Did Going Public Impair Moody's Credit Ratings?

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March 13, 2013

Comments welcome

Abstract

We investigate a prominent allegation in Congressional hearings that Moody's loosened its standards for assigning credit ratings after it went public in the year 2000 in an attempt to chase market share and increase revenue. We exploit a difference-in-difference design by benchmarking Moody's ratings with those assigned by its rival S&P before and after 2000. Consistent with Congressional allegations, we find that Moody's credit ratings for new and existing corporate bonds are significantly more favorable to issuers relative to S&P's after Moody's initial public offering (IPO) in 2000. The laxer ratings assigned by Moody's after its IPO are more pronounced for clients that are large issuers of structured finance products and operate in the financial industry, suggesting that easier ratings standards emanated in the structured finance products group of Moody's. Moody's ratings are more favorable for clients where Moody's is likely to face larger conflicts of interest: (i) large issuers; and (ii) firms that are more likely to benefit from better ratings, on the margin. Moody's laxer ratings, post IPO, are also less informative as captured by expected default frequencies (EDFs). Our findings have implications for incentives created by a public offering for capital market gatekeepers and professional firms.

We acknowledge financial assistance from our respective schools. We thank Sam Bonsall (discussant) and seminar participants at Washington University at St. Louis, National University of Singapore, Indian School of Business (ISB), IIM Bangalore, and Seton Hall University. All errors are ours alone.

Did Going Public Impair Moody's Credit Ratings?

"Many former employees said that after the public listing, Moody's culture changed, it went "from [a culture] resembling a university academic department to one which values revenues at all costs," according to Eric Kolchinsky, a former managing director of Moody's" (The Financial Crisis Inquiry Report 2011, page 207)

1.0 Introduction

The recent financial crisis has spurred an active debate on why the major credit rating agencies failed to downgrade the ratings of structured finance products in a timely manner. Much of the academic debate has focused on the conflicts of interest inherent in the issuer-pay model followed by credit rating agencies.[1] However, relatively little attention has been devoted to the incentives created by the public or private ownership structure of the rating agencies. In this paper, we investigate whether the quality of credit ratings assigned by Moody's systematically declined after it went public in 2000.

Moody's was founded in 1900 to produce manuals of performance statistics related to stocks and bonds. The business was acquired by Dun & Bradstreet in 1962 and spun off as a separate company, organized as Moody's Corporation, on October 4, 2000. In Congressional hearings investigating the culpability of the major credit rating agencies in the financial crisis of 2007, Moody's employees testified that the culture at Moody's changed after it went public. They alleged that after its IPO, Moody's encouraged an environment where employees were asked to focus on revenues and market share such "that they looked the other way, trading the firm's reputation for short term profits" (The Financial Crisis Inquiry Report 2011, page 207).[2] Richard Michalek (2010), a former Moody's vice president and senior credit officer, testified to the Financial Crisis Inquiry Commission "the threat of losing business to a competitor, even if not

[1] See for example, Mathis, McAndrews, and Rochet (2009), Xia (2010), Kraft (2011), Bolton, Freixas and Shapiro (2012), Bonsall (2012), Jiang, Stanford and Xie (2012) and Cornaggia and Cornaggia (2013).

[2] Similar concerns were raised when Goldman Sachs went public. For instance, one partner was worried that "the public company could never replicate the close-knit culture of a partnership, where financial rewards are measured in lifetimes instead of months." (Kahn 1998).

realized, absolutely tilted the balance away from an independent arbiter of risk towards a captive facilitator of risk transfer."

We begin by comparing credit ratings on new corporate bonds that were rated by both Moody's and S&P. To study the impact of Moody's IPO on its credit ratings, we compare the difference in its ratings of corporate bonds before and after it went public in 2000. The period prior to going public ("pre-public period") spans 1995 to 1999, and the period after going public ("post-public period") extends from 2001 to 2005. To control for potential time based variation in corporate credit rating standards (Jorion, Liu and Shi 2006, Cheng and Nematiu 2009, Becker and Milbourn 2011 and Alp 2012) and changes in the nature of corporate bonds issued in the two periods, we employ a difference-in-difference methodology. In particular, we benchmark Moody's ratings for a common set of corporate bonds to those assigned by its closest rival, Standards & Poor (S&P), and then evaluate whether the changes in Moody's ratings relative to S&P's ratings, on average across all corporate bonds, were laxer after Moody's IPO than before.

Although the Financial Crisis Inquiry Commission (FCIC) was mainly concerned with Moody's push for market share of structured debt products, we study the impact of Moody's IPO on its ratings for corporate bonds. A culture of catering to client needs that started in the structured finance products group was allegedly transmitted to other products such as corporate bonds. Moreover, employees pointed to a change in compensation criteria that involved rewarding compliant analysts with promotions, bonuses and stock options. These compensation practices, emanating from the structured products group, also facilitated the migration of the new client centric culture to other groups within Moody's.

Studying corporate bonds has four advantages. First, most of the corporate bonds in the U.S. are rated by both Moody's and S&P. Hence, we can construct a sample of comparable securities with little selection bias. In contrast, many structured finance products are not rated by both Moody's and S&P. Second, corporate bonds are an established product with a long time series of relevant data, whereas there is relatively little issuance of mortgage backed securities

(MBS) and collateralized debt obligations (CDOs) in the pre-public period, making a difference-in-difference test methodology, that we follow, difficult to implement. Third, finding biases in ratings of corporate bonds is more difficult, given that it is an older and a more mature market than that for MBS and CDOs, and hence our tests are more stringent. Finally, understanding agencies' standards for rating corporate bonds is important given the influence of bond credit ratings on a firm's cost of debt and capital structure (Graham and Harvey, 2001, Kisgen 2006, and Kisgen and Strahan 2010).

We obtain data on new corporate bond issues and their initial ratings by Moody's and S&P from the Mergent's Fixed Income Securities Database (FISD). For each new issue, we create a variable, *RatingDiff*, which is the S&P's numerical rating minus Moody's numerical rating for the bond issue. As more favorable ratings have smaller numerical values, a positive value of *RatingDiff* implies that Moody's assigned a more favorable rating than S&P for the new issue. The average value of *RatingDiff* for the 5,722 new bond issues in the pre-public period is -0.302. This implies that, prior to its IPO, Moody's, on average, assigned tougher ratings than S&P. The mean value of *RatingDiff* for the 2,783 new bond issues in the post-public period rises to 0.286, suggesting that in the post IPO period Moody's reversed its conservative policy and assigned more favorable ratings than S&P. The change in these differenced ratings, of more than half a notch, before and after Moody's IPO, is statistically significant at the 1% level. The relative loosening of Moody's ratings is also observed for (i) median values of *RatingDiff*; (ii) both investment-grade and high-yield bonds; and (iii) after controlling for both issue and issuer specific characteristics. We go on to investigate whether the relative loosening of Moody's credit rating is due to its actions or due to S&P becoming more conservative. We find no evidence of significant changes in the ratings assigned by S&P following Moody's IPO in 2000. Hence, the relative loosening of Moody's ratings is primarily attributable to Moody's laxity rather than to S&P's actions.

To test whether the loosening of Moody's rating standards for corporate bonds emanated from its structured finance products group, as alleged in the Congressional hearings, we collect

data on the issuers of structured products from the ABS database managed by J.P. Morgan's Asset Backed Alert. The structured products included are asset-backed securities (ABS), mortgage-backed securities (MBS), and collateralized debt obligations (CDOs). We find that Moody's rating is significantly more favorable, relative to S&P's, for corporate bonds issued by large issuers of structured finance products. Moreover, after going public, Moody's is relatively more favorable towards bond issues by financial firms, who, as a group, are more likely to issue structured finance products.

The culture of catering to the needs of important clients likely permeated to other important corporate bond issuers, irrespective of their involvement in structured finance products. In particular, large and frequent issuers of corporate bonds account for a significant share of the credit rating agencies' revenues. Therefore, we investigate whether large issuers of corporate bonds are also likely to experience a greater loosening of credit ratings by Moody's, relative to S&P. Consistent with this conjecture, we find that although the large issuers got a tougher rating from Moody's relative to S&P in the pre-public period, they received a relatively more favorable rating from Moody's in its post-public period.

We also identify bonds whose credit ratings are on the margin and can hence benefit from a better rating from Moody's. Bongaerts, Cremers and Goetzmann (2012) document that firms with lower ratings often shop for better ratings from other agencies to serve as a tiebreaker. Among all the bonds in any rating class of S&P, the bonds at the top of the rating class are those with the highest operating profits, and these could potentially take advantage of a higher credit rating from Moody's. We find that prior to its IPO, Moody's was relatively tougher on these bond issuers, but tended to go easy on such issuers after its IPO.

We next investigate changes in Moody's ratings, post IPO, on all the outstanding bonds rated, as opposed to new bond issues alone. One way to address this question is to examine whether Moody's became tardier at downgrading bonds after it went public. However, comparing the timeliness of rating changes across rating agencies is challenging because rating changes by

different rating agencies often occur at different levels and at different magnitudes. Therefore, it is difficult to identify the same rating change by Moody's and S&P, and then ascertain which agency is faster in its rating action. To account for these constraints, we compute a new measure that captures, on a daily basis, whether Moody's had a better rating than S&P. The resultant daily indicator variable is aggregated over the year to capture the fraction of the year for which Moody's had a better rating. Our measure, *LeadTimeDiff*, is the difference in the fraction of the year where Moody's rating is better minus the fraction of the year where S&P's rating is better, for an outstanding bond. A positive (negative) value of *LeadTimeDiff* implies that, on average, Moody's has a higher (lower) number of days with a better rating on outstanding bonds relative to S&P.

We find that *LeadTimeDiff* is significantly higher in the post-public period. Furthermore, we show that *LeadTimeDiff* in the post-public period is significantly higher for bonds (i) issued by large structured products issuers, (ii) issued by financial firms, (iii) issued by large corporate bond issuers; and (iv) that are on the margin, as described earlier, and would hence gain significantly by procuring a better rating. In summary, after going public, Moody's tends to assign better ratings than S&P for outstanding bonds as well.

