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Does Increased Competition Affect Credit Ratings? A Reexamination of the Effect of Fitch's Market Share on Credit Ratings in the Corporate Bond Market

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Abstract

We examine two competing views regarding the impact of competition among credit rating agencies on rating quality: the view that rating agencies do not sacrifice their reputation by inflating firm ratings, and the view that competition among rating agencies arising from the conflict of interest inherent in an "issuer pay" model creates pressure to inflate ratings. Using Fitch's market share as a measure of competition among rating agencies and controlling for the endogeneity problem caused by unobservable industry effects, we find no relation between Fitch's market share and ratings, suggesting that competition does not lead to rating inflation.

I. Introduction

Credit rating agencies play a crucial role in the efficient operation of capital markets by providing independent assessments of a borrower's credit risk. Credit ratings assigned by rating agencies have an effect on the welfare of both borrowers and investors. Higher credit ratings allow firms to borrow at better terms and thus positively affect a firm's value. Because of investment policies or government regulations, some institutional investors and banks are allowed to invest only in investment-grade bonds. Credit ratings assigned by rating agencies can thus affect the allocation of risk capital in the economy.

Given the critical role of credit rating agencies in the capital market, it is important for rating agencies to provide market participants with accurate ratings based on unbiased assessment of firms' creditworthiness. It is also important for regulators to assure that rating agencies fulfill their duty as unbiased assessors.

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There are two competing views regarding the impact of competition among credit rating agencies on credit rating quality: the view that competition does not result in rating inflation, and the view that competition leads to rating inflation. Specifically, the former view posits that rating agencies, especially those that are active in the credit rating business, attach a high value to their reputation, so they have strong incentives to provide credible ratings. Supporting the view that credit rating agencies have played the proper role of gatekeepers, previous studies show that rating standards in the corporate bond market have experienced a secular tightening trend, which has resulted in a downward trend in firm credit ratings over time (Blume, Lim, and MacKinlay (1998), Amato and Furfine (2004), Jorion, Shi, and Zhang (2009), and Baghai, Servaes, and Tamayo (2014)). Furthermore, in a recent paper, Xia (2012) examines how the quality of ratings issued by incumbent issuer-paid rating agencies responds to the entry of Egan-Jones Rating Company (EJR), an investor-paid rating agency. He finds a significant improvement in the quality of Standard & Poor's (S&P) ratings following EJR's rating initiation on the corporate bond issue: S&P's rating levels are shifted downward, ratings are more responsive to market-based risk measures, and S&P's rating changes are associated with stronger market reactions. These findings suggest that the increased competition among rating agencies in fact improves the rating quality of incumbent raters.

On the other hand, the latter view holds that given the conflict of interest inherent in the rating business, competition among rating agencies creates pressure to inflate ratings. The majority of credit rating agencies adopt the issuer-pay business model in which they are paid by the firms they rate. This issuer-pay model gives issuers strong incentives to shop around the rating agencies that provide favorable ratings, since the levels of credit ratings directly affect issuers' costs of financing. This issuer behavior in turn provides both new and existing credit rating agencies that want to quickly ramp up their market shares with incentives to inflate ratings, which causes rating inflation in the rating industry. Consistent with this view, prior theoretical studies show that rating agencies are more likely to issue inflated ratings when they face competition pressure (Bolton, Freixas, and Shapiro (2012), Camanho, Deb, and Liu (2010)). The studies further show that rating agencies' incentives to issue inflated ratings are higher when the rated securities are complex (Mathis, McAndrews, and Rochet (2009)) or when ratings are issued during a boom period (Bar-Isaac and Shapiro (2013)). These rating inflation problems can become worse when the incentives for regulatory arbitrage exist (e.g., Acharya and Richardson (2009), Acharya, Schnabl, and Suarez (2013), and Opp, Opp, and Harris (2013)) or when issuers shop around favorable ratings (Bongaerts, Cremers, and Goetzmann (2012)).[1]

[1]Even though rating inflation exists, its extent can differ between corporate bond and structured bond markets. There are multiple reasons for this difference. First, corporate bonds are not as complex as structured bonds, and their ratings are mainly based on the analysis on the issuing firms. These differences make the rating process of corporate bonds more transparent than that of structured bonds. Consequently, rating inflation in the corporate bond market is more likely to be easily detected than rating inflation in the structured bond market, making rating inflation in the corporate bond market less likely. Second, while the corporate bond market has many issuers, the structured bond market is dominated by a small number of large financial institutions. Thus, the corporate bond market tends to

Supporting the view that competition among rating agencies results in rating inflation, in their recent empirical study, Becker and Milbourn (BM) (2011) show a positive relation between competition among rating agencies as measured by Fitch's market share and firm credit ratings during the period 1995–2006. They provide evidence that Fitch's market share in a particular industry (their main variable of interest used to capture the intensity of competition among rating agencies) is positively correlated with the credit ratings of the firms in that industry. They interpret this result as evidence that increased competition from Fitch, the main competitor of the two incumbent rating agencies, Moody's and S&P, leads to rating inflation in corporate bond markets due to potential conflicts of interest among rating agencies.[2] This interpretation is consistent with the view raised by some investors and regulators who have blamed credit rating agencies since the recent financial crisis for their failure to fulfill their responsibilities as gatekeepers.

Overall, the mixed evidence on rating inflation in corporate bond markets suggests that the issue regarding the impact of competition among credit rating agencies on rating quality remains an important empirical question. Given the controversy regarding the role of rating agencies in the corporate bond market and their importance in the capital market, it is important for both academics and regulators to fully understand whether the ratings have indeed been unduly inflated owing to intensified competition among rating agencies.

In this paper, we examine the debate over the alleged conflict of interest in the rating industry by revisiting the analysis of BM (2011). While their results, that competition results in inflated ratings, are provoking and have important implications for various stakeholders in the credit rating industry, it is premature to make such a conclusion for two reasons: First, despite the fact that the average Fitch's market share has increased steadily since 2000 from approximately 10% to 34%, the average credit rating has actually decreased a bit over the same period.[3] While the decreasing trend of credit rating over time does not necessarily invalidate BM's conclusion, it suggests that the effect of competition among rating agencies on rating inflation, if it exists, cannot be of first-order importance. Second, their argument crucially depends on the assumptions that rating agencies have different reputational concerns in different industries and that rating agencies are willing to sacrifice their reputation by inflating firms' ratings in an industry where competition from Fitch is strong. However, the assumption that the same rating agency has weaker reputational concern in a certain industry (e.g., finance industry) than in other industries (e.g., retail industry), or vice versa, is a rather strong presumption. In most cases, the rating agency is likely to care about its

be less concentrated than the structured bond market, suggesting that the bargaining power of large issuers against rating agencies in the former market is smaller than that of large issuers in the latter market. These arguments imply that rating inflation should be more prevalent in the structured bond market than in the corporate bond market.

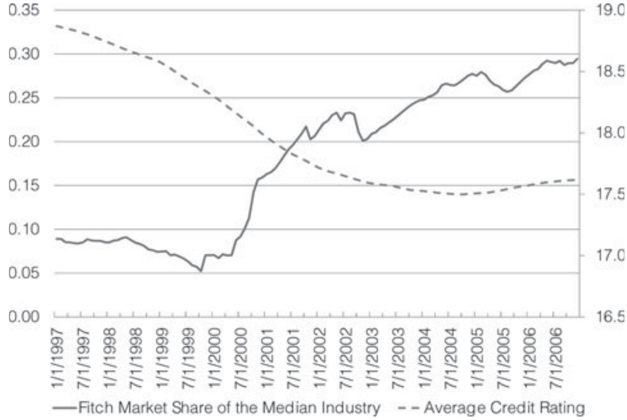
[2]Since EJR adopts an investor-paid business model that is different from the traditional issuer-paid business model adopted by a majority of rating agencies, the findings in Xia (2012) do not necessarily contradict BM's (2011) finding.

[3]See Figure 1 for the time-series trend of Fitch's market share and credit ratings. It plots the trends in the 24-month rolling average of Fitch's market share and the 24-month rolling average of credit ratings of all Compustat firms rated by S&P.

