-, dividend-, M&A-announcements, and other securities offerings in the [-3,+3] event window. If we find a confounding event, we exclude the affected RSB offering from our stock, bond, and CDS market event studies. The results after removing confounding events are presented in table 10.

In the stock market event study the CAR over the [-1,+1] event window drops from 0.6% to 0.5%, and stays marginally significant. The CAR over the [-5,+5] event window drops from 1,4% to 0.8%, and also stays marginally significant. In the bond market event study the CABR over the [-5,+5] event window drops from

0.4% to 0.3% and stays marginally significant. The CABR over the [-10,+10] event window remains unchanged and significant at the 5% level. In the CDS event study the CASC in the [-1,+1] event window actually increases in both the economic and statistical significance. Thus, our main results are only marginally affected by confounding events. The conclusions from the event studies remain unchanged.

[Table 10 here]

6 Conclusion

In this paper we test the signaling theory of Manso et al. (2010) who argue that firms include performance-pricing provisions in their debt contracts if they believe a performance deterioration is less likely than what the market expects. Since the performance-pricing provision is a credible and costly signal, using such provision allows better credit firms to separate themselves from worse credit firms and thereby lower their external funding costs.

Consistent with the signaling hypothesis we find that upon announcement of a rating-sensitive bond the issuer's stock and bond prices react positively, while the issuer's CDS spread declines. The announcement effects in the stock and bond market are +1.4% and +0.4% respectively over a [-5,+5] event window. The announcement effect in the CDS market is -3.9% over the same event window. Furthermore, firms' subject to more information asymmetries and firms' just above the IG/non-IG threshold are more likely to issue rating-sensitive bonds. When financial markets are in distress the likelihood of bond issues with performance-pricing provisions also rises. Finally, issuers of rating-sensitive bonds are more likely to experience rating improvements over the first three years post issue relative to issuers of regular bonds.

These results corroborate that information asymmetries and the benefits from signaling motivate the use of rating-sensitive bonds. The most likely issuers of rating-sensitive bonds appear to be opaque firms rated just above the IG/non-IG threshold when financial markets are in distress.

References

Acharya, Viral V, Sanjiv Ranjan Das, and Rangarajan K Sundaram (2002). "Pricing Credit Derivatives With Rating Transitions". In: *Financial Analysts Journal* 58.3, pp. 28–44.

Adam, Tim R and Daniel Streitz (2016). "Hold-up and the Use of Performance-Sensitive Debt". In: *Journal of Financial Intermediation* 26, pp. 47–67.

Adam, Tim R et al. (2020). "Managerial Optimism and Debt Contract Design: The Case of Syndicated Loans". In: *Management Science* 66.1, pp. 352–375.

Andres, Christian, André Betzer, and Markus Doumet (2021). "Measuring Changes in Credit Risk: The Case of CDS Event Studies". In: *Global Finance Journal*, p. 100647.

Asquith, Paul, Anne Beatty, and Joseph Weber (2005). "Performance Pricing in Bank Debt Contracts". In: *Journal of Accounting and Economics* 40.1-3, pp. 101–128.

Bannier, Christina E and Markus Wiemann (2014). "Performance-Sensitive Debt–the Intertwined Effects of Performance Measurement and Pricing Grid Asymmetry". In: *CFS Working Paper*.

Begley, Taylor A (2012). "Signaling, Financial Constraints, and Performance Sensitive Debt". In: *Available at SSRN 2140217*.

Bessembinder, Hendrik, William Maxwell, and Kumar Venkataraman (2006). "Market Transparency, Liquidity Externalities, and Institutional Trading Costs in Corporate Bonds". In: *Journal of Financial Economics* 82.2, pp. 251–288.

Bessembinder, Hendrik et al. (2008). "Measuring Abnormal Bond Performance". In: *The Review of Financial Studies* 22.10, pp. 4219–4258.

Callen, Jeffrey L, Joshua Livnat, and Dan Segal (2009). "The Impact of Earnings on the Pricing of Credit Default Swaps". In: *The Accounting Review* 84.5, pp. 1363–1394.

Chung, Kee H and Hao Zhang (2014). "A simple approximation of intraday spreads using daily data". In: *Journal of Financial Markets* 17, pp. 94–120.

Dann, Larry Y and Wayne H Mikkelson (1984). "Convertible Debt Issuance, Capital Structure Change and Financing-Related Information: Some New Evidence". In: *Journal of Financial Economics* 13.2, pp. 157–186.

Das, Sanjiv R and Peter Tufano (1995). "Pricing Credit Sensitive Debt When Interest Rates, Credit Ratings and Credit Spreads Are Stochastic". In: *Journal of Financial Engineering.*

Dick-Nielsen, Jens (2009). "Liquidity Biases in TRACE". In: *The Journal of Fixed Income* 19.2, pp. 43–55.

— (2014). "How to Clean Enhanced TRACE Data". In: *Available at SSRN 2337908.*

Eckbo, B Espen (1986). "Valuation Effects of Corporate Debt Offerings". In: *Journal of Financial Economics* 15, pp. 119–151.

Ederington, Louis, Wei Guan, and Lisa Zongfei Yang (2015). "Bond Market Event Study Methods". In: *Journal of Banking & Finance* 58, pp. 281–293.

Fama, Eugene F and Kenneth R French (1992). "The Cross-Section of Expected Stock Returns". In: *the Journal of Finance* 47.2, pp. 427–465.

— (1993). "Common Risk Factors in the Returns on Stocks and Bonds". In: *Journal of Financial Economics* 33.1, pp. 3–56.

— (2015). "A Five-Factor Asset Pricing Model". In: *Journal of Financial Economics* 116.1, pp. 1–22.

Federal Reserve Bank of St. Louis (2023). *TED Spread.* URL: https://fred.stlouisfed.org/series/TEDRATE (visited on 08/30/2023).

French, Kenneth (2022). *US Fama French Factors*. URL: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html (visited on 05/25/2022).

Gande, Amar and Anthony Saunders (2012). "Are Banks Still Special When There Is a Secondary Market for Loans?" In: *The Journal of Finance* 67.5, pp. 1649–1684.

Houweling, Patrick, Albert Mentink, and Ton CF Vorst (2004). "Valuing Euro Rating-Triggered Step-up Telecom Bonds". In: *The Journal of Derivatives* 11.3, pp. 63–80.

Hull, John, Mirela Predescu, and Alan White (2004). "The Relationship Between Credit Default Swap Spreads, Bond Yields, and Credit Rating Announcements". In: *Journal of Banking & Finance* 28.11, pp. 2789–2811.