The data thus far show that Moody's gives better ratings relative to S&P after it went public in 2000. However, a skeptic could assert that Moody's more favorable ratings could potentially be more informative about bonds' eventual default. To assess this conjecture, we follow Duffie, Saita, and Wang (2009) and estimate the "distance to default" measure for each bond in our sample based on the Black-Scholes-Merton specification. The relative accuracy of Moody's ratings, as captured by the expected default frequency (EDF) measure, decreased after it went public in 2000. Such lower accuracy is observed for both the new bond issue sample as well as for all outstanding bond issues. In summary, using EDF, a standard benchmark for evaluating the accuracy of a credit rating, also points to impaired rating standards by Moody's after it went public.

Although we benchmark Moody's ratings to S&P's, we hasten to add that our paper does not say anything about absolute credit standards or the absence of ratings related problems at S&P.[3] The results are consistent with both Moody's and S&P assigning better ratings to chase market share but Moody's assigned significantly higher ratings than S&P in its post public period.

We perform several robustness tests. One potential question relates to the impact of the financial crisis of 2007 given that our reported tests only cover the post-public period of 2001 to 2005. To shed light on this issue, we include the years of the financial crisis and extend the post-public period from 2001 to 2009. For symmetry, the pre-public period is also extended to cover the years 1991 to 1999. Using these extended time windows, we continue to find that Moody's ratings, on both new issues, as well as outstanding bonds, are more favorable than S&P's after it went public. We also investigate whether our results hold for a shorter time period around the decision to go public. Although we expect the effect of going public on ratings to be stronger over a longer time period, we study the one year period before (1999) and after (2001) going public to examine sensitivity of our results. We continue to find a significant easing in Moody's ratings, relative to S&P, in the year after it went public.

Next, we investigate the robustness of our results to the choice of Fitch's ratings, instead of S&P's, as the benchmark. Unlike S&P, Fitch is not an ideal benchmark because (i) it is much smaller than Moody's; and (ii) Fitch, itself, experienced significant ownership changes in 2000 when it acquired Duff and Phelps, a smaller, publicly listed rating agency. Despite such contamination, we find significant evidence that even relative to Fitch, Moody's assigned more favorable ratings on both new issues and outstanding issues in the period after it went public.

Another concern is the timing of the IPO. Did the decision to spin off Moody's reflect changing unobserved underlying forces in the credit rating business? This does not appear to be the case for three reasons. First, if this hypothesis were true, such underlying forces in the credit

[3] The Department of Justice sued S&P on February 4, 2013 alleging that the rating agency ignored its own standard in rating mortgage bonds over the years 2004 to 2007.

rating business should have been equally felt by S&P. Hence, we should have seen a similar attempt by S&P to go public. Second, the decision to spin off Moody's is one in a series of spin offs conducted by its parent, Dun and Bradstreet (D&B), as part of an overall corporate restructuring plan. Specifically, prior to Moody's IPO, D&B had spun off A. C. Nielson, the market research firm and Cognizant Corporation, the technology consultancy, in 1996. In 1998, D&B spun off R.H Donnelley, a yellow pages advertiser. D&B cites continuing pressure from institutional investors to increase shareholder value by becoming a more focused firm as a significant driver of the Moody's IPO (Gilpin, 1999). Lastly, if Moody's IPO was initiated in response to some unobserved underlying forces in the credit rating business, these forces would have manifested in relative easing in Moody's rating even prior to the year of the IPO. However, as documented in the paper, there is no evidence of loosening in ratings prior to 2000. Further, the IPO was structured as a spin-off of Moody's shares to existing D&B shareholders. Hence, it did not involve raising funds that might have substantially altered Moody's investment and capital expenditures.

Going public allows for sharper managerial incentives and potentially gives the firm greater control over compensation criteria that are relevant for its business. Thus, the Moody's IPO could have achieved the opposite result by fostering the maintenance and strengthening of credit ratings standards. However, as modeled by Holmstrom and Milgrom (1991), when agents are involved in multiple tasks, such as increasing market share along with maintaining credit rating standards in the case of credit analysts, it may not be desirable to provide strong incentives for the activity that can be effectively measured as the agent will likely neglect the activity that cannot be effectively measured. Because measuring revenues is easier than measuring adherence to credit ratings standards or even eventual default, the act of going public and the availability of sharper incentives via stock options may have precipitated the lax ratings at Moody's. As discussed later in the paper, there is a large literature that has documented the pressures faced by public firms to meet revenue and earnings target and the negative behavior that such pressures can potentially engender.

Our paper contributes to the existing literature by documenting the potential impact of stock market pressures on the quality of credit ratings at Moody's subsequent to its IPO. The extant literature has instead concentrated on the conflicts induced by the "issuer-pays" model on the quality of rating. Our findings have implications for the impact of ownership structures on the independence of gatekeepers to financial markets such as auditors, lawyers and underwriters. Traditionally, these gatekeepers have been organized as privately-held companies or partnerships (e.g., the Big Four audit firms) to avoid potential conflicts between clients and public shareholders. Our results suggest that such conflicts are real and can potentially impact the independence of capital market gatekeepers.

The remainder of the paper is organized as follows. Section 2 discusses the background, and Section 3 explains the research design. Section 4 reports the data and empirical analyses. Section 5 estimates results with expected default frequency (EDF), Section 6 conducts several robustness tests on our results and finally, section 7 offers concluding remarks.

2. Background and Congressional Allegations

2.1 Ownership Status of other gatekeepers

Gatekeepers such as lawyers, accountants and finance professionals, who assist the company in raising public funds, are crucial to the smooth operation of capital markets. Most gatekeepers, such as auditors and lawyers, are organized as privately owned enterprises possibly due to potential conflicts of interest between the gatekeeper's clients and its shareholders. For instance, the prospectus of the first publicly traded law firm in the world, Slater and Gordon, listed on the Australian Stock Exchange in March 2007 includes the following caveat:[4]

"Lawyers have a primary duty to the courts and a secondary duty to their clients. These duties are paramount given the nature of the company's business as an incorporated legal practice. There could be circumstances in which the lawyers of Slater & Gordon are required to act in accordance

[4] Publicly owned law firms are legally prohibited in the United States.

with these duties and contrary to other corporate responsibilities and against the interests of shareholders or the short-term profitability of the company."[5]

Debuse (2006) argues that outside, especially public, ownership of a law firm creates conflicts between clients and shareholders. In particular, it is hard to reconcile the key features of a "profession" such as autonomy, the ability to self-regulate through peer review and ethical codes of conduct with the pressures imposed by public ownership and a focus on the maximization of profits. In fact, the American Bar Association's House of Delegates objected to public ownership in the early 1980s because they were concerned that non-lawyers will interfere with lawyers' exercise of professional judgment (Debuse 2006).

Adams and Matheson (2008) suggest that these arguments have no merit, since a publicly owned law firm would succeed in the long term only by providing sound legal judgment to its consumers. Because the firm's stock price would incorporate the public law firm's reputation, lawyers would have no incentive to allow profit considerations to interfere with their professional independence and judgment, especially when these lawyers are compensated via stock or stock options. They go on to point out that the pressure to maximize profits is already intense, even at privately held law firms.[6] Morrison and Wilhelm (2008) model the decision of investment banking partnerships to go public and show that the decision depends on the trade-off between the bank's need for human and physical capital. This is consistent with the Slater and Gordon's stated reason for going public: "the need for (physical) capital investment."

Although providing credit ratings is not considered a profession, as per the classic definition of the term, many of the concerns listed in the context of a publicly owned law firm potentially apply to Moody's as well. More important, there is virtually no empirical evidence on the impact, positive or negative, of the act of going public and the consequent stock market induced

[5] We could not find a similar caveat in Moody's prospectus or its 10-K right after it went public.
[6] The trend of audit firms being organized as limited liability partnerships (LLPs) is related but not directly on point here. LLPs limit the liability of any one partner but continue to suffer from the same limits on raising capital as a traditional partnership.

pressure on a gatekeeper's decisions. We address this important gap in the literature. It is worth noting that the pressure to deliver earnings and meet revenue targets is likely to affect all public firms. However, an investigation into the potential impact of such pressures on gatekeepers is even more important than for other public firms. Gatekeepers play crucial roles in our capital markets as they are far better equipped to gather information about companies than most investors, and their stakeholders trust these gatekeepers and rely on them. When their independence gets compromised, market integrity and confidence suffers.

2.2 Literature on the negative impact of going public

The literature suggests two reasons why going public might create incentives for the firm to deviate from the "first best" level of outcomes. First, going public necessarily splits ownership from management (Berle and Means 1932, Jensen and Meckling 1976), which, in turn, can create agency problems when the interests of the manager diverge from those of the owners. One version of this agency problem is highlighted in the models of "managerial myopia" such as those advocated by Stein (1989). He suggests that the public-firm's manager will make decisions that deviate from "first best" choices if he has utility for the firm's short-run stock price.

Graham, Harvey and Rajgopal (2005) find survey evidence that a majority of Chief Financial Officers (CFOs) would not be averse to giving up positive net present value projects to meet analyst-consensus estimates of quarterly earnings. Bhojraj et al. (2009) show that firms that barely beat analysts' earnings forecasts cut discretionary R&D and advertising spending to avoid the short-run stock price decline stemming from missing earnings forecasts (Skinner and Sloan 2002), although such cuts lead to underperformance over longer horizons. Asker, Farre-Mensa and Ljungqvist (2012) find that publicly listed firms invest less and are less responsive to changes in investment opportunities compared to similar, matched private firms, especially in industries in which stock prices are particularly sensitive to current earnings. Several other papers document that managers with agency-related incentives cut R&D or marketing expenditure (e.g., Baber et al.

1991, Dechow and Sloan 1991, Bushee 1998, Roychowdhury 2006, Mizik and Jacobsen 2007, Cohen, Mashruwala and Zach 2010, and Chapman and Steenburgh 2011).