FIGURE 1

Trends in Average Fitch's Market Share and Average Firm Credit Rating

Figure 1 shows the trends in average Fitch's market share (left scale) and average firm credit rating (right scale) over the sample period 1995–2006. A firm's credit rating is measured at the end of its fiscal year and is converted into the rating scale number, with a higher number indicating a better credit rating. Details of the conversion scheme are described in Table 1. Average rating is the monthly average of the rating scale number of all Compustat firms rated by S&P during 1995–2009. For each industry-month cell, where the industry is defined by the first 2 digits of the NAICS code, the Fitch's market share is computed by dividing the number of bond ratings assigned by Fitch by the sum of the number of bond ratings assigned by S&P, Moody's, and Fitch. The 24-month moving average is applied to estimate the trends of both average Fitch's market share and average credit rating.



overall reputation. If the rating agency has the same reputational concern for its ratings irrespective of a firm's industry, then the cross-sectional difference in competition measure will not likely lead to cross-sectional difference in rating quality across industries.

We argue that Fitch's market share (BM's (2011) main measure of competition among rating agencies) is subject to an endogeneity problem. Since Fitch's market share is an industry-level variable that captures Fitch's presence in a particular industry-year, it is likely to be correlated with certain industry characteristics that also influence credit ratings. We find that the effect of Fitch's market share on credit ratings issued by S&P and Moody's is indeed driven by industry characteristics, not by "competition effect."

Our analysis begins by replicating BM's (2011) main results. Consistent with their results, we find a positive relation between Fitch's market share and firm credit ratings during their 1995–2006 sample period. We then examine whether their results are robust to the endogeneity problem discussed above. Specifically, in the regressions that examine the effect of Fitch's market share on firm credit rating, we include industry-fixed effects to control for unobservable industry characteristics as well as firm-level determinants of credit ratings. We find that their main results are not robust to using this approach. We also find that the positive relation between Fitch's market share and credit ratings is largely driven by the cross-sectional differences in both Fitch's market share and credit ratings between firms in regulated (i.e., finance and utilities) and nonregulated industries. In other words, the positive relation arises because both Fitch's market share and credit ratings are higher in regulated industries than in nonregulated industries. Once we exclude firms in regulated industries from the analysis, the positive relation no longer holds for firms in nonregulated industries even though nonregulated industries account for more than 80% of the BM's sample.

Next, we examine whether the levels of credit ratings are different between regulated and nonregulated firms and whether the debt ratios of regulated firms have a different impact on credit ratings than do those of nonregulated firms. We find that regulated firms have higher credit ratings than nonregulated firms even after controlling for the set of firm characteristics that are known to affect ratings. Consistent with Morgan (2002), we also find that the effect of financial leverage on credit ratings is different between financial and nonregulated firms. These results suggest that it is important to control for industry characteristics in regression models that attempt to predict firms' credit ratings.

Finally, we examine whether several robustness tests performed by BM (2011) hold after controlling for industry effects and firm characteristics. First, we examine whether the positive relation between Fitch's market share and credit ratings is more pronounced for firms with a higher debt ratio. Since firms that are closer to financial distress are more likely to demand inflated ratings, the effect of Fitch's market share on credit ratings is expected to be more pronounced for a firm with a higher debt ratio. Second, we examine whether Fitch's market share affects the informativeness of credit ratings in predicting future firm defaults. If competition results in rating inflation, the credit ratings associated with higher Fitch's market share should have less power in predicting future firm defaults. Last, we investigate whether Fitch's market share affects the yield spreads of corporate bonds. If credit ratings are inflated due to competition from Fitch, and the bond market is sufficiently efficient to discern inflated ratings, then bonds that are associated with higher Fitch's market share are expected to exhibit higher yield spreads than bonds that are associated with lower Fitch's market share. While BM find evidence in support of these three predictions, we find little evidence supporting these predictions after controlling for industry effects and firm characteristics.

Taken together, our results indicate that the finding in the previous study that the positive relation between Fitch's market share and credit ratings is driven by industry characteristics rather than competition among rating agencies. In particular, this positive relation is largely caused by the fact that the Fitch's market share and credit ratings were relatively high in regulated industries during the late 1990s. For some reasons, Fitch chose to enter regulated industries more aggressively in the late 1990s than nonregulated industries.[4] Given a generally higher level of credit ratings in regulated industries, it is not surprising to observe the positive relation between Fitch's market share and credit ratings if industry effects are not properly controlled for.

Our results have important policy implications for the costs and benefits of competition in the rating industry. From the positive side, competition can

[4]It could be that Fitch chose to enter regulated industries because firms in these industries are large and frequent issuers of bonds. In untabulated tests, we compute the number of bond issues and the total par value of the bonds issued during our sample period for nonregulated, financial, and utilities industries. We find that the number of bond issues and the total dollar amount of bonds issued are higher in regulated industries, particularly financial industry, than in nonregulated industries. Specifically, during the 1995–2006 period, regulated industries account for 86.7% of the total number of bond issues and 61.2% of the total dollar amount of bonds issued.

incentivize innovation and provide a check on product quality. However, at the same time, competition can reduce incentives to provide high-quality ratings because it may reduce the expected future profits associated with maintaining a good reputation. These two opposing views on competition suggest that there should be an optimal level of competition in the rating industry. Whether the current level of competition is optimal is an empirical issue. Our results indicate that it is premature to conclude that the current level is too high or too low for the best functioning of the rating industry in the corporate bond market. Moreover, given previous findings indicating rating inflation problems in structured bond markets,[5] our result that competition among rating agencies in the corporate bond market does not lead to rating inflation suggests that regulation reform in the credit industry should treat corporate and structured debt markets separately.

The remainder of the paper is organized as follows: Section II describes the data and presents summary statistics. In Section III, we examine the relation between Fitch's market share and firm credit ratings and show that the positive relation documented by BM (2011) is mainly driven by industry effects. Section IV examines the differences in firm credit ratings between regulated and nonregulated industries and reexamines several auxiliary tests performed by BM. Section V examines whether the results in the previous sections are sensitive to the choice of sample firms. Section VI summarizes and concludes the paper.

II. Data and Summary Statistics

In this section, we describe the sample selection procedure and provide summary statistics on Fitch's market share and credit ratings for our sample firms. We use the Mergent Fixed Income Securities Database (FISD) to calculate Fitch's market share. FISD provides data on issue-level ratings by S&P, Moody's, and Fitch, as well as issue- and issuer-specific characteristics. Following BM (2011), we define Fitch's market share as the fraction of all bond ratings in an industry-year cell assigned by Fitch, where industries are defined by the 2-digit North American Industry Classification System (NAICS) codes.

Our data source for firm credit ratings is Compustat. We use the credit rating at the end of each fiscal year as a firm's rating in each year. Our sample includes all Compustat firms rated by S&P. Our final sample consists of 19,068 firm-year observations.

Since credit ratings are alphabetical symbols ranging from AAA to D, following BM (2011), we convert them into rating scale numbers, with higher numbers indicating better ratings. Table 1 describes the details of the conversion scheme.

Table 2 reports the summary statistics of Fitch's market share and credit ratings of our sample firms during the period 1995–2006. While Fitch's market

[5]Mathis et al. (2009), He, Qian, and Strahan (2012), Stanton and Wallace (2010), and Griffin and Tang (2012) provide evidence on rating inflation in the structured bond market. Moreover, the recent Franken Amendment that aims to reduce conflicts of interest at credit rating agencies targets only the structured debt market, suggesting that rating inflation is a particularly serious concern in the structured bond market. On the other hand, evidence of rating inflation in the corporate bond market appears to be rare.

TABLE 1

Conversion of Alphabetical Credit Ratings into Cardinal Scales and Rating Class Numbers

Table 1 describes how the alphabetical credit rating is converted into the cardinal scale and the rating class number.

