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Multiple Credit Ratings, Cost of Debt and Self-Selection

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Abstract: In a world where firms pay for credit ratings and (because of regulatory requirements) where some investors must pay attention to the ratings of some specified set of raters, it may well be in the interests of a firm to seek a third 'optional' rating, beyond the standard 'mandatory' two ratings from Moody's and Standard and Poor's. The firm may get a better rating from the third major rater Fitch, which could save substantially on future debt issuance costs. In this paper I specify and estimate a structural self-selection model of the demand for optional credit ratings derived from their expected reduction effect on borrowing cost compared with the optional ratings' cost. Attention is focused on specifying the role of expected cost of debt savings in the derived demand for optional ratings; these are found to be empirically important determinants of the decision to request Fitch ratings.

Keywords: credit ratings, default risk, selection bias

1. INTRODUCTION

The US rating market is highly concentrated and can be characterized by a 'two-rating norm', i.e., to access a broad investor pool, issuers are implicitly required to obtain ratings from both major credit rating agencies, Moody's and Standard and Poor's ('S&P's'). The two-rating norm and their earned reputation in financial markets protects these two agencies to some degree against competition from 'third', smaller agencies like FitchRatings ('Fitch') and makes them less susceptible to issuer pressure for upwardly biased risk assessments.[1] However, given the established debt certification value of ratings from Moody's and S&P's, debate exists about the economic justification

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1 To reflect the two-rating norm and to follow the literature (Cantor and Packer, 1997), I will call Moody's and S&P's a 'mandatory' agency (or one that assigns and publishes ratings on all issuers) and Fitch an 'optional' or 'third' agency (or one that only assigns and publishes upon request of the issuer).

of buying ratings from more than the two mandatory agencies. For example, Baker and Mansi (2002) report that whereas 20.2% of the issuers responding to their survey hire three or more agencies, all surveyed institutional investors require at most two ratings, as a matter of formal policy, before buying rated corporate bonds.

Furthermore, it is well known (e.g., Jewell and Livingston, 1999; and Fitch, 2006) that Fitch's and S&P's ratings tend to be more favorable to issuers than are Moody's, and differences between Fitch's and S&P's are rather small. This finding is compatible with two mutually exclusive explanations. First, assuming that observed Fitch ratings reflect a random sample from the overall population, there may exist systematic variations in ratings across Fitch/S&P's on the one hand and Moody's on the other, possibly due to differences in rating methodologies, rating scales, or the implied meaning of ratings. Second, optional Fitch ratings may serve as a tie-breaker whenever the two mandatory ratings disagree. That is, firms do request and publish a third Fitch rating if and only if it is in line with the most favorable mandatory rating, which is, on average, the rating from S&P's. Due to this kind of self-selection mechanism, publicly observed Fitch ratings are, on average, similar to S&P's ratings and higher than Moody's ratings. Under this view, the optional rating choice is the result of non-systematic variations in ratings across agencies.[2]

To shed further light on the issue of systematic vs. non-systematic variations (i.e., selection bias) in agency ratings, this paper tries to investigate the impact of optional ratings on aggregate firm level borrowing cost, and how potential rating cost and benefits affect a firm's choice of the optimal number of ratings. I use a sample of 1,066 US bond issuers with both mandatory ratings at the beginning of a particular year within the period from 1998 to 2003. Of these issuers, 253 switch from a 'two-rater' to a 'three-rater' status during a given year by requesting an additional rating from Fitch. As the decision to request a third rating may be determined by the expected gain (or net benefits), I use a structural self-selection model to control for the endogeneity of rating choice. Application of the model allows estimation of the influence of costs (e.g., rating fees) and benefits (e.g., reduction in borrowing cost) on a firm's Fitch rating choice.

The empirical evidence highlights the important role of benefits considerations. In particular, the self-selection model allows the determination of what the borrowing costs would have been for switchers to Fitch and non-switchers if the alternative number of ratings had been used. I find that the average 'typical' corporate bond credit spread is 171.9 basis points (bp) for firms with Fitch ratings, but would have been 201.7 bp without the additional rating. A 30 bp spread reduction translates into an annual

2 The observation that ratings from Moody's are systematically lower compared to S&P's ratings is quite puzzeling and cannot be explained by a selection effect. However, ample evidence supports this observation. Using a sample of nearly 60,000 jointly-rated US structured finance securities outstanding on February 28, 2006, Moody's (2007) shows that whereas roughly 98% of the Moody's/S&P's ratings are the same when Moody's rating is Aaa, the percentage of identical ratings drops to 60% when Moody's rating is non-Aaa, with Moody's being lower almost 75% of the time. A similar pattern holds for the Moody's/Fitch comparison. Importantly, when the Moody's rating is below the rating of one of the other two agencies, the average gap exceeds two notches (difference unit measured on the refined or alpha-numeric rating scale) for the single-B and Caa-below rating levels. At the Ba up to single-A rating levels, the difference still exceeds one-and-a-half notches compared to both S&P's and Fitch. Jewell and Livingston (1999), studying monthly bond ratings from January 1991 through March 1995, report a statistically significant (at the 1% level) difference in mean S&P's and Moody's ratings of −0.41 (January 1991 sample) and −0.42 (March 1995 sample). More recently, Morgan (2002), Bongaerts et al. (2008) and Livingston et al. (2007) also found that Moody's ratings are consistently on the downside compared to S&P's.

interest cost saving of $9 million for the average switcher in the sample with long-term debt outstanding of $3,000 million. This significant selection effect is robust to various measures of aggregate firm level borrowing cost.

The results suggest that rating costs play a crucial role too in the optional rating choice. Firms with lower average rating fees (i.e., firms with greater long-term debt outstandings), and less financially constraint firms (as measured by leverage, liquid assets, or return on assets) are also more likely to have third ratings. Furthermore, the analysis of costs and benefits of optional ratings implies that the firms which are the most difficult to evaluate (e.g., financial firms with asset opaqueness problems or low rated firms with greater intrinsic uncertainty about their true credit risk), and that consequently face higher rating cost, may also benefit the most from optional ratings. Finally, firms with mandatory ratings marginally below the investment grade hurdle, and firms with unfavorable private information possess a greater likelihood to request an additional Fitch rating. In sum, the paper's evidence is consistent with switchers using optional ratings to minimize borrowing costs. Hence, Fitch rating selection and publication decisions are not random, but related to expected rating differences (i.e., anticipated favorable Fitch ratings).

This paper contributes to a growing body of research investigating whether a sample selection or rating shopping effect arises in a setting in which rating errors by agencies induce firms with better information about their true creditworthiness to optimize their average rating. In closely related research, Cantor and Packer (1997) and Bongaerts et al. (2008) also employ rating data at the issuer/issue level to understand the motivation for using a third rating agency. But, whereas these papers simply assume that Fitch is always the marginal or third rater, I explicitly control for the temporal pattern of rating requests. The paper is also related to the literature on unsolicited ratings (Poon, 2003; and Poon and Firth, 2005), which attempts to control for sample selection to see whether there is a difference in treatment between solicited and unsolicited ratings. However, all of the above papers presume that the variables explaining a firm's decision to obtain an optional (or solicited) rating are exogenous. In particular, the bite of this assumption is to preclude the possibility that the decision to self-select into a three-rater (or solicited) status does not directly depend on the anticipated outcome (a possible reduction in borrowing cost). This assumption appears to be too strong. By using a structural self-selection model I can analyze the rating decision as an optimal trade-off between the costs and anticipated benefits of optional ratings.

The remainder of the paper is organized as follows. The next section outlines a self-selection model to estimate the price effect of optional ratings, and to analyze the costs/benefits trade-off inherent in a firm's rating choice. Section 3 describes the sample, discusses the variables used to proxy for aggregate firm level borrowing cost, and presents the exogenous variables. Section 4 shows the results, separately for cost of debt regressions with and without a Fitch rating, and for the firm's optional rating choice equation. Section 5 concludes.

2. A MODEL OF OPTIONAL RATINGS, COST OF DEBT AND SELF-SELECTION

If the market default risk premium on debt issues is related to the average of ratings across different agencies, as evidenced, for example, by Cantor et al. (1997) or Jewell and Livingston (1998), issuers can achieve lower expected funding costs through soliciting a third rating, if they expect this rating to be favorable (i.e., at least better than the worst mandatory rating).[3] At the same time, additional ratings may impose substantial direct and opportunity costs (e.g., agency fees, information collection and preparation costs, costs of required management resources, etc.). The theory of comparative advantage implies that firms weigh the costs and benefits of third ratings, and only firms finding net positive benefits switch to a three-rater status. In this case, the price effect of optional ratings cannot be estimated by regressing cost of debt proxies on optional rating dummies using OLS (as in, for example, Jewell and Livingston, 1999; and Bongaerts et al., 2008) because optional rating dummy variables are endogenous. In particular, the dependence of the decision to self-select optional Fitch ratings on outcomes (cost of debt levels) and the dependence of outcomes on the self-selection decision is essentially a problem of simultaneity. To overcome this problem, I use a structural self-selection model along the lines of Lee (1978) to estimate the price effect of optional ratings.

