MULTIPLE RATINGS AND CREDIT STANDARDS: DIFFERENCES OF OPINION IN THE CREDIT RATING INDUSTRY

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Abstract

We test whether the tendency of third rating agencies to assign higher ratings than Moody's and Standard & Poors results from more lenient standards or sample selection bias. More lenient standards might result from incentives to satisfy issuers who are, in fact, the purchasers of the ratings. Selection bias might be important because issuers that expect a low rating from a third agency are unlikely to request one. Our analysis of a broad sample of corporate bond ratings at year-end 1993 reveals that, although sample selection bias appears important, it explains less than half the observed difference in average ratings.

We also investigate why bond issuers seek ratings in addition to those of Moody's and Standard & Poors. Contrary to expectations, we do not find that the probability of obtaining a third rating is related to levels of *ex ante* uncertainty over firm default probabilities. In particular, a firm's decision to obtain a third rating appears unrelated to its Moody's and Standard & Poors ratings or the amount of disagreement between them. Instead, the most important determinants of the decision are a firm's age and size.

Our results should be of interest to investors and financial market regulators who generally use the ratings of different agencies as if they correspond to similar levels of default risk. In addition, our findings raise a number of questions about the certification role of rating agencies and about the strength of the rating agencies' incentive to maintain a reputation for high quality (accurate) ratings.

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Multiple Ratings and Credit Standards:

Differences of Opinion in the Credit Rating Industry

In private capital markets, informational asymmetries between borrower and lender are reduced by evaluation and monitoring activities undertaken by the lender. In public capital markets where lenders are diverse and anonymous, many investors delegate these evaluation and monitoring activities to credit rating agencies. The finance literature often assumes that ratings are accurate and synonymous with public information about the riskiness of the borrower.[1] This literature, however, does not take into account the fact that it is bond issuers (and not investors) that choose which rating agencies and how many agencies to employ.

The major rating agencies earn the bulk of their revenue by charging the issuers of debt securities for ratings. While this payment structure may encourage agencies to assign higher ratings to satisfy issuers, the agencies have a powerful incentive to maintain a reputation for high-quality, accurate ratings. If investors were to lose confidence in an agency's ratings, issuers would no longer believe they could lower their funding costs by obtaining its ratings.[2] It is possible, however, that this reputation mechanism works imperfectly. Investors may be naive and fail to recognize differences in rating agencies standards. Furthermore, firms may demand an agency's ratings in order to meet regulatory

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[1] For example, in Diamond's theoretical work (1991a,b), the extent of external finance and the maturity structure of debt are shown to relate to credit ratings -- defined as the best estimate, given public information, of a borrower having only a negative present value project.

[2] The credit rating agency's reputation in the bond market plays a similar role as the reputation of the underwriter in the IPO market. According to the empirical literature on IPO pricing (Beatty and Ritter (1986), Carter and Manaster (1990), Simon (1990), the reputation of the intermediary does serve as a check to the degree to which low quality issues are brought to the market.

guidelines independently of how that agency's ratings are viewed in the marketplace.[3]

Moody's and Standard & Poors automatically assign ratings to all corporations issuing in the U.S. public bond markets, while firm purchases of additional ratings from the other two leading agencies, Fitch or Duff & Phelps, are optional. All four agencies have rating scales that are parallel in symbology and their ratings are used interchangeably in regulations issued by the Securities and Exchange Commissions and the National Association of Insurance Commissioners.

Table 1

	Distribution of Duff & Phelps' Ratings Relative to:		Distribution of Fitch's Ratings Relative to:	
	Moody's	Standard & Poors	Moody's	Standard & Poors
Percent Rated Higher	47.6	39.9	55.3	46.6
Percent Rated Same	42.3	46.5	37.9	43.5
Percent Rated Lower	10.1	13.5	6.8	9.9
Average Differences In Ratings Notches	0.57	0.36	0.74	0.56

Note: Compares 288 firms rated jointly by Moody's, Standard & Poor's and Duff & Phelps and 161 firms rated jointly by Moody's, Standard & Poor's and Fitch at year-end 1993.

Table 1 compares the corporate ratings assigned by the four largest U.S. rating agencies. Consistent with previous studies (Beattie and Searle, 1992; Cantor and Packer, 1994), our sample reveals that Duff & Phelps and Fitch have systematically higher ratings on average than Moody's and Standard & Poors. Both investors and regulators need to know whether these ratings differences reflect different standards. Are the default risks associated with a particular

[3] The proliferation of rating agencies and "rating shopping" has prompted the SEC to reconsider its uses of ratings in regulations and the procedures it uses to identify which agencies' ratings it recognizes. For an overview of recent trends in the ratings industry, see Cantor and Packer (1994).

agency's rating process.

Regardless of the source of sample selection, consistent estimates of the true α can be obtained with the two-step approach proposed by Heckman (1979). This approach utilizes information on the sample selection process in a first stage probit regression on the decision to obtain a third rating. If firm f's decision to obtain a rating from the optional agency is based on some exogenous characteristics z_f and a random variable η_f, which may be correlated with ε_f, then firm f's decision rule can be summarized by the following equation:

$$(6) \qquad y_f = z_f\gamma + \eta_f, \text{ for } f \in N,$$

where y_f measures firm f's incentive to obtain a rating from the optional agency,

γ is a vector of parameters,

z_f is a vector of exogenous characteristics of firm f, and

η_f is a random variable with mean zero, variance $\sigma_{\eta\eta}$ and covariance with ε, $\sigma_{\varepsilon,\eta}$.

The variables that comprise z_f include any observable factor that would influence the cost or benefit of obtaining a rating. Without loss of generality, we assume firm f obtains a rating from new agency if and only if $y_f>0$ or $\eta_f>-z_f\gamma$. Hence, equation (5) can be rewritten as,

$$(7) \qquad E[r_f|f \in S] = E[r_f|\eta_f>-z_f\gamma] = \alpha + E[x_f\beta|f \in S] + E[\varepsilon_f|\eta_f>-z_f\gamma].$$

If ε_f and η_f are jointly normally distributed, equation (7) can be written as,

$$(8) \qquad E[r_f|z_f, \eta_f>-z_f\gamma] = \alpha + z_f\gamma + (\rho/\sqrt{\sigma_{\varepsilon\varepsilon}})\lambda_f,$$

where ρ is the correlation between ε and η, and λ is the inverse Mills ratio, $\phi(v)/\Phi(-v)$,

evaluated at $v=z_f\gamma/\sqrt{\sigma_{\eta\eta}}$.