	Standard & Poor's	Moody's	Fitch	Cardinal Scale	Rating Class Number
Investment Grade					
Highest grade	AAA	Aaa	AAA	28	7
High grade	AA (+, none, −)	Aa (1, 2, 3)	AA (+, none, −)	26, 25, 24	6
Upper medium grade	A (+, none, −)	A (1, 2, 3)	A (+, none, −)	23, 22, 21	5
Medium grade	BBB (+, none, −)	Baa (1, 2, 3)	BBB (+, none, −)	20, 19, 18	4
Speculative Grade					
Lower medium grade	BB (+, none, −)	Ba (1, 2, 3)	BB (+, none, −)	17, 16, 15	3
Speculative	B (+, none, −)	B (1, 2, 3)	B (+, none, −)	14, 13, 12	2
Poor standing	CCC (+, none, −)	Caa (1, 2, 3)	CCC (+, none, −)	11, 10, 9	1
Highly speculative	CC	Ca	CC	7	1
Lowest quality, no interest	C	C	C	4	1
In default	D		DDD/DD/D	1	1

TABLE 2

Summary Statistics for Fitch's Market Share and Firm Credit Rating

Table 2 reports the mean values of Fitch's market share and firm credit ratings by year. The sample includes all Compustat firms that are rated by S&P during the period 1995–2006. There are 24 industries in the sample, where the industry is defined by the first 2 digits of the NAICS code. For each industry-year cell, the Fitch's market share is computed by dividing the number of bond ratings assigned by Fitch by the sum of the number of bond ratings assigned by S&P, Moody's, and Fitch. A firm's credit rating is measured at the end of its fiscal year and is converted into the rating scale number, with a higher number indicating a better credit rating. Details of the conversion scheme are described in Table 1. Financial (utilities) firms are those whose first 2 digits of the NAICS code are 52 (22). Nonregulated firms are those that are not in financial or utilities industries.

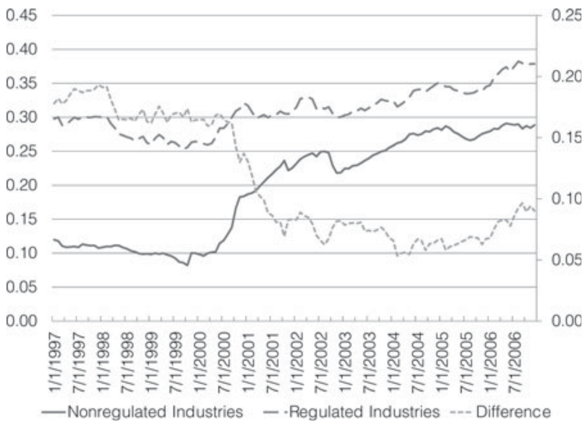
	Fitch's Market Share				Credit Ratings			
	All Firms	Non-regulated Firms	Financial Firms	Utilities Firms	All Firms	Non-regulated Firms	Financial Firms	Utilities Firms
Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1995	0.16	0.15	0.36	0.23	18.96	18.31	21.31	21.11
1996	0.12	0.10	0.36	0.25	18.82	18.22	21.14	20.98
1997	0.12	0.10	0.36	0.23	18.67	18.06	20.91	21.09
1998	0.09	0.08	0.26	0.18	18.49	17.88	20.87	21.05
1999	0.14	0.12	0.27	0.41	18.09	17.39	20.74	21.18
2000	0.31	0.31	0.21	0.39	17.94	17.29	20.75	20.75
2001	0.21	0.21	0.31	0.22	17.80	17.20	20.13	20.35
2002	0.25	0.25	0.31	0.33	17.48	16.94	19.89	19.62
2003	0.27	0.26	0.34	0.32	17.38	16.85	19.91	19.26
2004	0.34	0.33	0.41	0.36	17.46	16.92	19.86	19.41
2005	0.28	0.27	0.33	0.36	17.51	16.98	19.81	19.46
2006	0.35	0.34	0.45	0.44	17.48	16.88	20.07	19.38
Average	0.22	0.21	0.33	0.31	17.97	17.37	20.40	20.29

share is an industry-level measure, the average value reported in Table 2 is calculated across firms using the Fitch's market share associated with each individual firm. In column (1), we find that the mean Fitch's market share during our sample period is 0.22, suggesting that Fitch commands a relatively small market share compared with S&P and Moody's. We also find that Fitch's average market share has increased steadily over time from 0.16 in 1995 to 0.35 in 2006, suggesting that Fitch has become an increasingly important competitor of the two major market players, S&P and Moody's. The significant increase in Fitch's market share around 2000 is likely due to Fitch's acquisitions of Duff & Phelps and Thomson BankWatch. In columns (2)–(4), we divide the industries into nonregulated, financial, and utilities industries and examine Fitch's annual market shares separately for these three different industries. In all three industries, Fitch's market shares have increased over our sample period. We also find that Fitch's market shares are higher in financial and utilities industries than in nonregulated industries. Figure 2 plots the 24-month moving averages of Fitch's market share in regulated (financial and utilities) and nonregulated industries and their difference. Consistent with the results in Table 2, it shows that while Fitch's market share has increased significantly over time in both industries, Fitch's market share in regulated industries has always been higher than that in nonregulated industries, particularly during the early sample period.

FIGURE 2

Comparison of Trends in Fitch's Market Share between Regulated and Nonregulated Industries

Figure 2 shows the trends of average Fitch's market shares in nonregulated and regulated (i.e., finance and utilities) industries (left scale), and the difference in average Fitch's market shares between the two industries (right scale). For each month, the Fitch's market share in nonregulated (regulated) industries is computed by dividing the number of bond ratings assigned by Fitch in nonregulated (regulated) industries by the sum of the number of bond ratings assigned by S&P, Moody's, and Fitch in the same industries. Regulated industries include finance (2-digit NAICS code is 52) and utilities (2-digit NAICS code is 22) industries. The 24-month moving average is applied to estimate the trends of both average Fitch's market share and average credit rating.



The last four columns in Table 2 present the mean rating scale numbers for our sample firms. In column (5), we find a downward trend in the annual average ratings, which decline from a mean of 18.96 in 1995 to a mean of 17.48 in 2006. In columns (6)–(8), we again divide the industries into nonregulated, financial, and utilities industries and find the similar trend for all these industries. Columns (6)–(8) also show that the average credit ratings in financial and utilities industries are always higher than those in nonregulated industries across all years. If Fitch's market share measures the intensity of competition in the rating industry and the increase in competition from Fitch leads to rating inflation, then we should observe an increasing trend in average ratings due to an increase in Fitch's market share over time. Thus, the results in Table 2 do not appear to support the view that the increase in competition among rating agencies leads to rating inflation. While these simple univariate tests do not necessarily invalidate BM's (2011) conclusion that competition leads to rating inflation, they cast doubt on the validity of such a conclusion and beg further tests to verify their results. They also suggest that it is important to control for industry effects in model specifications that predict firms' credit ratings with Fitch's market share. In the next sections, we examine the relation between Fitch's market share and credit ratings using multivariate regression analyses.

III. Relation between Fitch's Market Share and Firm Credit Rating: Regression Analysis

In this section, we first replicate BM's (2011) main tests using their sample period 1995–2006. We then perform further analyses by focusing on the effects of industry characteristics on the link between Fitch's market share and credit ratings, and examine whether controlling for industry effects can significantly change their results.

A. Replication of BM's Main Tests

Panel A of Table 3 presents the estimates from regressions that replicate Table 4 of BM (2011). Following their specification, we regress firm credit ratings on Fitch's market share and other important determinants of credit ratings. The number of firm-year observations used in the analysis is 19,608 from 1995 to 2006. This number is almost identical to the 19,630 used by BM for the same period.

In regression (1) of Panel A in Table 3, we use the ordinary least squares (OLS) regression to estimate the model. We include only Fitch's market share as the explanatory variable and allow standard errors clustered at the industry-year level. The coefficient estimate on Fitch's market share is 2.028, which is significant at the 0.10 level. The R^2 of the regression is 0.003. These results are similar to those of BM (2011), who show that the coefficient estimate on Fitch's market share is 2.395 and the R^2 of the regression is 0.004.

In regression (2) of Panel A in Table 3, we add industry and year dummies as additional control variables. The coefficient estimate on Fitch's market share remains positive at 1.523, which is significant at the 0.05 level. The R^2 of the regression increases to 0.15 from 0.003. These results again are similar to those of BM (2011).