Kisgen, Darren J (2006). "Credit Ratings and Capital Structure". In: *The Journal of Finance* 61.3, pp. 1035–1072.

Koziol, Christian and Jochen Lawrenz (2010). "Optimal Design of Rating-Trigger Step-up Bonds: Agency Conflicts Versus Asymmetric Information". In: *Journal of Corporate Finance* 16.2, pp. 182–204.

Lando, David and Allan Mortensen (2003). "On the Pricing of Step-up Bonds in the European Telecom Sector". In: *Available at SSRN 495562*.

Loon, Yee Cheng and Zhaodong Ken Zhong (2014). "The Impact of Central Clearing on Counterparty Risk, Liquidity, and Trading: Evidence From the Credit Default Swap Market". In: *Journal of Financial Economics* 112.1, pp. 91–115.

MacKinlay, A Craig (1997). "Event Studies in Economics and Finance". In: *Journal of Economic Literature* 35.1, pp. 13–39.

Manso, Gustavo, Bruno Strulovici, and Alexei Tchistyi (2010). "Performance-Sensitive Debt". In: *The Review of Financial Studies* 23.5, pp. 1819–1854.

Maskara, Pankaj K and Donald J Mullineaux (2011). "Information Asymmetry and Self-Selection Bias in Bank Loan Announcement Studies". In: *Journal of Financial Economics* 101.3, pp. 684–694.

Mikkelson, Wayne H and M Megan Partch (1986). "Valuation Effects of Security Offerings and the Issuance Process". In: *Journal of Financial Economics* 15.1-2, pp. 31–60.

Shyam-Sunder, Lakshmi (1991). "The Stock Price Effect of Risky Versus Safe Debt". In: *Journal of Financial and Quantitative Analysis* 26.4, pp. 549–558.

Tchistyi, Alexei (2016). "Security Design With Correlated Hidden Cash Flows: The Optimality of Performance Pricing". In: *Available at SSRN 875900.*

Tchistyi, Alexei, David Yermack, and Hayong Yun (2011). "Negative Hedging: Performance-Sensitive Debt and Ceos' Equity Incentives". In: *Journal of Financial and Quantitative Analysis* 46.3, pp. 657–686.

7 Tables and Figures

Figure 1: **Performance-Pricing Grid of a Rating-Sensitive Bond**
This figure shows how the coupon of a rating-sensitive bond issued by Hexcel Corporation in 2017 increases as Hexel's two ratings by S&P and Moody's deteriorate. Source: Bond Prospectus.

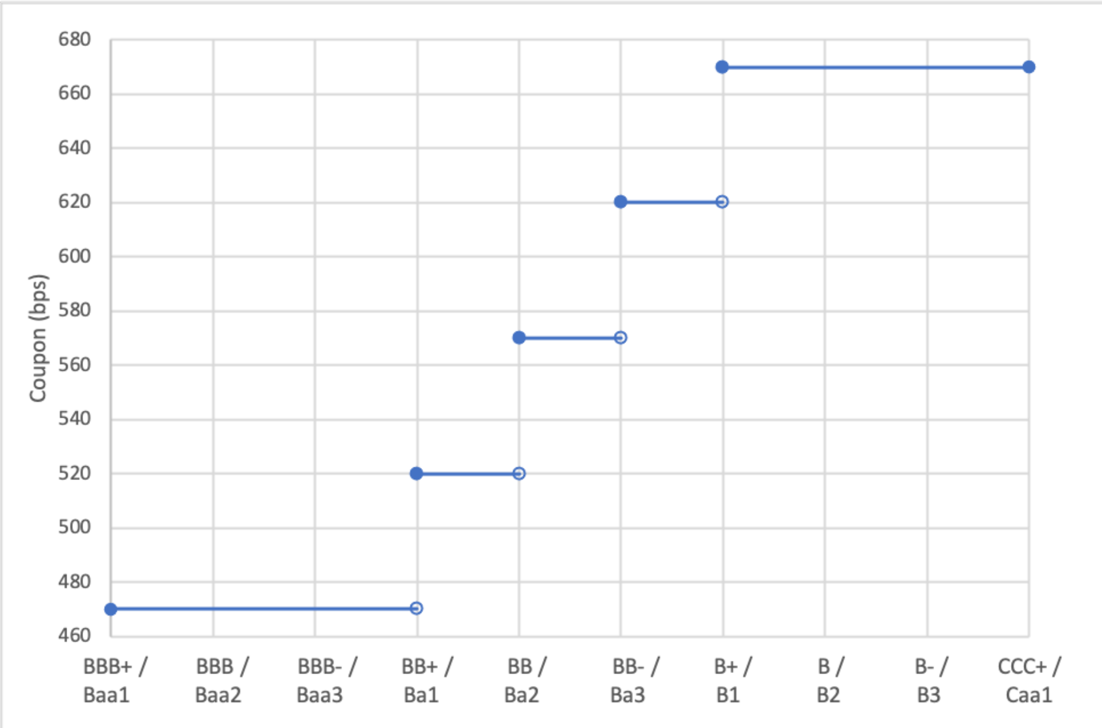

Figure 2: **Distributions of Initial Ratings of RSB and Regular Bonds**
This figure shows the initial S&P credit rating distributions of RSBs and regular corporate bonds (incl. medium term notes) issued in the U.S. between 1989 and 2019. Source: Mergent FISD.

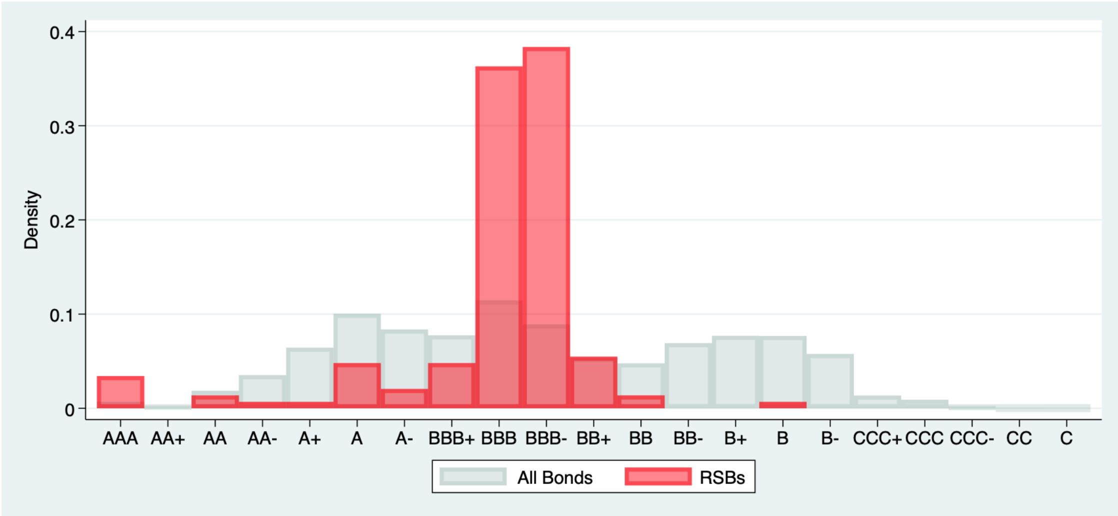

Figure 3: **Yields of U.S. Industrial Bond Indices**
This figure shows the yield to maturities of U.S. industrial bond indices with a tenor of 10 years for S&P credit ratings ranging from AAA to B- on February 27th, 2017. Source: Bloomberg.