The inverse Mills ratio is a measure of the extent that a firm f appears in the sample of firms rated by agency j unexpectedly, based on their observed characteristics z_f. Estimates of the inverse Mills ratio can be derived from a probit estimation of equation (6). Equation (8) is then estimated by ordinary least-squares regression. If estimates of equation (8) reveal a positive coefficient on λ, then $\rho>0$, which implies that firms unexpectedly rated by the optional agency are more likely to have positive values of η_f. Using the least squares estimates of equation (8),[8] the observed difference between the two agencies' average ratings difference can then be decomposed into the difference in the absolute positioning of their rating scales ($\alpha + E[x\beta|f\in P]$), the bias due to sample selection based on the "x's" ($E[x\beta|f\in S]- E[x\beta|f\in P]$), and other sources of sample selection, $(\rho/\sqrt{\sigma_{\varepsilon\varepsilon}})*E[\lambda_f|f\in S]$.

The methodology outlined above follows much of the empirical literature on ratings that assumes the ratings can be interpreted as cardinal variables, with specific fractional values in relation to one another. As a check on the robustness of our results to the weakening of this assumption, we also estimate an ordered multinomial probit estimation of equation (8) instead of OLS, which assumes only that ratings signal a positioning relative to other ratings.

In particular, we divide the observed ratings differences r_f into three categories - the new agency rates higher, the same, or lower - and estimate the probabilities that ratings differences will fall into one of these categories. A second stage ordered probit estimation of ratings differences with the inverse Mills ratio from the first stage probit model included as an

[8] Consistent estimates of the standard errors of the estimated coefficients for the second stage regression can be obtained following the procedures suggested by Greene (1981).

explanatory variable enables us to contrast the relative fractions observed directly in the data (sample S) with those estimated for the population (sample P) when sample selection bias is taken into account.

3. The Data

The dependent variables in our regression analysis are the long-term credit ratings assigned by Moody's, Standard & Poors, Duff & Phelps and Fitch to U.S. corporations with public, taxable debt outstanding at year-end 1993. Our primary data source is *Credit Ratings International* (CRI), which tracks the ratings of all the major rating agencies on a quarterly basis. Our sample is drawn from the first issue in 1994, which corresponds to outstanding ratings as of December 31, 1993.

Collecting a consistent dataset for ratings comparisons across agencies is difficult because individual firms often receive different ratings for different types of debt issues. CRI, however, presents agency ratings on a consistent basis since it reports only the ratings that agencies have assigned to each company's most representative long-term security, typically its long-term senior unsecured or senior subordinated debt. Because of possible misreporting by the rating agencies and typographical errors, we cross-checked CRI's ratings against alternative sources of information, including ratings given to us directly by Moody's and Standard & Poors for the purposes of this study and ratings published in the *Duff & Phelps Rating Guide* and *Fitch Rating Book*. Discrepancies were resolved through these sources and direct contacts with the agencies themselves. In the end, we were able to obtain reliable data on 1413 companies rated jointly by Moody's and Standard & Poors.

Our primary source for explanatory variables is COMPUSTAT, which records descriptive financial information (e.g., assets and leverage) and nonfinancial information (e.g., industry and location) on a wide variety of companies. Of the 1413 companies rated by Moody's and Standard & Poors, 871 companies had sufficient information on COMPUSTAT to be included in this study.

Ratings differences between agencies are calculated by assigning numerical values to ratings [AAA (Aaa) = 1, AA+ (Aa1) = 2, and so on] and subtracting the associated numerical values from each other: the units of these differences are referred to as rating "notches." Since the agencies have different letter ranges in the C category, we truncated each agency's ratings from below B- (B3) = 16 to equal 17. Firms in default were not included in the sample.

4. Factors Affecting the Likelihood of Obtaining a Third Rating

A firm's decision whether to obtain a third rating should be depend on the relative costs and benefits of that rating. The theoretical determinants of the cost of a rating are relatively straightforward. The direct costs of obtaining a credit rating vary in proportion with the size of the bond issue for most firms, but are generally capped through negotiation for large and frequent debt issuers. In addition, the issuers must spend a considerable time dealing with the rating agency, particularly the first year they obtain a rating.

The determinants of the benefits of a rating are more abstract. The purpose of obtaining ratings is to lower debt issuance costs, and, as a potential byproduct, to lower the costs of raising other types of capital as well. Theoretical work (Ramakrishnan and Thakor, 1984; Millon and Thakor, 1985) suggests that credit rating agencies, in their roles as information gatherers and

processors, can reduce a firm's capital costs by certifying its value in a market characterized by informational asymmetries between purchasers and issuers. Additional ratings are likely to be most desirable when the degree of uncertainty about a firm's prospects is large and when the amount of funds to be raised through rated debt or other forms of capital is substantial. Surprisingly, studies investigating the decision to obtain a single or second rating for municipal issues have not included explanatory variables proxying for the ex ante uncertainty about the issuer (Hsueh and Kidwell, 1988; Moon and Stotsky, 1993).

Of course, the perceived benefits of a rating are likely to vary directly with the expected rating assignment relative to market perceptions. If a rating agency is particularly lenient in its ratings compared to other agencies with respect to specific characteristics, then issuers possessing that characteristic may be more likely to seek a rating from that agency. This sort of rating agency selection based on known ratings criteria makes sense only if these differences in criteria are not transparent to investors.

These considerations motivate the inclusion of the following variables:

Size variables. The above discussion suggests an ambiguous relationship between size and the likelihood of getting a third rating. Beatty and Ritter (1986) interpret size as being inversely related to uncertainty -- hence, size should be inversely related to the probability of obtaining a third rating. On the other hand, because large firms can spread the fixed costs of obtaining a rating over large amounts of debt and other sources of capital, larger firms may be more likely to obtain a third rating. We consider two measures of firm size, the log of long-term debt and the log of assets.

Firm Age. As in the case of size, the expected sign on firm age is ambiguous. Since uncertainty should be less for older firms, the benefit of a third rating should be less. However, because the cost in terms of management time in obtaining a rating is greatest on the first occasion, older firms may be more likely to have third ratings due to a persistence effect. In our probit specifications, we include an "age" dummy that takes on the value 1 if the firm has been rated by Moody's and Standard & Poors for more than 10 years.