In regression (3) of Panel A in Table 3, we control for firm-fixed effects and add a set of firm characteristics as additional control variables. Following BM (2011), we use as the set of firm characteristics the log of sales, log of book value of assets, cash over total assets (and its square), earnings before interest, taxes, depreciation, and amortization (EBITDA) over total assets (and its square), cash flow over total assets (and its square), EBITDA over sales (and its square), cash flow over sales (and its square), property, plant, and equipment (PPE) over total assets (and its square), interest expense over EBITDA (and its square), and debt over total assets (and its square). We find that the coefficient estimate on Fitch's market share is 0.719, which is significant at the 0.10 level. Adding firm-fixed

TABLE 3

Predicting Firm Credit Ratings with Fitch's Market Share

Table 3 presents the estimation results from the regression in which a firm's credit rating scale number is regressed on a set of firm characteristics and Fitch's market share. The sample consists of all Compustat firms that are rated by S&P during the period 1995–2006. Panel A reports the estimation results from replicating Table 4 in BM (2011). In regressions (1)–(4) following BM, standard errors are clustered at the industry-year level. In regression (5), we first calculate the sample means of firm ratings and firm controls for each industry-year cell and then estimate the regression at the industry level instead of the firm level. In regression (6), we reestimate regression (5), replacing the sample mean for each industry-year cell with the sample median. Panel B reports the estimation results after controlling for both industry effects and firm characteristics. In all regressions, standard errors are clustered at the industry level. In both Panels A and B, following BM, firm controls include log of sales, log of book value of assets, cash over total assets (and its square), EBITDA over total assets (and its square), cash flow over total assets (and its square), EBITDA over sales (and its square), cash flow over sales (and its square), PPE over total assets (and its square), interest expense over EBITDA (and its square), and debt over total assets (and its square). For each industry-year cell where the industry is defined by the first 2 digits of the NAICS code, the Fitch's market share is computed by dividing the number of bond ratings assigned by Fitch by the sum of the number of bond ratings assigned by S&P, Moody's, and Fitch. Intercepts are not reported. The *p*-values reported in parentheses are based on standard errors that are heteroskedasticity-consistent. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Replication of Table 4 in BM

Variables	OLS (1)	OLS (2)	OLS (3)	Ordered Probit (4)	OLS: Using the Sample Mean for Each Industry-Year Cell (5)	OLS: Using the Sample Median for Each Industry-Year Cell (6)
Fitch's market share	2.028*	1.523**	0.719*	0.401**	0.228	−0.340
	(0.09)	(0.03)	(0.08)	(0.04)	(0.58)	(0.71)
Year dummies	No	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	No	Yes	Yes	Yes
Firm dummies	No	No	Yes	No	No	No
Firm controls	No	No	Yes	No	Yes	Yes
No. of obs.	19,608	19,608	19,608	19,608	188	188
R^2 / Pseudo-R^2	0.00	0.15	0.91	0.03	0.97	0.93

Panel B. Controlling for Both Industry-Fixed Effects and Firm Characteristics

Variables	OLS (1)	Ordered Probit (2)
Fitch's market share	0.313	0.075
	(0.39)	(0.66)
Year dummies	Yes	Yes
Industry dummies	Yes	Yes
Firm controls	Yes	Yes
No. of obs.	19,608	19,608
R^2 / Pseudo-R^2	0.68	0.23

effects and firm-specific characteristics to the regression increases the R^2 to 0.91. Again, these results confirm those of BM.

In regression (4) of Panel A in Table 3, we reestimate regression (2) using an ordered probit regression. Consistent with BM (2011), we find that the coefficient estimate on Fitch's market share is 0.401, which is significant at the 0.05 level.

The fact that our results are very similar to those of BM (2011) in terms of the sample size, the R^2, and the magnitude and significance of coefficient estimates on Fitch's market share suggests that we construct a sample and variables that are very close to those used by them.

As a further replication of their tests, we collapse the data by industry-year cell and regress the average (median) firm ratings in the industry-year cell on average (median) firm characteristics and industry- and year-fixed effects (sample size $=$ 188). Following BM (2011), in estimating the regressions, we exclude industry-year cells that have fewer than 25 firms. In regressions (5) and (6) of Panel A in Table 3, which use the average and median values, respectively, the corresponding coefficient estimates on Fitch's market share are 0.228 and −0.34. None of these coefficient estimates are statistically significant. In comparison, the corresponding coefficient estimates in BM are significant at the 0.05 level.

Overall, our results using individual firm ratings confirm those of BM (2011) except for the results using collapsed data.

B. Extension of BM's Main Tests: Controlling for Industry-Fixed Effects and Firm Characteristics

While regressions (2) and (4) in Panel A of Table 3 control for industry-fixed effects, they do not control for any firm characteristics that affect credit ratings. Similarly, in regression (3), while firm characteristics that affect credit ratings are controlled, the industry-fixed effects are not. In other words, none of their regression models control for both industry effects and firm characteristics in the same regression, suggesting that the results in Panel A could be biased due to the omitted variable problem. Therefore, in the subsequent tests, we consider the possibility that Fitch's market share captures omitted industry- and firm-level characteristics that are correlated with credit ratings. Specifically, we add both industry dummies and firm characteristics to OLS and ordered probit regressions of Panel A. In addition, unlike BM (2011), who use standard errors that are robust to clustering at the industry-year level, we use standard errors that are robust to clustering at the industry level. Using standard errors that are robust to clustering at industry-year level implicitly assumes that time-series correlation in Fitch's market share is very low, so such clustering does not create any bias in estimating standard errors. However, since Fitch's market share in each industry tends to be relatively stable over time, using industry-year level clustering could underestimate the standard errors (Petersen (2009)).[6]

Panel B of Table 3 reports the results. The first column presents the results from the OLS regression. We find that the coefficient estimate on Fitch's market share is 0.313 and insignificant. This result suggests that the positive relation between credit rating and Fitch's market share documented in Panel A is largely driven by omitted variable problems.

The second column of Table 3 shows the results from the ordered probit regression. The coefficient estimate on Fitch's market share is 0.075 and is again insignificant.

In sum, the results in Panel B of Table 3 show that the positive relation between credit ratings and Fitch's market share no longer exists once we control for both firm-level determinants of credit ratings and industry-fixed effects. These results cast doubt on the argument that competition reduces rating agencies'

[6]We find that the correlation between Fitch's market shares in year t and year $t-1$ is 49%. While we believe that using industry-level clustering is more appropriate than industry-year level clustering in estimating p-value of the regression coefficient, our results are qualitatively similar irrespective of whether we use industry-level or industry-year level clustering. In other words, it is industry control that derives the difference in results between BM's (2011) and our studies.

incentives to maintain reputation for providing high-quality ratings in corporate bond markets.

IV. Further Tests on the Relation between Fitch's Market Share and Firm Credit Rating

In this section, we first show how unobservable differences in industry characteristics affect credit ratings by comparing firms in regulated and nonregulated industries. We then show that the results in several other important tests performed by BM (2011) are sensitive to controlling for omitted variable problems, particularly those associated with industry characteristics.

A. Differences in Firm Credit Ratings between Regulated and Nonregulated Industries

Our finding in the previous section suggests that industry characteristics in addition to firm characteristics are important determinants of firm credit ratings. To explore this issue further, we compare credit ratings between firms in regulated industries and those in nonregulated industries. We compare credit ratings between these two types of industries, since Table 2 shows that regulated industries have both higher firm credit ratings and higher Fitch market shares than nonregulated industries. Moreover, Morgan (2002) finds that financial firms are inherently more opaque than firms in other industries, and this opacity increases the disagreement between rating agencies. He also finds that financial firms' high-leverage compounds the uncertainty over their assets, suggesting that the effect of leverage ratio on credit rating might be different between financial and nonfinancial firms. Therefore, at least part of the industry-fixed effects that render BM's (2011) results insignificant can be driven by unobservable differences in industry characteristics between regulated and nonregulated industries.

First, in Panel A of Table 4, we compare credit ratings between firms in the financial industry and those in nonregulated industries.[7] In regression (1), we regress firm credit ratings on an indicator that takes the value of 1 if a firm operates in the financial industry, and 0 otherwise, the same set of firm characteristics as those used in regression (3) of Table 3, and year-fixed effects. We find that the coefficient estimate on the dummy for financial firms is 0.963 and significant at the 1% level. This result supports the view that industry characteristics affect firm credit ratings beyond the known firm-level determinants.