Since my purpose is to study the interaction between optional ratings and cost of debt capital, the population of interest consists of firms with both mandatory ratings at the beginning of a particular year (the start of the planning horizon). There are two options available to each firm: it can solicit and publish a third Fitch rating or not. At any point in time, each firm faces two cost of debt levels, the average cost of debt Y_n without a Fitch rating and the average costs Y_f with a Fitch rating.[4] More precisely, Y_n and Y_f denote present values of average debt costs accumulated over a specified planning horizon. Firm i is assumed to switch to a third rating if the net switching benefits $I_i \equiv Y_{ni} - Y_{fi} - C_i$ are positive. Here, C_i is the present value of the costs to firm i of obtaining and maintaining a Fitch rating over the planning horizon. This criterion may be written in the form of a probit model: if $I_i^* > 0$ firm i switches to Fitch, otherwise not, where:

$$I_i^* \equiv \beta_1 (Y_{ni} - Y_{fi}) + \beta_2' X_i - \varepsilon_i. \tag{1}$$

The vector X_i includes characteristics of firm i that affect rating cost and ε_i captures unobserved variables and is assumed to be $N(0, \sigma_\varepsilon^2)$. In the empirical specification, X_i contains proxies for debt issuance size, firm's asset opaqueness, market uncertainty regrading a firm's credit risk, capital constraints and managerial agency costs, and regulatory variables. Thus, a firm's choice to request an optional Fitch rating depends on a consideration of the expected reduction in average cost of debt levels $(Y_{ni} - Y_{fi})$ and the net marginal costs associated with the additional rating. To allow for complete interactions between the number of ratings and the effect of firm characteristics on the average cost of debt, I write separate equations for Y_{ni} and Y_{fi}:

$$Y_{fi} = \gamma_f' Z_i + \varepsilon_{fi} \tag{2}$$

$$Y_{ni} = \gamma_n' Z_i + \varepsilon_{ni}, \tag{3}$$

3 In case the Fitch rating is forthcoming only after the issuer has issued the bonds in question, the more favorable Fitch rating may cause the interest rate on those bonds to decrease - but that won't favorably affect the issuer unless the issue is a floating rate issue (which few, if any, corporate bonds are). But there may be favorable effects if there are follow-on issuances (or, for commercial paper, where the issuances are more frequent).

4 Of course, ratings as default risk proxies are not the sole determinants of cost of debt levels or bond spreads. Other economic determinants include liquidity, tax liability, recovery risk, age and maturity (see Elton et al. 2001; and Huang and Huang, 2003, for notable contributions to this literature). To focus on optional ratings' price effects the impact of these other price factors is assumed to be averaged out.

where the vector Z contains factors known to affect the (default risk related) cost of debt (e.g., financial leverage, firm size, return on assets, etc.), and ε_{ni} and ε_{fi} are random residuals $N(0, \sigma^2_{\varepsilon_n})$ and $N(0, \sigma^2_{\epsilon_f})$, respectively. The model to be estimated consists of equations (1) through (3). The first step of the estimation procedure is to substitute the cost of debt equations (2) and (3) into the optional rating choice equation (1) and obtain a reduced form model as follows:

$$\begin{aligned} I_i^* &= \beta_2' X_i + \beta_1(\gamma_n' Z_i - \gamma_f' Z_i) + \beta_1(\varepsilon_{ni} - \varepsilon_{fi}) - \varepsilon_i \\ &\equiv \beta_2' X_i + \theta' Z_i - \varepsilon_i^*, \end{aligned} \tag{4}$$

where $\theta = \beta_1(\gamma_n - \gamma_f)$ and $\varepsilon_i^* = \varepsilon_i - \beta_1(\varepsilon_{ni} - \varepsilon_{fi})$. The reduced form equation (4) is estimated using a probit maximum likelihood procedure and the model prediction $\hat{\psi}_i = X_i'\hat{\beta}_2 + Z_i'\hat{\theta}$ is used to generate the inverse Mills ratio, defined as $\lambda_{f_i} = \frac{-\phi(\hat{\psi}_i)}{\Phi(\hat{\psi}_i)} < 0$ for firms with an optional rating, and $\lambda_{n_i} = \frac{\phi(\hat{\psi}_i)}{1-\Phi(\hat{\psi}_i)} > 0$ for firms without. Here, $\phi(\cdot)$ and $\Phi(\cdot)$ are the standard normal density function and cumulative distribution function, respectively. The second step of the procedure is to augment equations (2) and (3) with the inverse Mills ratio as a right-hand side variable. The OLS on the augmented regression for the two subsamples provides consistent estimates of γ_f and γ_n since the addition of the inverse Mills ratio corrects for a non-zero conditional expectation of error terms ε_{fi} and ε_{ni}. Finally, the consistent estimates of γ_f and γ_n may be used to form consistent predictors of cost of debt differences for the entire sample (without and with optional ratings), $\hat{Y}_{ni} - \hat{Y}_{fi} = \hat{\gamma}_n' Z_i - \hat{\gamma}_f' Z_i$, and these may be included in the structural probit equation (1) to obtain consistent estimates of β_1 and β_2.[5]

3. THE DATA

The sample starts with the selection of all US firms having issuer credit ratings from Moody's and S&P's *both*, at the start and the end of some year within the period from 1998–2003. Issuer ratings were obtained from the Financial Times Credit Ratings International (FT-CRI) database, that presents agency ratings on a consistent basis since it reports only the ratings that agencies have assigned to each firm's most representative long-term security, typically its long-term senior unsecured or senior subordinated debt. The sample of US issuers rated jointly by Moody's and S&P's is drawn from FT-CRI's first issues in 1998 to 2004, that report ratings valid as at January 1 of each year, respectively. Because of possible misreporting by the rating agencies and typographical errors, I cross-checked FT-CRI's ratings against alternative sources of information, including Bloomberg and ratings directly obtained from Moody's, S&P's and Fitch. Besides issuer ratings, firms also need to have the required financial information from Compustat annual tapes to construct the accounting ratios described below. In addition, a firm

5 For estimation of the system of equations (1)–(3), two sets of variables must be specified: those determining the optional rating selection (X) and those determining the average borrowing cost (Z). The X and Z need not be orthogonal. They may have some elements in common, but identification requires that they not have all elements in common. If X and Z are identical (or Z does not have elements that are not in X), the predicted values of $Y_{ni} - Y_{fi}$ are collinear with the other explanatory variables in the structural probit equation (1), and its estimation is precluded. If, on the other hand, X does not have elements that are not in Z, the reduced-form probit (4) is estimable, and it still may be possible to estimate the structural cost of debt equations and selection bias. The reason is that, although the Mills ratios are functions of the same variables that enter the $\gamma' Z$ parts of these equations, they are non-linear functions of the measured variables.

must have at least 200 daily stock returns each year from CRSP to estimate the betas and standard errors from the market model.

An important issue in the construction of the sample concerns the decision of what constitutes an 'observation' and the timing of its components. I construct sample observations as firm years with both mandatory ratings outstanding at January 1, and December 31, of that year. Furthermore, all exogenous variables are measured based on data available to the issuer at the start of the year. For example, to analyze the Fitch rating request decision for calendar year t, daily stock price data for calendar year $t-1$ and accounting data from the last annual balance sheet with fiscal year-end in $t-1$ is collected. The final sample consists of 2,876 firm years from 1,066 firms. For 253 firm years, I identify a switch from a 'two-rater' to a 'three-rater' status within the year, i.e., 253 firms solicited an optional Fitch rating.[6] In sum, I have 253 (8.8%) firm years with a switch, and 2,623 (91.2%) firm years without a switch to a third Fitch rating. I control for the fact that Fitch acquired two smaller agencies within the sample period, Duff & Phelps Credit Rating in April 2000 followed by the acquisition later that year of the rating business of Thomson BankWatch. All firm years with Duff & Phelps or Thomson BankWatch ratings in 2000 that were converted into Fitch ratings are not counted as switchers.

Table 1 describes the sample by the end-of-year rating from Moody's, S&P's and Fitch. Letter ratings and notch ratings, which subdivide the letter ratings (e.g., A+, A, A−), are transformed to a numerical scale as shown in the first two columns of the table. Note that, for Moody's and S&P's, the fraction of speculative-grade ratings (ratings below BBB-/Baa3) is higher among the non-switchers, compared to the firms with three ratings. This leads to significant differences in the overall look of the rating distribution between both groups. For example, using a Kolmogorov-Smirnov distributional test, I cannot reject the hypothesis that the group of non-switchers has lower (more risky) ratings than the group of switchers. This is true both, for Moody's and S&P's ratings.