Other Proxies for Ex Ante Uncertainty. Although size, age and industry may be correlated with uncertainty, they clearly influence the decision to obtain a rating through other channels as well. We, therefore, include in the analysis a number of other variables to proxy more directly for uncertainty about a firm's credit risks. Since earlier work (Cantor and Packer, 1994; 1995) indicates that uncertainty is greater for lower quality credits, we include in the probit specifications a dummy that takes on the value 1 if a firm is rated investment grade by both Moody's or Standard & Poors, which we expect to be negatively related to the probability of obtaining a third rating. We also have included three other measures of uncertainty derived from disagreements between Moody's and Standard & Poors -- (1) a dummy equal to one if the two disagree at the letter grade level, (2) a dummy if they disagree at the ratings notch level, and (3) a variable measuring the absolute ratings difference (measured in ratings notches) between the two agencies. If these variables do proxy for uncertainty and higher levels of uncertainty increase the benefits of ratings, then the expected coefficients on all these variables should be positive.

Financial Ratios. We also consider a standard set of financial ratios -- interest coverage, leverage and profitability (ROA) -- that have been shown to be important determinants of credit ratings (Ederington and Yawitz, 1987). We also include industry dummies. If Duff & Phelps or Fitch rated relatively leniently based on particular criteria, then firms with those characteristics may be more likely to obtain ratings from them. We have no particular priors on these variables, except that Fitch (1994) stresses in a recent publication that it places greater weight on cash flow coverage than the other agencies.

4a. Summary Statistics

For our sample of 871 corporations at year-end 1993, Tables 4a and 4b provide detail on market share and ratings differences across various types of sample disaggregation -- by industry, Moody's and Standard & Poors ratings, and financial ratio characteristics. Of these firms, 33.1 percent were rated by Duff and Phelps and 18.5 percent were rated by Fitch. Both Duff & Phelps and Fitch rate relatively large fractions of utilities, banks and thrifts and other financial firms. The relative market penetrations of these agencies, however, diverge in other areas. Unlike Duff & Phelps, Fitch has a very limited presence in the rating of insurance companies and other industrial firms. Duff & Phelps has a larger market share in the Midwest than it does for other firms.[9]

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[9] Of the four rating agencies under consideration, only Duff & Phelps is headquartered in Chicago rather than New York. It is plausible that Duff and Phelps could have an expertise in the analysis of firms from the Midwest, particularly as regional factors have been shown to affect whether venture capitalists have membership on firm boards (Lerner, 1995). For the reason, we include a dummy which equals 1 if the firm is headquartered in one of twelve Midwestern states.

Contrary to expectations, Duff & Phelps and Fitch proportionately more firms that are rated investment grade by Moody's and Standard & Poors than firms rated below-investment-grade. In addition, Duff & Phelps and Fitch rate proportionately more firms with the same ratings from Moody's and Standard & Poors than firms that have split ratings either at the notch or the whole letter rating. Disaggregating the data according to firm financial ratios reveals that Duff & Phelps and Fitch rate proportionately more large firms with low leverage.

The data on rating differences also indicate significant variation across market segments. Interestingly, the variation in ratings differences across market segments appears uncorrelated with the variation in market shares. Contrary to what might be expected if ratings shopping were common, market niche concentrations for the third rating agencies do not seem to correspond either to larger differences in ratings (Table 4a), or to higher probabilities of obtaining higher third ratings (Table 4b). For example, for the seven categories reported in Table 4a where Duff & Phelps has a larger than average market share, the ratings differential with Moody's is larger than average three times. Similar comparisons of the ratings frequencies reported in Table 4b suggest no consistent correlation between the relative market share of Duff & Phelps or Fitch and the likelihood of obtaining a higher or lower rating. While this suggests that sample selection bias *based on observed variables* is likely to be small, simultaneous estimation of the impact of multiple variables is necessary to sort out confounding effects. Even more important, the summary statistics imply nothing about sample selection bias *based on unobserved factors*. The econometric analysis to follow is designed to uncover both sources of selection bias.

4b. Probit Regression Results.

In this section, we estimate probit models measuring the importance of various factors affecting the probability a particular issuer obtains a rating from either Duff & Phelps or Fitch. In all the specifications, industry dummies (representing those broad sectors listed in Tables 4a and 4b) are included. In addition, in the Duff & Phelps equations, we include a dummy for the Midwest to reflect that agency's local presence in the region. To these baseline models, we added a number of variables that might reasonably be expected to affect the costs or benefits of obtaining ratings, including firm size, proxies for ex ante uncertainty about default probabilities, and standard credit ratios.

Tables 5 and 6 report the results of probit regressions of the above variables on the likelihood of having a third rating from Duff & Phelps or Fitch, respectively. The estimated coefficients on the industry dummies (not reported) reflected the sample frequencies shown in Tables 4a and 4b. With regard to the midwest regional dummy included in the Duff & Phelps' probits, its coefficient estimate has the expected positive sign for all five reported specifications (midwest firms are more likely to have a rating from Duff & Phelps), although it is not statistically significant in any specification.

The most consistently significant variables are age (firms rated 10 years or more) and size, both assets and debt. The estimated coefficients on all three variables are significantly positive for both Duff & Phelps and Fitch. (When they are included together in the Fitch probits, assets and long-term debt are not individually significant due to collinearity, but the specification with the highest-log-likelihood is one that includes both variables.) The positive coefficients on the age and size variables underscore the importance of spreading fixed costs in

the decision to obtain a third ratings and do not support the joint hypothesis that these variables vary inversely with uncertainty and firms request additional ratings to reduce uncertainty. As stated earlier, larger firms can more easily amortize the fixed costs of obtaining a rating. Similarly, older firms may be more likely to have additional ratings because of a persistence effect: once a third rating has been obtained, it is relatively inexpensive to keep because most of the fixed costs have already been paid.

In general, uncertainty does not appear to be a major factor affecting the likelihood of obtaining a third ratings. Results are mixed with regard to the importance of investment-grade status. In the case of Duff & Phelps, a firm is less likely (statistically significant in 2 out of 5 cases) to obtain a third rating if the firm is investment-grade, consistent with the hypothesis that the greater uncertainty associated with non-investment-grade status were to increase the demand for a third rating. However, in the case of Fitch, a firm is more likely (statistically significant in 4 out of 5 cases) to have a third rating if the firm is investment-grade, contrary to the uncertainty hypothesis.