In regressions (2)–(5) of Panel A in Table 4, we augment regression (1) by adding the interaction of the dummy for financial firms with the debt to total assets ratio, the long-term debt to total assets ratio, the high-leverage dummy, and the debt to EBITDA ratio, respectively. We find that the coefficient estimates on the interaction terms are significantly positive in all regressions except for regression (5), suggesting that the effect of financial leverage on credit ratings is different between financial and nonregulated firms. In addition, except for regression (2),

[7]We exclude firms in the utilities industry from the analysis.

TABLE 4

Differences in Firm Credit Ratings between Regulated and Nonregulated Industries

Table 4 presents the estimation results from the regression in which a firm's credit rating scale number is regressed on a set of firm characteristics, the dummy for financial (utilities) firms, and the interaction of this dummy with firm leverage. Panel A (B) reports the estimation results from comparing financial (utilities) firms with nonregulated firms. A high-leverage dummy takes the value of 1 if a firm's debt to assets ratio is above 0.2324, and 0 otherwise. Detailed descriptions of the firm controls and the construction of the Fitch's market share are described in the legend in Table 3. Intercepts are not reported. The *p*-values reported in parentheses are based on standard errors that are heteroskedasticity-consistent. The standard errors allow for clustering at the industry level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1)	(2)	(3)	(4)	(5)
Panel A. Comparison between Financial Firms and Nonregulated Firms					
Dummy for financial firms (D1)	0.963***	0.116	0.554**	0.623**	0.877***
	(0.00)	(0.67)	(0.05)	(0.01)	(0.00)
D1 × Debt / Total assets		2.955***			
		(0.00)			
D1 × Long-term leverage			2.411**		
			(0.03)		
D1 × High-leverage dummy				0.817**	
				(0.04)	
D1 × Debt / EBITDA					0.040
					(0.23)
Year dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	No	No	No	No
Firm controls	Yes	Yes	Yes	No	Yes
No. of obs.	17,043	17,043	17,043	17,043	17,043
R^2	0.70	0.70	0.70	0.70	0.71
Panel B. Comparison between Utilities Firms and Nonregulated Firms					
Dummy for utilities firms (D2)	1.200***	1.049*	1.058**	0.608	1.068***
	(0.00)	(0.06)	(0.03)	(0.22)	(0.00)
D2 × Debt / total assets		0.406			
		(0.78)			
D2 × Long-term leverage			0.531		
			(0.72)		
D2 × High-leverage dummy				0.635	
				(0.19)	
D2 × Debt / EBITDA					0.036
					(0.48)
Year dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	No	No	No	No
Firm controls	Yes	Yes	Yes	No	Yes
No. of obs.	18,216	18,216	18,216	18,216	18,216
R^2	0.69	0.69	0.69	0.69	0.69

the coefficient estimates on the dummy for financial firms remain significantly positive.

Next, in Panel B of Table 4, we compare the difference in credit ratings between firms in the utilities industry and those in nonregulated industries.[8] We replace the dummy for financial firms with the dummy for utilities firms in the Panel A regressions and reestimate the regressions. We find that the coefficient estimates on the dummy for utilities firms are all significantly positive except for regression (4). However, we find that none of the coefficient estimates on the interaction terms is significant.

[8]We exclude firms in the financial industry from the analysis.

In sum, the results in Table 4 suggest that industry characteristics are important determinants of firm credit ratings beyond the known firm-level determinants. The results also suggest that, consistent with Morgan (2002), unobservable differences in industry characteristics between financial and nonregulated industries affect the relation between credit ratings and firm leverage, implying that it is important to control for industry characteristics in regression models that attempt to predict firms' credit ratings.

B. Effect of an Interaction Term between Fitch's Market Share and Firm Leverage on Credit Ratings

BM (2011) show that the interaction term between Fitch's market share and firm leverage is positively related to firm credit rating, suggesting that the positive relation between Fitch's market share and credit ratings is more pronounced when firms' leverage ratios are higher. Since firms with higher debt ratios tend to benefit more from rating inflation, they argue that this result is consistent with the view that competition among rating agencies causes rating inflation.

To further examine the effect of firm leverage on credit ratings, we first replicate their tests using their model specifications. Specifically, we regress a firm's credit rating scale number on the interaction term between Fitch's market share and the debt to total assets ratio (long-term debt to total assets ratio, high-leverage dummy variable, and debt to EBITDA ratio), a set of firm characteristics, and industry-year-fixed effects, and allow standard errors to be clustered at the industry-year level.

Panel A of Table 5 reports the results. Consistent with their findings, the coefficient estimates on the interaction term between Fitch's market share and firm leverage are positive and significant in all four regressions.

We then consider the possibility that the effect of leverage on credit rating is different across different industries. As shown in the previous sections, firms in financial and utilities industries tend to have higher leverage and yet maintain higher credit ratings. Figure 2, which compares the 24-month rolling averages of Fitch's market share between regulated and nonregulated industries, shows that the average Fitch's market shares in regulated industries are consistently higher than those in nonregulated industries during the sample period 1995–2006. To the extent that regulated industries have relatively low business risk, they can enjoy high debt capacities as well as higher credit ratings. Indeed, consistent with this view, Table 2 shows that the average credit rating of firms in the financial industry (20.40) (utilities industry (20.29)) is significantly higher than that of firms in nonregulated industries (17.37). Thus, the positive coefficient estimate on the interaction between Fitch's market share and firm leverage documented by the previous study could be simply driven by the fact that firms in certain industries (e.g., financial and utilities industries) have both high credit ratings and high debt ratios, not necessarily by competition effects. This argument suggests that the effect of leverage on credit ratings could differ across industries and thus such a differential effect should be controlled in the regression analysis. We address this issue by adding the interaction between industry dummies and leverage ratio in the regression. We also allow standard errors to be clustered at the industry

TABLE 5

Predicting Firm Credit Ratings with Fitch's Market Share:
Differential Effect of Fitch's Market Share on Highly Levered Firms

Table 5 presents the estimation results from the regression in which a firm's credit rating scale number is regressed on a set of firm characteristics, Fitch's market share, and the interaction of Fitch's market share with firm leverage. Panel A reports the results from replicating Table 6 in BM (2011). In all regressions, following BM, standard errors are clustered at the industry-year level. Panel B reports the results after controlling for the industry effects (interaction between industry dummies and leverage). In all regressions, standard errors are clustered at the industry level. A high-leverage dummy takes the value of 1 if a firm's debt to assets ratio is above 0.2324, and 0 otherwise. Detailed descriptions of the firm controls and the construction of the Fitch's market share are described in the legend in Table 3. Intercepts are not reported. The *p*-values reported in parentheses are based on standard errors that are heteroskedasticity-consistent. In Panel A, the standard errors allow for clustering at the industry × year level, while in Panel B, at the industry level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	OLS			
Variables	(1)	(2)	(3)	(4)
Panel A. Replication of Table 6 in BM				
Fitch's market share × Debt / Total assets	4.147***			
	(0.00)			
Fitch's market share × Long-term leverage		2.643**		
		(0.01)		
Fitch's market share × High-leverage dummy			1.328**	
			(0.01)	
Fitch's market share × Debt / EBITDA				0.113*
				(0.09)
Debt / EBITDA				0.173***
				(0.00)
Firm controls	Yes	Yes	Yes	Yes
Industry-year dummies	Yes	Yes	Yes	Yes
No. of obs.	19,608	19,608	19,608	19,608
R^2	0.69	0.69	0.69	0.69
Panel B. Controlling for Industry Effect by Adding Interaction between Industry Dummies and Leverage Measure				
Fitch's market share × Debt / Total assets	0.763			
	(0.35)			
Fitch's market share × Long-term leverage		1.062		
		(0.13)		
Fitch's market share × High-leverage dummy			0.199	
			(0.56)	
Fitch's market share × Debt / EBITDA				−0.027
				(0.70)
Debt / EBITDA				0.213***
				(0.00)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Industry dummies × leverage measure	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes
No. of obs.	19,608	19,608	19,608	19,608
R^2	0.69	0.68	0.68	0.69

level instead of the industry-year level. If the results in Panel A of Table 5 are driven by unobservable industry effects, then they will disappear once we control for the different effects of leverage on credit ratings across different industries.

