Reputation and competition: evidence from the credit rating industry

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Abstract. Fair and accurate credit ratings arguably play an important role in the financial system. In an environment absent free entry of rating agencies, the provision of quality ratings is at least partially sustained by the reputational concerns of the rating agencies. The economically significant entry of a third agency into a market that was previously best described as a duopoly provides a unique experiment to examine the effect of increased competition on the disciplining effects of reputation. Using a variety of data sources, we find that ratings became friendlier to issuers and less informative as competition increased. First, we find that the average credit ratings issues by the two incumbent agencies increased. Second, we find that the correlations between bond yields and ratings fell. And lastly, negative stock price responses to announced rating downgrades are larger in absolute value, consistent with a lowering of the quality standards in that a downgrade in this weaker ratings environment is even worse news. Ultimately, our findings are consistent with models that suggest competition can impede the reputational mechanism.

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1. Introduction

A credit rating is an assessment of the credit worthiness of a corporation or security[1], most often based on the history of borrowing and repayment for the issuer, a firm's assets, liabilities and business performance. Such ratings fulfill a key function of information transmission in debt markets. Issuers seek credit ratings for a number of reasons, such as to improve the marketability or pricing of their financial obligations, improve the trust of their business counterparties or because they wish to sell securities to investors with preferences over ratings.[2] Credit ratings of firms and of particular security issues are produced by rating agencies, such as Moody's, Standard & Poor's (S&P) and Fitch Ratings. Ratings are made publicly available and disseminated for free. Agencies charge the firms they rate (or whose securities they rate) for the work, but the users of ratings, such as investors, use them for free.[3] Firms issuing debt care about the ratings they receive (see Graham and Harvey (2001) for a survey of financial executives' attitudes toward credit ratings and Campbell and Taksler (2003) for recent evidence on the effect of ratings on corporate bond prices). Since the demand for accurate ratings resides with the users of ratings (such as investors), whereas the rating agencies' revenues come from issuing firms that arguably prefer more favorable ratings to accurate ones, an agency problem can certainly arise in the form of compromised quality of credit ratings. Perhaps exacerbating this problem is the lack of free entry to this industry. It has been suggested that the key feature that keeps this tension in check is reputation. Rating agencies' reputations for honest and precise ratings are considered critical in the industry. According to a Bear Stearns & Co analyst in June 2007, S&P claimed that "reputation is more important than revenues".[4]

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[1] The majority of ratings of corporate securities relate to corporate bonds. Securities other than bonds, such as preferred stock, are frequently rated as well.

[2] The amount of capital required for banks and insurance companies who own securities varies with the credit rating. There are also real regulatory constraints in that some institutions can only hold a debt security if it is of Investment Grade (that is, holding a rating of BBB or better).

[3] Early on, rating agencies tried a different revenue model, charging users of ratings. This model suffers from being very dependent on enforcement of contractual limits to how customers can share ratings information they receive. As pointed out by White (2002), the change from user-paid to issuer-paid ratings "in the early 1970s coincides with the spread of low-cost photo-copying".

[4] Smith and Ingo (2002) also argue that reputation can help overcome agency problems in the rating industry.

Reputations are known to sometimes support quality provision in markets with information problems. In many markets, users can only assess the quality of a seller's product after using it, and not before making the decision to purchase it. The provision of quality under such imperfect information is problematic, but may be an efficient equilibrium if producers can establish reputations. In such markets, sellers are induced to provide quality (at their own expense) when the value of expected future rents associated with a maintained reputation exceeds the temporary profit gains from delivering lower quality goods (see Klein and Leffler 1983, Shapiro 1983, and Cooper and Ross 1984). Naturally, the building and maintenance of reputation is likely to be heavily affected by competition. Competition will reduce the effectiveness of the reputational mechanism for two reasons. First, reputations are only valuable if there are future producer rents. If competition reduces rents, the incentive for maintaining a reputation is correspondingly lower. Secondly, if the demand elasticity facing individual sellers is higher in a competitive market, the temptation to reduce prices or otherwise attract business may be stronger, again undermining the value of preserving a reputation to garner future rents.

On the other hand, competition may enhance the effectiveness of the reputational mechanism if the existence of competitive choice is required to make the loss of reputation a real threat. In Hörner's (2002) model, "*competition endogenously generates the outside option inducing disappointed consumers to leave firm*". Only with competition does the loss of reputation lead to lost business. Hence, theory provides conflicting predictions about the effect of increased competition on the reputational mechanism: the quality of output may increase or decrease.

The credit ratings industry provides a natural environment for studying the effect of competition on reputation and its ability to mitigate potential agency problems. The environment differs from the standard setting where there are two parties: producers who produce a good of ex ante unobservable quality, and consumers who must decide whether to buy a product where sellers are evaluated by their reputations. In the credit ratings industry, there are three parties. The rating agencies have a reputation for the quality of their ratings. Investors attempt to determine the value of securities using these ratings. Firms must then chose which rating agencies (if any) to use, based on whether investors will assign value to them. The setting is slightly more complicated than standard models, but it seems natural that

theoretical predictions should carry over from more typical settings. A few conditions are obvious. First, theories of reputation will only apply to the ratings industry if investors and issuers (firms) agree about the reputation established by raters. This seems plausible, since one key event for the ex post assessment of ratings quality, corporate default, is usually publicly observable. Second, the provision of quality must be costly to producers. Presumably, informative ratings are expensive to produce because they require the input of significant skilled labor and information discovery. In addition, honest ratings may require forgoing potential revenue since favorable ratings are valuable to issuers and consequently these issuers may offer a premium to the rating agency for the inflated ratings.