Table 2, Panel A, tests for notch level differences in mean ratings between the three agencies. As can be seen, for all three samples (full sample, investment grade (IG) subsample, below investment grade (BIG) subsample), every single difference for the two rater-pairs Fitch vs. Moody's and S&P's vs. Moody's is statistically significant at the 1% level, indicating that Moody's ratings are significantly lower, on average, than both Fitch and S&P's. However, there is no significant difference between the mean S&P's and the mean Fitch ratings in the full sample and in the sample with below investment grade S&P's ratings, and only a statistically weak difference in the S&P's investment grade rating sample. For comparison purposes, I also include in Panels B through D numbers from comparability studies conducted by Moody's and Fitch, employing a large number of double- and triple-rated structured finance securities. In general, these studies agree with the findings in Panel A, showing small differences between Fitch and S&P's, but consistently lower Moody's ratings compared to either Fitch or S&P's. Note that the values for av. Δ (BIG) are not directly comparable between Panels A/B and Panels C/D, because in the Fitch (2006) study, Fitch ratings are used to define the IG and the BIG subsamples, whereas in Panels A/B subsamples are separated according to S&P's (column (1)) or Moody's ratings (column (2) and (3)).

6 For switchers to a third (Fitch) rating, I only utilize the firm year of the switch. Hence, 253 is also the number of switching firms with complete data available.

Table 1

Distribution of End-of-Year Issuer Ratings from Moody's, S&P's and Fitch

Numerical Scale		*Standard & Poor's*					*Moody's*					*Fitch*		
			Non-switcher		*Switcher*			*Non-switcher*		*Switcher*			*Switcher*	
Letter	*Notch*	*Symbol*	*No.*	*%*	*No.*	*%*	*Symbol*	*No.*	*%*	*No.*	*%*	*Symbol*	*No.*	*%*
1	1	AAA	41	1.56	5	1.98	Aaa	37	1.41	4	1.58	AAA	3	1.19
2	2	AA+	5	0.19	0	0.00	Aa1	8	0.30	0	0.00	AA+	0	0.00
2	3	AA	38	1.45	2	0.79	Aa2	16	0.61	4	1.58	AA	3	1.19
2	4	AA–	71	2.71	5	1.98	Aa3	75	2.86	8	3.16	AA–	4	1.58
3	5	A+	136	5.18	14	5.53	A1	105	4.00	9	3.56	A+	22	8.70
3	6	A	182	6.94	37	14.62	A2	204	7.78	25	9.88	A	35	13.83
3	7	A–	161	6.14	21	8.30	A3	155	5.91	30	11.86	A–	26	10.28
4	8	BBB+	219	8.35	25	9.88	Baa1	195	7.43	25	9.88	BBB+	29	11.46
4	9	BBB	296	11.28	52	20.55	Baa2	247	9.42	40	15.81	BBB	48	18.97
4	10	BBB–	266	10.14	31	12.25	Baa3	244	9.30	35	13.83	BBB–	29	11.46
5	11	BB+	161	6.14	20	7.91	Ba1	171	6.52	17	6.72	BB+	11	4.35
5	12	BB	250	9.53	16	6.32	Ba2	196	7.47	10	3.95	BB	12	4.74
5	13	BB–	338	12.89	7	2.77	Ba3	215	8.20	11	4.35	BB–	8	3.16
6	14	B+	229	8.73	9	3.56	B1	249	9.49	15	5.93	B+	8	3.16
6	15	B	123	4.69	3	1.19	B2	227	8.65	6	2.37	B	7	2.77
6	16	B–	43	1.64	4	1.58	B3	135	5.15	8	3.16	B–	3	1.19
7	17	CCC/C	64	2.44	2	0.79	Caa/C	144	5.49	6	2.37	CCC/C	5	1.98
Total			2,623	100	253	100		2,623	100	253	100		253	100

Note:
Firm years from issuers that request a Fitch rating are coded as 'switchers'. The distributions are calculated using a panel data sample of 2,876 firm year observations (including 253 switchers) from 1998 through 2003.

Table 2
Comparision of Rating Levels

	Fitch vs. S&P's (1)		*Fitch vs. Moody's* (2)		*S&P's vs. Moody's* (3)	
Panel A: Issuer Ratings from 1998–2003						
av. Δ	−0.07	(253)	−0.55***	(253)	−0.59***	(2,876)
av. Δ (BIG)	0.16	(61)	−1.11***	(73)	−1.01***	(1,410)
av. Δ (IG)	−0.14*	(192)	−0.33***	(180)	−0.18***	(1,466)
Panel B: Structured Finance Ratings as of Jan. 31, 2007 (Moody's, 2007)						
av. Δ	–		−0.20	(31,649)	−0.17	(59,547)
av. Δ (BIG)	–		−0.63	(2,308)	−0.62	(3,760)
av. Δ (IG)	–		−0.17	(29,341)	−0.14	(55,787)
Panel C: Structured Finance Ratings as of Jan. 1, 2006 (Fitch, 2006)						
av. Δ	0.02	(26,662)	−0.18	(20,209)	–	
av. Δ (BIG)	0.17	(1,938)	0.19	(1,493)	–	
av. Δ (IG)	0.00	(24,724)	−0.21	(18,716)	–	
Panel D: Triple-Rated Structured Finance Bonds (Fitch, 2006)						
av. Δ	0.03	(12,686)	−0.19	(12,686)	−0.22	(12,686)
av. Δ (BIG)	0.52	(628)	0.23	(628)	−0.66	(786)
av. Δ (IG)	0.01	(12,058)	−0.22	(12,058)	−0.20	(11,900)
Panel E: Issuer Ratings at Year-End 1993 (Cantor and Packer, 1997)						
av. Δ	−0.56	(155)	−0.74	(155)	–	
av. Δ (BIG)	−0.56	(13)	−1.40	(13)	–	
av. Δ (IG)	−0.56	(142)	−0.68	(142)	–	

Notes:
av. Δ corresponds to the average difference in rating notches calculated for jointly rated firms/structured finance tranches only. For example, the difference between A and A+ corresponds to a one-unit rating differential. A positive (negative) value in column (1) indicates that Fitch ratings are, on average, lower (higher) than S&P's ratings. A positive (negative) value in column (2) indicates that Fitch ratings are, on average, lower (higher) than Moody's ratings. A positive (negative) value in column (3) indicates that S&P's ratings are, on average, lower (higher) than Moody's ratings. Observation numbers are in parentheses. IG is investment grade and BIG is below investment grade. In Panels A, B and E, av. Δ (BIG) denotes the average rating difference for observations with below investment grade ratings from S&P's (column (1)), or Moody's (column (2) and (3)). In Panels C and D, av. Δ (BIG) gives the average rating gap for structured finance bonds with below investment grade ratings from Fitch (and Moody's in column (3) of Panel D). In Panel A, a *t*-test rejects the null hypothesis of equal mean ratings (av. Δ = 0) at: *** 1%, ** 5%, * 10%. Significance levels of mean comparison tests for the other panels are not available.

(i) Cost of Debt Proxies

The model includes the exogenous variables in X and Z, the optional Fitch rating indicator variable R (i.e., $R = 1$ if $I^* > 0$, $R = 0$ otherwise), and the limited dependent variables Y_f and Y_n.[7] I start the discussion with the cost of debt proxies (Y_f and Y_n). All cost of debt proxies detailed below are aggregate firm or issuer level variables,

7 It should be noted that in the model formulation of Section 2, Y_f and Y_n represent present values of average cost of debt levels, accumulated over the firm's planning horizon. However, since planning horizons are firm-specific and difficult to quantify, I use as an approximation average cost of debt levels at the end of each firm year in the sample. That is, by assumption, firms base their switching decision during a year on the expected debt cost reduction at the end of that year. However, this one-period setting should not be of major concern since if an additional Fitch rating does not lead at least to a reduction in the expected first-period cost of debt, the firm will most likely not go for the rating.

which have several advantages compared to issue/bond level variables. First, studying the pricing impact of optional rating switches on yields of newly issued bonds is troublesome since there is probably self-selection on other bond dimensions as well, such as maturity, collateral, or the callability of an issue, not speaking of the decision to issue debt in the first place. This raises the thorny question of what dimensions of self-selection should one control for in a given empirical application? Modeling every source of selection seems infeasible, while studying some sources of bias while ignoring others also seems a little ad-hoc. Second, firm's switching decisions are not necessarily correlated with new debt issuances but with the certification value of third ratings. According to survey results reported in Baker and Mansi (2002), firms typically solicit a third rating to resolve a mandatory split rating or to get better rating coverage, possibly indicating that they feel their default risk being overestimated by one or both mandatory agencies. In this sense, firms may switch to a third Fitch rating even without an immediately pending new public debt issue. Finally, the impact of additional (issuer) ratings is not limited to a particular debt class but extends to virtually any type of security issued.