Panel B of Table 5 presents the results. Supporting our conjecture that the results in Panel A are due to unobservable industry effects, we find that none of the coefficient estimates on the interaction term between Fitch's market share and firm leverage is statistically significant.[9]

[9]In untabulated tests, we reestimate the regression by replacing the interaction between industry dummies and leverage ratio with the interaction between the regulated industry dummy and

C. Does Competition from Fitch Reduce the Informativeness of Credit Ratings in Predicting Future Defaults?

If competition from Fitch indeed causes rating inflation, this rating inflation lowers the quality of ratings, which in turn reduces the power of ratings to predict a firm's future defaults. Supporting this view, BM (2011) provide evidence that the informativeness of credit ratings is lower when Fitch's market share is higher. In this subsection, we revisit this issue and examine whether competition indeed reduces the informativeness of credit ratings.

Panel A of Table 6 shows the results from replicating BM's (2011) tests. The dependent variable is a dummy variable that equals 1 if the firm goes default during the subsequent 3 years after the rating is assigned, and 0 otherwise. A firm is considered to be in default if its credit rating is downgraded to the level of D. Following BM, we use OLS to estimate the regression models. Since we use ratings data in the subsequent 3 years to identify firm default, we perform the analysis using a sample of 18,151 firm-year observations during the 1995–2005 period.

In regression (1) of Panel A in Table 6, we use as the explanatory variables Fitch's market share, a dummy variable for investment-grade rating, and an interaction term between these two variables. If competition from Fitch leads to rating inflation, some firms with low quality might receive an investment-grade rating even though they do not deserve such a high rating. Thus, the inflated ratings are more likely to be downgraded to D in the future, suggesting a positive coefficient on the interaction term between Fitch's market share and the dummy variable for investment-grade rating. Consistent with the finding of BM (2011), we find that the coefficient estimate on this interaction term is positive and significant at the 0.01 level.

In regression (2) of Panel A in Table 6, we replace the dummy variable for investment-grade rating with the rating scale number. The coefficient estimate on the interaction term between Fitch's market share and the rating scale number is 0.021, which is significant at the 0.01 level.

In regression (3) of Panel A in Table 6, we control for a set of firm characteristics and industry- and year-fixed effects. The coefficient estimate on the interaction term between Fitch's market share and the rating scale number remains significant at the 0.01 level.

In regression (4) of Panel A in Table 6, we include the interaction terms between the year dummy and the rating scale number and between the industry dummy and the rating scale number. While BM (2011) find a positive and significant coefficient estimate on the interaction term between Fitch's market share and the rating scale number, we find an insignificant coefficient estimate on this interaction term.

In regression (5) of Panel A in Table 6, we collapse the data by industry-year cell and regress the average of the dummy variables for firm default on the average values of rating scale number, Fitch's market share, their interaction, firm characteristics, and industry and year dummies. While BM (2011) find a positive and significant coefficient estimate on the interaction term between Fitch's market

leverage ratio. We find that none of the coefficient estimates on the interaction term between Fitch's market share and firm leverage is statistically significant.

TABLE 6

OLS Regression Estimates of the Effect of Fitch's Market Share on the Likelihood of Firm Default

Table 6 presents the estimation results from the regression in which the dependent variable is a dummy variable for firm default (equals 1 if a firm is defaulted in the subsequent 3 years after the rating is assigned, and 0 otherwise) is regressed on a set of firm characteristics, Fitch's market share, and the interaction of Fitch's market share with an investment-grade (IG) dummy (credit rating). Panel A reports the results from replicating Table 9 in BM (2011) using the OLS regressions. In regressions (1)–(4), following BM, standard errors are clustered at the industry-year level. In regression (5), we first calculate the sample means of firm ratings and firm controls for each industry-year cell and then estimate the regression at the industry level instead of the firm level. Panel B reports the results after controlling for industry effects (interaction between industry dummies and credit rating (or investment-grade dummy)). In all regressions, standard errors are clustered at the industry level. Detailed descriptions of the firm controls and the construction of the Fitch's market share are described the legend in Table 3. A firm's credit rating is converted into the rating scale number. Details of the conversion scheme are described in Table 1. Intercepts are not reported. The *p*-values reported in parentheses are based on standard errors that are heteroskedasticity-consistent. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Replication of Table 9 in BM

Variables	(1)	(2)	(3)	(4)	(5)
IG dummy × Fitch's market share	0.169***				
	(0.00)				
IG dummy	−0.070***				
	(0.00)				
Credit rating × Fitch's market share		0.021***	0.016***	0.006	−0.164
		(0.00)	(0.00)	(0.27)	(0.26)
Credit rating		−0.010***	−0.007***	−0.007	0.001
		(0.00)	(0.00)	(0.36)	(0.90)
Fitch's market share	−0.163***	−0.441***	−0.296***	−0.118	0.316
	(0.00)	(0.00)	(0.00)	(0.32)	(0.24)
Year dummies	No	No	Yes	Yes	Yes
Industry dummies	No	No	Yes	Yes	Yes
Year dummies × credit rating	No	No	No	Yes	No
Industry dummies × credit rating	No	No	No	Yes	No
Firm controls	No	No	Yes	No	Yes
No. of obs.	18,151	18,151	18,151	18,151	175
R^2/ Pseudo-R^2	0.02	0.02	0.04	0.04	0.53

Panel B. Controlling for Industry Effects by Adding Interaction between Industry Dummies and Credit Rating (Investment-Grade Dummy)

Variables	(1)	(2)
IG dummy × Fitch's market share	0.081	
	(0.26)	
IG dummy	−0.047***	
	(0.00)	
Credit rating × Fitch's market share		0.006
		(0.49)
Credit rating		−0.004
		(0.14)
Fitch's market share	−0.047	−0.097
	(0.47)	(0.56)
Year dummies	Yes	Yes
Industry dummies	Yes	Yes
Year dummies × IG dummy	Yes	No
Industry dummies × IG dummy	Yes	No
Year dummies × credit rating	No	Yes
Industry dummies × credit rating	No	Yes
Firm controls	Yes	Yes
No. of obs.	18,151	18,151
R^2 / Pseudo-R^2	0.05	0.05

share and the rating scale number, we find a negative and insignificant coefficient on this interaction term.

The results in Panel A of Table 6, however, suffer from the similar endogeneity problem discussed in the previous subsections. We note that the default probability of firms with the same credit rating could be different depending on their industries. For example, it is well documented in the rating literature that credit ratings are slowly adjusted to new information.[10] Thus, to the extent that the financial sector is expected to suffer more from economic downturn than other industries and that credit ratings for firms in finance industries are not fully adjusted for this forthcoming event, then for a particular rating level, firms in finance industries are more likely to default than are firms in other industries, thereby resulting in the positive relation between the default probability and the interaction between finance industry dummy and credit rating.

To account for this possibility, in Panel B of Table 6, we control for the interactions between industry dummies and credit rating in addition to the interactions between Fitch's market share and credit rating. In doing so, we take into account the possibility that default probability could be different across different industries for given credit ratings. In regression (1), we include the interactions between industry dummies and investment grade dummy. We find that the coefficient estimate on the interaction between Fitch's market share and the investment grade dummy becomes insignificant.

In regression (2) of Panel B in Table 6, we reestimate regression (1) using the rating scale number instead of the investment grade dummy. The interaction term between Fitch's market share and credit rating again becomes insignificant. Thus, the results reported in Panel A of Table 6 are sensitive to the endogeneity problem caused by unobservable industry effect.[11]

In sum, the results in Table 6 suggest that the conclusion in the previous study that competition reduces rating informativeness is sensitive to additional controls accounting for the possibility that default probability could be different in different industries for the same rating.

D. Effect of Competition on Bond Yields

If competition from Fitch causes rating inflation for certain bonds and the bond market is sufficiently efficient to discern such rating inflation, then the yield spreads should be higher when the bonds have inflated ratings due to intensified competition. BM (2011) investigate this issue by regressing the yield spread for each bond on the interaction term between Fitch's market share and credit ratings and find the evidence in support of this conjecture (i.e., a positive coefficient estimate). In this subsection, we reexamine this issue by correcting for the endogeneity problem caused by unobservable industry effects.