Second, the liquidity associated with the stock's listing on public exchanges also makes it easier for concentrated shareholders to sell rather than hold the stock, monitor the firm and force value-increasing changes on management (Bhide 1993). In contrast, privately held firms are usually owned by holders with concentrated holdings, which are inherently illiquid. These characteristics, on the margin, create incentives for owners in private firms to exercise better governance of the manager's actions. Large and active shareholders in a public firm can potentially achieve similar results by monitoring. The 2001 proxy statement filed by Moody's right after it went public, lists two concentrated owners who hold at least 5% of its shares: (i) Harris Associates LP at 5.28% and (ii) Berkshire Hathaway at 14.98%. Berkshire Hathaway, though it owns a large stake, is known for a hands-off approach in managing its investees (Bowen et al. 2012). Consistent with this philosophy, Warren Buffett (2010) testified to the FCIC that he had no knowledge of how Moody's assigns ratings. Harris Associates LP ownership stake drops below 5% in the subsequent quarter and continues to stay below 5%. In sum, Moody does not appear to have large shareholders that actively monitor its operations.

2.3 Impact of going public on Moody's: employee testimonials

Before going public, Moody's had branded itself with notions of integrity, commitment, and expertise.[7] At the FCIC hearings, one of the analysts described the corporate culture at Moody's before going public as follows: "Moody's analysts were proud to work for what they believed was by far the best of the rating agencies. They viewed Moody's competitors as a very distant second in quality and ratings integrity" (Froeba 2010). Until that time, Moody's had an extremely conservative analytical culture (Permanent Sub Committee on Investigations 2011, page 273). A 1994 article in Treasury and Risk Management magazine entitled "Why Everyone Hates

[7] Charlie Munger complimented the Moody's brand at the 2000 Berkshire Hathaway annual meeting: "Moody's is like Harvard, a self-fulfilling prophecy."

Moody's" concluded that "ingrained in Moody's corporate culture is a conviction that too close a relationship with issuers is damaging to the integrity of the ratings process" (McLean and Nocera 2010, page 114).

However, the culture at Moody's allegedly changed after it went public in 2000, with the focus shifting to improving revenues and market share. Froeba (2010) testified that "as long as market share and revenue were at issue, Moody's best answer could never be much better than its competitors' worst answers." The *Wall Street Journal* (April 11, 2008) discusses an anecdote where Brian Clarkson, a managing director, quadrupled Moody's market share in the residential mortgage backed securities group by simply firing (or transferring) nearly all the analysts in the group and replacing them with analysts willing to apply a new, potentially laxer, rating methodology. Gary Witt, a former team managing director covering U.S. derivatives, described the cultural transformation under Clarkson: "My kind of working hypothesis was that [former chairman and CEO] John Rutherford was thinking, 'I want to remake the culture of this company to increase profitability dramatically [after Moody's became an independent corporation],' and that he made personnel decisions to make that happen, and he was successful in that regard. And that was why Brian Clarkson's rise was so meteoric: he was the enforcer who could change the culture to have more focus on market share" (Financial Crisis Inquiry Report 2011, page 207).

The rapid promotions of Brian Clarkson signaled that the culture advocated by the structured finance side had won. Bond analysts, even in the pre-IPO days, regularly faced pressure to issue favorable ratings, but Moody's had always backed them when they resisted. After Clarkson's ascension, the corporate bond side was likely unable to resist the pressure to be favorable to issuers. This would be especially pertinent if the issuers were large players in the structured products and whose business Moody's was trying to win.

Employees have asserted that the increase in market share, especially for structured products, was achieved in two ways: (i) via fears of reprisal; and (ii) by encouraging investment banker clients. According to employee testimonials, the reprisals consisted of a pattern of

rewarding compliant analysts with promotions, bonuses and stock options and intimidating analysts that were not compliant with the threat of dismissal. In particular, performance appraisals of analysts valued market coverage, revenue, market outreach, ratings quality, and development of analytical tools. However, evaluating employees on the quality of ratings is difficult in real time as the predictive ability of a rating can take years to validate. Hence, greater emphasis was placed on revenue and market share, consistent with the predictions of the Holmstrom and Milgrom (1991) model discussed in the introduction. This change in evaluating and promoting employees that began in the structured products group was allegedly adopted across the entire firm.

At the same time, Moody's tried to reach out to their investment banker clients. Froeba (2010) testified that "investment banks had learned that Moody's would allow them to ask that all of the bank's deals be assigned to the same particularly "flexible" analyst or team of analysts." They had also learned that they could go over the heads of analysts (even of rating committees despite Moody's policies to the contrary) if they should ever really need to do so by appealing directly to Moody's managers and senior managers."

Other employees have alleged that Moody's under-invested in compliance related activities after the IPO. Scott McCleskey, a former chief compliance officer testified: "so Brian Clarkson comes up to me, in front of everybody at the table, including board members, and says literally, 'How much revenue did Compliance bring in this quarter? Nothing. Nothing.' For him, it was all about revenue" (Financial Crisis Inquiry Report 2011, page 208).

Top officers at Moody's have denied the significant influence of the public IPO. They have argued (i) that market share was always a focus, before and after going public; and (ii) Moody's failure to spot deficiencies in the structured mortgage products reflected an industry-wide failure to identify such problems. In particular, Moody's Corporation Chairman and CEO Raymond McDaniel testified that he didn't see "any particular difference in culture" after the IPO (Financial Crisis Inquiry Report 2011, page 207). Brian Clarkson explained that Moody's cares about business, but the quality of ratings matters even more: "I think that Moody's has always been

focused on business… but ratings quality, getting the ratings to the best possible predictive content, predictive status, is paramount." He blamed unforeseen conditions in the housing market when he testified to the FCIC: "we believed that our ratings were our best opinion at the time that we assigned them. As we obtained new information and were able to update our judgments based on the new information and the trends we were seeing in the housing market, we made what I think are appropriate changes to our ratings" (Financial Crisis Inquiry Report 2011, page 208).[8]

3. Research Design

To explore whether Moody's standards for assigning credit ratings loosened following its IPO in 2000, we begin by analyzing the difference in its ratings of new corporate bond issues during the pre- and post-public periods. Merely comparing Moody's ratings before and after its IPO is subject to obvious criticisms that such changes may capture overall trends in the industry. For instance, Alp (2012) documents a structural shift toward more stringent credit ratings in 2002. Becker and Milbourn (2011) find that greater competition from a bigger Fitch negatively impacted standards for credit quality at all rating agencies. Ratings quality are also impacted by the issuer pay model (Mathis, McAndrews, and Rochet (2009), Xia (2010), Kraft (2011), Bolton, Freixas and Shapiro (2012), Bonsall (2012), Jiang, Stanford and Xie (2012) and Cornaggia and Cornaggia (2013)). Cornaggia, Cornaggia and Xia (2012) find that conflict of interest for credit analysts leaving to join the issuer firm impacts ratings. Moreover, the pressure to increase market share and its impact on rating standards was likely felt by all rating agencies and not just Moody's.

Specifically, the drive for market share was also emphasized at S&P, Moody's primary competitor (Permanent Subcommittee on Investigations 2011). One former S&P Managing Director testified: "by 2004 the structured finance department at S&P was a major source of

[8] In the literature on the potential conflict of interest induced by the "issuer pays" model (e.g., Jiang et al. 2012), skeptics (e.g., Bonsall 2012) have pointed out that the issuer pays model enables the rated company to provide the rating agency with non-public information that might actually make the rating more informative. The "informativeness" defense seems less germane to the incentives imposed on the rating agency by going public. That is, the access to the rated company does not change in our setting for Moody's due to its IPO or for it rival S&P.

revenue and profit for the parent company, McGraw-Hill. Focus was directed at collecting market share and revenue data on a monthly basis from the various structured finance rating groups and forwarded to the finance staff at S&P" (Permanent Subcommittee on Investigations 2011, page 276). The hearings produced several emails where S&P's management discusses the possibility of easing rating criteria to gain market share and respond to pressures from investment banks. Indeed, the Justice Department sued S&P on February 4, 2013 alleging the agency ignored its own standards to rate mortgage bonds that imploded in the financial crisis and cost investors billions of dollars.

He, Qian and Strahan (2012) examine a hand collected sample of mortgage backed securities issued between 2000 and 2006 and find that both Moody's and S&P issue more favorable ratings to large issuers, who likely generate more business and higher fees for these agencies.[9] Therefore, an alternate hypothesis is that S&P, Moody's chief competitor, was equally susceptible to maximizing short term profits and to investment banker pressure. That is, the act of Moody's going public, per se, did not affect ratings quality.

To address these concerns, we employ a difference-in-difference methodology by benchmarking Moody's rating of a bond to that assigned by S&P. Specifically, we estimate the difference in the initial ratings provided by both Moody's and S&P for new bond issues, *RatingDiff*, by subtracting Moody's numerical ratings for a bond issue from that assigned by S&P, and examine how *RatingDiff* changes around the time when Moody's went public.

S&P serves as an ideal benchmark for Moody's. S&P was formed in 1941 from the merger of H.W. Poor Co. and the Standard Statistics Bureau. In 1966, it was acquired by The McGraw-Hill Companies and has been a fully owned division of McGraw Hill ever since. S&P has been the closest competitor of Moody's. Based on the number of outstanding ratings, Moody's and S&P are the two largest Nationally Recognized Statistical Rating Organizations (NRSROs)

[9] Other literature on ratings of structured finance products includes An, Deng and Sanders (2008), Benmelech and Dlugosz (2009) and Griffin and Tang (2012).

designated by the Securities and Exchange Commission (SEC).[10] Furthermore, as S&P's ownership status did not change over our sample period, any change in S&P's ratings does not reflect market pressures potentially faced by Moody's after it went public. This difference-in-difference methodology in the context of credit ratings has also been used by Jiang, Stanford, and Xie (2012).[11] Note that the research design does not imply that Moody's credit ratings have declined or improved on an absolute scale. Rather, the interpretation is whether relative to the S&P, Moody's ratings became favorable or tougher after it went public.