Until the late 1990s, two agencies – Moody's and Standard & Poor's (S&P), founded in 1909 and 1916, respectively – were dominant as raters of U.S. corporate debt. Other raters, such as Duff & Phelps, which entered in the early 1970s, were considerably smaller. Fitch Ratings, although as old as the main agencies (it was founded in 1913 and has rated bonds on the AAA to D scale since 1924), was historically a much smaller rater. Starting in 1989, and especially since it's acquisition by a French investor in 1997, the firm has invested in growing market share to become an alternative to S&P and Moody's, and has grown to more or less size-parity through both organic growth and acquisitions. Acquisitions include IBCA (British) in 1997, Duff & Phelps Credit Rating (American) and Thomson Bankwatch (Canadian) in 2000. Fitch's growth has varied considerably across industries. Over the decade starting in the mid-1990s that we study, Fitch's share of corporate bond ratings issued has increased from around 10% to approximately one third of the market.[5]

The argument that ratings would be of better quality if there was more competition has bee nraised many times. For example, the President of the Investment Company Institute, Paul Schott Stevens, in testimony for a US Senate Committee on Banking, Housing, and Urban Affairs states "I firmly believe that robust competition for the credit rating industry is the best way to promote the continued integrity and reliability of their ratings".[6]

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[5] This is the average across shares in 2-digit NAICS industries. The same pattern is true for the median market share across these industries as well.

[6] See http://www.financial-planning.com/asset/article/527499/fund-industry-group-calls-more-credit.html

We test theories of the impact of competition on reputation building, using the growth of Fitch's market share as the measure of competition faced by other rating firms. In our tests, we exploit the fact that entry varied across industries. We rely on three different types of evidence. First, ratings issued by S&P and Moody's increased (moved closer to the top AAA rating) as competition increased. Second, the correlation between bond yields and ratings fell. Third, we find evidence from equity price responses to firm downgrades. As competition increased, downgrade returns became larger in absolute value, consistent with a lower bar for rating categories. We observe an even greater price decline in response to competitive entry if the rating downgrade takes the issuer from the investment grade category to the speculative grade one.

While we present three distinct pieces of evidence that suggest competition led to poor ratings quality, it is possible that our results are misleading due to some omitted variable. For instance, could Fitch's rate of entry in a particular industry be correlated with future changes in ratings levels, e.g., due to industry performance changes (beyond what's captured by firm controls)? One possibility is that a period of less-friendly credit ratings coincides with demand for alternative ratings by issuers who prefer not to see their ratings decline. This is unlikely to explain our findings, however, since we find that Fitch's entry is correlated with friendlier ratings. Also, this explanation does not seem to explain why ratings become less correlated with bond prices as competition increases.

There are several implications of our findings. First, ratings quality seems to decrease with competition, providing support for the rent theories of reputation. Obviously, these findings do not necessarily indicate misbehavior by rating agencies, only that the equilibrium in the ratings industry relies on rents to reward reputation-building activities which are costly in the short run, and that the absence of such rents reduces the amount of reputation-building. Second, encouraging competition may reduce monopolistic (or in the case of ratings, oligopolistic) rents, but is not likely to improve quality. For policy makers, the benefits and costs of competition must be carefully compared.

There are several caveats and limitations to our findings. First, we only consider corporate ratings, not ratings of CDOs, mortgage-backed securities or other structured products. Second,

our findings have limited implications for the efficacy of reputation mechanisms in other imperfectly-competitive settings, since the ratings industry is a particularly special one. Third, we disregard many potential important aspects of reputations, such as how the reputational mechanism varies over firms' life-cycles (see Diamond (1989)) and how entrants appear in the industry (Mailath and Samuelson (2001)).

The rest of the paper is organized as follows. In Section 2, we discuss credit ratings and the underlying industry in more detail. In Section 3, we present the predictions of various theories, and the methodology used to test them. We present the data in Section 4 and results in Section 5. Concluding remarks can be found in Section 6.

2. Credit ratings

Sylla (2002) presents an excellent history of the ratings industry in the US. Credit ratings range from AAA to D (see Table 1B for an overview of the ratings levels for the three main rating agencies and our numerical value assignments for our empirical work). There are two main types of ratings. Bond ratings are provided for a vast majority of publicly-traded bonds in the US. Firm (or Issuer) ratings are produced by each of the three main agencies for all U.S. public firms that issue public debt. Ratings are typically shared freely by the rating agencies; whose revenues derive from charges to the firms whose credit quality is being assessed. Fees for bond ratings typically consist of a fixed fee per year coupled with a larger upfront fee which is charged when the bond issue is first rated at time of issuance.[7] Paying for firm ratings is voluntary, although raters will only consider non-public information provided by the firm itself if they receive payment from the corporate issuer (see Jorion et al. (2005) regarding raters' access to non-public information). Ratings generated at the request of the issuer are referred to as solicited ratings for which the aforementioned fees apply, whereas ratings assigned not at the issuer's request are called unsolicited. Rating agencies also provide various other types of ratings, such as short-term credit opinions and various industry-specific ratings.

[7] Fees vary with the face value of a bond issue, but usually in a non-linear way (i.e., they are capped). Also, active issuers may receive quantity discounts. In February, 2008, S&P shared information about their rating fee structure, including that corporate issuers (including industrial and financial service companies) pay "up to 4.25 basis points for most transactions" and that the minimum fee is $67,500. Also, "S&P will consider alternative fee arrangements for volume issuers and other entities that want multi-year ratings services agreements" (Standard and Poor's 2008).