Even more surprisingly, the three ratings uncertainty variables were always of an unexpected negative sign, and in the case of the absolute ratings difference between Moody's and Standard & Poors, significantly negative in two out of three specifications for the decision to obtain a long-term rating from Duff & Phelps. In other words, ceteris paribus, the larger the difference between the Moody's and Standard & Poors rating, the less likely the firm is to have a Duff & Phelps rating. Taken as a whole, the results refute convincingly the hypothesis that ratings uncertainty due to disagreements between Moody's and Standard & Poors increase the likelihood of obtaining a third rating to resolve the difference. The results were robust to

numerous additional specifications of ratings uncertainty, such as the existence of a split at critical cutoff levels (i.e., investment grade, A-letter grade).

With regard to the three financial ratios -- leverage, coverage, and profitability -- the latter two were insignificant in all specifications for the existence of a Duff & Phelps rating, while all three were insignificant in all specifications for the existence of a Fitch rating. Although a significant negative relationship was found between leverage and the existence of a Duff & Phelps rating for four out of five specifications, the financial variables were not jointly significant for either Duff & Phelps or Fitch.

5. Sample Selection and Rating Differences

In this section, we analyze the ratings differences between the third agencies and Moody's and Standard & Poors. We regress the observed ratings differences against a variety of possible determinants of relative ratings, while controlling for selection bias using Heckman's (1979) two-step approach. We also examine qualitative differences in ratings (higher, same or lower) with ordered-probit regressions in the second stage.

Theory and previous empirical work provide only limited guidance as to the selection of appropriate explanatory variables beyond a simple constant term (controlling for potential differences in average rating scales) and the inverse Mills ratio (controlling for sample selection bias not accounted for by other included variables). While a large number of papers have demonstrated that industry dummies and financial variables help predict an agency's *ratings* (for a survey, see Ederington and Yawitz 1987), other research comparing Moody's and Standard & Poors ratings (Ederington 1986) suggests that these same variables are unlikely to help explain

ratings differences.

We begin, therefore, with the simplest specification, regressing ratings differences on a constant and the inverse Mills ratio obtained from the best-fitting probit regressions analyzed in the previous section.[10] We then estimate two more inclusive specifications of the ratings difference equations. Our second model adds industry dummies to the ratings difference equation. This modification is important if the third agency rates easier or harder on a particularly industry relative to Moody's or Standard & Poors (relative to their average rating scales) and the third agency has an disproportionately small or large market share in that industry.

Similarly, it may be important to incorporate certain financial variables in the regression if the third agencies place different weights on specific variables than Moody's or Standard & Poors and rate a disproportionate share of firms with high or low realizations of these variables. Our third model, therefore, includes four financial variables as regressors in addition to the industry dummies. The four additional variables are the log of assets, total debt divided by assets (leverage), return on assets (profitability), and cash flow coverage of fixed charges (coverage).[11]

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[10] Specifically, we use equation (5c) from Table 5 for Duff and Phelps and equation (6c) from Table 6 for Fitch. Because the implied mills ratios vary little across the alternative probits presented in Tables 5 and 6, the particular specification chosen from Tables 5 and 6 does not influence the second-stage results.

[11] Since coverage ratios are reported only for the nonfinancial firms in COMPUSTAT, for financial firms we set coverage equal to a constant, which, given the presence of industry dummies, eliminated the effect of that variable for nonfinancial firms in the regression.

5a. Least Squares Regressions

Table 7 presents all three models for the ratings differences between Duff & Phelps and both Moody's and Standard & Poors. In all six regressions, the coefficient on the Mills ratio is positive and, in five of cases, significant at the 1% percent level. With regard to the industry dummies and financial variables, the reported F-statistics imply that neither set of variables adds significant explanatory power to the Duff/Moody's or the Duff/Standard & Poors ratings difference equations. Hence, equations (7a) and (7d) are the preferred specifications. Evaluating the inverse Mills ratio at its mean (0.63) for firms obtaining ratings from Duff & Phelps, these two regressions imply that 0.33 of the observed 0.57 ratings difference with Moody's and 0.16 of the observed 0.36 ratings difference with Standard & Poors are explained by sample selection bias.

In Table 8, we present similar regressions to those in Table 7, but here we examine factors underlying the differences between Fitch's ratings and ratings of Moody's and Standard & Poors. Looking first at the coefficient on the inverse Mills ratio, we find modest evidence of sample selection in the Fitch/Moody's regression and no such evidence in the Fitch/Standard & Poors equations. In the Fitch/Moody's equations, the coefficient is consistently positive and is significant at the 5% level in the first model and slightly less significant in the other two models. In the Fitch/Standard & Poors regression, the coefficient on the Mills ratio changes sign and is never significantly different from zero.

Adding the industry dummies adds significant explanatory power to the Fitch/Moody's equation, though not for the Fitch/Standard & Poors equation as shown by the improvement in the R-squared and standard F-tests. The addition of financial variables does not provide

significant improvement in fit in either equation although, in the Standard & Poors/Fitch equation, two financial variables appear individually significant. In particular, coverage and profitability appear strongly significant in specifications (8c) and (8f) although we are skeptical of the robustness of these estimates since their significance disappears when assets is omitted from regression (not reported).[12]

Hence, for Fitch, there is some evidence in favor of sample selection bias but only in the determination of rating comparisons with Moody's. Based on the preferred specification (8b), evaluating the inverse Mills ratio at its mean (0.78) and evaluating the industry ratings at their population means, we find that 0.31 of Fitch's observed 0.74 average ratings difference with Moody's is explained by sample selection bias.[13] On the other hand, estimated sample selection bias can account for none of the ratings difference between Fitch and Standard & Poors.

5b. Ordered-Probit Regressions

We also estimate second-stage equations a trinomial, ordered probit presented in Tables 9 and 10. In particular, we define as dependent variables indicator variables that take on one of three possible qualitative outcomes -- the third agency ratings higher, the same or lower than Moody's or Standard & Poors. The right-hand-side variables were kept the same, including the

[12] It is worth noting, however, that as suggested by a report published by Fitch (1994), coverage does appear significant in equation (8f) -- but it has the wrong sign.

[13] Of the total 0.31 difference, 0.23 is accounted for by sample selection bias due to unobserved factors (the inverse Mills ratio) and 0.08 due to industry composition of observed ratings which differs from that of the population.

inverse Mills ratios derived from the probits presented in Tables 5 and 6. While this approach is more general than least squares in some respects, it reduces the weight given to large rating differences, putting all ratings differences of the same direction into a single category.[14]

Table 9 present estimates of the ordinal rating differences between Duff & Phelps and both Moody's and Standard & Poors. The estimated coefficients on the inverse Mills ratio are all positive and statistically significant in 5 out of 6 cases. The coefficient estimates on the industry dummies and the financial variables are similar in sign and significance to those presented in Table 7, although their absolute magnitudes are not directly comparable. Again, we find that the addition of industry dummies and financial ratios fail to add significant explanatory power in these regressions.