The first and primary borrowing cost proxy is Mean_Spread, representing the mean secondary market spread for bonds that are part of Lehman Brothers (now Barclay's) US corporate investment grade and high yield indices. In particular, I match each firm's end-of-year rating combination (on the notch level) with average end-of-month credit spreads observed for bonds with those rating combinations over a 25 month period from July 2005 to July 2007. For example, if a sample firm is rated Baa2 by Moody's, BBB- by S&P's, and not rated by Fitch at the end of a year, I calculate the average (end-of-month) spread (143.1 bp in this case) for bonds in Lehman Brothers indices that are rated similarly in any of the 25 months. Hence, the variable Mean_Spread takes on the value 143.1 for this firm year. As a slight variation, the second proxy Median_Spread uses median bond spreads instead of mean spreads to estimate the spread/rating relationship. Hence, Mean_Spread (Median_Spread) proxies for the 'typical' credit spread per rating class combination of an average (median) bond to be issued at the end of the switching year.[8]

In calculating mean or median spreads (difference in yield to maturity between a corporate bond and a US Treasury bond with the same maturity), I exclude callable, putable and sinkable bonds as well as those with matrix quotes, or with maturities less than one year or greater than 30 years. To be able to match firms and bond spreads based on rating levels, I consider only senior unsecured or senior subordinated bonds, the ratings of which correspond to the firm-level ratings supplied in the FT-CRI database. Furthermore, since Lehman Brothers incorporated Fitch ratings into its index rules on credit quality for the global family of indices on July 1, 2005, I choose July 2005 as the starting month, making sure that all bonds with ratings from Moody's, S&P's and Fitch are carefully identified. Finally, for each rating combination there must be at least 100 monthly observations to compute the mean and median spreads.

8 Instead of using mean or median corporate bond credit spreads, Resti and Sironi (2007) employ a multivariate regression framework to estimate the typical spread/rating relationship for a sample of eurobonds. Following their approach, I also estimated various OLS regressions of bond spreads on ratings and other spread determinants. However, the use of rating level spreads paid by 'standard' bonds as predicted from these regressions, instead of Mean_Spread or Median_Spread, does not materially affect the results.

The third and fourth proxies are simply averages of cardinalized values of end-of-year rating levels.[9] For switchers, averages are formed across three ratings (Moody's, S&P's and Fitch), and across the two mandatory ratings for non-switchers. In particular, Av_rating7 denotes the average numerical rating using the transformed broad rating letters (see Table 1, first column), and Av_rating17 uses the finer notch rating transformation (see Table 1, second column). For both variables, better ratings correspond to lower numbers. These two proxies measure optional rating benefits in a broader sense, focusing not exclusively on credit costs, but possibly also on credit source supply. For example, the growing body of research documenting the importance of credit ratings in corporate policy (Faulkender and Petersen, 2006; and Kisgen, 2006) provides basic evidence as to why firms should care about their credit ratings – better ratings allow them to have better capital market access, both in terms of the cost of borrowing and the amount of debt issued, which in turn has significant impact on firms' real outcomes.

As a final cost of debt proxy, I employ the realized cost of debt (RealCost), calculated as the ratio of firm i's interest expense in year $t + 1$ (Compustat No. 15) to average interest-bearing debt outstanding during years t and $t + 1$ (Compustat No. 9 and No. 34). Summary information reported in Panel A of Table 3 shows that firms switching to an optional Fitch rating face significantly lower mean and median costs of debt at the end of the switching year compared to non-switching firms. This is true for all five cost of debt proxies considered. For example, the median switching firm has an average (numerical) notch level rating of 9.0, which translates to BBB (S&P's; Fitch) or Ba2 (Moody's), and is 1.5 notches better than the corresponding value for non-switchers. Furthermore, the difference in borrowing cost between median non-switchers and switchers amounts to 37 bp, 30 bp, or 91 bp, respectively, depending on whether Mean_Spread, Median_Spread, or RealCost is used.

(ii) Exogenous Variables

I first discuss the specification of the vector X, that contains proxies for the costs of optional ratings, and then turn over to the variables used in the borrowing cost regressions. Since total fees per issuer charged by rating agencies are subject to caps,[10] the average cost of obtaining an optional rating declines with the scale of issuance. Hence, I expect that firms with greater long-term debt (LT-Debt) outstanding will be more likely to have third ratings.

Livingston et al. (2007) and Morgan (2002) find that firms with asset opaqueness problems face a higher probability of receiving split ratings from Moody's and S&P's, and Baker and Mansi (2002) report survey evidence that firms with split ratings are more likely to hire additional agencies in order to resolve the split. Adam and Goyal

9 Studies using firm level credit ratings as a measure of the ex ante cost of debt include Ahmed et al. (2002) and Ashbaugh-Skaife et al. (2006), among others. In the present research setting, the benefit of using firm level ratings as a proxy for cost of debt rather than issue specific measures is that firm level ratings are less likely to reflect issue specific characteristics that could be determined simultaneously with issue ratings or bond yields. Thus, compared to issue specific debt ratings, firm level credit ratings are more likely to be a pure measure of the additional certification value provided by optional agencies.

10 The 'Terms of Use' part on Fitch's webpage (see www.fitchratings.com) states that 'In certain cases, Fitch will rate all or a number of issues issued by a particular issuer, or insured or guaranteed by a particular insurer or guarantor, for a single annual fee. Such fees are expected to vary from US$10,000 to US$1,500,000 (or the applicable currency equivalent)'.

Table 3
Summary Statistics

	Non-switcher			*Switcher*			*Significance*
	Mean	*Median*	*Std. Dev.*	*Mean*	*Median*	*Std. Dev.*	*[t-test]/[Wilcoxon]*
Panel A: Cost of Debt Proxies							
Mean_Spread (in bp)	221.95	162.12	150.44	171.94	125.24	115.07	0.00***/0.00***
Median_Spread (in bp)	209.31	154.28	133.42	157.85	124.45	102.57	0.00***/0.00***
Av_rating17	10.37	10.50	3.63	8.91	9.00	3.07	0.00***/0.00***
Av_rating7	4.45	4.50	1.25	3.96	4.00	1.06	0.00***/0.00***
RealCost (in %)	7.82	7.26	5.98	6.38	6.35	2.07	0.00***/0.00***
Panel B: Exogenous Variables							
Size ($Billion)	8.33	1.24	30.10	9.99	3.10	24.34	0.40/0.00***
Roa (in %)	3.30	3.43	6.78	3.54	2.96	4.88	0.59/0.07*
Lev (in %)	32.99	29.73	20.82	26.06	26.39	17.09	0.00***/0.04**
Beta	1.04	0.92	0.74	0.96	0.86	0.74	0.14/0.13
Vola	1.01	0.91	0.47	0.83	0.73	0.37	0.00***/0.00***
DTD	4.91	4.46	3.78	5.09	4.46	3.20	0.48/0.95
LT-Debt ($Billion)	1.32	0.52	4.48	2.99	1.33	4.35	0.00***/0.00***
MTB	1.71	1.35	1.15	1.54	1.22	0.83	0.02**/0.00***
Financial	0.10	0.00	0.29	0.33	0.00	0.47	0.00***/0.00***
Free_CF (in %)	7.03	6.99	6.34	6.75	6.13	5.69	0.54/0.07*
Cash (in %)	6.49	2.78	9.68	6.78	3.38	9.83	0.65/0.07*
Margi	0.02	0.00	0.14	0.04	0.00	0.20	0.03**/0.05**
Ab_diff	0.91	1.00	0.95	0.74	1.00	0.90	0.01***/0.02**
S&P's letter rating	4.30	4.00	1.19	3.86	4.00	0.99	0.00***/0.00***
Moody's letter rating	4.50	4.00	1.31	3.99	4.00	1.11	0.00***/0.00***