Since 1975, the Securities and Exchange Commission (SEC) has limited competition in the market for credit ratings by assigning certain firms as "Nationally Recognized Statistical Rating Organizations" (NRSROs). This may induce concerns for maintaining a reputation of quality ratings beyond that induced by investors. It may also make entry in the industry more difficult, since many investors will only consider ratings by an NRSRO when making investment decisions.[8] Some argue, such as SEC Commissioner Paul S. Atkins, that "the unintended consequence of the SEC's approach to credit rating agencies was to limit competition and information flowing to investors. The legislative history reflects a genuine concern that the SEC facilitated the creation of — and perpetuated — an oligopoly in the credit rating business. Indeed, today, three NRSRO-designated firms have more than 90 percent of the market share."[9]

A natural question arises as to what extent the rating agencies will diminish either the quality or informativeness of their ratings to garner further market share. In fact, it has been alleged that Brian Clarkson, upon being named President of Moody's in August 2007, "set out to make [the firm] more client-friendly and focused on market share".[10]

In recent US Congressional hearings, practitioners have spoken out against the rating agencies and the SEC's process for recognizing these agencies, of which there currently only five with the esteemed designation of NRSROs. The President of the Investment Company Institute, Paul Schott Stevens, said during Senate testimony that "unfortunately, the current designation process does not promote--but, in fact, creates a barrier to--competition."[11] In this paper we examine whether increased competition in the credit rating industry is exclusively a positive thing, as suggested by these quotes, or whether perhaps the disciplining effects of reputation preservation are diminished when competition increases.

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[8] See Boot, Milbourn and Schmeits (2006) for both a discussion and model of such investor restrictions to hold only investment grade debt securities.

[9] See "Speech by SEC Commissioner: Remarks to the Institute of International Bankers", by SEC Commissioner Paul S. Atkins, March 3, 2008. Link to full speech is here: (http://www.sec.gov/news/speech/2008/spch030308psa.htm)

[10] See "Rating Game – As Housing Boomed, Moody's Opened Up", *Wall Street Journal*, April 11, 2008, page A1.

[11] See http://www.financial-planning.com/asset/article/527499/fund-industry-group-calls-more-credit.html

3. Theory, hypotheses and methodology

The key empirical challenge in this study is to define rating quality in a theoretically appealing and empirically relevant manner. The SEC (2003) uses the phrase that they want to promote a market environment resulting in "credible and reliable ratings". In our attempt to understand the impact of increased competition in this industry, we use several complementary approaches and three main data sets to evaluate rating quality. Our methods are based on the idea that high quality ratings should be accurate, informative and honest. Hence, we assume that lower quality ratings – that is, ratings more influenced by issuer preferences – will be more favorable to issuers (higher) and less informative about credit quality. There are multiple implications of this statement. First, lower quality ratings will be better ratings, i.e. ratings closer to the AAA end of the spectrum, since this must be the universal desire of issuers and subject of ratings. Second, we also use information in equity prices. A firm's stock price tends to fall on announcement of a rating downgrade (i.e., the announcement that a firm's or bond's rating has been lowered by a rating agency).[12] If ratings standards deteriorate as competition increases, downgrades should be worse news in the wake of increased competition, since the downgraded security (or firm) has failed to pass an even lower quality bar than what was in place originally.[13] The return to ratings downgrades should then be more negative (i.e., larger in an absolute sense). Conversely, if ratings standards improve as competition increases, ratings downgrades should result in smaller equity price drops because a downgrade under stricter quality standards suggests less negative news. We test these predictions by examining if the negative equity returns around downgrades are smaller or larger when there is more competition. It is worth pointing out that, unlike the first prediction, this is not a permanent effect. In the short run, downgrades are worse news, but in the long run, the ratings distribution has adjusted, and downgrade return should revert in magnitude.

Third, lower quality ratings mean that ratings will reflect things other than expected repayment, and thereby rating levels will likely be less correlated with bond prices. Testing the informativeness of ratings is slightly more challenging. Direct testing using actual

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[12] See, for example, Jorion et al (2005).

[13] This effect is likely to be temporary, since in the longer run, all ratings will be set consistently with these lower (less informative) standards. In this longer term setting, announced downgrades would convey less information and result in less pronounced bond and stock price effects in response to downgrades.

performance, such as the observed default rates and repayment histories for various rating categories, is impractical. Such direct testing would require a very long data horizon (since many ratings are issued for securities with long maturities for which ultimate payment performance is unobserved for a very long time. Second, for many rating categories, default is very unusual. This doesn't mean that individual ratings are not distinct, only that the distinction is difficult to identify using actual defaults. Instead of actual payment performance, we use market prices of debt to assess the informativeness of ratings. We examine the correlation of ratings with bond yields, conditional on various controls known to correlate with yields. That is, we ask if ratings contain information about bond values beyond easily observable characteristics such as bond covenants and firm characteristics. In particular, we test if competition reduces or increases the informativeness of ratings, as measured by the conditional correlation with prices.

If ratings in practice are fraught with imperfections (they become of lower quality and informativeness), then this is most likely the case because the subject of these ratings (the issuing firm) has a strict preference for more favorable ratings. However, there should be some cross-sectional variation among firms with regards to their preferences for better ratings. In particular, more heavily indebted firms are likely to care more about ratings than less indebted firms (this is born out in survey data presented in Graham and Harvey (2001)). We therefore exploit cross-firm variation in the importance of ratings to issuers, and predict that any effect of competition would be stronger for firms with higher leverage.

Our tests rely on the use of Fitch's market share as a measure of competition. We calculate this based on the number of bond ratings issued. This is not a perfect measure of market share, and revenue share would probably be preferable, but is not easily available. We believe that Fitch's market share of bond ratings is indicative of the competitive threat to S&P and Moody's in a segment of the market for ratings. One advantage of using bond ratings is that we have lots of data. From the early nineties until 2007, we use a total of approximately 1.1 million ratings as described in the next section.

4. Data

Our tests require drawing data from a number of sources. We also collect data on individual bond (issue) as well as firm (issuer) credit ratings, on firm characteristics and accounting numbers, on equity returns around rating downgrade events, and on bond prices for rated securities.