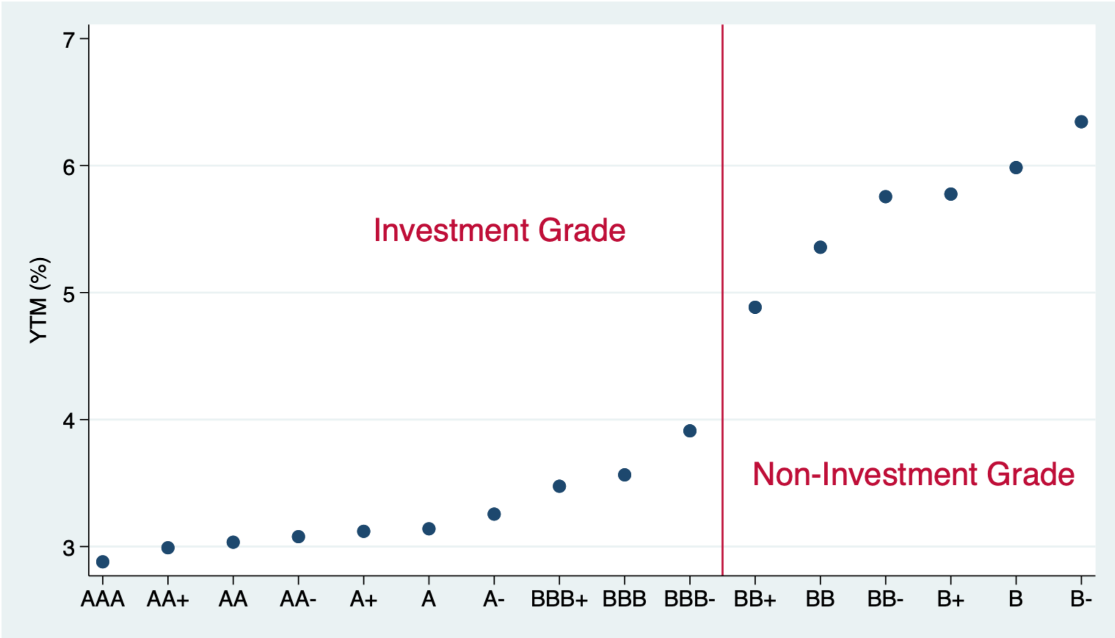

Figure 4: **RSB Issues and TED Spread**
This graph shows the total notional amount of RSB issued per year in the U.S., and the TED spread, defined as the spread between the 3-Month U.S. dollar LIBOR and the 3-Month U.S. Treasury Bill rate. Source: Own calculations and Federal Reserve Bank of St. Louis.

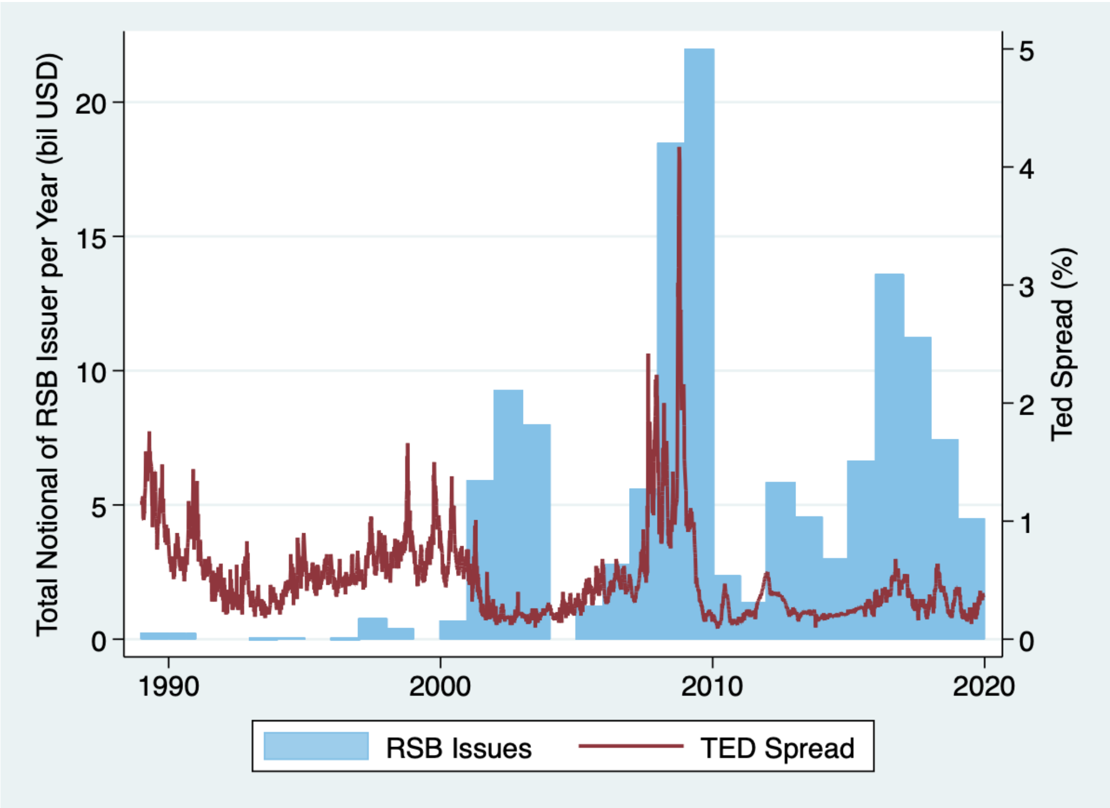

Table 1: **Summary Statistics: Public Bonds**

This table provides summary statistics of our sample of public debt obligations at the deal level. The public debt sample consists of 11,440 corporate bond and medium term note deals issued by U.S. firms between 1989 and 2019. Variable definitions can be found in the appendix.