The difference-in-difference methodology has the advantage of controlling for all underlying factors that affect the credit rating industry. However, Bertrand, Duflo and Mullainathan (2004) point out that difference-in-difference tests that rely on many years of data have biased standard errors due to serial correlation. To address this issue, we use one of Bertrand, Duflo and Mullainathan's (2004) suggestions and ignore the time series to just examine one year before and one year after Moody's IPO. These results using two years of data are discussed in Section 6 and do not impact our results.

The second aspect of our research design is the focus on the credit rating of corporate bonds. Recent congressional hearings regarding Moody's quest to gain market share by loosening rating standards following its IPO were primarily focused on structured products. However, as discussed before, studying corporate bonds has several advantages. Along with the advantages listed earlier, it should be noted that the risk assessment models for corporate bonds are relatively established, unlike those for structured finance products. Hence, it becomes harder to argue that any differences in ratings between Moody's and S&P are attributable to (i) differential learning about the nature of the financial products between these agencies; or to (ii) important innovations

[10] For the year 2010, Moody's and S&P have approximately 1 million and 1.2 million ratings reported outstanding, respectively. These magnitudes far exceed those of the third largest rating agency, Fitch, with approximately 500,000 ratings reported outstanding (see SEC 2011).

[11] Jian, Stanford and Xie (2012) use historical data between 1971 and 1978 to examine the impact on ratings when S&P adopted the issuer-pays business model. In a difference-in-difference setting, they use Moody's rating for the same bond as a benchmark. They report that S&P assigns better rating once it switches to collecting fees from issuers.

in the structuring and delivery of such products. As Kroezner and Shiller (2011, page 59) assert, corporate bonds are less opaque than structured finance products because there is a substantial amount of public information available about corporate debt. Consequently, the "information advantage" that a credit rating agency might have compared to an industry analyst in rating a corporate bond, relative to a structured finance product, is not great. This feature reduces Moody's opportunity to rate bonds favorably, which in turn would make it harder for us to detect the effect of the IPO on its ratings of corporate bonds.

4. Data and Results: New Issues

We obtain data on bond characteristics, such as issue size, offering date, and maturity date, as well as the history of credit rating changes by Moody's and S&P from the Mergent's Fixed Income Securities Database (FISD). We begin by studying new bond issues during the pre- and post- public periods. In particular, we examine the potential differences between the initial credit ratings assigned by Moody's and S&P for each new bond issue. For all firms covered by both CRSP and Compustat, we retrieved the list of new bond issues rated by both Moody's and S&P from 1995 to 2005 but excluding 2000.[12] This process results in a sample of 30,484 bonds issued by 903 unique firms. However, a substantial fraction of these new bond issues were by Freddie Mac and Fannie Mae, and almost all these bonds received an AAA rating from both the rating agencies. Eliminating these government agency bonds reduces our sample to 8,505 new bond issues made by 901 firms.[13]

Table 1 presents the credit ratings categories used by Moody's, the equivalent ratings by S&P, and the distribution of our sample new issues across these categories. There are a total of 21

[12] FISD assigns a unique Issuer ID to each issuing firm. For each Issuer ID, we first identify the list of associated unique 6-digit issuer CUSIPs. We then match the CRSP and Compustat information to all bonds with the same Issuer ID as long as one of the Issuer ID's 6-digit firm CUSIP is covered in CRSP and Compustat at the time of issuance. Further, we exclude bonds where the initial rating by Moody's and S&P are different by four or more notches. This mismatch is most likely attributable to errors but such mismatches account for less than 1% of the bond issues.

[13] The reported results in this paper hold when we expand our sample to include bonds issued by Freddie Mac and Fannie Mae. The results after inclusion of Freddie and Fannie bonds are not reported for brevity, but are available upon request.

rating categories for both Moody's and S&P. For ease of comparison, a numeric value is assigned to each notch of Moody's credit rating, with 1, 2, 3, 4, … denoting Aaa, Aa1, Aa2, Aa3, …, respectively. Note that more favorable ratings have smaller numerical values. We find that a substantial fraction of the new issues are investment-grade with very few new issues in the highest or lowest credit quality rating. Table 2 reports that the mean (median) issue size is $141 million ($50 million), and the average time to maturity is about eight years. Not surprisingly, firms issuing debt are large, as the average issuer's market value (sum of the market value of equity and the book value of debt) is $94 billion, though the median issuer's market value is much smaller at $39 billion.

4.1 Univariate analysis

To study the difference in the initial ratings assigned by Moody's and S&P for new issues, we create the variable *RatingDiff*, which is the numerical value of the S&P rating minus the numerical value of the Moody's rating for the same bond issue. As favorable ratings are coded as smaller values, a positive value of *RatingDiff* means that Moody's rated the new issue as better quality credit relative to S&P.

As seen in Table 3, in the pre-public period, there were 5,722 new issues with a mean *RatingDiff* of -0.302. The negative number implies that Moody's assigned, on average, a tougher credit rating than S&P in the five years prior to going public. The average *RatingDiff* in the post-public period, however, is 0.286, implying that in the five years following its IPO, Moody's, on average, assigned a laxer credit rating relative to S&P. The move from -0.302 in the pre-public period to the 0.286 in the post-public period is statistically significant at the 1% level. In sum, Moody's was significantly more likely to assign a better rating of more than half a notch relative to S&P in the years after its IPO.

We also examine how *RatingDiff* changes over the individual years around Moody's IPO. Figure 1 shows that the average value *RatingDiff* was consistently negative in the pre-public period of 1995 to 1999. After the IPO in 2000, the average *RatingDiff* approaches zero in 2001 and

becomes progressively more positive in 2002 and years after that. The size of the change from 1999 to 2001 suggests a discernible shift in the conservative culture of Moody's after its IPO.

To ensure that the results are not driven by a few extreme observations, we also examine the median values of *RatingDiff*. Although the median of *RatingDiff* is zero for both periods, the distribution of *RatingDiff* moves significantly towards the positive end, or towards better ratings by Moody's after its IPO. To ascertain whether this relative loosening of Moody's standards after its IPO is restricted to a few classes of bonds, we examine the rating differences separately for investment-grade and high-yield bonds. As shown in Table 3, Moody's relatively looser standards post-IPO are apparent in all cases. For the subsample of bonds which received a high-yield rating from at least one of the two agencies, we find that Moody's is tougher than S&P both before and after the IPO, though it is relatively less tough after the IPO.

4.2 Multivariate analysis

The univariate tests yield significant evidence consistent with the Congressional allegations. In this section, we verify whether these results hold in a multivariate set up. To capture the impact of the IPO on *RatingDiff*, we create an indicator variable, *post2000Dum*, that takes the value of one for all bonds issued after 2000, i.e., in the post-public period, and zero otherwise. We then regress *RatingDiff* on *post2000Dum*. If Moody's loosened its standards for assigning credit ratings following IPO, as hypothesized earlier, we would expect the coefficient of *post2000Dum* to be positive and significant.

In addition, we control for a host of issuer and bond characteristics in line with those employed by prior work (Pinches and Mingo 1973, Kaplan and Urwitz 1979, Blume, Lim and Mckinlay 1998, Campbell and Taskler 2003, and Jiang, Stanford and Xie 2012). Specifically, we include variables pertaining to the issuing firm: (i) the firm's size using the logarithm of the sum of market value of equity and book value of debt (*IssuerSize*), (ii) leverage which is the ratio of long-term debt to total assets (*Leverage*); (iii) firm performance using the ratio of operating performance before depreciation to sales (*OpMargin*); and (iv) firm volatility as measured by the standard

deviation of stock returns (*Stkretstd*). All accounting variables are of annual frequency, belonging to the fiscal year prior to the issuance of the new bond, and issuer volatility is estimated from daily stock returns in the year prior to the new issue. We also include bond specific variables: (i) the logarithm of the par value of the bond issue (*IssueSize*), (ii) the number of years to maturity (*YTM*), and (iii) a dummy variable for whether the issue is senior debt (*SeniorDum*). It is likely that Moody's rating models for issuers or bonds with specific characteristics changes after its IPO, relative to S&P's model. To control for this potential confound, we include interactions of all the control variables with *post2000Dum*. In summary, we estimate the following empirical model:

$$RatingDiff_i = \gamma_0 + \gamma_1 post2000dum_i + \sum_{j=2}^{8} ControlVar_i^j + \sum_{j=2}^{8} ControlVar_i^j * post2000dum_i + \varepsilon_i, \quad (1)$$

where *ControlVar*^{2} to *ControlVar*^{8} refer to *IssuerSize*, *Leverage*, *OpMargin*, *Stkretstd*, *IssueSize*, *YTM*, and *SeniorDum*, respectively and *post2000Dum* is the key explanatory variable.[14] Standard errors for adjusted for heteroscedasticity and clustered at the firm level when calculating *p*-values.

As shown in Column I of Table 4, in a simple difference-in-difference setting, the coefficient on *post2000Dum* is 0.585 and is significant at the 1% level. This result suggests that, subsequent to its IPO, Moody's ratings get better by more than half of a rating notch, which is a magnitude of easing that is both statistically and economically significant. Our results are qualitatively unchanged in column II where we include all the control variables. The coefficient on *post2000Dum* is positive and significant at the 1% level, and the magnitude is higher at 0.851.

With respect to the control variables, Moody's is relatively tougher on firms with higher operating margins and those with high stock volatility. Relative to S&P, Moody's weighs bond characteristics differently as well. Moody's assigns better ratings to bond issues that are larger and have shorter maturity while being tougher on senior issues. This tendency is partly reversed in the

[14] Consistent with Jiang, Stanford and Xie (2012), we demean the control variables. Specifically, we include each control variable's deviation from the annual sample average when estimating the model.

post-public period. Overall, the results suggest that Moody's model for assessing credit quality based on bond and issuer characteristics significantly changes after its IPO. More important, controlling for this potential change in their credit rating process does not impact the coefficient on *post2000Dum*. In summary, the evidence supports the findings of the univariate test that Moody's assigns relatively better ratings for new bond issues in the years after its IPO.