Data on bond ratings and market shares is drawn from the Mergent Fixed Income Securities Database (FISD). This database provides both issue- and issuer-specific data. We use data on ratings by S&P, Moody's and Fitch of individual issues (bonds) to estimate the market share of Fitch in each industry-year cell. The total number of bond ratings used to calculate market shares is approximately 1.1 million. Each bond rating is matched to an industry using the issuer's Cusip. There are more ratings around the year 2000 than in other years, but no year has fewer than 30,000 ratings. We define Fitch's market share as the fraction of all bond ratings in a year-industry cell performed by Fitch, where industries refer to the 2-digit North American Industry Classification System (NAICS) industries and our sample years run from 1995 to 2006 (many of our tests will not use the first few years of data). Figure 1 presents a moving average of monthly market shares for Fitch from 1998 to 2006.[14] When we analyze bond ratings, we exclude financial firms, NAICS 52, since bonds in this area may be difficult to compare to non-financial firms' bonds.

Firm ratings and accounting data is collected from the Compustat Industrial and Operating Segments databases. Compustat also contains S&P issuer credit ratings, defined as "a current opinion of an issuer's overall creditworthiness, apart from its ability to repay individual obligations. This opinion focuses on the obligor's capacity and willingness to meet its long-term financial commitments (those with maturities of more than one year) as they come due". We examine these ratings as well as bond ratings by Moody's and S&P. An important caveat to the use of these Compustat long-term debt ratings is the fact that they are updated only annually. In other tests below that require more precise calendar information on ratings changes, we rely on another database.

[14] In tests, we use the total market share for each industry-year. This figure presents moving averages of total monthly market share across industries, in order to provide a sense of the time path of Fitch's entry.

To identify bond prices, we use bond transaction data from the Mergent FISD database. This dataset covers all bond acquisitions and disposals (sales, redemptions) since 1995 by insurance companies. We exclude bonds denominated in foreign currencies, as well as any bonds that are callable, puttable, convertible, substitutable or exchangeable. We also exclude US issues by foreign issuers (i.e., Yankee bonds). We drop non-active bond issues, bonds denominated in foreign currency, and bonds with refund protection. We also require several control variables (such as issuer industry) to be available, and drop bond trades with very high or very low sales prices to avoid data errors (this constraint does not affect our results). We match each bond transaction to the most recent rating of the bond by Moody's or S&P, and throw out any bonds with no ratings in the month preceding the transaction. If there is more than one rating on the same date, we use the median of the most recent ratings. The remaining sample of bond transactions consists of approximately thirty five thousand observations.

We also collect data on changes in firm (issuer) ratings. The source for these data is Standard & Poor's Ratings History. We hand-match this sample to CRSP to generate company-level Permno. Through this process, we obtain a total of 1,585 issuing firm credit rating downgrades with some matching stock return data for 543 different firms (our number of observations in some regressions is somewhat reduced due to limited availability of independent variables). Of these downgrades, 221 are from investment grade (BBB- and higher) to junk grade (BB- and lower).

An overview of the most important variables is presented in Table 1A. The number of observations for Fitch's market share refers to the number of industry-year cells.

5. Empirical results

This section presents evidence from the various tests of rating quality.

5.1. Bond and firm credit rating levels

The first test of rating quality and how this is affected by increased competition is for the level of firm credit ratings. We regress firm ratings on Fitch's market share. Results are presented in Table 2. In column one, no controls are included. In a sample of 24,606 firm-year observations, there is a significant positive correlation between competition and credit ratings, suggesting

that more competition pushes ratings toward the higher end of the rating spectrum (i.e. toward AAA). This result is consistent with theories that predict a negative effect of competition on product quality, along the lines of Klein and Leffler (1984). The result in column (1) may be unreliable, however, since no controls are included. In column two, we rectify this by including year and industry dummies. This pushes up the R-squared significantly, and reduces the coefficient and standard error on competition. In this specification, the coefficient on Fitch's market share is positive and significant at the 5% level. The magnitude is modest but non-trivial. For a one standard deviation change in competition (0.142), average ratings are predicted to increase by 0.191. This corresponds to, for example, a one step upgrade of approximately one out of every five firms. In column three, we include firm fixed effects (which makes industry fixed effects redundant). The estimated effect of competition remains positive and significant, and the implied magnitude is slightly smaller (one in nine firms). So far, we have not controlled for any time-varying features of a firm. In column four, we include further firm controls (see table notes) intended to capture each firm's current performance. The estimated coefficient is very similar to the one founding the previous specification.

Implicitly, the left hand side variable treats every step of the rating system as equal in the OLS specifications (see Table 1B for details of the numerical rating variable). There is no reason for this to be accurate, however. In column six, we run an ordered probit regression instead of OLS. This specification allows each cut-off to be estimated and so implicitly allows the effect of dependent variables to vary across different levels of ratings. The effect of competition remains positive and significant.

Overall, the firm rating results suggest that ratings become more favorable to issuers when competition increases, consistent with Klein and Leffler (1983) style theories that suggest disciplining effects of reputation are diminished as competition increases.