Despite its statistical significance, sample selection bias does not appear to explain much of the different frequencies of higher and lower ratings. While Duff & Phelps rates easier than Moody's 48 percent of the time and harder 10 percent of the time, correcting for selection bias implies adjusted frequencies of 41 percent and 13 percent, respectively.[15] Similarly, Duff & Phelps rates easier than Standard & Poors 40 percent of the time and harder 14 percent of the time; controlling for selection bias implied adjusted frequencies of 35 percent and 17 percent,

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[14] We did experiment with other specifications in which the number of values which the indicator variable can take on covers the full range of observed ratings differences. These results were broadly the same as those presented in Tables 9 and 10.

[15] Selection-bias adjusted frequencies for Duff & Phelps are calculated using the best fitting specifications in Table 9, equations (9a) and (9d). These estimates are obtained by multiplying the estimated coefficient on the inverse Mill's ratio by the mean of the inverse Mill's ratio, and adding this number to both of the two estimated constant terms. The revised constant terms correspond to threshold values that divide the standard normal distribution into three regions whose relative cumulative distributions then reflect the relative frequencies of the three outcomes in the observed data, corrected for sample selection.

respectively.

For the Fitch/Moody's specifications, the ordered-probits in Table 10 present stronger evidence of selection bias, as the inverse Mills ratio is statistically significant in all three models. As in the least squares regressions, however, these results again indicate that large ratings differences remain after controlling for sample selection. While Fitch rates easier than Moody's 55 percent of time and harder 7 percent of the time, correcting for selection bias implies estimated frequencies of 46 percent and 11 percent, respectively.[16] In the Fitch/S&P specifications, the ordered-probit approach, like least squares, fails to uncover any evidence of sample selection bias.

6. Conclusion.

In this article, we identify the factors that determine whether a firm obtains a rating other from an agency in addition to the ratings received from Moody's and Standard & Poors. We then ask whether the higher average additional ratings we observe in practice reflects more lenient standards or sample selection bias. The two questions are closely linked, for the estimation of sample selection bias requires a prior specification and estimation of the factors determining the existence of an additional rating.

We find that the most important determinants of the decision to get an additional rating are a firm's size and age, underscoring the importance of the ability to spread the fixed costs of

[16] These estimates are derived from specification (b) in Table 10 which is the best fitting Moody's/Fitch model and includes industry dummies but not financial ratios. The procedure used is same as that described in Footnote 14 except we also adjusted for differences between the industry compositions of the sample of Fitch-rated firms and broader population of firms rated by Moody's and Standard & Poors.

additional ratings and reflecting a strong persistence effect. We find the prevalence of additional ratings is unrelated to firms' credit-related financial ratios and to variables that proxy for the degree of *ex ante* uncertainty about firms' default probabilities. As for the determinants of the observed ratings differences between third agencies and Moody's and Standard Poors, we find that sample selection bias is significant, but it can only explain at most half of the observed average ratings differences. Our findings suggest that reputational considerations do not prevent systematic differences in rating scales across agencies. A reevaluation of ratings-dependent regulations that implicitly assume identical ratings scales seems well justified.

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Table 2

Long-term Debt Rating Symbols

Interpretation	Moody's	Standard & Poors Duff & Phelps and Fitch
---------- Investment-Grade-Ratings ----------		
Highest quality	Aaa	AAA
High quality	Aa1	AA+
	Aa2	AA
	Aa3	AA-
Strong payment capacity	A1	A+
	A2	A
	A3	A-
Adequate payment capacity	Baa1	BBB+
	Baa2	BBB
	Baa3	BBB-
---------- Speculative-Grade-Ratings ----------		
Likely to fulfill obligations, ongoing uncertainty	Ba1	BB+
	Ba2	BB
	Ba3	BB-
High risk obligations*	B1	B+
	B2	B
	B3	B-

* The agencies do assign ratings to securities below this level of risk (very near or actually in default); however, they use different categorization systems that are difficult to compare. ratings of the different agencies are not easily comparable because they make very different distinctions among securities at or very near default.

Table 3
Selected Uses of Ratings in Regulation

Year Adopted	Ratings-Dependent Regulation	Minimum Rating	How Many Ratings?	Regulator/Regulation
1931	Required banks to mark-to-market lower rated bonds	Baa/BBB	2	OCC and Federal Reserve examination rules
1936	Prohibited banks from purchasing "speculative securities"	Baa/BBB	Unspecified	OCC, FDIC, and Federal Reserve joint statement
1951	Imposed higher capital requirements on insurers' lower rated bonds	Various	N.A.	NAIC mandatory reserve requirement
1975	Imposed higher capital hiarcuts on broker/dealers' below-investment-grade bonds	Baa/BBB	2	SEC amendment to Rule 15c3-1; the uniform net capital rule
1982	Eased disclosure requirements for investment grade bonds	Baa/BBB	1	SEC adoption of Integrated Disclousure System (Release #6383)
1984	Eased issurance of nonagency mortgage-backed securties (MBSs)	Aa/AA	1	Congressional promulgation of the Secondary Mortgate Market Enhancement Act of 1984
1987	Permitted margin lending against MBSs and (later) foreign bonds	Aa/AA	1	Federal Reserve Regulation T
1989	Allowed pension funds to invest in high-rated	A/A	1	Department of Labor relaxation of ERISA Restriction (PTE 89-88)
1989	Prohibited S&Ls from investing in below-investment-grade bonds	Baa/BBB	1	Congressional promulgation of the Financial Institution Recovery and Reform Act of 1989
1991	Required money market mutual funds to limit holdings	P1/A1*	1+	SEC amendment to Rule 2a-7 under the Investment Company Act of 1940
1992	Exempted issuers of certain asset-backed securities from registration as a mutual fund	Baa/BBB	1	SEC adoption of Rule 3a-7 under the Investment Company Act of 1940
1994	Would impose varying capital charges on banks' and S&Ls' holdings	Aaa&Baa/	1	Federal Reserve, OCC, FDIC, OTS Proposed
Proposal	of different tranches of asset-backed securities.	AAA&BBB		Rules on Recourse and Direct Credit Substitutes

* Highest ratings on short-term debt, generally implying an A-long-term debt rating or better.
+ If issue is rated by only one Nationally Recognized Statistical Rating Organization, its rating is adequate; otherwise, two ratings are required.