To explore what causes the relatively better ratings by Moody's following its IPO, and also to shed some light on individual rating agencies, we examine ratings assigned by each agency separately. In column III of Table 4, we re-estimate model (1) by using Moody's ratings, instead of *RatingDiff*, as the dependent variable. The coefficient of *post2000Dum* is negative (-0.935) and significant at the 1% level, suggesting that Moody's assigns more favorable ratings after its IPO in 2000. However, when we examine the ratings assigned by S&P (column IV), we find the coefficient of *post2000Dum* to be -0.084, which is not statistically significant. These results indicate that the increase in *RatingDiff* following Moody's IPO appears to be driven by better ratings from Moody's, rather than from stricter ratings assigned by S&P.

4.3 Cross sectional results

The results so far document a relative loosening of rating standards at Moody's after it went public in 2000. As discussed earlier, this was likely caused by a move to a client centric culture that started in the structured products group. If the culture of laxity in ratings was directed towards winning market share in structured finance products, then the post IPO laxity in ratings should be stronger for corporate bond issuers that also issue the most structured finance products. Catering to these clients by giving them a better rating in their corporate bond issues will increase the likelihood of securing their ratings business for structured finance products. To examine this conjecture, we obtain information on the issuance of structured products, including asset-backed securities (ABS), mortgage-backed securities (MBS), and collateralized debt obligations (CDOs), for 1995 through 2005 from the ABS database managed by J.P. Morgan's Asset Backed Alert. The

total issuance of these structured products increased from $142 trillion in 1995 to $1,605 trillion in 2005 (See Table 5). We manually link the names of bond issuers in our sample with those in the ABS database. The top 40 issuers of structured products in every year, accounting for an average of 69.2% of total issuance, are classified as large structured product issuers.

To examine Moody's ratings of corporate bonds by large structured products issuers, we estimate the following model:

$$RatingDiff_i = \gamma_0 + \gamma_1 post2000dum_i + \gamma_2 HighConfDum_i + \gamma_3 HighConfDum_i * post2000dum_i + \sum_{j=4}^{10} ControlVar_i^j + \sum_{j=4}^{10} ControlVar_i^j * post2000dum_i + \varepsilon_i, \quad (2)$$

where all control variables from model (1) are included in estimation.

The variable *HighConfDum* is an indicator variable that captures bond issues with high conflicts of interest. It takes the value of one for corporate bond issues by firms that are identified as large structured products issuers in the prior year. The interaction of *HighConfDum* with *post2000dum* captures the relative loosening in Moody's ratings relative to S&P after Moody's IPO in 2000. Partial results of the estimation are displayed in Column 1, Table 6. The coefficient on the interaction of *HighConfDum* with *post2000dum* is positive and highly significant. After going public in 2000, Moody's assigned significantly better ratings than S&P to corporate bond issues of large structured products issuers. The coefficient on *HighConfDum* is not significant suggesting that Moody's ratings of corporate bonds issued by large structured products issuers were not different from S&P ratings before Moody's went public. The coefficient on *post2000dum* continues to be positive and significant as before. In summary, Moody's ratings on all new issues was better than S&P after it went public but it was significantly more favorable for new corporate bond issues by large structured products issuers.

We also create another proxy for issuers active in the structured products market. As most of the structured products are issued by financial firms, we construct an indicator variable labeled as *Findum* that takes the value of one if the firm operates in the following industries: Banking,

Credit/Financing, Real Estate, and Savings & Loan.[15] In this specification (Column II of Table 6), the *HighConfDum* takes the value of one if the bond is issued by a firm in the finance industry. The coefficient on *HighConfDum* is positive and significant implying that Moody's always gave better ratings than S&P for issues by financial firms. However, after going public, this tilt towards clients significantly increased – the coefficient on the interaction of *post200dum* and *HighConfDum* is positive and significant.

Next, we study whether, over time, the culture of catering to clients spread to ratings of large corporate bond issuers, irrespective of their connection to structured products. Specifically, after its IPO in 2000, Moody's management had greater incentives to keep important clients (such as the larger issuers of bonds) satisfied, as they accounted for a significant fraction of its current and future business.[16] Thus, we focus on large bond issuers and examine whether there is greater loosening of Moody's ratings for these large issuers after it went public.

Large issuers are identified based on issue size and frequency of issue. This empirical filter has the added advantage of capturing Moody's payment model which includes both a fixed payment for a bond issue and a variable fee based on the size of the bond issue. A bond issue is classified as large if it is greater than the median size of all bond issues in the past three years. An issuer is classified as large if the par value of all bonds issued in the last three years is above the median for the sample. The indicator variable *HighConfDum*, takes the value of one if the bond issue is large and is issued by a large issuing firm, and zero otherwise. As shown in Column III of Table 6, the coefficient on the interaction of *HighConfDum* with *post2000Dum* is positive and significant, and the coefficient on *HighConfDum* is negative and significant. That is, before its IPO, Moody's was relatively tough on these large issuers. However, Moody's became

[15] Information on a bond's industry classification is provided by Mergent's FISD. The industries that were excluded were Financial Services, Insurance, and Leasing. We tried different variations of the *Findum* variable such as including only firms in Banking and obtained very similar results.

[16] According to the 2008 Report of the "Autorité des marchés financiers" on credit rating agencies (see page 15), fees paid by issuers accounted for 80% of Moody's revenues in 2007. For McGraw-Hill, which is Standard & Poor's parent company, the analogous measure was 33%.

significantly more favorable towards these large issuers after going public in 2000. The coefficient of *post2000Dum* continues to be positive and significant suggesting that though the relatively loosening of credit ratings after going public is seen for all new issues, it is significantly higher for new large issues by large issuers.[17]

Next, we identify bond issues that are on the margin and could benefit from getting a better rating. In particular, we examine all new issues in a rating class assigned by S&P. Among the issuers in any rating class, some are relatively more profitable and almost qualify for a better rating relative to the one assigned to them by S&P. Obtaining a better rating from a competitor such as Moody's is likely to make a substantial difference to these issuers, and is also likely to translate into a better relationship for Moody's with the issuer. Hence, we expect a greater loosening of credit ratings by Moody's for such marginal cases after it went public. The identification of high conflict of interest clients, based on this strategy, is motivated by Jiang, Stanford and Xie (2012). To seek out the best issuers in any S&P rating class, we use the issuers' operating profits (operating income before depreciation divided by sales) in the year before the new issue. If the operating profits of the issuer are above the median of all issuers in the S&P rating class, then we identify that issuer as a client with greater conflicts of interest with *HighConfDum* taking the value of on.

As seen in Column IV of Table 6, the coefficient on the *HighConfDum*, newly defined based on operating profits, is negative and significant and its interaction with *post2000Dum* is positive and significant. Consistent with previous results, Moody's is relatively tougher on these high conflict of interest issuers in the period prior to 2000 but loosens up after 2000. The coefficient of *post2000Dum* continues to be positive and significant in this specification as well.

[17] Another potential cross sectional test would be to examine solicited and unsolicited ratings. Unsolicited ratings, i.e., ratings that are not paid by the issuer do not have revenue considerations and hence should not experience any relative favorable treatment from Moody's after its IPO. Unfortunately, we do not have data to identify which ratings are unsolicited.

4.4 Outstanding bonds

The preceding section provides consistent evidence on the relative loosening of Moody's credit ratings of bond issuers after its IPO in 2000. In this section, we examine whether the relative loosening of credit ratings is also seen in the ratings on outstanding bonds. A direct way to address this question is to compare the timeliness of rating changes across rating agencies before and after Moody's went public. However, examining which agency is faster in its rating action requires the identification of same rating changes by both agencies, which is challenging given that rating changes by different agencies often occur at different levels and at different magnitudes. For instance, consider a typical case with three rating events: (i) S&P downgrades a bond from AA- to A+ in May 1999; (ii) Moody's downgrades the same bond by two notches, from AA to A, in July 1999; and (iii) finally, S&P downgrades the bond again from A+ to A- in September 1999. This example highlights the difficulty in identifying a rating change from the same level and with the same magnitude by both rating agencies, rendering the direct comparisons in the timeliness of rating migrations across rating agencies rather difficult.

To capture these disparate levels, magnitudes and timing in rating changes, we estimate a measure of the differences between Moody's and S&P ratings on a daily basis. Specifically, we create an indicator variable, *Moody'sLeadDum*, which is set equal to one if Moody's assigned a better rating than S&P for a particular bond on a particular day, and zero otherwise. *S&PLeadDum* is created in a similar way. To capture the fraction of the year for which Moody's rating is better than S&P's, we create a new variable, *LeadTimeDiff*, which is the average value of *Moody'sLeadDum* for the year minus the average value of the *S&PLeadDum* over the same year for the same bond. A positive value of *LeadTimeDiff* suggests that Moody's has a better rating than S&P for a higher fraction of the year for that bond. Note that the average value of *LeadTimeDiff* should be zero if (i) there are no differences between the ratings assigned by the two agencies for the bond; or if (ii) the differences between the ratings assigned by these two agencies are randomly distributed across bonds and time.

In line with the model for new issues, we estimate a similar model for all outstanding bonds using *LeadTimeDiff* as the dependent variable. As seen in Column I of Table 7, the coefficient on *post2000Dum* is positive and highly significant (coefficient = 0.301, *p*-value < 0.01), confirming that Moody's had a more favorable rating than S&P, on average, for outstanding bonds after its IPO in 2000.

Similar to the earlier analysis with new bond issues, we examine whether greater loosening of Moody's credit ratings occurs for clients that are large issuers of structured finance products and those with higher conflicts of interest. Consistent with the results for new issues, we find outstanding corporate bonds issued by large structured products issuers have a better rating from Moody's relative to S&P after 2000. As seen in Column II of Table 7, the coefficient of interaction of *post200dum* and *HighConfDum* is positive and significant. Results are qualitatively similar when we use bonds issued by financial firms to proxy for issuance of structured products (see Column III). In summary, although Moody's gives better ratings than S&P across all bonds after 2000, the loosening of credit ratings is significantly higher for large issuers of structured products and for financial issuers after 2000.