Notes:
The table reports summary statistics for aggregate firm level cost of debt proxies (measured at the end of a year) in Panel A and for the exogenous variables (measured at the beginning of a year) in Panel B. Issuer credit ratings are obtained from FT-CRI, accounting data from Compustat, stock market data from CRSP daily stock files, and bond spread data from Lehman Brothers. Mean_Spread and Median_Spread are, respectively, the rating dependent mean and median secondary markt spreads for bonds that are part of Lehman Brothers US corporate investment grade and high yield indices. End-of-year issuer credit rating combinations (on the notch level) from Moody's and S&P's (and Fitch for switchers) are converted into mean and median credit spreads observed for bonds with those rating combinations over a 25 month period from July 2005 to July 2007. Av_rating7 denotes the average numerical rating (across Moody's and S&P's, and Fitch for switchers) using the transformed broad rating letters (see Table 1, first column), and Av_rating17 uses the finer notch rating transformation (see Table 1, second column). For both variables, better ratings correspond to lower numbers. RealCost is the realized cost of debt, calculated as the ratio of firm i's interest expense in year $t+1$ (Compustat No. 15) to average interest-bearing debt outstanding during years t and $t+1$ (Compustat No. 9 and No. 34). Size is the natural logarithm of the market value of equity (Compustat No. 24·No. 25), Roa is return on assets (Compustat No. 13/No. 6), Lev is book leverage (Compustat No. 9/No. 6), MTB is the market-to-book ratio defined as market value of equity minus book value of equity (Compustat No. 60) plus total assets (Compustat No. 6) divided by total assets. Free_CF denotes free cash flow ((Compustat No. 13 - No. 16 - No. 15 - No. 21 - No. 19)/No. 6), and Cash is the cash to assets ratio (Compustat No. 1/No. 6). Three-year moving averages of the accounting ratios are calculated for each firm year. LT-Debt denotes the amount of outstanding long-term debt (Compustat No. 9). Market model beta is estimated from the market model using daily stock returns from the previous calendar year. The beta estimates are controlled for nonsynchronous trading effects using the Dimson (1979) procedure. Idiosyncratic risk (Vola) is the standard error from the market model. Both equity risk measures are standardized by their cross-sectional mean for each year. DTD is the Merton (1974) based distance-to-default estimated using the procedure outlined in Bharath and Shumway (2008). Financial is a dummy for financial firms (SIC codes 6000-6999). Ab_diff measures the absolute difference, in rating notches, between the ratings assigned by Moody's and S&P's to the same firm at the beginning of a firm year. The dummy Margi takes on a value of 1 if the firm's mandatory ratings at the beginning of the year from Moody's and S&P's are Ba1 and BB+, respectively. All statistics are calculated using a panel data sample of 2,876 firm year observations (2,623 non-switchers and 253 switchers) from 1998 through 2003, except for RealCost and Free_cf which are only available for 2,487 (202 switchers) and 2,666 (198 switchers) firm years, respectively. Significance denotes the p-values of a simple t-test of differences in means, t-test, and of differences in medians, based on a non-parametric Wilcoxon signed rank test (Wilcoxon), respectively.

(2006) provide evidence that market-to-book is the most informative proxy for growth opportunities, and firms with larger growth opportunities tend to be younger firms in newer industries, making them more opaque and harder to value. To control for cross-sectional differences in asset opaqueness, I include the market-to-book ratio (MTB) defined as market value of equity (Compustat No. 24·No. 25) minus book value of equity (Compustat No. 60) plus total assets (Compustat No. 6) divided by total assets. In addition, since Morgan (2002) has shown banking firms to be much more likely to have split ratings given the nature of their assets, I include a dummy for financial firms (SIC codes 6000-6999).

Closely related to asset opaqueness problems, the required time (and hence the costs) to complete initial ratings and monitor existing ones is likely higher for firms that have greater intrinsic uncertainty regarding their credit risk, that is, firms about whom investors are more likely to have different opinions of their default risk. On the other hand, firms with the highest market uncertainty may also benefit the most from the additional certification value of optional ratings. I include dummy variables for beginning-of-year letter ratings from Moody's and S&P's to control for the fact that the lower the rating, the greater the uncertainty about a firm's true credit risk, as there is much more cross-sectional variation in credit spreads, greater rating volatility (e.g., Nickell et al., 2000), and more disagreement among agencies (e.g., Livingston et al., 2007) over bonds with low ratings than with high ratings. In addition, the variable Ab_diff measures the absolute difference, in rating notches, between the ratings assigned by Moody's and S&P's to the same firm at the beginning of the year.

Since ratings are costly and require a significant initial cash outlay, the opportunity cost of obtaining an optional rating might be higher for financially constraint firms. Note, however, that asymmetric information is one of the key drivers of financial constraints, indicating that firms without sufficient information production in markets are more likely to be financially constraint. Thus, support for the market uncertainty hypothesis (higher uncertainty, greater certification benefits, higher switching probability) is indirect evidence against the importance of financial constraints. Furthermore, unconstraint firms with available financial slack may face significant managerial agency costs whenever shareholders have a preference for the disbursement of this free cash flow, while managers may prefer to make empire building investments with returns below the cost of capital (Jensen, 1986). In this context, the independent third-party monitoring provided by the optional agency and the additional rating fees might decrease agency cost of managerial discretion, predicting a negative (positive) relationship between financial constraints (agency costs) and the probability of observing a third rating. I proxy for these considerations empirically by using free cash flow to assets (Free_CF), cash to assets (Cash), book leverage (Lev), and return on assets (Roa).[11]

Finally, debt issuers with Moody's and S&P's ratings just below regulatory thresholds may have an added incentive to obtain third ratings to improve their chances of clearing those hurdles and thereby increase their investor base. The investment grade distinction should be particularly important since a speculative grade rating prohibits some investor groups from investing in a firm's bonds (e.g., banks and pension funds)

11 Free_CF: (Compustat No. 13 - No. 16 - No. 15 - No. 21 - No. 19)/No. 6; Cash: Compustat No. 1/No. 6; Lev: Compustat No. 9/No. 6; Roa: Compustat No. 13/No. 6.

and increases capital charges for other investors. Rating triggers are also most prevalent around the change in rating from investment grade to speculative grade, and disclosure requirements increase at this change in rating. I include a dummy (Margi) that takes on a value of 1 if the firm's beginning-of-year ratings from Moody's and S&P's are Ba1 and BB+, respectively.

The selection of the exogenous variables in the borrowing cost regressions is motivated by previous studies (see Blume et al., 1998; Francis et al., 2005; and Jorion et al., 2007) predicting credit ratings and cost of debt levels. In addition to the accounting ratios Lev and Roa, I consider three variables meant to capture business risk. These variables include the market value of the firm (Size), market model beta (Beta), and residual volatility (Vola).[12] The rationale for Size is that larger firms tend to be older, with more established product lines and more varied sources of revenues, implying more stable underlying cash flows from operations. Since the two equity risk measures take into account both the degree of leverage and cash flow variability, the expected signs on these two relative measures of equity risk are positive. Finally, according to Merton (1974), a firm with more volatile assets is more likely to reach boundary conditions for default, and bondholders require higher yields to compensate for this risk. I thus include the Merton based distance-to-default (DTD), which is an estimate of the number of standard deviations (σ_V) of asset growth by which the asset value (V) of a firm exceeds a measure of liabilities (F).[13]

In Panel B of Table 3, I compare the beginning-of-year values of the exogenous variables between the sample of switchers and non-switchers. As in Blume et al. (1998) or Jorion et al. (2009), all accounting ratios are reported as three-year moving averages, and the equity risk measures (Beta, Vola) are scaled by dividing by the cross-sectional mean for each year, which eliminates any trend. Some results are striking. First, firms that switch to a third Fitch rating tend to be larger with more long-term debt, less leverage, fewer growth opportunities and more cash, supporting the financial constraints/agency costs argument since agency problems of managerial discretion are inversely related to the quality of the firm's investment opportunities and to leverage (Stulz, 1990). Second, the statistics for Moody's and S&P's letter ratings and for Ab_diff provide evidence that non-switchers face lower and more different mandatory ratings, not supporting the market uncertainty hypothesis of third ratings. One interpretation of this result is that the speculative-grade market is dominated by sophisticated institutional investors that more heavily rely on their own internal analysis

12 Estimates of beta and residual standard errors are obtained from the market model using at least 200 daily returns from the previous year. To adjust for nonsynchronous trading effects in the beta estimates, I adopt the Dimson (1979) procedure with one leading and lagging value of the CRSP value-weighted market return.

13 For a one-year horizon, the distance-to-default at the beginning of year t is defined as:

$$\mathrm{DTD}_t = \frac{\ln(V_t/F) + \left(\mu_V - \sigma_V^2/2\right)}{\sigma_V},$$

where μ_V is an estimate of the expected annual return of the firm's assets. Default occurs when the ratio of firm value to debt (V_t/F) drops below unity or the log of the ratio is negative. In order to implement this approach empirically, we need reliable estimates of total firm value and volatility. Given knowledge of F (e.g., the sum of the firm's book measure of short-term debt, plus one half of its long-term debt), estimates of V_t and σ_V can be obtained by using either past equity values and an iterative approach (Duffie et al., 2007), or by simultaneously solving two equations numerically, employing the current equity value and an estimate of the equity volatility (Bharath and Shumway, 2008).

than on agency ratings (Cantor and Packer, 1997).[14] Finally, the percentage of financial firms and firms with mandatory ratings marginally below the investment grade cut-off is significantly higher among switchers compared to non-switchers.