Table 4a
Summary Statistics for 871 firms rated by Moody's and S&P
(as of year end 1993)

Firm Categories	Number of Firms	Percent Rated By Duff & Phelps	Observed Ratings Differential Between Duff & Phelps and ... Moody's	S&P	Percent Rated By Fitch	Observed Ratings Differential Between Fitch and ... Moody's	S&P
All Firms	871	33.1	0.57	0.36	18.5	0.74	0.56
Utilities	140	64.3	0.44	0.31	52.9	0.36	0.35
Banks & Thrifts	64	56.3	0.53	0.56	53.1	1.06	1.00
Insurance	38	26.3	1.30	0.70	10.5	2.00	0.50
Other Finance	47	53.2	0.72	0.44	53.2	1.12	0.64
Other Industrial	582	21.8	0.59	0.29	4.1	0.83	0.50
Investment Grade	526	46.6	0.53	0.30	28.5	0.69	0.54
Midwest Headquarters	205	40.0	0.62	0.38	22.0	0.58	0.49
Split Rating (Letter)	235	26.4	0.81	0.15	14.0	1.15	0.70
Split Rating (Notch)	533	27.6	0.76	0.34	15.4	0.96	0.61
Assets > $2 billion (median)	436	55.0	0.51	0.31	28.9	0.74	0.57
Leverage > 38.6% (median)	436	26.8	0.48	0.37	14.4	0.79	0.49
Profitability > .042 (median)	436	32.6	0.57	0.30	17.7	0.52	0.44
Coverage > 2.32 (median)	361	36.9	0.62	0.26	18.3	0.35	0.26

Note: Leverage is defined as (Long-term debt + Current liabilities + 8*Rent) / (Assets + 8*Rent). Profitability is defined as (Net Income/Assets). Coverage is defined as (Net Income + Interest + Rent) / (Interest + Rent). Coverage ratio summary statistics are calculated for utilities and other industrial companies. Midwest, as defined by the Census Bureau, includes 12 states. A firm is defined as investment grade if both ratings from Moody's/S&P are at least Bbb3 (BBB-) Observed ratings differential corresponds to the average difference in rating notches calculated for jointly rated firms only. For example, A/A+ corresponds to a one-unit rating notch differential. Positive numbers correspond to higher ratings for Duff & Phelps or Fitch.

Table 4b
Summary Statistics for 871 firms rated by Moodys and S&P
(as of year end 1993)

	Distribution of Duff Ratings relative to Moodys			Distribution of Duff Ratings relative to S&P			Distribution of Fitch Ratings relative to Moodys			Distribution of Fitch Ratings relative to S&P		
Firm Groupings	Higher	Same	Lower	Higher	Same	Lower	Higher	Same	Lower	Higher	Same	Lower
All Firms	47.6%	42.3%	10.1%	39.9%	46.5%	13.5%	55.3%	37.9%	6.8%	46.6%	43.5%	9.9%
Utilities	43.3%	46.7%	10.0%	35.6%	54.4%	10.0%	37.8%	54.1%	8.1%	41.9%	47.3%	10.8%
Banks & Thrifts	47.2%	47.2%	5.5%	47.2%	38.9%	13.9%	73.5%	20.6%	5.9%	61.8%	29.4%	8.8%
Insurance	60.0%	40.0%	0.0%	50.0%	40.0%	10.0%	75.0%	25.0%	0.0%	50.0%	25.0%	25.0%
Other Finance	64.0%	28.0%	8.0%	48.0%	44.0%	8.0%	68.0%	32.0%	0.0%	48.0%	52.0%	0.0%
Other Industrial	46.5%	40.9%	12.6%	38.6%	44.1%	17.3%	66.7%	20.8%	12.5%	37.5%	45.8%	16.7%
Investment Grade	46.1%	45.3%	8.6%	37.6%	48.6%	13.9%	54.7%	38.7%	6.7%	46.0%	44.7%	9.3%
Midwest Headquarters	53.7%	41.5%	4.9%	43.9%	42.7%	13.4%	46.7%	44.4%	8.9%	46.7%	37.8%	15.6%
Split Rating (Letter)	51.6%	32.3%	16.1%	33.9%	41.9%	24.2%	72.7%	24.2%	3.0%	57.6%	27.3%	15.2%
Split Rating (Notch)	55.1%	31.3%	13.6%	40.1%	39.5%	20.4%	68.3%	24.4%	7.3%	51.2%	35.4%	13.4%
Assets > $2 billion (median)	45.6%	43.5%	10.9%	38.1%	48.5%	13.4%	55.5%	37.3%	7.1%	47.6%	42.1%	10.3%
Leverage > 38.6% (median)	49.2%	37.3%	13.6%	42.4%	43.2%	14.4%	57.8%	34.4%	7.8%	40.6%	51.6%	7.8%
Profitability > .042 (median)	45.1%	47.9%	7.0%	34.5%	54.2%	11.3%	41.6%	49.4%	9.1%	39.0%	50.7%	10.4%
Coverage > 2.32 (median)	46.4%	47.6%	6.0%	36.1%	50.0%	13.9%	50.0%	42.0%	8.0%	43.0%	46.0%	11.0%

Note: Variables are defined as in Table 4a.

TABLE 5

Dependent Variable: Does the Firm have a Long-Term Rating from Duff & Phelps?

Probit Regressions Using Different Measures of Ratings Uncertainty and Size

	(a)	(b)	(c)	(d)	(e)
Leverage	-1.01*	-1.02*	-1.00*	-0.47	-1.78*
	(-2.17)	(-2.24)	(-2.29)	(-1.38)	(-3.24)
Coverage	-0.01	-0.01	-0.01	-0.01	0.00
	(-0.39)	(-0.44)	(-0.48)	(-0.89)	(0.00)
Profitability (RoA)	0.32	0.36	0.43	0.52	0.15
	(0.30)	(0.36)	(0.43)	(0.56)	(0.11)
Rated 10 yrs or more	0.77*	0.77*	0.78*	0.78*	0.79*
	(5.75)	(5.87)	(6.17)	(6.56)	(4.63)
Investment Grade	-0.30	-0.30	-0.34*	-0.37*	-0.19
	(-1.62)	(-1.67)	(-1.97)	(-2.22)	(-0.81)
Split at Letter	-0.15	---	---	---	---
	(-1.03)				
Split at Notch	---	-0.20	---	---	---
		(-1.57)			
Absolute Ratings Difference	---	---	-0.15*	-0.16*	-0.14
			(-2.23)	(-2.60)	(-1.05)
Assets	0.41*	0.40*	0.42*	0.63*	---
	(3.53)	(3.55)	(3.79)	(11.34)	
Long-term Debt	0.24*	0.24*	0.23*	--	0.57*
	(2.26)	(2.35)	(2.28)		(7.68)
Midwest Headquarters	0.17	0.16	0.15	0.13	0.15
	(1.18)	(1.13)	(1.07)	(0.98)	(0.82)
Sample size	871	871	871	871	871
Number with third rating	288	288	288	288	288
Log Likelihood	-325.8	-325.0	-323.7	-331.3	-326.8