Next, we study whether the culture of catering to clients extends to important issuers in corporate bonds. Similar to the previous section, we use two proxies of higher conflicts of interest. The first proxy for high conflicts of interest is large issuers, as defined in the previous section (see Column IV). The second proxy is to identify firms that likely just missed a higher S&P rating as in the prior section (Column V). We find that (i) the coefficient on *post2000dum* is positive and significant suggesting better ratings by Moody's relative to S&P after 2000 on average for all outstanding bonds; and (ii) a significant coefficient on the interaction of *HighconfDum* and *post200dum* in line with the view that Moody's granted significantly better ratings to large issuers of corporate bonds and to those that just missed higher S&P ratings after it went public in 2000. Note that the coefficient on *Highconfdum* in Column IV is negative and significant pointing to Moody's tendency to be tough on large issuers of corporate bonds, relative to S&P, prior to going

public in 2000 but to be significantly more favorable after 2000. In summary, the results for outstanding bonds mirror those for new issues.

5. Alternate Benchmark

In this section, we use an alternate benchmark to study the quality of Moody's ratings relative to that of S&P. Following Duffie, Saita, and Wang (2009), we estimate the distance to default measure based on the Black–Scholes–Merton specification. The Black-Scholes-Merton specification implies that the expected default frequency is the cumulative standard normal distribution function valued at the negative distance to default. Based on market equity data and COMPUSTAT balance sheet data, we use an iterative method to estimate this measure for each bond-year in our sample.

If Moody's relatively better rating after 2000, as documented in prior sections, is justified, these higher relative ratings should be associated with a lower expected default frequency (EDF). However, if these relatively better ratings by Moody's after 2000 are a reflection of loosening standards, then such ratings should be associated with a higher EDF. In other words, a positive *Ratingdiff* – pointing to a better rating by Moody's relative to S&P –suggests that Moody's is relatively more accurate if such a rating difference is associated with a lower expected default frequency. However, a positive association between *Ratingdiff* and EDF points to lower accuracy of Moody's rating relative to S&P's. The same intuition holds for a positive association between *Leadtimediff* and EDF for outstanding bonds.

We investigate this conjecture for both our samples of new issues and outstanding bonds. We include the estimate of EDF and the interaction of EDF with *post200dum* in our base models for new issues where the dependent variable is *Ratingdiff*. As displayed in Column I of Table 8, the coefficient on EDF is negative and significant whereas the coefficient on EDF with *post2000dum* is positive and significant. Moody's was relatively more accurate than S&P in the period prior to going public. However, after 2000, the data suggests a significant decrease in the

accuracy of Moody's ratings relative to S&P. Similarly for all outstanding bond issues, displayed in Column II, the coefficient on EDF is negative and significant; whereas the coefficient on the interaction of EDF with *post2000dum* is positive and significant. The relative accuracy of Moody's ratings, as captured by expected default frequencies, decreased after it went public in 2000.

These results using expected default frequency (EDF) data negate concerns that Moody's move towards better ratings after 2000 was the result of a strategy designed to increase the informativeness of their ratings and not due to loosening ratings standards. In short, data that relies on another standard benchmark for evaluating the accuracy of credit ratings also points to Moody's loosening rating standards after it went public.

6. Robustness Tests

In this section, we examine the robustness of our results to three specification checks. In particular, we investigate the sensitivity of our results to (i) longer time periods that include the financial crisis; (ii) shorter time windows that focus more narrowly on the IPO event; and (3) using Fitch as an alternative benchmark.

6.1 Impact of the financial crisis

We investigate whether our results are robust to the inclusion of the unique circumstances associated with the financial crisis. Our research design thus far has relied on data five years before and after the 2000 IPO and hence excludes the years 2007 to 2009, the period of financial crisis. To address this issue, we re-estimate our results using a longer window around the IPO, i.e., 1991 to 2009. Specifically, we now define the pre-public period as the nine-year period from 1991 to 1999, and the post-public period where the *post2000dum* is set to one for the years from 2001 to 2009. As seen in panel A of Table 9, studying the nine year window before and after the IPO does not impact our results. The coefficient of *post2000dum* continues to be positive and highly significant for both new issues and outstanding issues.

6.2 Shorter time period around IPO

In the analysis reported so far, our research design has focused on studying five years before and after Moody's IPO to account for the fact that the resulting stock market induced pressure to report higher revenues may not have been instantaneous. However, a longer time period opens up the possibility of confounding events. Therefore, we also examine the effect of Moody's going public over a short time period, i.e. from 1999 to 2001, considering ratings for the one year before and after Moody's went public.

The results for both new issues and outstanding issues for this short time period are displayed in panel B of Table 9. The coefficient on *post2000dum* for new issues is 0.475 and for outstanding issues is 0.114. Both are highly significant. In the shorter time period, the results again clearly point towards a loosening of Moody's credit ratings after going public. As mentioned earlier, the shorter time period also addresses concerns of biased standard errors due to serial correlation as pointed out by Bertrand, Duflo and Mullainathan (2004).

6.3 Benchmarking against Fitch

Fitch is currently the third largest credit rating agency in the world. It was acquired by IBCA Limited of London in 1997 and in 2000 it acquired Duffs and Phelps, a publicly listed credit rating agency. The acquisition in 2000, the year of Moody's IPO, raises concerns about the suitability of Fitch as a benchmark. Nevertheless, we identify all new issues as well as outstanding issues that had both a Moody's ratings as well as a rating by Fitch. After ensuring that data on control variables are available, we have a sample of 5,851 new issues over the period 1995 to 2005 (excluding 2000) and 32,428 bond-years for the analysis of outstanding bonds.

The variable *RatingDiff* is now defined as the numerical equivalent of Fitch's rating minus the numerical equivalent of Moody's rating. A positive value of *RatingDiff* implies that Moody's has a more favorable rating than Fitch, similar to the previous sections. We find that Moody's assigned significantly more favorable ratings to new bond issues relative to Fitch in the years after

2000 in comparison the years prior to 2000 (see Panel C of Table 9). The coefficient on *post2000Dum* is positive and highly significant at the 1% level. To capture rating differences on outstanding bonds, we define *LeadTimeDiff* as the percentage of days in a year that Moody's has a better rating minus the percentage of the days in the year that Fitch has a better rating, and re-estimate model (2). The coefficient of *post2000Dum* for this estimation is again positive and highly significant at the 1% level. In summary, even relative to Fitch, Moody's assigned more favorable ratings to new issues as well as to outstanding issues in the years after its IPO in 2000.

7. Conclusions

In this paper we investigate Congressional allegations that going public changed Moody's from a conservative rating agency to one focused on market share and short term profits. To examine this allegation, we benchmark Moody's ratings to those of its main competitor, S&P, which did not undergo a change in its ownership status over this time period. We find significant evidence, both in economic and statistical terms, that Moody's was more likely to assign favorable ratings relative to S&P for new corporate bond issues in the period after its IPO. A similar trend is also seen in the ratings of outstanding bonds, with Moody's being, relative to S&P, significantly more favorable in the years after its IPO.

Although this relative loosening of Moody's credit rating standards after it went public is seen for all bonds, it is significantly more pronounced for corporate bonds issued by large issuers of structured finance products and financial firms. This finding corroborates employees' testimonies at Congressional hearings that the new culture at Moody's was focused on market share and the lower rating standards emanated from the structured products group. The loosening of rating standards in corporate bonds is also significantly greater for large and frequent issuers of corporate bonds and those most likely to gain from a higher rating.

The results hold for an alternative measure of credit rating accuracy as Moody's relatively better ratings after it went public are not accompanied by a lower expected default frequency. This

finding is consistent with a lower relative accuracy of Moody's credit ratings after it went public. In sum, the evidence points to the importance of ownership structure and consequent incentives of credit analysts on the ratings they issued.

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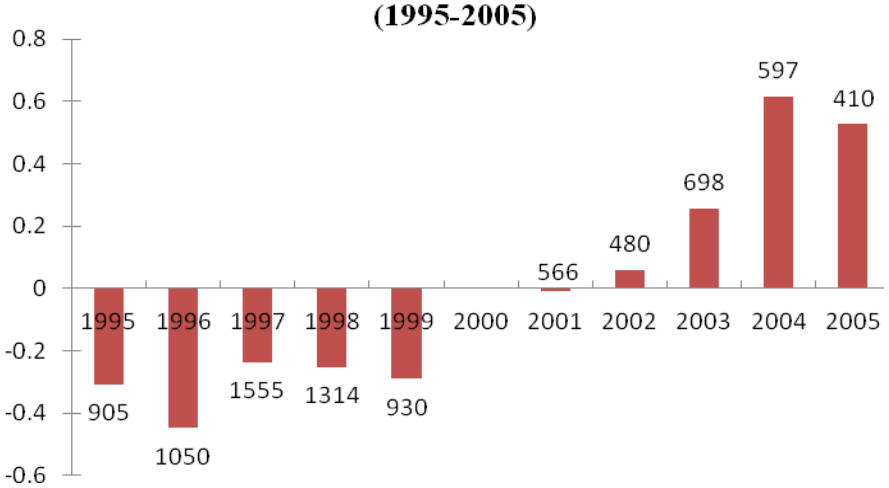
Figure 1: Difference in Credit Ratings Assigned by Moody's and S&P around Moody's IPO in 2000 (1995-2005)



The length of the bar in the figure represents the yearly average of the *RatingDiff* variable. Note that there is no value plotted for 2000 the year of the Moody's IPO. *RatingDiff* is the S&P's numerical rating minus the Moody's numerical rating for new bond issues, coded as per Table 1. As smaller numbers correspond to higher ratings, a positive (negative) value of *RatingDiff* implies that Moody's assigns a better (stricter) rating. The number on top of each bar represents the number of new bond issues over which the *RatingDiff* variable was computed every year.