	Mean	Median	Std	Min	5%	95%	Max	N
RSB Dummy	0.01	0.00	0.11	0.00	0.00	0.00	1.00	11440
Deal Amount (mil USD)	649.93	314.49	952.59	6.76	50.00	2499.74	6000.00	11440
Deal Maturity (Years)	10.49	9.67	6.83	1.00	3.00	30.00	35.00	11440
Deal Offering Yield (bps)	662.91	657.00	265.72	92.20	263.40	1125.00	1450.00	8885
Initial Rating (S&P)		BBB		AAA	AA-	B-	C	7166
Total Assets (bil USD)	56.28	6.47	166.37	0.10	0.35	336.10	1119.80	11440
Deal Amount / Total Assets	0.13	0.06	0.20	0.00	0.00	0.52	1.26	11440
Tangibility	0.34	0.28	0.28	0.00	0.01	0.85	0.91	11431
2-Month MA Bid-Ask	0.01	0.00	0.01	0.00	0.00	0.03	0.05	10516
2-Month MA Bid-Ask^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10516
Number of Analysts	15.26	14.00	9.34	1.00	2.00	32.00	39.00	9662
Ln(Total Assets)	8.89	8.78	1.97	4.62	5.85	12.73	13.93	11440
Market-to-Book	0.89	0.64	0.85	0.04	0.08	2.61	4.62	11440
Leverage	0.36	0.34	0.20	0.01	0.07	0.76	1.03	11440
Leverage^2	0.17	0.11	0.19	0.00	0.00	0.57	1.06	11440
R&D / Sales	0.01	0.00	0.03	0.00	0.00	0.08	0.20	11429
Debt Maturity Ratio	0.59	0.09	1.62	0.00	0.00	3.10	11.42	11317
Profitability	0.08	0.08	0.07	-0.18	-0.01	0.20	0.29	11440
RoA	0.03	0.03	0.07	-0.29	-0.08	0.13	0.21	11440
Ted Spread	0.45	0.36	0.29	0.14	0.17	1.04	1.63	11296

Table 2: **Summary Statistics: Rating-Sensitive Bonds**
This table provides summary statistics of our sample of 146 public rating-sensitive debt obligations (incl. medium term notes) issued by U.S. firms between 1989 and 2019. Variable definitions can be found in the appendix.

	Mean	Median	Std	Min	5%	95%	Max	N
Deal Amount (mil USD)	913.18	525.00	1115.04	10.56	100.00	3000.00	6000.00	146
Deal Maturity (Years)	10.43	9.08	7.13	1.50	4.58	30.00	35.00	146
Deal Offering Yield (bps)	582.32	572.40	216.36	92.20	309.83	965.12	1250.00	120
Initial Rating (S&P)		BBB		AAA	AA-	BB+	B	146
Total Assets (bil USD)	19.33	8.23	37.30	1.27	1.99	60.77	251.51	146
Deal Amount / Total Assets	0.11	0.08	0.12	0.00	0.01	0.28	1.10	146
Tangibility	0.26	0.18	0.24	0.01	0.02	0.74	0.91	137
2-Month MA Bid-Ask	0.00	0.00	0.01	0.00	0.00	0.01	0.05	139
2-Month MA Bid-Ask^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	139
Number of Analysts	15.24	15.00	8.04	1.00	3.00	29.00	39.00	125
Ln(Total Assets)	9.13	9.01	1.08	7.15	7.59	11.01	12.44	146
Market-to-Book	0.98	0.77	0.78	0.04	0.19	2.46	3.95	146
Leverage	0.32	0.30	0.16	0.01	0.06	0.58	0.83	146
Leverage^2	0.12	0.09	0.12	0.00	0.00	0.33	0.69	146
R&D / Sales	0.02	0.00	0.04	0.00	0.00	0.11	0.20	146
Debt Maturity Ratio	0.58	0.14	1.50	0.00	0.00	2.33	11.42	144
Profitability	0.10	0.09	0.06	-0.18	0.03	0.23	0.29	146
RoA	0.04	0.04	0.06	-0.22	-0.05	0.15	0.21	146
Ted Spread	0.56	0.41	0.41	0.14	0.18	1.47	1.63	145

Table 3: **Propensity Score Matched Sample**
This table provides the results of the propensity score matching. The control group is matched using nearest-neighbor propensity score matching based on the deal amount (mil USD) divided by total assets (mil USD), the issuance date, the bond deal maturity (years), the intital S&P rating, the market-to-book ratio, and leverage. Variable definitions can be found in the appendix. The last two columns present T-tests of differences in means.

	Full Sample (Excluding RSBs)			Matched Control Group			Rating-Sensitive Bonds				
	Median	Mean	N	Median	Mean	N	Median	Mean	N	Diff. in Mean (Control vs. RSB)	t-stat.
Panel A. Matched Variables											
Deal Amount / Total Assets	0.07	0.15	7,020	0.06	0.09	146	0.08	0.11	146	-0.019	-1.497
Deal Maturity (Years)	9.75	10.93	7,020	8.92	10.43	146	9.08	11.49	146	-1.062	-0.978
Initial Rating (SP)	9.00	9.94	7,020	9.00	9.45	146	9.00	8.92	146	0.521	1.554
Market-to-Book	0.64	0.89	7,020	0.72	0.95	146	0.77	0.98	146	-0.031	-0.331
Leverage	0.33	0.36	7,020	0.30	0.30	146	0.30	0.32	146	-0.011	-0.539
Panel B. Unmatched Variables											
Deal Amount (mil USD)	300.00	629.87	7,020	425.00	789.18	146	525.00	933.72	146	-144.546	-1.089
Deal Offering Yield (bps)	676.02	673.95	5,487	550.00	549.63	118	572.40	581.55	120	-31.926	-1.159
Initial Rating (Moodys)	9.00	9.76	5,843	9.00	9.58	130	10.00	9.07	137	0.512	1.385
Ln(Total Assets)	8.65	8.75	7,020	9.28	9.41	146	9.01	9.13	146	0.281	1.649
Tangibility	0.32	0.36	7,020	0.20	0.31	146	0.18	0.26	137	0.047	1.480
Profitability	0.08	0.08	7,020	0.08	0.09	146	0.09	0.10	146	-0.011	-1.440
RoA	0.03	0.03	7,020	0.04	0.05	146	0.04	0.04	146	0.003	0.463