Note: Absolute t-statistics are in parentheses. The coefficients for the constant and industry dummies are not reported. An asterisk denotes significance at the 5% confidence level (two-tailed test). Leverage, coverage, and profitability are defined as in Table 4a. Rated 10 years or more is an indicator variable which equals one if the firm has had ratings from both Moody's and S&P for at least 10 years. Investment Grade is an indicator variable which equals one if the firm is investment grade (as defined in Table 4a). Split at Letter and Split at Notch are indicator variables which equal one if the Moody's and S&P ratings differ at the letter grade level (e.g., AAA vs. AA), and the ratings notch level (AAA vs. AA, and AA+ vs. AA-), respectively. Absolute Ratings Difference measures the absolute value of the ratings notch differential between the Moody's and S&P ratings. Assets and Long-Term Debt are measured in natural logs of their actual value. Midwest, as defined by the Census Bureau, includes 12 states.

TABLE 6

Dependent Variable: Does the Firm have a Long-Term Rating from Fitch?

Probit Regressions Using Different Measures of Ratings Uncertainty and Size

	(a)	(b)	(c)	(d)	(e)
Leverage	0.50 (1.04)	0.51 (1.05)	0.51 (1.07)	0.86* (1.95)	0.41 (0.96)
Coverage	-0.02 (-0.72)	-0.02 (-0.73)	-0.02 (-0.72)	-0.02 (-0.81)	-0.02 (-0.71)
Profitability (RoA)	2.58 (1.49)	2.54 (1.47)	2.50 (1.46)	2.46 (1.39)	2.43 (1.45)
Rated 10 yrs or more	0.87* (5.15)	0.86* (5.11)	0.85* (5.06)	0.87* (4.96)	0.85* (5.19)
Investment Grade	0.52 (1.92)	0.56* (2.14)	0.51 (1.92)	0.48 (1.73)	0.54* (2.12)
Split at Letter	-0.12 (-0.62)	--	--	--	--
Split at Notch	--	-0.02 (-0.11)	--	--	--
Absolute Ratings Difference	--		-0.10 (-0.98)	-0.11 (-1.06)	-0.10 (-1.01)
Assets	0.07 (0.57)	0.06 (0.51)	0.06 (0.52)	0.23* (3.65)	--
Long-term Debt	0.18 (1.60)	0.19 (1.65)	0.18 (1.57)	--	0.23* (4.18)
Sample size	871	871	871	871	871
Number with third rating	161	161	161	161	161
Log Likelihood	-226.2	-226.4	-225.8	-226.0	-227.4

Note: Absolute t-statistics are in parentheses. The coefficients for the constant and industry dummies are not reported. An asterisk denotes significance at the 5% confidence level. Independent variables are defined as in Table 5.

TABLE 7

OLS Regressions Using Industry Dummies, Financial Variables, and the Inverse Mills Ratio

	Dependent Variable: Ratings Notch Difference Between Moody's and Duff & Phelps			Dependent Variable: Ratings Notch Difference Between S&P and Duff & Phelps		
	(a)	(b)	(c)	(d)	(e)	(f)
Constant	0.24* (2.31)	0.10 (.629)	-1.31 (1.16)	0.19* (2.19)	-0.01 (0.06)	0.23 (0.25)
Banks	-	0.18 (0.81)	0.01 (0.02)	-	0.41* (2.20)	0.45* (2.04)
Insurance	-	0.75* (2.05)	0.52 (1.18)	-	0.43 (1.39)	0.56 (1.53)
Other Finance	-	0.34 (1.36)	0.49 (1.68)	-	0.28 (1.31)	0.25 (1.05)
Utilities	-	0.12 (0.70)	0.31 (1.36)	-	0.18 (1.27)	0.15 (0.79)
Leverage	-	-	-0.50 (0.96)	-	-	0.04 (0.08)
Coverage	-	-	-0.02 (0.97)	-	-	-0.03 (-1.55)
Profitability (RoA)	-	-	2.13 (1.44)	-	-	0.62 (0.49)
Assets	-	-	0.15 (1.40)	-	-	-0.02 (-0.23)
Inverse Mills Ratio	0.53* (4.17)	0.58* (4.15)	0.89* (3.51)	0.26* (2.39)	0.35* (2.94)	0.33 (1.54)
Adjusted R-squared	0.05	0.06	0.06	0.02	0.03	0.02
F-Statistics for significance of entire model	17.45*	4.67*	3.17*	5.69*	2.49*	1.73
F-Statistics for significance of variables not in (a),(d)	-	1.44	1.35	-	1.67	1.22
F-Statistics for significance of variables not in (b),(e)	-	-	1.29	-	-	0.79

Note: Absolute t-statistics are in parentheses. The Greene formula (1981) for the correct variance/covariance of OLS estimates has been used to calculate T-statistics. An asterisk denotes significance at the 5% confidence level. (A one-tailed test for the Inverse Mills Ratio, a two-tailed test for other individual variables). Independent variables are defined as in Tables 4a and 5.