Table 1: Numerical Coding of Rating Categories and Frequencies of Such Categories for New Bond Issues
This table presents summary statistics on the different rating categories for Moody's and S&P and their numerical mapping. Frequency is the percentage of new issues over the period 1995 to 2005 (excluding 2000) that belong to each category.

	Numeric Rating	Moody's		S&P	
		Credit Rating Letter	Frequency (%)	Credit Rating Letter	Frequency (%)
		Investment-grade			
Highest Quality	1	Aaa	0.21	AAA	0.25
Very High Quality	2	Aa1	0.07	AA+	0.68
	3	Aa2	0.92	AA	1.61
	4	Aa3	17.32	AA-	9.68
High Quality	5	A1	11.13	A+	11.57
	6	A3	22.54	A	32.58
	7	A3	5.62	A-	4.83
Minimum Investment Grade	8	Baa1	8	BBB+	5.02
	9	Baa2	4.67	BBB	4.84
	10	Baa3	3.01	BBB-	3.14
		High-yield			
Low Grade	11	Ba1	1.72	BB+	1.63
	12	Ba2	1.27	BB	7.88
	13	Ba3	6.67	BB-	1.65
Very Speculative	14	B1	5.03	B+	3.64
	15	B3	4.96	B	5.08
	16	B3	5.2	B-	4.26
Substantial Risk	17	Caa1	1	CCC+	0.93
	18	Caa2	0.47	CCC	0.55
	19	Caa3	0.16	CCC-	0.12
Very Poor Quality	20	Ca	0.04	CC	0.06
	21	C	0.00	C	0.00

Table 2: Descriptive Statistics of Firms Issuing Rated New Bonds

Issuer Size is the market value of equity plus the book value of debt. Leverage is long term debt divided by total assets. Operating Margin is operating income before depreciation divided by sales. Stock return standard deviation is the standard deviation of daily stock returns in the year prior. Issue size is the par value of the bond issue. All firm characteristics are measured the year prior to the new issue.

	Mean	Median	Std
Issuer Size ($ million)	93,589.51	38,808.46	117,998.88
Leverage	0.27	0.21	0.19
Operating Margin	0.22	0.43	6.58
Stock Return Standard Deviation	0.06	0.02	0.15
Issue Size ($ million)	141.40	50.00	291.00
Time to Maturity at Issuance (Years)	7.75	5.76	8.03

Table 3: Univariate Comparisons of Ratings of New Issues between Moody's and S&P

This table presents results of univariate tests for the variable *RatingDiff*. *RatingDiff* is the S&P's numerical rating minus the Moody's numerical rating for the new bond issues, coded as per Table 1. As smaller numbers mean better ratings, a positive value of *RatingDiff* implies that Moody's gives better ratings. The column "Pre-Moody's IPO" covers all eligible new bonds issued over 1995 to 1999. The column "Post-Moody's IPO" includes all eligible new bond issues over 2001 to 2005. "Investment-grade category (IV)" includes all new issues where both Moody's and S&P assigned an investment grade rating at the time of issuance. "High-Yield (HY)" refers to new issues where both Moody's and S&P assigned a high yield rating at the time of issuance. "Across IV and HY" refers to the small sample of new issues where one rating agency assigns an investment-grade rating while the other assigns a high-yield rating.

		Pre-Moody's IPO	Post-Moody's IPO	Test (p-value)
Full Sample	Mean	-0.302	0.286	<.0001
	Median	0.000	0.000	<.0001
	Nobs	5,722	2,783	
Investment-grade (IV)	Mean	-0.189	0.425	<.0001
	Median	0.000	0.000	<.0001
	Nobs	4,076	2,150	
High-yield (HY)	Mean	-0.567	-0.158	<.0001
	Median	-1.000	0.000	<.0001
	Nobs	1,588	582	
Across IV and HY	Mean	-0.966	-0.490	0.057
	Median	-1.000	-1.000	0.037
	Nobs	51	58	

Table 4: Do Moody's Ratings Become Laxer for New Issues after its IPO?

The table presents results from estimating four different specifications of model (1). The dependent variable in columns I and II is *RatingDiff* and in columns III and IV is the numeric rating by Moody's and S&P, *Moody's Rating* and *S&P Rating*, respectively. *RatingDiff* is the S&P numerical rating minus the Moody's numerical rating. *Post2000Dum* is a dummy variable that takes the value of one for new bond issued during the post-public period, i.e., from 2001 to 2005, and zero otherwise. *IssuerSize* is natural logarithm of total market value. *Leverage* is the ratio of long-term debt divided by total assets. *OpMargin* is operating income before depreciation divided by sales. *Stkreststd* is the standard deviation of daily stock returns in the year prior to the issuance. *IssueSize* is the logarithm of the par value of the bond issue. *YTM* is the number of years to maturity. *Seniordum* is a dummy variable one for senior debt. All accounting variables are measured in the year prior to the new issue. The number below each estimate of the coefficients is heteroscedasticity adjusted robust *p*-value. We cluster standard errors by the issuing firm. ***, **, * represent significance at 1%, 5% and 10% level, respectively.

	I *RatingDiff*	II *RatingDiff*	III *Moody's rating*	IV *S&P's rating*
Intercept	-0.299	0.155	8.401	8.556
	(<.0001)***	(0.088)*	(<.0001)***	(<.0001)***
post2000Dum	0.585	0.851	-0.935	-0.084
	(<.0001)***	(<.0001)***	(<.0001)***	(0.676)
IssuerSize		-0.010	-1.259	-1.269
		(0.229)	(<.0001)***	(<.0001)***
Leverage		-0.105	2.755	2.651
		(0.290)	(<.0001)***	(<.0001)***
OpMargin		-0.006	-0.026	-0.032
		(<.0001)***	(<.0001)***	(<.0001)***
Stkretstd		-1.314	7.397	6.083
		(<.0001)***	(<.0001)***	(<.0001)***
IssueSize		0.034	0.193	0.227
		(0.002)***	(<.0001)***	(<.0001)***
YTM		-16.560	-65.638	-82.198
		(0.000)***	(<.0001)***	(<.0001)***
SeniorDum		-0.188	-1.673	-1.860
		(<.0001)***	(<.0001)***	(<.0001)***
IssuerSize*post2000Dum		0.123	0.041	0.164
		(<.0001)***	(0.312)	(<.0001)***
Leverage*post2000Dum		-0.052	1.290	1.238
		(0.751)	(0.021)**	(0.021)**
OpMargin*post2000Dum		0.006	0.015	0.021
		(<.0001)***	(<.0001)***	(<.0001)***
Stkretstd*post2000Dum		1.725	9.575	11.300
		(0.257)	(0.047)**	(0.020)**
IssueSize*post2000Dum		-0.106	-0.012	-0.118
		(<.0001)***	(0.797)	(0.003)***
YTM*post2000Dum		6.859	124.945	131.804
		(0.325)	(<.0001)***	(<.0001)***
Seniordum*post2000Dum		0.019	-0.096	-0.077
		(0.759)	(0.560)	(0.642)
Adjusted R-square	0.095	0.216	0.765	0.762
N	8,505	8,505	8,505	8,505

Table 5: Summary Statistics on Structured Products Issuance

The structured products included are Asset-Backed Securities (ABS), Mortgage-Backed Securities (MBS), and Collateralized debt obligations (CDOs). The data comes from the ABS database managed by J.P. Morgan's Asset Backed Alert.

Year	Total Issuance ($Trillion)	Number of Issues	Number of Issuers	Share of Top 40 Issuers
1995	142.65	492	208	0.75
1996	212.01	684	279	0.68
1997	322.49	903	328	0.62
1998	438.46	1015	352	0.61
1999	416.80	1002	358	0.57
2000	399.63	938	315	0.59
2001	529.90	1157	308	0.69
2002	688.39	1521	286	0.76
2003	861.18	1760	253	0.78
2004	1115.81	1948	266	0.80
2005	1605.60	2400	341	0.76

Table 6: Cross Sectional Variation in Moody's Ratings Post IPO for New Issues

This table displays partial results for the OLS estimation where the dependent variable was *RatingDiff*, the S&P numerical rating minus the Moody's numerical rating. *Post2000Dum* takes the value of one if the bond is issued 2001 to 2005 and zero otherwise. In Column I (II) *HighConfDum* takes the value one if the bond is issued by firms that are large issuers of structured finance products (Financial firms). In Column III (IV) *HighConfDum* takes the value one if the bond is issued by a large issuer (the issuers' profit margin is above the median for that S&P's rating grade). Other variables included but not reported in the table are *IssuerSize* (natural log of total market value), *Leverage* (ratio of long-term debt to total assets), *OpMargin* (operating income before depreciation divided by sales), *Stkreststd (* standard deviation of daily stock returns in the year prior to the issuance), *IssueSize* (log of the par value of the bond issue), *YTM* (number of years to maturity), *Seniordum* (dummy variable that is one for senior debt). All accounting variables are measured in the year prior to the new issue. The number below each estimate of the coefficients is heteroscedasticity adjusted robust *p*-value. We cluster standard errors by the issuing firm. ***, **, * represent significance at 1%, 5% and 10% level, respectively.