4. THE EMPIRICAL RESULTS

(i) Estimates from the Optional Rating Choice Equation

I assume first that the decision to solicit a third rating is independent of the anticipated borrowing cost reduction effect. Hence, in the econometric analysis, ordinary probit can be used to estimate the cross-sectional determinants of the optional rating choice. Results from this exercise are reported in the first two columns of Table 4. The first specification excludes dummies for the beginning-of-year mandatory letter ratings and two proxies for a firm's private information: Downgrade and Upgrade. A firm with sufficiently unfavorable information about future profitability that leads to a downgrade if released to the mandatory agencies, might be better off with a third rating if the optional agency puts less weight on the new information. The dummy Downgrade (Upgrade) takes on the value 1 if both mandatory ratings are downgraded (upgraded) within the year, making this proxy of unfavorable (favorable) private information likely unobservable to the market at the start of the year.[15] Upgrade is a suitable proxy for mandatory rating errors whenever the default risk of a firm, which is subsequently upgraded by Moody's and S&P's, has been previously falsely overestimated, thus providing a strong incentive for a corrective third rating.

The results for Model (1) indicate that financial firms with more long-term debt that is rated marginally below the investment grade hurdle by both mandatory agencies are more likely to switch to a third Fitch rating. Furthermore, the parameter estimates of Lev and Cash are consistent with the managerial agency cost argument, firms with significant amounts of liquid assets and less leverage may face more severe problems of managerial discretion, making the additional scrutiny through the optional agency more valuable to external stakeholders. The positive but insignificant coefficient of Roa also provides limited support for the above claim since conflicts of interest between shareholders and managers over payout policies are especially severe when the firm generates substantial cash flow (Jensen, 1986).[16] However, these results also point to the importance of capital constraints in the optional rating choice.

Model (2) introduces the rating letter dummies to capture the presumed positive relation between the uncertainty about a firm's true credit risk and its rating.

14 Baker and Mansi (2002) report that among 100 surveyed institutional investors (corporate bond funds) 63% put less or no weight at all on agency ratings compared to their own analysis, and only 9% put more emphasis on external ratings.

15 Several studies (see, e.g., Hand et al., 1992; and Kliger and Sarig, 2000) found that the stock market responds negatively to announcements of downgrades of firms' bond ratings. However, they found no stock price response to announcements of bond rating upgrades. This evidence suggests that rating agencies may have asymmetric loss functions, and hence upgrades are not as timely as downgrades. That is, upgrades merely reflect publicly available (favorable) data, whereas downgrades preempt any public release of unfavorable data.

16 I exclude the free cash flow variable Free_CF which is not available for 51 of the 253 switchers. Including Free_CF yields qualitatively similar results but with lower significance levels.

Table 4
Ordinary and Structural Probit of Optional Rating Choice - Results for Mean_Spread

	Ordinary Probit		*Structural Probit*	
	Model (1)	*Model (2)*	*Model (3)*	*Model (4)*
$\hat{Y}_n - \hat{Y}_f$			2.191***	2.401***
			(0.842)	(0.915)
LN(LT-debt)	0.304***	0.322***	0.334***	0.346***
	(0.041)	(0.047)	(0.059)	(0.061)
Margi	0.522**	0.632**	0.462*	0.631**
	(0.246)	(0.266)	(0.257)	(0.270)
Financial	0.808***	0.783***	0.821***	0.802***
	(0.118)	(0.119)	(0.132)	(0.131)
A category		0.691***		0.584**
		(0.233)		(0.244)
BBB category		0.688***		0.532**
		(0.243)		(0.259)
BB category		0.489*		0.268
		(0.274)		(0.313)
B and below		0.525		0.290
		(0.326)		(0.377)
Lev	−0.951***	−1.028***	−0.863**	−0.883*
	(0.254)	(0.310)	(0.428)	(0.460)
MTB	<0.000	<0.000	<0.000	<0.000
	(0.002)	(0.002)	(0.003)	(0.002)
Roa	0.163	0.428	2.014	2.000
	(0.747)	(0.899)	(1.485)	(1.532)
Cash	1.039**	0.897**	1.072**	0.975**
	(0.425)	(0.446)	(0.462)	(0.485)
Downgrade		0.415**		0.365**
		(0.165)		(0.176)
Upgrade		0.305		0.394
		(0.297)		(0.300)
Ab_diff	−0.012	0.012	−0.008	0.023
	(0.049)	(0.051)	(0.051)	(0.052)
Intercept	−3.203***	−3.953***	−3.242***	−4.125***
	(0.294)	(0.461)	(0.493)	(0.594)
N	2,876	2,876	2,876	2,876
Pseudo R^2	0.142	0.160	0.177	0.193

Notes:
The left hand variable in the binary probit regressions is the indicator R taking on the value 1 if a Fitch rating is requested and observed at the end of the year, and 0 otherwise. The estimates in the first two columns are obtained from the ordinary probit maximum likelihood procedure. The benefits variable $\hat{Y}_n - \hat{Y}_f$ (the expected reduction in borrowing cost conditional on rating status) is estimated from the corresponding cost of debt regressions (with LN(Mean_Spread) as dependent variable) shown in Table 5. The reference category for S&P's letter rating dummies is AAA and AA. The dummy Downgrade (Upgrade) takes on the value 1 if both mandatory ratings are downgraded (upgraded) within the year. The other independent variables are defined in Table 3. Standard errors (in parentheses) are obtained from the non-parametric bootstrap with 5,000 replications. The sample is a panel of 2,876 firm year observations from 1998 through 2003. *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

Throughout the paper, I use S&P's rating to measure the level of credit risk. Using Moody's rating provides very similar results. Compared to the reference category AAA and AA, firms with S&P's ratings of A, BBB and BB are significantly more likely to solicit a Fitch rating, supporting the market uncertainty hypotheses of optional ratings.[17] In addition, the positive and significant coefficient for the Downgrade dummy indicates that firms with unfavorable private information, leading to a mandatory rating downgrade, switch to Fitch, given the chance that Fitch might interpret the private information differently, thereby partly softening the negative effects of the mandatory downgrade. Finally, in the multivariate setting, the market-to-book ratio is insignificant, which is also true for other accounting proxies for asset opaqueness like the amount of intangible assets or R&D expenditures (results not reported).

Turning to the structural probit estimates in the last two columns of Table 4, it is important to note that the first stage reduced form probit model (see equation (4)) contains all independent variables included in the borrowing cost regressions (the vector Z) and the optional rating choice model (the vector X). Thus, the reduced form will be different for each optional rating choice model. Therefore, Table 5, which reports the results from the cost of debt regressions, provides (in the columns labeled Model (3) and Model (4)) two different sets of estimates using different inverse Mills ratios depending on which optional rating choice regression (Model (3) or Model (4) in Table 4) is used as part of the reduced form model.[18]

The results for the structural probit equations (Models (3) and (4) in Table 4) indicate that the benefits associated with optional ratings, proxied by the variable $\hat{Y}_n - \hat{Y}_f$, are an important factor in explaining the firm's decision to request an optional Fitch rating. The greater the estimated reduction in debt cost, the more likely firms are to switch to a third Fitch rating.[19] This relation is predicted by the model in Section 2, its economic significance is discussed below. Furthermore, the results for the remaining variables are qualitatively unchanged compared to the ordinary probit estimates.

(ii) Estimates from the Cost of Debt Regressions

Estimates of the cost of debt regressions, separately for firms with and without optional ratings, using ordinary OLS without the selectivity bias correction are presented in the first two columns of Table 5. The cost of debt proxy is LN(Mean_Spread). First, I note that all variables have the predicted signs and are highly significant, at least in the regression for firms without an optional rating. That is, whereas leverage and the two equity risk measures increase rating-based debt cost, profitability and size decrease cost levels. There is no surprise here; the results merely confirm the findings by others (e.g., Francis et al., 2005; and Blume et al., 1998) that these variables can account for a major portion of the cross-sectional variation in borrowing cost and rating levels. The lower significance found for some of the variables in the regressions with firms that obtained the optional rating is most likely due to the lower sample size, yielding higher standard errors. In addition, the negative relation found for DTD (i.e., a higher distance to default implies a lower underlying default probability, hence, a lower cost of

17 Note that the second uncertainty proxy, the absolute difference in rating notches between the mandatory ratings, is insignificant. In addition, in place of the absolute rating difference, I tried several split-rating dummies, with little impact on the results.

18 I do not report the estimates of the reduced form probit since they capture the net effects of the costs and benefits as to a firm's choice of optional ratings. While one can make predictions regarding the sign of β_1, γ_n, and γ_f, it is difficult to predict the signs of the combinations of these variables as represented by θ.

19 In this section, cost of debt reductions are defined in terms of LN(Mean_Spread), while evidence from the structural self-selection model using the four alternative cost of debt proxies is presented below in Section 4(*iii*).