As a robustness test, we turn now to ratings of individual issues as opposed to the issuing firms. Such tests should provide further evidence of how increases in competition among rating agencies can affect the quality of ratings. In Table 3, we report the estimates of regressions of bond credit ratings on Fitch's market share. The number of observations is very large, since many firms issue very many bonds, even though financial firms (NAICS 52) are

excluded from this sample. We include a range of fixed effects in order to control for the effect of observables on bond ratings. In column one, we report a regression of ratings on Fitch's market share, controlling for fixed effects for year and industry, as well as the previous rating for the same bond. Together with our competition measure, the fixed effects capture 93.8% of the variation in ratings. The effect of competition is positive and significant, in line with the finding for firm level ratings. Observe that the estimated magnitude is about half of the firm level effect (a one standard deviation increase in competition predicts that one in twenty one bonds will have a one step higher rating). The large number of observations of bond ratings allows us even more careful controls. In column two, we control for bond duration non-parametrically by including fixed effects for time to maturity (measured in years) as well as the lagged rating (i.e. the previous rating by S&P or Moody's, whenever it occurred). The coefficient estimate is now slightly higher (one in sixteen bonds). In column three, we include bond issue fixed effects, which make industry fixed effects redundant. In this specification, Fitch's market share is again positively and significantly related to ratings (this time, the implied magnitude is a one step upgrade for one in fourteen bonds, and the significance level is 5%). The R-squared in this regression is almost 96%, indicating how much of the variation in ratings is explained by the fixed effects, xx in total in column three. Like firm level ratings, bond ratings increase with competition, consistent with the theories predicting a negative effect of competition on quality.

5.2. Firm credit rating levels: interaction tests

We next consider cross-sectional variation in the impact of competition on firm ratings. The effect of competition should be felt more acutely for those firms that are likely to care more about their ratings. We use firm indebtedness to identify firms with greater concern for ratings. In Table 4, we interact Fitch's market share with four measure of indebtedness: leverage (debt over assets), long-term leverage (long term debt over assets), a high leverage dummy (leverage is above the median in the firm's industry) and debt divided by EBITDA. These specifications allow us to include industry-year interaction fixed effects (i.e. approximately 400 dummies), so reducing any concern about omitted variables that are correlated with Fitch's market share and vary within industries and years. Without exception, the interactions of competition and debt are negative and highly significant. This suggests that the effect of competition is disproportionately felt for firms which are likely to care more about their ratings because they

rely more heavily on debt financing, which is consistent with the argument that competition makes ratings more responsive to firm preferences.

5.3. Bond prices and ratings

With the empirical results related to rating levels in hand, we turn now tests of how informative bond ratings are and whether this informativeness changes in response to competition. In particular, we examine the conditional correlation of prices and ratings declines when competition increases. We test this by including Fitch's market share times a bond's credit rating in a regression of bond prices on bond and issuer characteristics. Results are reported in Table 5. Bond trades occur at different times, and interest rates are likely to be an important source of time series variation in prices, so we include fixed effects for each date (each month-year). In column one, we control for credit rating, the yield offered when the bond was first issued, the size of the issuer (log of face value) and time remaining until maturity, as well as the square of the last two variables in case their effect is non-linear. We also include fixed effects for issuing firms and control for Fitch's market share. The coefficient on credit ratings is positive and significant, confirming that bonds with better credit ratings trade at higher prices. The coefficient on the credit rating – Fitch's market share interaction is negative and highly significant (t-stat 3.5, significant at the 1% level), implying that the correlation of credit ratings and prices is lower when competition is stronger. The magnitude of this effect is large. A one standard deviation increase in Fitch's market share reduces the coefficient on credit ratings by approximately 12% of the implied value when Fitch has zero market share. This is consistent with the view that competition *reduces* the information content of ratings.

In column two, we include bond issue fixed effects to more carefully control for bond characteristics. Several variables drop out of the regression because they do not vary within a particular bond issue (e.g. face value, issuing firm, and so on). The interaction of credit ratings and Fitch's market share is less significant, but remains significant at the 5% level. The coefficient is very similar to the estimate in column one.

Campbell and Taksler (2003) suggest that insurance companies are less likely to trade in non-investment grade bonds, so we run a regression without those bonds (those with ratings of BB+ or lower). In column three, we rerun the regression in column one but exclude observations for

non-investment grade bonds, dropping about a tenth of the observations. Credit ratings are somewhat less important for the price of investment grade bonds, and the implied net coefficient on credit ratings for an industry where Fitch's market share is at the median, is about a third lower than for the overall sample. The effect of competition remains similar: an increase in Fitch's market share by one standard deviation reduces the coefficient on credit ratings by approximately 11% of the implied value when Fitch has zero market share. Finally, in column four we include year-industry interaction fixed effects, which drops Fitch's market share out of the equation. The result for the interaction is somewhat larger in this specifiation, implying a reduction of 23% in the correlation between credit ratings and bond prices for each increase in Fitch's market share. Again, the implication is that credit ratings are less informative for prices when competition is stronger. Overall, the results in Table 5 support the theories that predict lower quality (here measured as less informative) ratings when competition is stronger.

5.4. Rating downgrade announcement returns

In the next, and final, set of tests, we explore the information content of ratings by examining equity price reactions in response to rating downgrades. We follow the general methodology of Holthausen and Leftwich (1986).[15]

A quality reduction in ratings could have two contradictory effects. First, lower quality ratings should correspond to reduced creditor quality in any particular ratings category. One can then interpret this as the rating agency "lowering the bar", making a rating downgrade now even worse news since the firm is falling below an even lower quality threshold. Thus, returns should be worse for downgrades following a rating quality reduction should be worse signals. This should tend to make downgrade returns more negative (i.e. larger in an absolute sense) in response to an announced rating downgrade.

There is also a second, long term effect, of such quality shifts. This relates to the reduced informational content overall once the population of ratings has come to reflect these factors

[15] See Jorion et al (2005) for a recent example. There is also a literature looking at bond price reactions to downgrades, including Weinstein (1977), Wakeman (1978), Katz (1974), Grier and Katz (1976) and Ingram, Brooks and Copeland (1983) (with mixed findings). Hand, Holthausen and Leftwich (1992) find excess returns of around -0.80% for the day of and day after a downgrade announcement.

other than credit quality. Lower quality ratings reflect factors other than expected repayment on the issue and that such ratings will be less correlated with the creditworthiness of borrowers. This will likely tend to reduce the amount of information released with downgrades, hence moving downgrades returns toward zero. Since this effect requires the population of ratings to be moved to a new equilibrium, whereas in practice revising ratings is most likely a slow and gradual process, this effect is unlikely to be visible quickly. It is therefore likely to be more challenging econometrically to detect.