Table 4: **Event Study**
This table provides the results of the stock, bond, and CDS market event studies for several event windows. The models were trained with 150 days of data before the event window. Panel A shows the results of the rating-sensitive bond sample, while Panel B shows the results of the matched control group sample. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Panel A. Rating Sensitive Bonds				Panel B. Control Group			
Stock Market - Fama French 5 Factor Model								
Event Window	CAR	Std. E.	t-stat.	N	CAR	Std. E.	t-stat.	N
[-1, +1]	0.006**	0.003	2.058	146	-0.002	0.002	-0.912	146
[-5, +5]	0.014**	0.006	2.523	146	-0.000	0.005	-0.075	146
[-10, +10]	0.030***	0.008	3.918	146	-0.005	0.006	-0.725	146
[-20, +20]	0.032***	0.011	2.959	146	-0.005	0.009	-0.558	146
Bond Market - Fama French Bond 5 Factor Model								
Event Window	CABR	Std. E.	t-stat.	N	CABR	Std. E.	t-stat.	N
[-1, +1]	0.001	0.001	0.980	84	-0.000	0.001	-0.544	91
[-5, +5]	0.004**	0.002	2.002	84	0.000	0.001	0.271	91
[-10, +10]	0.006**	0.003	2.015	84	0.002	0.002	0.790	91
[-20, +20]	0.007*	0.004	1.739	84	0.003	0.003	1.181	91
CDS Market - Market Model								
Event Window	CASC	Std. E.	t-stat.	N	CASC	Std. E.	t-stat.	N
[-1, +1]	-0.005	0.012	-0.390	62	0.003	0.009	0.403	53
[-5, +5]	-0.038*	0.023	-1.686	62	0.004	0.016	0.234	53
[-10, +10]	-0.064**	0.032	-1.983	62	0.014	0.023	0.600	53
[-20, +20]	-0.128***	0.045	-2.812	62	-0.032	0.031	-1.026	53

Table 5: **Selection Model**

This table presents marginal effects of logit models that evaluate the likelihood of issuing RSBs rather than regular corporate bonds. The marginal effects of all covariates are calculated as the difference in predicted probabilities of a particular outcome while keeping the other variables at their means. The sample is restricted to rated issues only. Standard errors are heteroskedasticity robust, clustered at the firm level, and presented in parentheses. *,**,*** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Variable definitions can be found in the appendix.

	(1) RSB	(2) RSB	(3) RSB	(4) RSB	(5) RSB	(6) RSB
Tangibility	-0.009*	-0.009*	-0.008**	-0.007**	-0.019**	-0.017**
	(0.005)	(0.005)	(0.004)	(0.004)	(0.010)	(0.008)
2-Month MA Bid-Ask	-0.505	-0.398	-1.077***	-0.895***	-1.339	-2.649***
	(0.760)	(0.692)	(0.248)	(0.213)	(1.449)	(0.588)
2-Month MA Bid-Ask^2	12.948	10.390	20.774***	17.546***	27.881	48.608***
	(14.474)	(13.456)	(5.695)	(5.111)	(25.589)	(10.908)
Number of Analysts	0.000	0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln(Total Assets)	-0.002*	-0.001	-0.001	-0.000	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Market-to-Book	-0.002	-0.001	-0.001	-0.000	-0.000	-0.000
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Leverage	0.027	0.025	0.028	0.025	0.091**	0.092***
	(0.020)	(0.019)	(0.017)	(0.016)	(0.041)	(0.035)
Leverage^2	-0.028	-0.027	-0.030	-0.027	-0.141***	-0.132***
	(0.026)	(0.024)	(0.022)	(0.021)	(0.053)	(0.046)
R&D / Sales	0.009	-0.003	0.012	0.004	-0.005	0.003
	(0.027)	(0.026)	(0.020)	(0.018)	(0.055)	(0.046)
Debt Maturity Ratio	0.001	0.001	0.000	0.000	0.002**	0.001
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Rating AAA/AA (All)	0.029***	0.022***	0.021***	0.016***		
	(0.008)	(0.008)	(0.006)	(0.006)		
Rating A (All)	0.019**	0.013*	0.014**	0.009		
	(0.008)	(0.007)	(0.006)	(0.006)		
Rating BBB (All)	0.032***		0.026***			
	(0.007)		(0.006)			
Rating BBB+		0.015**		0.012**		
		(0.007)		(0.005)		
Rating BBB		0.028***		0.022***		
		(0.006)		(0.005)		
Rating BBB-		0.031***		0.024***		
		(0.007)		(0.005)		
Rating BB (All)	0.015**	0.013**	0.013***	0.011***		
	(0.007)	(0.006)	(0.004)	(0.004)		
Deal Amount / Total	0.009	0.005	0.010**	0.007**	-0.002	-0.001
Assets	(0.005)	(0.005)	(0.004)	(0.004)	(0.016)	(0.013)
Deal Maturity (Years)	0.000	0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ted Spread			0.006***	0.006***		0.013***
			(0.002)	(0.002)		(0.003)
Year Fixed Effect	Yes	Yes	No	No	Yes	No
Pseudo R^2	0.234	0.267	0.204	0.241	0.121	0.078
Mean(Probabilities)	0.025	0.025	0.020	0.020	0.020	0.020
Correctly Predicted Probabilities (%)	97.43	97.43	97.98	97.93	97.98	97.93
Observations	4403	4403	5596	5596	4403	5596

Table 6: **Ex-post Issuer Performance**

This table presents coefficient estimates of ordered probit regressions of credit rating changes (Panel A), and the marginal effects of probit regressions of RoA changes (Panel B) for k years after a bond issue (k = 1-10). Marginal effects for each covariate are estimated as the difference in predicted probabilities for a particular outcome holding all other covariates at their means. For factor levels it is computed as the discrete change from the base level. The firm-level controls include firm size, leverage, market-to-book ratio, profitability, and tangibility. The bond-level controls include deal size and deal maturity (months). Standard errors are heteroskedasticity robust, clustered at the firm level, and presented in parentheses. *,**,*** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Panel A. Credit Rating Evolution, Ordered Probit Model (-1, 0, 1)									
	$\Delta CR(+1)$	$\Delta CR(+2)$	$\Delta CR(+3)$	$\Delta CR(+4)$	$\Delta CR(+5)$	$\Delta CR(+6)$	$\Delta CR(+7)$	$\Delta CR(+8)$	$\Delta CR(+9)$	$\Delta CR(+10)$
RSB	0.426**	0.560***	0.486**	0.339	0.296	0.171	0.139	0.327	0.251	0.335
	(0.214)	(0.207)	(0.214)	(0.215)	(0.221)	(0.244)	(0.253)	(0.263)	(0.261)	(0.259)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.127	0.107	0.097	0.109	0.125	0.169	0.198	0.223	0.237	0.267
Observations	266	266	263	257	245	233	217	199	177	164