TABLE 8

OLS Regressions Using Industry Dummies, Financial Variables, and the Inverse Mills Ratio

	Dependent Variable: Ratings Notch Difference Between Moody's and Fitch Investor's Service			Dependent Variable: Ratings Notch Difference Between S&P and Fitch Investor's Service		
	(a)	(b)	(c)	(d)	(e)	(f)
Constant	0.52*	0.32	-0.50	0.56*	0.41	-0.27
	(3.43)	(0.70)	(0.35)	(3.60)	(0.83)	(0.18)
Banks	-	0.55	1.14*	-	0.56	1.36*
		(1.43)	(2.35)		(1.34)	(2.64)
Insurance	-	1.16*	2.24*	-	-0.00	2.38*
		(2.05)	(2.41)		(0.00)	(2.38)
Other Finance	-	0.64	0.58	-	0.20	0.62
		(1.54)	(1.17)		(0.45)	(1.18)
Utilities	-	-0.13	0.21	-	-0.09	0.40
		(0.35)	(0.41)		(0.23)	(0.73)
Leverage	-	-	1.09	-	-	-0.10
			(1.63)			(0.14)
Coverage	-	-	-0.11	-	-	-0.39*
			(0.85)			(2.73)
Profitability (RoA)	-	-	3.76	-	-	14.49*
			(0.79)			(2.83)
Assets	-	-	0.02	-	-	0.06
			(0.19)			(0.58)
Inverse Mills Ratio	0.29*	0.29	0.41	-0.01	0.05	0.24
	(1.82)	(1.24)	(1.31)	(0.03)	(0.20)	(0.73)
Adjusted R-squared	0.01	0.10	0.11	-0.01	0.02	0.05
F-Statistics for significance of entire model	3.29*	4.50*	3.13*	0.00	1.51	1.86
F-Statistics for significance of variables not in (a),(d)	-	4.70*	3.05*	-	0.83	2.07
F-Statistics for significance of variables not in (b),(e)	-	-	1.28	-	-	2.22

Note: Absolute t-statistics are in parentheses. The Greene formula (1981) for the correct variance/covariance of OLS estimates has been used to calculate T-statistics. An asterisk denotes significance at the 5% confidence level. (A one-tailed t-test for the Inverse Mills Ratio, a two-tailed test for other individual variables). Independent variables are defined as in Tables 4a and 5.

TABLE 9

Ordered Multinomial Probit Regressions
Using Industry Dummies, Financial Variables, and the Inverse Mills Ratio

	Ordered Category:: Ratings Notch Difference Between Moody's and Duff & Phelps			Ordered Category:: Ratings Notch Difference Between S&P and Duff & Phelps		
	(a)	(b)	(c)	(d)	(e)	(f)
Intercept 0	-0.23*	-0.42*	-0.96	-0.39*	-0.61*	-1.23
	(2.05)	(2.51)	(0.83)	(3.44)	(3.70)	(1.09)
Intercept 1	1.12*	0.94*	0.407	0.98*	0.77*	0.16
	(8.73)	(5.44)	(0.35)	(8.04)	(4.58)	(0.14)
Banks	-	0.27	0.23	-	0.34	0.32
		(1.20)	(0.85)		(1.51)	(1.20)
Insurance	-	0.49	0.47	-	0.34	0.45
		(1.23)	(1.00)		(0.89)	(0.98)
Other Finance	-	0.53*	0.59*	-	0.43	0.39
		(1.98)	(1.94)		(1.67)	(1.31)
Utilities	-	0.14	0.21	-	0.20	0.28
		(0.81)	(0.89)		(1.21)	(1.25)
Leverage	-	-	-0.19	-	-	0.08
			(0.35)			(0.15)
Coverage	-	-	-0.02	-	-	-0.04
			(1.02)			(1.90)
Profitability	-	-	1.76	-	-	1.20
			(1.10)			(0.76)
Assets	-	-	0.06	-	-	0.06
			(0.52)			(0.58)
Inverse Mills Ratio	0.28*	0.35*	0.49*	0.21	0.31*	0.47*
	(2.01)	(2.31)	(1.77)	(1.58)	(2.13)	(1.78)
Log-Likelihood	-271.1	-268.3	-267.5	-284.8	-282.6	-280.2
LR-Statistics for significance of entire model	4.04*	9.65	11.25	2.48	7.05	11.68
LR-Statistics for significance of variables not in (a),(d)	-	5.61	7.21	-	4.58	9.21
LR-Statistics for significance of variables not in (b),(e)	-	-	1.59	-	-	4.63

Note: Absolute t-statistics are in parentheses. The ordered categories consist of three difference values which take a value of -1 when the Moody's /S&P rating is lower than Duff, 1 when the Moody's/S&P rating is higher than Duff, and 0 when the ratings are equal. An asterisk denotes significance at the 5% confidence level. (A one-tailed test for the inverse Mills Ratio, a two-tailed test for other individual variables.) Independent variables are defined as in Tables 4a and Table 5.

TABLE 10

Ordered Multinomial Probit Regressions
Using Industry Dummies, Financial Variables, and the Inverse Mills Ratio

	Ordered Category: Ratings Notch Difference Between Moody's and Fitch			Ordered Category:: Ratings Notch Difference Between S&P and Fitch		
Intercept 0	-0.11 (0.66)	-.61 (1.11)	-2.75 (1.58)	0.04 (0.27)	-0.33 (0.66)	-2.60 (1.61)
Intercept 1	1.25* (6.40)	0.82 (1.47)	-1.30 (0.75)	1.42* (7.57)	1.07* (2.08)	-1.15 (0.71)
Banks	-	0.84 (1.82)	1.43* (2.34)	-	0.56 (1.33)	1.32* (2.40)
Insurance	-	0.50 (0.68)	1.38 (1.15)	-	0.08 (0.13)	2.26* (2.08)
Other Finance	-	0.88 (1.75)	0.97 (1.61)	-	0.44 (0.97)	1.34* (2.38)
Utilities	-	0.09 (0.21)	0.74 (1.18)	-	0.15 (0.38)	1.11 (1.88)
Leverage	-	-	1.15 (1.30)	-	-	-0.79 (1.05)
Coverage	-	-	-0.06 (-0.36)	-	-	-0.38* (2.49)
Profitability	-	-	1.28 (0.22)	-	-	13.23* (2.44)
Assets	-	-	0.12 (1.07)	-	-	0.21 (1.94)
Inverse Mills Ratio	0.32* (1.82)	0.52* (1.75)	0.87* (2.17)	-0.17 (1.05)	-0.02 (0.06)	0.51 (1.42)
Log-Likelihood	-139.9	-132.8	-130.8	-152.0	-150.0	-145.4
LR-Statistics for significance of entire model	3.23	17.31*	21.31*	1.09	5.01	14.19
LR-Statistics for significance of variables not in (a),(d)	-	14.08*	18.08*	-	3.93	13.10
LR-Statistics for significance of variables not in (b),(e)	-	-	4.00	-	-	9.18

Note: Absolute t-statistics are in parentheses. The ordered categories consist of three difference values which take a value of -1 when the Moody's /S&P rating is lower than Fitch, 1 when the Moody's/S&P rating is higher than Fitch, and 0 when the ratings are equal. An asterisk denotes significance at the 5% confidence level. (A one-tailed test for the Inverse Mills Ratio, a two-tailed test for other individual variables). Independent variables are defined as in Table 4a and Table 5.