[10]For studies that examine slow adjustment of credit ratings, see, for example, Weinstein (1977), Altman and Kao (1992), Hand, Holthausen, and Leftwich (1992), Association for Financial Professionals (2002), Altman and Rijken (2004), and Odders-White and Ready (2006). The underlying motivation for slow adjustment of credit ratings is to achieve an optimal balance between rating timeliness and rating stability, so that credit ratings become insensitive to business cycles, which is sometimes called the "through-the-cycle" approach used by rating agencies (Cantor and Mann (2003)). From investors' point of view, this practice can be a desirable feature, since they do not want to engage in unnecessary portfolio rebalancing too frequently.

[11]Using a logit model to estimate the specifications in Panel B of Table 6 does not change the results.

Following BM (2011), we use bond transactions data from the Mergent FISD from 1995 to 2006 to estimate the bond yields. The Mergent FISD database covers all bond transactions by insurance companies after 1995. We match each bond transaction to the most recent bond rating assigned by Moody's or S&P. If there is more than one rating on the same date, we use the average of all ratings on the same date. For each bond transaction, we use a numerical method to estimate the yield to maturity implied by the transaction price, taking into account the timing of the coupons and principal payment. We calculate the yield spread of a bond as the difference between its estimated yield and the yield on a government bond with closest maturity. We obtain government bond yield data from the Federal Reserve Bank. In addition, for each bond in the sample, we obtain the yield on an initial issue from the FISD and match it to a credit rating that is assigned to the bond around the initial issue date.

We use the following selection criteria for sampling procedures: i) exclude bonds denominated in foreign currencies and bonds that are callable, puttable, convertible, substitutable, or exchangeable; ii) exclude U.S. issues by foreign issuers (i.e., Yankee bonds), defaulted bond issues, and bonds with refund protection; and iii) exclude variable coupon bonds because their yields to maturity are harder to estimate. We also require several bond characteristics such as issuer industries and maturity date to be available. After applying these sample selection criteria, our final sample consists of 107,026 bond transactions, which is very close to the sample size of 110,955 used by BM (2011).

Panel A of Table 7 reports the estimates from the OLS regressions that replicate Table 8 in BM (2011). The dependent variable is the yield spread for each bond transaction. In regression (1), we use as the explanatory variables Fitch's market share, credit ratings, their interaction, two bond characteristics (i.e., years to maturity and offering amount), and industry- and month-fixed effects. Consistent with BM, we find that the coefficient estimate on the interaction term between Fitch's market share and credit ratings is positive and significant at the 0.01 level, suggesting that bonds issued by firms in industries with higher Fitch's market share are traded at higher spreads.

In regression (2) of Panel A in Table 7, we replace industry dummies with industry-year dummies. Since Fitch's market share is measured at the industry-year level, we drop industry dummies from the regression and include industry-year dummies as additional control variables. The coefficient estimate on the interaction term between Fitch's market share and credit ratings remains positive and significant at the 0.10 level.

In regressions (3) and (4) of Panel A in Table 7, we reestimate regression (2) separately for a subsample of bonds that have an investment-grade rating and for a subsample that have a speculative-grade rating, respectively. We find that the coefficient estimate on the interaction term between Fitch's market share and credit ratings is positive and significant only in regression (3).[12]

[12]The insignificant coefficient estimate on the interaction term in regression (4) of Panel A in Table 7, which uses a subsample of bonds with a speculative-grade rating, is inconsistent with BM (2011), who find a positive and significant coefficient estimate on the interaction term.

In regression (5) of Panel A in Table 7, we use a subsample of bonds whose prices at issue are available. The dependent variable is the yield spread at issue instead of the yield spread in the secondary market. The coefficient estimate on the interaction term between Fitch's market share and credit ratings is again positive and significant. Overall, the results in Panel A are generally consistent with those reported by BM (2011).

However, test specifications in Panel A of Table 7 are again subject to potential endogeneity problems: Bond yields of firms with the same level of credit rating could differ across industries because credit ratings tend to respond to new information more slowly than bond yields. For example, consider two firms, one in the finance industry and the other in the retail industry, both of which have the same bond yields and credit ratings at the beginning. If investors expect that negative shocks to the industry occur in the finance sector in the near future, this information will be quickly incorporated into the bond yields of firms operating in the finance industry, whereas their credit ratings may remain unchanged due to

TABLE 7

Effect of Fitch's Market Share and Credit Ratings on Bond Yields

Table 7 presents the results of OLS regressions in which the difference between the yield to maturity of a bond and the yield to maturity of the government bond with the closest maturity is regressed on a set of bond characteristics variables, bond rating, Fitch's market share, and the interaction term between bond rating and Fitch's market share. For each bond transaction, the most recent bond rating prior to the transaction is identified and matched to the transaction. If a firm issues several bonds simultaneously, their average yield is used to estimate the yield to maturity. Bond ratings must not be older than 3 months when the bond transaction occurs. Panel A reports the results from replicating Table 8 in BM (2011). In all regressions, following BM, standard errors are clustered at the industry-year level. Panel B reports the results after controlling for the industry effect (interaction term between industry dummies and credit rating). In all regressions, standard errors are clustered at the industry level. Detailed descriptions of the construction of the Fitch's market share are described in the legend in Table 3. A firm's credit rating is converted into the rating scale number. Details of the conversion scheme are described in Table 1. Intercepts are not reported. The *p*-values in parentheses are based on standard errors that are heteroskedasticity-consistent. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Replication of Table 8 in BM

Variables	Full Sample (1)	Full Sample (2)	Subsample of Bonds with Investment Grades (3)	Subsample of Bonds with Noninvestment Grades (4)	Subsample of Initial Bond Issues (5)
Credit rating × Fitch's market share	0.438***	0.356*	0.272*	0.506	0.318***
	(0.00)	(0.06)	(0.06)	(0.60)	(0.00)
Credit rating	−0.396***	−0.368***	−0.254***	−0.566**	−0.242***
	(0.00)	(0.00)	(0.00)	(0.04)	(0.00)
Fitch's market share	−9.085**				
	(0.01)				
log(Time to maturity)	−0.665**	−0.747**	−0.843**	1.179	−0.275
	(0.03)	(0.01)	(0.01)	(0.16)	(0.40)
log(Time to maturity)^2	0.124**	0.136**	0.166**	−0.267	0.087
	(0.03)	(0.01)	(0.01)	(0.11)	(0.20)
log(Offering amount)	0.115	0.065	0.264**	−0.189	0.242***
	(0.29)	(0.60)	(0.01)	(0.90)	(0.00)
log(Offering amount)^2	−0.003	−0.000	−0.011***	0.013	−0.009***
	(0.53)	(0.94)	(0.01)	(0.84)	(0.00)
Month dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	No	No	No	No
Industry-year dummies	No	Yes	Yes	Yes	Yes
No. of obs.	107,026	107,026	98,576	8,450	8,347
R^2	0.51	0.56	0.50	0.53	0.36

(continued on next page)

TABLE 7 (continued)

Effect of Fitch's Market Share and Credit Ratings on Bond Yields

Panel B. Controlling for Industry Effects by Adding Interaction between Industry Dummies and Credit Rating

Variables	Full Sample (1)	Subsample of Initial Bond Issues (2)
Credit rating × Fitch's market share	0.092	0.022
	(0.72)	(0.89)
Credit rating	0.039	−0.198**
	(0.89)	(0.01)
Fitch's market share	−2.324	−0.074
	(0.70)	(0.98)
log(Time to maturity)	−0.550	−0.262**
	(0.23)	(0.01)
log(Time to maturity)^2	0.106	−0.087***
	(0.23)	(0.00)
log(Offering amount)	−0.002	0.255***
	(0.99)	(0.00)
log(Offering amount)^2	0.002	−0.010***
	(0.71)	(0.00)
Month dummies	Yes	Yes
Industry dummies	Yes	Yes
Month dummies × credit rating	Yes	Yes
Industry dummies × credit rating	Yes	Yes
No. of obs.	107,026	8,347
R^2	0.58	0.38

its slow adjustment to the information. Consequently, for the same level of credit rating, if the retail industry is not expected to enter a downturn, the bond yields of firms operating in the finance industry will be higher than those of firms operating in the retail industry, resulting in the positive relation between bond yields and the interaction between finance industry dummy and credit rating. Since Fitch's market share is an industry-year level variable, we would observe a spurious positive impact of the interaction between Fitch's market share and credit rating on bond yields if we do not account for the fact that the link between bond yields and credit ratings could be different across industries.