We rely on this distinction in timing and focus on the first effect, which implies larger (i.e. even more negative) downgrade returns as quality increases. If our competition measure correlates with worse quality of ratings, returns should be negatively correlated with competition. We present results for this type of test in Table 6.

The dependent variable in Table 6 is the equity return during an event window around a firm downgrade, net of the market return during the same period.[16] We use [-1,1], [-2,2] and [-10,1] daily event windows (the latter is in case there is pre-event return drift). In columns one to three, we control only for industry and year fixed effects. The effect of competition on returns is negative for all event windows, and the two longer event windows present significant coefficients. The implied magnitude is also large. Based on column two, an increase of Fitch's market share is implied to reduce average event returns by about half of the mean, or 15% of a standard deviation.[17]

Event returns are likely to vary by firm, and reflect features such as how variable its share price is. In columns four, we control for firm volatility, along with its square and cube to capture any nonlinearities. Fitch's market share has a negative and significant effect on five day event window returns, with a magnitude essentially unchanged from column two. The distinction between junk and investment grade is often considered particularly important. In our sample, the mean equity return in a five day event window is 3.7% for such downgrades, slightly higher than the average 2.7% return for all downgrades. By focusing on these larger events, we

[16] We have run similar tests with equity returns around bond downgrades. Although mean returns for these are different, the result for the effect of competition is very similar.

[17] We have also clustered standard errors by firm instead of by industry-year, with similar results (somewhat higher significance).

hope to more clearly identify the effect of competition, although it will reduce our sample size. In columns five and six, we focus exclusively on downgrades from investment grade to junk status, leaving us with 182 observations. With or without controls for volatility, in column five and six, respectively, we find an effect of competition about three times as large for downgrades to junk as for the full sample. The effect is more significant than for the full sample. A one standard deviation increase in Fitch's market share implies reduced average event returns by slightly more than the mean, or 40% of a standard deviation.

The results in Table 6 suggest that competition has made ratings more lenient and lowered the quality bar for downgrades, making downgrade worse news and equity returns around downgrades more negative.

6. Conclusions

Credit ratings are a key aspect of the financial system. The quality of ratings is almost certainly sustained in large part by the reputational concerns of rating agencies, whose paying customers have no inherent interest in the quality of ratings. Competition in this industry has been increasing and there have been calls for yet more competition. Will this reduce quality, as can be predicted by an argument along the lines of Klein and Leffler (1983) or improve it, as perhaps predicted by Hörner (2002)? We test these conflicting predictions in the ratings industry using the entry of Fitch Ratings as an experiment in the amount of competition faced by the incumbent rating agencies of S&P and Moody's. [18]

We find three pieces of evidence, all more or less consistent with a reduction in credit rating quality as Fitch increased its market presence. First, competition is associated with friendlier ratings (i.e., they are closer to AAA). Second, ratings and bond prices have become less correlated (conditional on public information about bonds and issuers). Third, at least in the short run, equity prices react more to downgrades as competition increases, consistent with a

[18] The system of third party ratings is based on considerable investment by rating agencies in a reputation for honesty and precision. These investments are only likely to occur if the rewards are commensurate. The current system relies on the existence of rents outweighing the short-term interest of individual issuers. Our study confirms this, but implies no criticism of individual firms. The expectation that rating agencies should provide a public good for free is unrealistic. If they are to fulfill their function, rents may be necessary.

lowering of the bar for ratings categories. This is especially clear for downgrades from investment grade to junk status.

The economic magnitudes we find are moderate but interesting. Conservatively, we find that a rise in competition corresponding to a one standard deviation increase in Fitch's market share is predicted to increase the average firm and bond rating by 5-10% of a rating step (and increase it significantly more for more highly-levered firms), to reduce the conditional correlation between ratings and bond prices by about a sixth compared to the case when Fitch has no market share, and increase the negative equity price responses to downgrades by a quarter or more.

These results have potential policy implications. For regulators, it is worth considering that increasing competition in the ratings industry involves the risk of impairing the reputational mechanism that underlies the provision of good quality ratings. There may obviously be benefits of competition in other areas (e.g., reducing rents may be a policy goal in and of itself). Nevertheless, calls for more competition, such as by the U.S. Department of Justice (1998), may deserve a caveat. For bond markets, it is clear that relying on third part ratings paid for by issuers is not a system without risks. Our empirical findings suggest that the system will work better when competition is not too severe. These results about the level of competition and the efficiency of reputational mechanisms offer support for models of the Klein and Leffler (1983) variety. In other words, competition reduces future rents and increases the short terms gains to cheating, and hence makes the reputational equilibrium harder to sustain. Obviously, these implications may not apply to other markets and in other settings.

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Table 1A: Summary statistics

	Firm credit rating	Bond credit rating	Fitch market share	Bond price (normalized)	Leverage	Debt/ EBITDA	Downgrade equity return [-1,1]	Downgrade equity return [-2,2]	Downgrade equity return [-10,1]	Investment-to-junk downgrade return [-2,2]
Mean	18.246	23.080	0.212	100.737	0.261	2.599	-0.027	-0.027	-0.030	-0.037
Median	19	23	0.225	100	0.232	1.852	-0.011	-0.011	-0.013	-0.015
Standard Deviation	3.910	4.943	0.142	6.412	0.224	2.716	0.095	0.110	0.133	0.109
Observations	16,821	686,990	429	26,625	62,686	52,118	1,844	1,837	1,777	221

Notes: Each column presents the coefficient estimates from an OLS or logistic specification. Intercepts not reported. The sample period is from 1995 until 2006. The left hand side variable is coded as follows: AAA = 1, AA+ = 2, AA = 3, AA- = 4, A+ = 5, A = 6, A- = 7, BBB+ = 8, BBB = 9, BBB- = 10, BB+ = 11, BB= 12, BB- = 13, B+ = 14, B = 15, B- = 16, CCC = 17, CC = 18, C = 19 and D (default) = 20. Firm charateristics are the measured at the end of the previous fiscal year (using accounting data from Compustat). Leverage is debt over total assets. Downgrade returns refer to cumulative equity returns around a firm downgrade. Investment-to-junk refers to downgrades of firms from investment grade (BBB- and better) to junk status (BB+ and worse).