Table 5

OLS and Selectivity Bias Corrected Cost of Debt Regressions

	Cost of Debt Proxy: LN(Mean_Spread)					
	OLS		*Model (3)*		*Model (4)*	
	With Opt. Rating	*Without Opt. Rating*	*With Opt. Rating*	*Without Opt. Rating*	*With Opt. Rating*	*Without Opt. Rating*
Lev	0.531***	0.438***	0.614***	0.438***	0.553**	0.427***
	(0.206)	(0.056)	(0.235)	(0.055)	(0.255)	(0.056)
Roa	−0.782	−1.142***	−0.556	−1.162***	−0.685	−1.218***
	(0.621)	(0.168)	(0.765)	(0.168)	(0.717)	(0.173)
LN(Size)	−0.105***	−0.140***	−0.115***	−0.137***	−0.106***	−0.132***
	(0.022)	(0.009)	(0.028)	(0.009)	(0.027)	(0.010)
Beta	0.075	0.108***	0.086	0.107***	0.076	0.103***
	(0.058)	(0.013)	(0.056)	(0.013)	(0.059)	(0.014)
Vola	0.330**	0.331***	0.370**	0.328***	0.339*	0.315***
	(0.158)	(0.031)	(0.180)	(0.032)	(0.183)	(0.033)
DTD	−0.012	−0.008**	−0.005	−0.009**	−0.010	−0.011***
	(0.013)	(0.003)	(0.016)	(0.004)	(0.018)	(0.004)
Intercept	5.584***	5.650***	5.678***	5.646***	5.586***	5.655***
	(0.274)	(0.086)	(0.324)	(0.085)	(0.286)	(0.086)
Inverse Mills ratio			0.082	−0.049**	0.013	−0.204**
			(0.086)	(0.024)	(0.090)	(0.088)
N	253	2,623	253	2,623	253	2,623
R^2	0.475	0.676	0.476	0.687	0.473	0.688

Notes:
The dependent variable is the lognormal transformation of Mean_Spread. The columns labeled Model (3) and Model (4) correspond to the specifications of the structural probit rating choice model shown in Table 4, respectively. The independent variables are defined in Table 3. All models include time fixed effects (not reported). Standard errors (in parentheses) are obtained from the non-parametric bootstrap with 5,000 replications. The sample is a panel of 2,876 firm year observations from 1998 through 2003. *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

debt) further supports the evidence in Bharath and Shumway (2008) that the Merton (1974) based distance-to-default model provides a useful, but probably not a sufficient statistic for default.

The columns labeled Model (3) and Model (4) in Table 5 report the results for the structural cost of debt equations belonging to the two structural probit optional rating choice equations in Table 4, respectively. Significance of the selectivity variables (i.e., the inverse Mills ratios λ_{f_i} and λ_{n_i}) indicates the presence of sample selection bias, thereby supporting the self-selectivity model. Recall that the coefficients on λ_f and λ_n provide estimates of the correlation between the error terms ε_f and ε^*, and ε_n and ε^*, respectively, and that ε^* enters the reduced form probit selection index (4) with a negative sign. Hence, the positive (but insignificant) correlation found between ε_f and ε^* implies that firms unexpectedly (given the observed characteristics in X and Z) rated by the optional agency are more likely to have low values of ε_f, hence, lower cost of debt after their switch to Fitch. On the other hand, the negative and significant coefficient on λ_n indicates that ε_n and ε^* are negatively correlated, implying that firms unexpectedly not rated by Fitch are also more likely to bear lower cost of debt levels without a Fitch rating.

(iii) Alternative Cost of Debt Proxies

Whereas the previous results are based on LN(Mean_Spread) as the primary cost of debt proxy, in this section I report estimates from the structural self-selection model using the four alternative measures of borrowing costs. In particular, I choose the full specification for the structural probit model (labeled Model (4) in Table 4), including mandatory rating and downgrade/upgrade dummies. Results from this exercise are presented in Table 6. For comparison purposes, column 1 replicates the structural probit estimates with LN(Mean_Spread) from Table 4 (last column). Most interestingly, the coefficient on the estimated benefits variable, $\hat{Y}_n - \hat{Y}_f$, is always positive and highly significant in four out of five regressions, supporting the view that firms weigh costs and benefits in their optional rating choice. Only for RealCost, a weighted average of the interest costs arising from outstanding debt, the coefficient estimate is insignificant, but still positive. This result might either be due to the smaller sample size of 2,487 in this case (the number of switchers with available data on RealCost is reduced from 253 to 202), or to the fact that realized debt cost is probably a noisy proxy for the underlying construct, as mentioned by Francis et al. (2005). Finally, note that the coefficient estimates for the remaining variables are fairly stable across the different columns.

(iv) Economic Significance

The estimated borrowing cost regressions (Model (4) in Table 5 for LN(Mean_Spread); not reported for the other four cost of debt proxies) are used to obtain forecasts of expected borrowing costs for firms had they used the alternative number of ratings (i.e., two for switchers and three for non-switchers). Specifically, forecasts are determined as the product of regression coefficient estimates and the independent variables, excluding the inverse Mills ratio. The inverse Mills ratio is excluded because its role is simply to adjust for non-zero expectations of regression errors. These forecasts are compared to actual costs in Table 7.

Table 6
Structural Probit of Optional Rating Choice – Alternative Cost of Debt Proxies

	Cost of Debt Proxy				
	LN(Mean_Spread) (1)	*LN(Median_Spread)* (2)	*Av_rating17* (3)	*Av_rating7* (4)	*RealCost* (5)
$\hat{Y}_n - \hat{Y}_f$	2.401***	1.826**	0.205***	0.630***	1.357
	(0.915)	(0.839)	(0.043)	(0.119)	(1.106)
LN(LT-debt)	0.346***	0.345***	0.314***	0.312***	0.335***
	(0.061)	(0.059)	(0.056)	(0.057)	(0.093)
Margi	0.631**	0.623**	0.614**	0.612**	0.633**
	(0.270)	(0.269)	(0.273)	(0.272)	(0.266)
Financial	0.802***	0.776***	0.764***	0.764***	0.783***
	(0.131)	(0.129)	(0.130)	(0.129)	(0.139)
A category	0.584**	0.580**	0.653***	0.643***	0.698***
	(0.244)	(0.245)	(0.237)	(0.237)	(0.252)
BBB category	0.532**	0.526**	0.639***	0.627**	0.711**
	(0.259)	(0.261)	(0.247)	(0.248)	(0.285)
BB category	0.268	0.283	0.429	0.419	0.522
	(0.313)	(0.313)	(0.291)	(0.290)	(0.332)
B and below	0.290	0.323	0.486	0.479	0.558
	(0.377)	(0.370)	(0.349)	(0.347)	(0.372)
Lev	−0.883*	−0.841*	−0.955**	−0.876**	−0.853
	(0.460)	(0.442)	(0.399)	(0.409)	(1.018)
MTB	<0.000	<0.000	<0.000	<0.000	<0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Roa	2.000	1.048	0.120	0.279	0.929
	(1.532)	(1.327)	(1.337)	(1.306)	(3.375)
Cash	0.975**	0.941*	0.891*	0.890*	0.901*
	(0.485)	(0.487)	(0.477)	(0.476)	(0.489)
Downgrade	0.365**	0.369**	0.421**	0.415**	0.438**
	(0.176)	(0.175)	(0.173)	(0.173)	(0.208)
Upgrade	0.394	0.377	0.339	0.339	0.295
	(0.300)	(0.297)	(0.288)	(0.288)	(0.319)
Ab_diff	0.023	0.020	0.024	0.024	0.015
	(0.052)	(0.052)	(0.051)	(0.051)	(0.055)
Intercept	−4.125***	−4.146***	−3.944***	−3.865***	−4.174***
	(0.594)	(0.555)	(0.556)	(0.583)	(1.204)
N	2,876	2,876 25	2,876	2,876	2,487
Pseudo R^2	0.193	0.181	0.170	0.172	0.160

Notes:
The left hand variable in the binary probit regressions is the indicator R taking on the value 1 if a Fitch rating is requested and observed at the end of the year, and 0 otherwise. The benefits variable $\hat{Y}_n - \hat{Y}_f$ (the expected reduction in borrowing cost conditional on rating status) is estimated from the predictions values of the corresponding borrowing cost regressions (Model (4) in Table 5 for LN(Mean_Spread); not reported for the other proxies). The reference category for S&P's letter rating dummies is AAA and AA. The dummy Downgrade (Upgrade) takes on the value 1 if both mandatory ratings are downgraded (upgraded) within the year. The various cost of debt proxies and the other independent variables are defined in Table 3. Standard errors (in parentheses) are obtained from the non-parametric bootstrap with 5,000 replications. The sample is a panel of firm year observations from 1998 through 2003. *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

Panel A reports the results for Mean_Spread, the 'typical' rating level corporate bond credit spread. For firms that solicited an optional Fitch rating, the mean credit spread would have been 201.7 bp without the third rating (row 2), compared to an actual mean spread of 171.9 bp (row 1). The mean change in spreads of 30 bp (row 3) if Fitch

Table 7

Comparison of Forecasts of Cost of Debt if the Alternative Number of Ratings were Solicited with Actual Cost of Debt for a Sample of 2,876 Firm Year Observations from 1998 through 2003