Panel B of Table 7 shows the results from regressions that address this endogeneity problem. We add the interactions between industry dummies and credit rating as additional control variables in addition to the interactions between Fitch's market share and credit ratings. We also include the interactions between time period (i.e., month) dummies and credit ratings because, during recessionary periods, bond yields may increase much faster than credit downgrades, making bond yields different for different time periods even for the same credit rating.

In regression (1) of Panel B in Table 7, the dependent variable is the yield spread for each bond transaction. The coefficient estimate on the interaction between Fitch's market share and credit rating is 0.092 and insignificant. In regression (2), in which the dependent variable is the yield spread at issue, we use the subsample of bonds whose prices at issue are available. The coefficient on the interaction term is 0.022 and again insignificant.

These results suggest that the positive relation between bond yields and Fitch's market share reported in Panel A of Table 7 is largely driven by not considering the possibility that for firms with the same credit rating, bond yields could be different across industries. Once we account for such a possibility in the model specifications, there is no evidence that Fitch's market share is positively related to bond yields.

V. A Closer Look at the Industry Effects

In the previous sections, we argue that the positive relation between credit ratings and Fitch's market share is a manifestation of industry effects. For instance, it is possible that some industries have both high credit ratings and high Fitch's market share at the same time, resulting in a positive relation between credit ratings and Fitch's market share. Once we control for the industry effects in the regressions, the positive relation between credit ratings and Fitch's market share disappears.

In Figure 2, we show that during our sample period, regulated industries have both higher credit rating and higher Fitch's market share than nonregulated industries, and Fitch's market share in regulated industries is particularly higher than that in nonregulated industries during the 1995–1999 period. In this section, we use these differences in industry characteristics to further show the importance of omitted industry variables in examining the relation between Fitch's market share and credit ratings.

One potential alternative interpretation of the observation in Figure 2 is that Fitch has covered more bonds issued by firms in regulated industries than by those in nonregulated industries and thus, the positive relation between Fitch's market share and credit ratings is driven by the differences in Fitch's market share and credit ratings between regulated and nonregulated industries. This interpretation suggests that if we exclude regulated industries from the sample, there should be a less pronounced relation between Fitch's market share and credit rating. To test this prediction, we use the same regression models as those used in Panel A of Table 3 (i.e., regression models of BM (2011)) excluding firms in regulated industries. Table 8 reports the results (sample size = 15,651).

In regression (1) of Table 8, we use only Fitch's market share as the independent variable. We find that the coefficient estimate on Fitch's market share becomes negative and significant at the 0.01 level.

In regression (2a) of Table 8, we include year and industry dummies. We find that the coefficient estimate on Fitch's market share becomes positive and significant. In regression (2b), we further control for firm-level determinants of credit ratings. We find that once we add firm characteristics as additional control variables, the coefficient estimate on Fitch's market share becomes negative and insignificant.

In regression (3) of Table 8, which controls for firm-fixed effects, we find that the coefficient estimate on Fitch's market share is insignificant.

In regression (4a) of Table 8, we reestimate regression (2a) using the ordered probit model. We find that the coefficient estimate on Fitch's market share is significantly positive at the 0.10 level. In regression (4b), when we add firm characteristics as additional control variables, the coefficient estimate on Fitch's market share becomes negative and insignificant.

TABLE 8

Predicting Firm Credit Ratings with Fitch's Market Share: Excluding Finance and Utilities Industries

Table 8 presents the estimation results from the regression in which a firm's credit rating scale number is regressed on a set of firm characteristics and Fitch's market share. The sample consists of all Compustat firms that are rated by S&P during the period 1995–2006, but excluding finance and utilities industries. In regressions (1)–(4), following BM (2011), standard errors are clustered at the industry-year level. In regression (5), we first calculate the sample means of firm ratings and firm controls for each industry-year cell and then estimate the regression at the industry level instead of the firm level. In regression (6), we reestimate regression (5), replacing the sample mean for each industry-year cell with the sample median. Detailed descriptions of the firm controls and the construction of Fitch's market share are described in the legend in Table 3. Intercepts are not reported. The *p*-values reported in parentheses are based on standard errors that are heteroskedasticity-consistent. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	OLS	OLS	OLS	OLS	Ordered Probit	Ordered Probit	OLS: Using the Sample Mean for Each Industry-Year Cell	OLS: Using the Sample Median for Each Industry-Year Cell
Variables	(1)	(2a)	(2b)	(3)	(4a)	(4b)	(5)	(6)
Fitch's market share	−2.756***	1.456*	−0.006	0.202	0.349*	−0.129	−0.293	−0.590
	(0.00)	(0.06)	(0.99)	(0.53)	(0.10)	(0.67)	(0.42)	(0.59)
Year dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Firm dummies	No	No	No	Yes	No	No	No	No
Firm controls	No	No	Yes	Yes	No	Yes	Yes	Yes
No. of obs.	15,651	15,651	15,651	15,651	15,651	15,651	164	164
R^2 / Pseudo-R^2	0.00	0.06	0.71	0.91	0.03	0.26	0.95	0.87

Finally, in regressions (5) and (6) of Table 8, we collapse the data by industry-year cell and use, respectively, the average and median firm ratings in the industry-year cell as the dependent variable. We find that none of the coefficient estimates on Fitch's market share are significant.

Overall, the results in Table 8 show that the estimates of the relation between credit ratings and Fitch's market share are very sensitive to the choice of control variables. They also suggest that the positive relation between credit rating and Fitch's market share documented by the previous study is largely driven by the difference in Fitch's market share and credit ratings between regulated and nonregulated industries.

We also examine how the positive relation between Fitch's market share and credit ratings documented in Panel A of Table 3 varies across sample periods by dividing the sample into two subperiods: pre- and post-2000. Since the increase in Fitch's market share is particularly evident in the 2000s, the competition view suggests that the effect of competition on rating inflation should be more pronounced during the post-2000 period than during the pre-2000 period. However, we find that during the subperiod 2000–2006, most of the coefficient estimates on Fitch's market share are not significant. A summary of these tests is in the Internet Appendix (available at www.jfqa.org). As a further test, we investigate how the rating standard has changed during the period 1995–2006. Following Blume et al. (1998), we use an ordered probit model to estimate the change in rating standards over time. We use as the dependent variable rating class numbers and as the independent variables a set of firm characteristics, industry dummies, and year dummies. We find a secular downward trend in the coefficient estimates on year dummies. Since Fitch's market share has increased significantly over the sample period, the downward trend in the coefficient estimates on year dummies, which suggests that rating standards have become more stringent over time, is not consistent with the view that competition from Fitch has a significant bearing on credit ratings. These tests are also tabulated in the Internet Appendix.

VI. Summary and Conclusion

In this paper, we revisit the debate about whether competition among credit rating agencies results in inflated credit ratings in corporate bond markets. We show that the finding in the previous study, that competition in the rating industry as measured by Fitch's market share leads to rating inflation, is largely driven by the endogeneity problem caused by unobservable industry effects. Specifically, when we explicitly control for industry effects and firm characteristics in regressions, we find little evidence of the positive relation between Fitch's market share and credit ratings. We also find that the results in the previous study are mainly driven by the difference in credit ratings and Fitch's market share between regulated and nonregulated industries. Moreover, we find that the positive relation between credit rating and Fitch's market share no longer holds when only the firms in nonregulated industries are included in the analysis.

Overall, these results cast doubt on the view that competition among rating agencies causes rating inflation in the corporate bond market. Although there is increasing evidence that credit ratings are inflated in the structured bond market, it is premature to conclude that competition among credit rating agencies has caused rating inflation in the corporate bond market.

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