	Panel B. RoA Evolution, Probit Model (0, 1)									
	$\Delta RoA(+1)$	$\Delta RoA(+2)$	$\Delta RoA(+3)$	$\Delta RoA(+4)$	$\Delta RoA(+5)$	$\Delta RoA(+6)$	$\Delta RoA(+7)$	$\Delta RoA(+8)$	$\Delta RoA(+9)$	$\Delta RoA(+10)$
RSB	-0.010	0.093	0.113	0.188*	0.214**	0.305***	0.264**	0.191	-0.018	0.109
	(0.091)	(0.091)	(0.105)	(0.106)	(0.106)	(0.104)	(0.115)	(0.120)	(0.119)	(0.130)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.135	0.152	0.177	0.205	0.166	0.221	0.268	0.243	0.123	0.142
Observations	270	268	253	234	230	224	191	177	156	124

Table 7: **Marginal Effects for Ex-post Credit Rating Evolution**

This table presents marginal effects of ordered probit regressions of credit rating changes for k years after a bond issue ($k =$ 1-10). Marginal effects for each covariate are estimated as the difference in predicted probabilities for a particular outcome holding all other covariates at their means. For factor levels it is computed as the discrete change from the base level. The firm-level controls include firm size, leverage, market-to-book ratio, profitability, and tangibility. The bond-level controls include deal size and deal maturity (months). Standard errors are heteroskedasticity robust, clustered at the firm level, and presented in parentheses. *,**,*** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	$\Delta CR(+1)$	$\Delta CR(+2)$	$\Delta CR(+3)$	$\Delta CR(+4)$	$\Delta CR(+5)$	$\Delta CR(+6)$	$\Delta CR(+7)$	$\Delta CR(+8)$	$\Delta CR(+9)$	$\Delta CR(+10)$
Panel A. AMEs for Upgrades										
RSB	0.073**	0.161***	0.165**	0.127	0.111	0.065	0.054	0.125	0.097	0.121
	(0.036)	(0.059)	(0.072)	(0.080)	(0.082)	(0.092)	(0.098)	(0.101)	(0.101)	(0.093)
Panel B. AMEs for No Change										
RSB	-0.008	-0.020	-0.026	-0.030	-0.023	-0.013	-0.012	-0.020	-0.011	0.000
	(0.015)	(0.021)	(0.018)	(0.020)	(0.018)	(0.018)	(0.023)	(0.019)	(0.015)	(0.010)
Panel C. AMEs for Downgrades										
RSB	-0.065*	-0.140***	-0.139**	-0.096	-0.088	-0.052	-0.042	-0.106	-0.086	-0.121
	(0.034)	(0.053)	(0.062)	(0.062)	(0.067)	(0.075)	(0.076)	(0.084)	(0.089)	(0.092)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Rating Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.127	0.107	0.097	0.109	0.125	0.169	0.198	0.223	0.237	0.267
Observations	266	266	263	257	245	233	217	199	177	164

Table 8: **Stock Market – Different Models**
This table provides the results of the robustness checks for alternative specifications of the abnormal stock market return calculation across several event windows. The market and Fama-French 3 Factor models were trained with 150 days of data before the event window. T-test (two-sided) if abnormal performance is unequal to zero. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Constant Mean Model

Event Window	CAR	Std. E.	t-stat.	p-value	N
[-1,+1]	0.006**	0.004	1.669	0.048	146
[-5,+5]	0.017**	0.007	2.281	0.011	146
[-10,+10]	0.042***	0.010	4.248	0.000	146
[-20,+20]	0.053***	0.014	3.886	0.000	146

Market Model

Event Window	CAR	Std. E.	t-stat.	p-value	N
[-1,+1]	0.006**	0.003	1.809	0.035	146
[-5,+5]	0.016***	0.006	2.773	0.003	146
[-10,+10]	0.032***	0.008	4.025	0.000	146
[-20,+20]	0.034***	0.011	3.037	0.001	146

Fama-French 3 Factor Model

Event Window	CAR	Std. E.	t-stat.	p-value	N
[-1,+1]	0.006**	0.003	1.925	0.027	146
[-5,+5]	0.013***	0.006	2.354	0.009	146
[-10,+10]	0.029***	0.008	3.680	0.000	146
[-20,+20]	0.031***	0.011	2.858	0.002	146

Table 9: **Credit Default Swap Market – Different Model**
This table provides the results of the robustness checks for alternative specifications of the abnormal credit default swap spread change calculation across several event windows. T-test (two-sided) if abnormal performance is unequal to zero. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Constant Mean Model					
Event Window	CASC	Std. E.	t-stat.	p-value	N
[-1,+1]	-0.016**	0.009	-1.836	0.033	62
[-5,+5]	-0.049**	0.023	-2.119	0.017	62
[-10,10]	-0.083***	0.032	-2.607	0.005	62
[-20,+20]	-0.180***	0.043	-4.145	0.000	62

Table 10: **Confounding Events Removed**
This table provides the results of the robustness check for confounding events in the stock, bond, and CDS market event studies across several event windows. The models were trained with 150 days of data before the event window. T-test (two-sided) if abnormal performance is unequal to zero. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Stock Market - Fama French 5 Factor Model
Removing Confounding Events [-3,+3]

Event Window	CAR	Std. E.	t-stat.	p-value	N
[-1,+1]	0.005*	0.003	1.554	0.060	130
[-5,+5]	0.008*	0.006	1.289	0.099	130
[-10,10]	0.023***	0.008	2.853	0.002	130
[-20,+20]	0.021**	0.011	1.838	0.033	130

Bond Market - Fama French 5 Factor Bond Model
Removing Confounding Events [-3,+3]

Event Window	CABR	Std. E.	t-stat.	p-value	N
[-1,+1]	-0.000	0.001	-0.405	0.343	73
[-5,+5]	0.003*	0.002	1.393	0.082	73
[-10,10]	0.006**	0.003	1.879	0.030	73
[-20,+20]	0.006*	0.004	1.384	0.083	73

CDS Market - Market Model
Removing Confounding Events [-3,+3]

Event Window	CASC	Std. E.	t-stat.	p-value	N
[-1,+1]	-0.015**	0.009	-1.801	0.035	54
[-5,+5]	-0.026	0.025	-1.020	0.154	54
[-10,10]	-0.048*	0.035	-1.363	0.087	54
[-20,+20]	-0.128***	0.050	-2.562	0.005	54