Table 1B. Credit ratings

Rating group	Rating agency: Moody's	Rating agency: S&P, Fitch	Numerical value assigned*	Category definition**
Investment Grade	AAA	AAA	28	The obligor's capacity to meet its financial commitment on the obligation is extremely strong.
	Aa	AA	24, 25, 26	The obligor's capacity to meet its financial commitment on the obligation is very strong.
	A	A	21, 22, 23	Somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories. However, the obligor's capacity to meet its financial commitment on the obligation is still strong.
	Baa	BBB	18, 19, 20	Exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitment on the obligation.
Speculative Grade	Ba	BB	15, 16, 17	Obligations rated 'BB', 'B', 'CCC', 'CC', and 'C' are regarded as having significant speculative characteristics. 'BB' indicates the least degree of speculation and 'C' the highest. While such obligations will likely have some quality and protective characteristics, these may be outweighed by large uncertainties or major exposures to adverse conditions.
	B	B	12, 13, 14	
	Caa	CCC	9, 10, 11	
	Ca	CC	7	
	C	C	4	
Default	D	D	1	An obligation in payment default. The 'D' rating category is used when payments on an obligation are not made on the date due even if the applicable grace period has not expired, unless Standard & Poor's believes that such payments will be made during such grace period. The 'D' rating also will be used upon the filing of a bankruptcy petition or the taking of a similar action if payments on an obligation are jeopardized.

* Multiple numerical values for a single rating level represent ratings with a + qualifier, no qualifier, and a - qualifier, respectively.

** Source for ratings definitions is Standard & Poor's Ratings Definitions from 17-Mar-2008.

Table 2. Predicting firm credit ratings with Fitch market share

	Dependent Variable: firm credit rating				
Regression model	OLS	OLS	OLS	OLS	Ordered Probit
	(1)	(2)	(3)	(4)	(5)
Fitch market share	2.994 ***	1.3466 **	0.8027 **	0.8088 **	0.3618 **
	(1.2845)	(0.5440)	(0.3935)	(0.4210)	(0.1523)
Year Fixed Effects		X	X	X	
Industry Fixed Effects		X			
Firm Fixed Effects			X	X	
Firm controls				X	
R^2	0.0057	0.1408	0.8865	0.9032	n/a
N	*N* = 16, 715	*N* = 16,715	*N* = 16,715	*N* = 16,715	*N* = 16,715

Notes: Each column presents the coefficient estimates from an OLS or ordered probit specification. Intercepts not reported. The sample period is from 1995 until 2006. The left hand side variable refers to credit opinion ratings by Standard and Poor's and is coded from 28 (AAA) to 1 (D). See Table 1 for details. Fitch market share is the fraction of bond ratings in an industry-year cell performed by Fitch Ratings. Firm charateristics are the log of sales, log of book value of assets, cash divided by total assets (and it's square), EBITDA divided by total assets (and it's square), cash flow over total assets (and it's square), EBITDA over sales (and it's square), cash flow over sales (and it's square), PPE over total assets (and it's square), interest expense over EBITDA (and it's square), debt over total assets (and it's square), all measured at the end of the previous fiscal year (using accounting data from Compustat). Industries are 2-digit level North American Industry Classifications System (NAICS) industries. The standard errors for the coefficient estimates are in parentheses and are clustered by industry*year cell.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3. Predicting bond ratings with Fitch market share

	Dependent Variable: bond issue credit rating		
Regression model	OLS	OLS	OLS
	(1)	(2)	(3)
Fitch market share	0.3378 *	0.4350 *	0.5153 **
	(0.2338)	(0.1876)	(0.2203)
Previous rating	0.9861 ***		
	(0.0062)		
Year Fixed Effects	X	X	X
Industry Fixed Effects	X	X	
Time to maturity Fixed Effects		X	X
Previous rating Fixed Effects		X	X
Bond Issue Fixed Effects			X
R^2	0.938	0.940	0.959
N	*N* = 375,447	*N* = 368,782	*N* = 368,782

Notes: Each column presents the coefficient estimates from an OLS or ordered probit specification. Intercepts not reported. The sample period is from 1995 until 2006. The left hand side variable refers to credit opinion ratings by Standard and Poor's and is coded from 28 (AAA) to 1 (D). See Table 1 for details. Fitch market share is the fraction of bond ratings in an industry-year cell performed by Fitch Ratings. Industries are 2-digit level North American Industry Classifications System (NAICS) industries. The standard errors for the coefficient estimates are in parentheses and are clustered by industry*year cell.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Predicting rating levels with Fitch market share - interactions with leverage

	Dependent Variable: firm credit rating			
Regression model	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)
Fitch market share * leverage	6.2954***			
	(1.887)			
Fitch market share * long term leverage		5.308 ***		
		(1.951)		
Fitch market share * high leverage dummy variable			2.053 ***	
			(0.789)	
Fitch market share * Debt/EBITDA				0.3912 ***
				(0.151)
Debt/EBITDA				0.3075 ***
				(0.0534)
Firm controls	X	X	X	X
Industry * Year Fixed Effects	X	X	X	X
R^2	0.591	0.599	0.591	0.628
N	*N* = 16,715	*N* = 16,715	*N* = 16,715	*N* = 16,013