	I	II	III	IV
Issuer Characteristics	Structured Products	Finance Firms	Large and Frequent	Missed S&P higher Rating
Intercept	0.133	0.047	0.291	0.228
	(0.193)	(0.604)	(0.002)***	(0.009)***
post2000dum	0.632	1.036	0.699	0.744
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***
HighConfDum	0.024	0.320	-0.205	-0.415
	(0.495)	(<.0001)***	(<.0001)***	(<.0001)***
HighConfdum*post2000dum	0.212	0.320	0.308	0.368
	(0.000)***	(<.0001)***	(<.0001)***	(<.0001)***
	Control variables have been included in the estimation but not reported			
Adjusted R-square	0.218	0.238	0.219	0.213
N	8,505	8,505	8,505	8,505

Table 7: Moody's Laxer Ratings with All Bond Issues After its IPO

This table presents OLS results where the dependent variable is *LeadTimeDif*, the fraction of a year where Moody's assigns a higher rating minus the fraction where S&P assigns a higher rating. *Post2000Dum* is a dummy variable that takes the value of one for the years in the post-public period, and zero otherwise. In Column II (III) *HighConfDum* takes the value one if issuer is a large issuer of structured products (a finance firm). In Column IV(V) *HighConfDum* takes the value one if issuer is a large issuer of corporate bonds (missed a higher S&P rating). Other variables are defined as in Table 4. All Models included a constant which has not been reported for brevity. The number below each estimate of the coefficients is heteroscedasticity adjusted robust *p*-value. We cluster standard errors by the issuing firm. ***, **, * represent significance at 1%, 5% and 10% level, respectively.

	I	II	III	IV	V
	Base	Structured Products	Finance Issuers	Large Issuers	Missed S&P higher Rating
post2000Dum	0.301	0.197	0.165	0.257	0.229
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***
HighConfDum		0.026	0.227	-0.128	0.011
		(0.011)**	(<.0001)***	(<.0001)***	(0.085)*
HighConfDum*post2000dum		0.323	0.445	0.052	0.132
		(<.0001)***	(<.0001)***	(0.010)**	(<.0001)***
IssuerSize	0.016	0.013	0.001	0.020	0.015
	(<.0001)***	(<.0001)***	(0.693)	(<.0001)***	(<.0001)***
Leverage	0.087	0.083	0.046	0.114	0.083
	(<.0001)***	(0.000)***	(0.034)**	(<.0001)***	(0.000)***
OpMargin	-0.005	-0.005	-0.005	-0.005	-0.005
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***
Stkretstd	-0.246	-0.264	-0.159	-0.255	-0.244
	(0.011)**	(0.005)***	(0.118)	(0.008)***	(0.011)**
IssueSize	0.005	0.005	0.005	0.005	0.005
	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***
YTM	0.019	0.020	0.026	0.019	0.019
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***
Seniordum	-0.044	-0.043	0.004	-0.036	-0.044
	(<.0001)***	(<.0001)***	(0.696)	(0.000)***	(<.0001)***
IssuerSize*post2000Dum	0.099	0.070	0.085	0.098	0.093
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***
Leverage*post2000Dum	-0.538	-0.488	-0.418	-0.554	-0.543
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***
OpMargin*post2000Dum	0.006	0.006	0.005	0.006	0.006
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***
Stkretstd*post2000Dum	0.225	0.241	0.144	0.234	0.226
	(0.020)**	(0.011)**	(0.158)	(0.016)**	(0.020)**
IssueSize*post2000Dum	0.009	0.009	0.021	0.009	0.006
	(<.0001)***	(<.0001)***	(<.0001)***	(<.0001)***	(0.007)***
YTM*post2000Dum	-0.005	0.009	-0.029	-0.004	-0.010
	(0.300)	(0.060)*	(<.0001)***	(0.411)	(0.038)**
Seniordum*post2000Dum	-0.127	-0.157	0.004	-0.134	-0.117
	(<.0001)***	(<.0001)***	(0.761)	(<.0001)***	(<.0001)***
Adjusted R-square	0.093	0.106	0.135	0.095	0.187
N	81,641	81,641	81,641	81,641	81,641

Table 8: Alternate Measure of Rating Accuracy

The dependent variable for New issues model is *Ratingdiff* and for All Issues is *Leadtimediff*. *Post2000dum* is a dummy that takes the value one for years after 2000. *EDF* is the expected default frequency estimated using Black-Scholes-Merton Model. The remaining variables are as defined before. The number below each estimate of the coefficients is heteroscedasticity adjusted robust *p*-value. We cluster standard errors by the issuing firm. ***, **, * represent significance at 1%, 5% and 10% level, respectively.

	New Issues	All Issues
Intercept	0.251	-0.022
	(0.260)	(0.009)***
post2000dum	0.623	0.301
	(<.0001)***	(<.0001)***
EDF	-0.404	-0.153
	(0.000)***	(<.0001)***
EDF*post2000dum	0.366	0.064
	(0.099)*	(0.013)**
IssuerSize	0.005	0.017
	(0.702)	(<.0001)***
Leverage	0.040	0.105
	(0.740)	(<.0001)***
OpMargin	-0.005	-0.063
	(<.0001)***	(0.628)
Stkretstd	-0.355	-0.005
	(0.123)	(<.0001)***
IssueSize	0.057	0.006
	(0.001)***	(<.0001)***
YTM	-18.612	0.014
	(0.072)*	(<.0001)***
SeniorDum	-0.158	-0.044
	(0.001)***	(<.0001)***
IssuerSize*post2000dum	0.079	0.098
	(0.000)***	(<.0001)***
Leverage*post2000dum	-0.135	-0.522
	(0.488)	(<.0001)***
OpMargin*post2000dum	0.006	0.054
	(<.0001)***	(0.680)
Stkretstd*post2000dum	3.317	0.006
	(0.089)*	(<.0001)***
IssueSize*post2000dum	-0.159	0.008
	(<.0001)***	(0.000)***
YTM*post2000dum	-12.112	0.000
	(0.533)	(0.923)
SeniorDum*post2000dum	0.090	-0.129
	(0.282)	(<.0001)***
Adjusted R-square	0.050	0.095
N	8,505	81,641

Table 9: Robustness Tests

The sample period for Panel A is 1991-2009, while for Panel B is 1999-2001. Panel C presents the results when Fitch's ratings are used as the benchmark over the period 1995 to 2005. We estimate model (1) on the sample of new bond issues, and model (2) on the sample that includes all outstanding issues. The dependent variables for model (1) and model (2) are *RatingDiff* and *LeadTimeDiff*, respectively. *RatingDiff* is the S&P numerical rating minus the Moody's numerical rating. *LeadTimeDiff* is the fraction of a year where Moody's assigns a higher rating minus the fraction of a year where S&P assigns a higher rating. *Post2000Dum* is a dummy variable that takes the value of one for the years in the post-public period, and zero otherwise. Other variables are defined as in Table 4. The number below each estimate of the coefficients is heteroscedasticity adjusted robust *p*-value. We cluster standard errors by the issuing firm. ***, **, * represent significance at 1%, 5% and 10% level, respectively.

	Pane A: 9 years around 2000 (1991-2009)		Panel B: 1 year around 2000 (1999-2001)		Panel C: Using Fitch as the Benchmark	
	I. New Issues	II. All Issues	III. New Issues	IV. All Issues	V. New Issues	VI. All Issues
Intercept	-0.251	-0.051	-0.023	-0.162	-1.724	-0.828
	(0.002)***	(<.0001)***	(0.931)	(<.0001)***	(<.0001)***	(<.0001)***
post2000Dum	0.178	0.285	0.475	0.114	0.555	0.106
	(<.0001)***	(<.0001)***	(0.017)**	(<.0001)***	(0.000)***	(<.0001)***
IssuerSize	0.025	0.014	-0.025	-0.020	-0.111	0.019
	(0.000)***	(<.0001)***	(0.375)	(<.0001)***	(0.001)***	(<.0001)***
Leverage	0.128	0.078	-0.697	-0.171	-0.651	0.461
	(0.084)*	(<.0001)***	(0.001)***	(0.000)***	(0.001)***	(<.0001)***
OpMargin	-0.007	-0.004	-0.053	-0.025	-0.607	-0.082
	(<.0001)***	(0.002)***	(0.000)***	(0.020)**	(0.148)	(<.0001)***
Stkretstd	-1.552	0.004	-0.231	-0.260	-1.665	-1.160
	(<.0001)***	(0.296)	(0.264)	(0.065)*	(<.0001)***	(<.0001)***
IssueSize	0.006	0.006	0.054	0.000	-0.037	-0.075
	(0.444)	(<.0001)***	(0.005)***	(0.983)	(0.003)***	(<.0001)***
YTM	8.794	0.012	-17.931	0.028	37.851	0.040
	(0.016)**	(<.0001)***	(0.144)	(<.0001)***	(<.0001)***	(<.0001)***
SeniorDum	-0.203	-0.002	0.048	-0.045	-0.379	0.041
	(<.0001)***	(0.824)	(0.702)	(0.038)**	(<.0001)***	(<.0001)***
IssuerSize*post2000Dum	0.045	0.089	0.087	0.045	0.172	0.044
	(<.0001)***	(<.0001)***	(0.017)**	(<.0001)***	(<.0001)***	(<.0001)***
Leverage*post2000Dum	-0.791	-0.384	1.014	-0.292	0.225	-0.705
	(<.0001)***	(<.0001)***	(0.003)***	(<.0001)***	(0.428)	(<.0001)***
OpMargin*post2000Dum	0.006	0.004	0.053	0.025	-0.090	-0.342
	(<.0001)***	(0.002)***	(0.000)***	(0.018)**	(0.842)	(<.0001)***
Stkretstd*post2000Dum	1.359	-0.021	1.270	0.262	2.345	1.150
	(0.148)	(0.014)**	(0.412)	(0.067)*	(0.241)	(<.0001)***
IssueSize*post2000Dum	-0.025	-0.004	-0.014	0.046	0.023	0.094
	(0.008)***	(0.008)***	(0.582)	(<.0001)***	(0.104)	(<.0001)***
YTM*post2000Dum	6.703	-0.028	17.629	-0.017	-14.810	-0.105
	(0.203)	(<.0001)***	(0.247)	(0.085)*	(0.169)	(<.0001)***
Seniordum*post2000Dum	0.460	-0.164	0.035	-0.072	0.045	-0.366
	(<.0001)***	(<.0001)***	(0.851)	(0.019)**	(0.673)	(<.0001)***
Adjusted R-square	0.145	0.090	0.092	0.042	0.194	0.117
N	11,697	137,411	1,496	15,827	5,851	32,428