Appendix

Variable Definitions

Variable	Source	Description
Total Assets (mil USD)	Compustat NA	Firm's total assets in US$ million (at)
Total Assets (bil USD)	Compustat NA	Firm's total assets in US$ billion (at)
Ln(Total Assets)	Compustat NA	Natural logarithm of total assets (mio USD) (at)
Debt Maturity Ratio	Compustat NA	Debt in current liabilities (dlc) / long-term debt (dltt)
Leverage	Compustat NA	(Long-term debt (dltt) + debt in current liabilities (dlc)) / total assets (at)
Market-to-Book	Compustat NA	(Price Close Annual Fiscal (prcc_f) * common shares outstanding (csho)) / total assets (at)
Tangibility	Compustat NA	Net property plant and equipment (ppent) / total assets (at)
Profitability	Compustat NA	EBIT (ebit) / total assets (at)
RoA	Compustat NA	Net income (ni) / total assets (at)
R&D / Sales	Compustat NA	Research and development expense (xrd) / net sales (sale)
Tranche Offering Yield	Mergent FISD	Yield to maturity at the time of issuance of the tranche, based on the coupon and any discount or premium to par value at the time of sale. Calculated by Mergent only for fixed rate issues.
Tranche Amount (mil USD)	Mergent FISD	The par value of debt initially issued in millions of USD.
Tranche Maturity (Years)	Mergent FISD	Maturity of tranche in years
Deal Offering Yield	Mergent FISD	Weighted (by tranche amount) average yield offered at issuance
Deal Amount (mil USD)	Mergent FISD	Total amount in millions of USD issued by the bond deal (across tranches)
Deal Maturity (Years)	Mergent FISD	Weighted (by tranche amount) maturity in years
Initial Rating (S&P)	Mergent FISD, Bloomberg	S&P issue credit rating at the closing date (1=AAA, 2=AA+, 3=AA, ..., 21=C). For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.
Initial Rating (Moody's)	Mergent FISD	Moody's issue credit rating at the closing date (1=Aaa, 2=Aa1, 3=Aa2, ..., 20=Ca).
Rating AAA/AA (All)	Mergent FISD, Bloomberg	Dummy variable equal to one if initial S&P Rating is AAA, AA+, AA, or AA-. For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.
Rating A (All)	Mergent FISD, Bloomberg	Dummy variable equal to one if initial S&P Rating is A+, A, or A-. For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.
Rating BBB (All)	Mergent FISD, Bloomberg	Dummy variable equal to one if initial S&P Rating is BBB+, BBB, or BBB-. For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.
Rating BBB+	Mergent FISD, Bloomberg	Dummy variable equal to one if initial S&P Rating is BBB+. For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.
Rating BBB	Mergent FISD, Bloomberg	Dummy variable equal to one if initial S&P Rating is BBB. For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.
Rating BBB-	Mergent FISD, Bloomberg	Dummy variable equal to one if initial S&P Rating is BBB-. For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.
Rating BB (All)	Mergent FISD, Bloomberg	Dummy variable equal to one if initial S&P Rating is BB+, BB, or BB-. For RSB group, issuer credit rating from Bloomberg when not available in Mergent FISD.

Rating History	Bloomberg	S&P issuer credit rating evolution over time
Stock Return History	CRSP	Daily dividend and stock split adjusted stock returns over time. Stock return data starts in 1989.
2-Month MA Bid-Ask	CRSP	Moving average of the ratio of daily ask and bid closing prices to the midpoint of of the ask and bid closing prices in the 2 months preceding the bond issuance. At least 40 observations of daily data are required to calculate the spread
Bond Price History	Trade Reporting and Compliance Engine (TRACE)	Bond transaction-level data over time. TRACE transaction data starts in 2002.
CDS Spread History	Thomson Reuters Datastream (CMA Datavision & Thomson Reuters CDS)	Daily five-year mid CDS quote evolution over time. CDS qoute data starts in 2005.
Number of Analysts	Thomson Reuters EIKON & I/B/E/S	Number of equity analysts following the firm in the period preceding the bond issuance
Ted Spread	Federal Reserve Economic Data	The spread between 3-month LIBOR and Treasury bills, which indicates perceived credit risk.
Michigan Consumer Sentiment Index	Federal Reserve Economic Data	University of Michigan's monthly Survey of Consumers, which is used to estimate future spending and saving.

Selection Model – Probit

This table presents marginal effects of probit models that evaluate the likelihood of issuing RSBs rather than regular corporate bonds. The marginal effects of all covariates are calculated as the difference in predicted probabilities of a particular outcome while keeping the other variables at their means. The sample is restricted to rated issues only. Standard errors are heteroskedasticity robust, clustered at the firm level, and presented in parentheses. *,**,*** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Variable definitions can be found in the appendix.

	(1) RSB	(2) RSB	(3) RSB	(4) RSB	(5) RSB	(6) RSB
Tangibility	-0.011*	-0.011**	-0.011**	-0.010**	-0.021*	-0.019**
	(0.006)	(0.006)	(0.005)	(0.005)	(0.011)	(0.009)
2-Month MA Bid-Ask	-0.494	-0.371	-1.305***	-1.036***	-1.335	-2.703***
	(0.792)	(0.699)	(0.298)	(0.269)	(1.363)	(0.635)
2-Month MA Bid-Ask^2	15.533	12.518	26.319***	21.532***	30.097	50.237***
	(14.800)	(13.309)	(6.759)	(6.213)	(24.532)	(11.746)
Number of Analysts	0.000	0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln(Total Assets)	-0.002	-0.001	-0.001	0.000	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Market-to-Book	-0.002	-0.000	-0.001	0.000	-0.001	0.000
	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)
Leverage	0.044*	0.042*	0.046*	0.042*	0.107**	0.103***
	(0.026)	(0.023)	(0.024)	(0.022)	(0.046)	(0.039)
Leverage^2	-0.050	-0.049	-0.052*	-0.049*	-0.166***	-0.148***
	(0.032)	(0.030)	(0.031)	(0.029)	(0.057)	(0.049)
R&D / Sales	0.022	0.009	0.025	0.014	0.005	0.008
	(0.037)	(0.034)	(0.032)	(0.029)	(0.067)	(0.055)
Debt Maturity Ratio	0.001	0.001	0.001	0.001	0.003**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Rating AAA/AA (All)	0.030***	0.021***	0.021***	0.014*		
	(0.009)	(0.008)	(0.008)	(0.007)		
Rating A (All)	0.018**	0.011	0.012*	0.007		
	(0.008)	(0.007)	(0.007)	(0.007)		
Rating BBB (All)	0.035***		0.030***			
	(0.007)		(0.006)			
Rating BBB+		0.014*		0.010*		
		(0.007)		(0.006)		
Rating BBB		0.030***		0.025***		
		(0.006)		(0.005)		
Rating BBB-		0.034***		0.029***		
		(0.007)		(0.006)		
Rating BB (All)	0.015**	0.012*	0.013**	0.011**		
	(0.007)	(0.006)	(0.006)	(0.005)		
Deal Amount / Total Assets	0.011	0.008	0.011**	0.008	-0.004	-0.003
	(0.008)	(0.008)	(0.006)	(0.005)	(0.018)	(0.014)
Deal Maturity (Years)	0.000	0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ted Spread			0.009***	0.009***		0.017***
			(0.002)	(0.002)		(0.003)
Year Fixed Effect	Yes	Yes	No	No	Yes	No
Pseudo R^2	0.230	0.264	0.195	0.232	0.120	0.077
Mean(Probabilities)	0.026	0.026	0.020	0.020	0.020	0.020
Correctly Predicted Probabilities (%)	97.41	97.39	97.98	97.98	97.98	97.98
Observations	4403	4403	5596	5596	4403	5596