Notes: Each column presents the coefficient estimates from an OLS or logistic specification. Intercepts not reported. The sample period is from 1995 until 2006. The left hand side variable refers to firm credit opinion ratings by Standard and Poor's and is coded from 28 (AAA) to 1 (D). See Table 1 for details. Fitch market share is the fraction of bond ratings in an industry-year cell performed by Fitch Ratings. Firm charateristics are the log of sales, log of book value of assets, cash divided by total assets (and it's square), EBITDA divided by total assets (and it's square), cash flow over total assets (and it's square), EBITDA over sales (and it's square), cash flow over sales (and it's square), PPE over total assets (and it's square), interest expense over EBITDA (and it's square), debt over total assets (and it's square), all measured at the end of the previous fiscal year (using accounting data from Compustat). Leverage is debt over total assets, , long term leverage is long-term debt over assets, teh highe leverage dummy is equal to one if debt over assets is above 0.2324 (the sample median). Industries are 2-digit level North American Industry Classifications System (NAICS) industries. The standard errors for the coefficient estimates are in parentheses and are clustered by industry*year cell.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Bond prices and ratings - the effect of Fitch market share

	Dependent Variable: bond price (normalized)			
Regression model	OLS	OLS	OLS	OLS
Sub-sample	All ratings	All ratings	Investment grade	All ratings
	(1)	(2)	(3)	(4)
Credit rating * Fitch market share	-1.923 ***	-1.774 **	-1.152 **	-3.617 ***
	(0.545)	(0.845)	(0.540)	(0.813)
Credit rating	2.283 ***	2.471 ***	1.548 ***	2.229 ***
	(0.182)	(0.237)	(0.175)	(0.247)
Fitch market share	40.21 ***	36.15 *	23.27 *	
	(12.41)	(18.648)	(12.78)	
Initial offering yield	4.494 ***		4.672 ***	4.237 ***
	(0.253)		(0.298)	(0.253)
Log of face value of issue	0.108		-0.136	1.326 **
	(0.328)		(0.234)	(0.571)
Log of face value of issue, squared	0.0094		0.019 *	-0.043 *
	(0.0132)		(0.010)	(0.025)
Log of time to maturity	-0.634	11.92 ***	-1.742	-0.549
	(0.950)	(3.262)	(1.145)	(1.138)
Log of time to maturity, squared	-0.563 **	-3.953 **	-0.326 *	-0.491 **
	(0.167)	(1.543)	(0.196)	(0.213)
Firm Fixed Effects	X		X	
Issue Fixed Effects		X		
Year - Industry Fixed Effects				X
Date Fixed Effects (Month - Year)	X	X	X	X
R^2	0.666	0.769	0.690	0.452
N	*N* = 35,714	*N* = 35,714	*N* = 32,031	*N* = 35,714

Notes: Each column presents the coefficient estimates from an OLS regression. Intercepts not reported. Each observation is the price of a bond in one transaction. The sample period is from 1995 until 2006. The left hand side variable is the price per bond as a fraction of par value, times one hundred, as reported by FISD for a bond trade. Credit ratings are bond credit rating issued by Standard and Poors and Moody's (reported by FISD), and represent the median rating in the month preceding the transaction. Fitch market share is the fraction of bond ratings in an industry-year cell performed by Fitch Ratings. Industries are 2-digit level North American Industry Classifications System (NAICS) industries. Bonds are excluded if they have non-standard features (see text for details). The standard errors for the coefficient estimates are in parentheses and are clustered by industry*year cell. In column (3), non-investment grade bonds are excluded.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Announcement returns around Firm credit rating downgrades - the effect of Fitch market share

	Dependent Variable: equity return [t1,t2]					
Regression model [t1,t2]	OLS [-1,1]	OLS [-2,2]	OLS [-10,1]	OLS [-2,2]	OLS [-2,2]	OLS [-2,2]
	(1)	(2)	(3)	(4)	(5)	(6)
Fitch market share	-0.046	-0.092 *	-0.112 **	-0.094 *	-0.290 ***	-0.307 ***
	(0.037)	(0.053)	(0.057)	(0.050)	(0.090)	(0.097)
Volatility				-1.059		-10.820
				(1.303)		(6.858)
Volatility squared				-10.092		305.4 *
				(28.57)		(173.51)
Volatility cubed				122.7		-2695.8 **
				(158.7)		(1272.7)
Industry Fixed Effects	X	X	X	X	X	X
Year Fixed Effects	X	X	X	X	X	X
R^2	0.064	0.074	0.060	0.109	0.287	0.364
N	*N* = 1,585	*N* = 1,580	*N* = 1,533	*N* = 1,552	*N* = 182	*N* = 179

Notes: Each column presents the coefficient estimates from an OLS regression. Intercepts not reported. Returns are for firm equity, as reported in the CRSP database. The sample period is from 1996 until 2006. The left hand side variable is the cumulative equity return from time t1 to t2 (where zero represents the day of the downgrade return around a rating downgrade), calculated from CRSP data and net of the value-weighted market return. Observations with event returns larger than 50 percent or lower than minus 50 percent are excluded. Volatility is the standard deviation of daily stock returns in the preceding 120 trading days. Fitch market share is the fraction of bond ratings in an industry-year cell performed by Fitch Ratings. Industries are 2-digit level North American Industry Classifications System (NAICS) industries. The standard errors for the coefficient estimates are in parentheses and are clustered by industry*year cell. Ibn column five and six, only downgrades from investment grade to junk status are included.

* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1.
Fitch monthly market share of credit ratings (U.S. issuers)
12 month moving average 1998 - 2006