Cost of Debt Proxy	*253 Switchers (three Ratings)*	*2623 Non-switchers (two Ratings)*
Panel A: Mean_Spread (in bp)		
(1) Mean actual cost of debt	171.9	222.0
(2) Mean forecasted cost of debt if alternative number of ratings were used	201.7	208.5
(3) Mean change in cost of debt if alternative number of ratings were used	29.8	−13.5
(4) Number of cases where change in cost of debt is positive	169*	1,423*
Panel B: Av_Rating17		
(1) Mean actual cost of debt	8.9	10.4
(2) Mean forecasted cost of debt if alternative number of ratings were used	9.4	10.3
(3) Mean change in cost of debt if alternative number of ratings were used	0.5	−0.1
(4) Number of cases where change in cost of debt is positive	153*	1,232*
Panel C: RealCost (in %)		
(1) Mean actual cost of debt	6.4	7.8
(2) Mean forecasted cost of debt if alternative number of ratings were used	8.7	5.6
(3) Mean change in cost of debt if alternative number of ratings were used	2.3	−2.2
(4) Number of cases where change in cost of debt is positive	144*	456*

Notes:
This table compares mean actual cost of debt to mean forecasts of those costs if the alternative number of ratings were used. Forecasts of borrowing costs with and without the optional rating are determined from the predictions values of the corresponding borrowing cost regressions (Model (4) in Table 5 for Mean_Spread; not reported for the other cost of debt proxies). The inverse Mills ratio is excluded because its role is simply to adjust for non-zero expectations of regression errors. The computations for RealCost in Panel C are based on 2,487 (202 switchers and 2,285 non-switchers) firm years. * indicates that the hypothesis that changes in costs are equally likely to be positive or negative can be rejected at the 1% level using the binomial test.

ratings had not been solicited is significantly different from zero using the binomial test (row 4). For the average switcher in the sample, long-term debt outstandings amount to $3,000 million (see Table 3), hence, a 30 bp lower credit spread would imply annual interest cost savings of $9 million. These findings are, therefore, consistent with switchers selecting the number of ratings that result in the lowest borrowing cost for them. However, the figures for the subsample of non-switchers indicate that some non-switchers also would have benefited from a third rating. The mean change in spreads given a Fitch rating had been solicited is −13.5 bp, but the fraction of cases in which a Fitch rating would have increased the spread is significantly above 0.5 (row 4). This implies that some non-switchers possibly would have received large reductions in typical credit spreads had they obtained a third Fitch rating, but, presumably, they never thought about seeking a Fitch rating or, alternatively, the additional rating cost outweigh the interest cost savings.

The findings for Av_rating17 (Panel B) and RealCost (Panel C) are largely consistent with the results for Mean_Spread.[20] In particular, the mean switcher would face a 0.5 notches higher (i.e., less favorable) average rating and a 2.3% increase in realized interest cost if the third rating had not been solicited. In addition, switching benefits are also visible among the non-switchers. For example, non-switchers would have reduced their realized interest cost by 2.2% on average had they obtained a third rating, possibly explaining the insignificant coefficient found for $\hat{Y}_n - \hat{Y}_f$ in Table 6 (last column). In sum, the evidence is consistent with cost-minimization behavior of switchers, but not so for non-switchers. There appears to be a significant fraction of non-switchers that would have benefited from soliciting a third rating, assuming moderate additional rating cost, but that probably never considered a Fitch rating.

(v) Further Robustness Checks

Can unsolicited ratings explain my findings? That is, do issuers acquire third party (Fitch) ratings 'to correct' for any unsolicited mandatory ratings bias?[21] The major distinction between an unsolicited and a solicited rating is that the latter is requested and therefore paid for by the rated firm while the former is neither of the two. Consequently, unsolicited ratings are based on publicly available information only, in order to keep the cost of rating preparation low. Academic studies uniformly found that unsolicited ratings are lower than paid ratings, controlling for firm specific and macroeconomic variables. This downward bias has been emphasized, for instance, by Gan (2004). Evidence from Van Roy (2005) suggests that unsolicited ratings are lower because they are only based on public information and, as a result, they tend to be more conservative than solicited ones. If, instead, firms with unsolicited ratings deliver sufficient public information to compensate for the lack of private information, they would not receive a low unsolicited rating, since in this case, there is no reason for the agency to err on the side of caution.

Since Moody's and S&P's do not distinguish solicited and unsolicited ratings in their domestic market,[22] the only publicly available indirect information source regarding which ratings are solicited and which are not is from the security registration statement that firms file with the SEC (Gan, 2004). In registration statements of type S-3, there is an 'item 14' that requires issuers to report expenses of the issuance: rating agency fee, registration fee, accounting and legal fee, etc. I hand-collected the rating fee information from the SEC's EDGAR (Electronic Data Gathering, Analysis and

20 Results for Median_Spread and Av_rating7 are not shown because they are very similar to the numbers for Mean_Spread and Av_rating17, respectively.

21 Note that third ratings are not necessary for this task, issuers can also correct any downward bias due to the 'inside information access' hypothesis (Van Roy, 2005) by soliciting an previously unsolicited mandatory rating.

22 S&P's identifies all of its *non-US* unsolicited ratings by a 'pi' (public information) subscript attached to its traditional long-term rating symbols. Moody's policy has long been not to disclose whether a rating was solicited or not. However, since April 2006, Moody's provides a list (on www.moodys.com) of firms designated as 'non-participating' in the rating process. The current version (as at February 2009) of the list contains nine corporates (and three governments), of which none are domiciled in the US, one in France, and the rest in the middle east (mainly financial institutions in Saudi Arabia).

Retrieval) system. Among the 1,066 sample firms 294 (83 of the 253 switchers) did not report a rating fee or reported a zero rating fee in the last debt issue registration statement prior to the observation date of the firm year.[23] For the remaining firms, I can be sure that at least one of the mandatory ratings is solicited. I excluded three additional firms that reported agency fees so low to be incompatible with solicited ratings from both Moody's and S&P's, given that agencies' fee schedules. The final sample of 2,103 firm years from 769 firms that reported agency fees large enough to be consistent with two solicited mandatory ratings is used to reestimate the structural self-selection model (results not reported). Whereas the key findings of the paper remain unchanged, the significance levels for the benefits variable in the structural probit are somewhat lower, possibly due to the reduced sample size.

Additionally, the results are qualitatively insensitive if Mean_Spread and Median_Spread are not log transformed. Similar results are obtained if the rating choice equation is estimated using a logit model.

5. CONCLUSION

I examine the impact of optional Fitch ratings on aggregate firm level borrowing cost using a procedure which explicitly accounts for self-selection in estimating borrowing cost relations. The evidence indicates that soliciting a third Fitch rating has a negative effect on borrowing cost. For firms with Fitch ratings, the average typical corporate bond credit spread is 171.9 bp, but would have been 201.7 bp without the additional rating. In addition, the mean switcher would face a 0.5 notches higher (i.e., less favorable) average rating and a 2.3% increase in realized interest cost if the third rating had not been solicited. In sum, the evidence is consistent with switchers using optional ratings to minimize borrowing costs. On the other hand, the evidence indicates that non-switchers do not always optimally weigh the costs and benefits of third ratings. There appears to be a significant fraction of non-switchers that would have benefited from soliciting a third rating, assuming moderate additional rating cost, but that probably never considered a Fitch rating.

At the bottom line, the paper's main result is that Fitch rating selection decisions are not random, but related to expected rating differences (i.e., anticipated favorable Fitch ratings). This finding has immediate relevance to the current debate about the adverse quality effects of limited competition in the credit rating agency industry. With the passage of the Credit Rating Agency Reform Act of 2006, a major goal of the US Congress was to encourage competition and entry into the bond rating business, thereby enhancing the likelihood of new ideas and new methods filtering into the industry, making rating errors less likely. To achieve this result, the US Congress mandated that the SEC simplify its criteria for recognizing and registering rating agencies. However, the government probably doesn't have the ability to readily destroy the oligopoly; use of Moody's and S&P's ratings has simply become too entrenched.

23 The firm group without reported agency fees covers 28%, which is comparable to the 22% reported in Gan (2004) for a sample of bond issues. However, it is noteworthy that this group also includes firms with solicited ratings that actually have paid the rating fee but included it in the 'miscellaneous fee' item, or that filed S-4 (does not have the item 14) registration statement instead of S-3. For approximately 13% of the firms I could not find a debt security S-3 registration form. This suggests that the percentage of firms receiving unsolicited ratings is fairly below 28%. In a survey among 113 US firms with a credit rating in 1999, Baker and Mansi (2002) find that firms with an unsolicited rating averaged 10.6%.

In this sense, if governmental effort is actually restricted to increasing the number of agencies providing optional ratings, overall rating quality will only be asymmetrically improved, if at all, since optional ratings will only be requested by firms feeling their default risk being overestimated (and not underestimated) by Moody's or S&P's. Hence, optional ratings cannot correct exactly the kind of rating errors that appear to be the most serious for investors.

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