Selection Model – LPM

This table presents coefficients of linear probability models that evaluate the likelihood of issuing RSBs rather than regular corporate bonds. The sample is restricted to rated issues only. Standard errors are heteroskedasticity robust, clustered at the firm level, and presented in parentheses. *,**,*** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Variable definitions can be found in the appendix.

	(1) RSB	(2) RSB	(3) RSB	(4) RSB	(5) RSB	(6) RSB
Tangibility	-0.026**	-0.026**	-0.028**	-0.028**	-0.022*	-0.023*
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
2-Month MA Bid-Ask	-1.232	-1.212	-3.444***	-3.199***	-1.070	-3.465***
	(0.934)	(0.932)	(0.733)	(0.710)	(0.939)	(0.707)
2-Month MA Bid-Ask^2	27.614	27.459	64.414***	60.219***	23.596	63.807***
	(18.524)	(18.521)	(14.984)	(14.774)	(18.564)	(14.188)
Number of Analysts	0.000	0.000	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln(Total Assets)	-0.005*	-0.004	-0.004	-0.003	-0.003	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Market-to-Book	-0.003	-0.001	-0.002	-0.001	0.000	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Leverage	0.076*	0.068*	0.085**	0.075*	0.064	0.079**
	(0.040)	(0.039)	(0.040)	(0.039)	(0.040)	(0.039)
Leverage^2	-0.077**	-0.071**	-0.080**	-0.074**	-0.093**	-0.103***
	(0.035)	(0.034)	(0.034)	(0.034)	(0.037)	(0.036)
R&D / Sales	0.030	0.016	0.047	0.032	0.017	0.027
	(0.099)	(0.099)	(0.098)	(0.098)	(0.100)	(0.100)
Debt Maturity Ratio	0.003	0.003	0.002	0.002	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Rating AAA/AA (All)	0.034***	0.025**	0.025*	0.016		
	(0.013)	(0.012)	(0.014)	(0.013)		
Rating A (All)	0.017**	0.009	0.011	0.004		
	(0.008)	(0.008)	(0.008)	(0.008)		
Rating BBB (All)	0.059***		0.060***			
	(0.009)		(0.010)			
Rating BBB+		0.008		0.007		
		(0.007)		(0.007)		
Rating BBB		0.062***		0.063***		
		(0.012)		(0.012)		
Rating BBB-		0.087***		0.091***		
		(0.016)		(0.016)		
Rating BB (All)	0.004	0.002	0.009**	0.007*		
	(0.004)	(0.004)	(0.004)	(0.004)		
Deal Amount / Total	0.017	0.015	0.020	0.017	-0.005	-0.005
Assets	(0.016)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)
Deal Maturity (Years)	0.000	0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ted Spread			0.045***	0.049***		0.048***
			(0.012)	(0.012)		(0.013)
Year Fixed Effect	Yes	Yes	No	No	Yes	No
R^2	0.064	0.078	0.043	0.059	0.040	0.017
Observations	5649	5649	5596	5596	5649	5596

Summary Statistics: Selection Model

This table provides summary statistics of our sample of rated public debt issues used in the selection model. Variable definitions can be found in the appendix.

	Mean	Median	Std	Min	5%	95%	Max	N
RSB Dummy	0.02	0.00	0.14	0.00	0.00	0.00	1.00	5596
Tangibility	0.35	0.30	0.28	0.00	0.01	0.86	0.91	5596
2-Month MA Bid-Ask	0.01	0.00	0.01	0.00	0.00	0.03	0.05	5596
2-Month MA Bid-Ask^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5596
Number of Analysts	14.67	14.00	8.98	1.00	2.00	31.00	39.00	5596
Ln(Total Assets)	8.90	8.79	1.81	4.62	6.23	12.43	13.93	5596
Market-to-Book	0.90	0.66	0.83	0.04	0.10	2.51	4.62	5596
Leverage	0.35	0.33	0.19	0.01	0.08	0.73	1.03	5596
Leverage^2	0.16	0.11	0.17	0.00	0.01	0.53	1.06	5596
R&D / Sales	0.01	0.00	0.03	0.00	0.00	0.08	0.20	5596
Debt Maturity Ratio	0.50	0.08	1.42	0.00	0.00	2.08	11.42	5596
Rating AAA/AA (All)	0.06	0.00	0.23	0.00	0.00	1.00	1.00	5596
Rating A (All)	0.25	0.00	0.43	0.00	0.00	1.00	1.00	5596
Rating BBB (All)	0.29	0.00	0.46	0.00	0.00	1.00	1.00	5596
Rating BBB+	0.08	0.00	0.28	0.00	0.00	1.00	1.00	5596
Rating BBB	0.12	0.00	0.32	0.00	0.00	1.00	1.00	5596
Rating BBB-	0.09	0.00	0.29	0.00	0.00	1.00	1.00	5596
Rating BB (All)	0.17	0.00	0.38	0.00	0.00	1.00	1.00	5596
Deal Amount / Total Assets	0.12	0.07	0.17	0.00	0.00	0.42	1.26	5596
Deal Maturity (Years)	10.50	9.67	6.68	1.00	4.00	30.00	35.00	5596
Ted Spread	0.42	0.32	0.28	0.14	0.16	0.97	1.63	5596