Pay for Praise: Do rating agencies get paid more when they provide higher ratings? An examination of the consequences of the recalibration of municipal debt

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ABSTRACT

We ask whether credit rating agencies receive higher fees and gain greater market share when they provide more favorable ratings. We investigate this issue using Fitch and Moody's 2010 recalibration of their rating scales, which increased ratings in the absence of any underlying change in issuer credit quality. Consistent with concerns raised by critics of the issuer pay model, we find that compared to S&P, the governmental entities rated by Moody's and Fitch received better ratings, were charged higher fees, and issued bonds with lower yields after the recalibration event. This recalibration also led to increases in Fitch and Moody's market share. Overall the results are consistent with concerns that issuers will pay more for higher ratings.

1. *Introduction*

Critics argue that the change in credit ratings agencies' business model from an investor-pay model to an issuer-pay model, which occurred in the early 1970's, created an independence problem for these credit ratings agencies. Specifically, academics, the popular press, and regulators suggest that when issuers pay for ratings they will be induced to choose the ratings agency that will provide the best ratings, which could prompt ratings agencies to bias their ratings upward in return for larger fees and market share. Industry supporters counter that the potential reputational harm associated with biased ratings is sufficiently large to deter ratings agencies from offering higher ratings for larger fees. This long-standing debate has received renewed interest due to the recent financial crisis.[1] We provide new evidence on this debate by examining whether municipal debt issuers pay ratings agencies more for better ratings, and whether better ratings induce these issuers to switch between ratings agencies.

The existing academic research that investigates whether the issuer-pay model leads to an independence problem provides only indirect, and often conflicting, evidence about the ability of issuers to pay more for better ratings. For example, both Bonsall [2014] and Jiang, Stanford and Xie [2012] examine corporate bond ratings at the time S&P and Moody's changed from investor-pay to issuer-pay but find conflicting evidence on whether this switch resulted in more optimistic ratings. The inconsistent evidence is likely due to the inability to examine ratings fees, which are not publicly available for corporate debt issues. We add to this literature by taking advantage of the disclosures of ratings fee information in certain jurisdictions in the municipal bond market surrounding a recalibration of ratings methodology by Moody's and Fitch. By using ratings fees,

[1] For example, Steven Pearlstein at the Washington Post argued that during the recent credit crisis ratings agencies failed in their role as gatekeepers, because they were seduced to provide "triple A ratings to stuff they barely understood." (See Pearlstein [2009], Missing the Mark on Ratings-Agency Reform, Washington Post).

we provide more direct evidence on whether ratings agencies are paid more when they provide better ratings.

Our sample consists of bonds issued in two states, i.e. California and Texas, both of which collect and disseminate information about the bonds issued by a variety of governmental entities domiciled in their states. These disclosures include the magnitude of the fees paid to agencies to rate their bonds,[2] which is advantageous because it allows us to directly examine the association between ratings and the fees charged by ratings agencies.

To identify the effect of debt ratings on ratings fees we use the upward recalibration of municipal debt ratings by Moody's and Fitch in April 2010. This recalibration was designed to increase the comparability of ratings across asset classes. Prior to the recalibration, Moody's and Fitch used a Municipal Rating Scale, which historically measured how likely a municipality is to require extraordinary support from a higher level of government to avoid default (Adelino, Cunha, and Ferreira [2017], Cornaggia, Cornaggia, and Israelsen [2017]). After the recalibration, both Moody's and Fitch moved to the Global Ratings Scale (used for corporate bonds, sovereign debt, and structured finance products), which measures default risk and expected losses given default. Both ratings agencies indicate that the recalibration does not represent a change in credit quality of the underlying security.[3]

In contrast, S&P did not recalibrate their ratings, claiming that they did not employ a dual ratings system. The difference between a ratings agency with systematic changes in ratings

[2] It is noteworthy that for each municipal bond issue, Texas requires disclosure of fees paid to each rating agency, while California requires disclosure only of total ratings fees. Since an issue can be rated by multiple rating agencies, for California, we only use the bonds rated by one ratings agency to identify the fees paid to that ratings agency. We include a state dummy variable to control for state specific effects.

[3] For example, Moody's 2010 Rating Implementation Guidance states "This recalibration does not reflect an improvement in credit quality or a change in our credit opinion for rated municipal debt issuers." Fitch also asserts that the recalibration did not reflect a change in credit quality, but instead was a change to their Global scale ratings methodology (see Business Wire [2010]).

calibration versus one without provides us with a rare opportunity to isolate the effect of ratings on fees paid that are largely free from confounding factors.

A recent paper by Cornaggia et al. [2017] takes advantage of this ratings recalibration to investigate the effects of debt ratings on bond yields. Focusing on Moody's recalibration, they find that over 509,000 bonds issued for $1.3 trillion were upgraded, while the ratings for 135,000 bonds ($850 billion) were unchanged. This implies that the recalibration lead to significant increases in municipal bond ratings which we exploit to investigate whether better bond ratings result in larger ratings fees.

We begin our analysis by identifying the municipalities that have rated debt disclosed to either the Texas Bond Review Board or to the California State Treasurer (who compiles this information at the California State Treasurer Debt Watch website). The Texas Bond Review Board includes bond issue ratings and bond issue ratings fees at issuance for over 18,900 different governmental bond issues from 2002 to 2016, representing over $199 billion in debt, while California has bond issue ratings and bond issue ratings fees at issuance for over 56,800 different governmental bonds issues from 1984 to 2017, representing over $1.7 trillion in debt. For most of our analyses we restrict our sample to rated bond issues in the three years prior to the recalibration date (April 2010) and the three years after the recalibration which produces an overall sample of 9,179 rated issues across the two states over this six-year period.

Our first analysis replicates the results of Cornaggia et al. [2017] for outstanding debt in the new issuance market, and expands their analysis to include Fitch. Since ratings fees are disclosed at issuance, we first compare the changes in ratings of newly issued debt around the recalibration date for Moody's and Fitch versus S&P. Consistent with Cornaggia et al. [2017], we find that the post period new issuance debt ratings were higher for Moody's or Fitch compared to S&P. In this analysis, we include controls for the debt par amount, purpose, insurance status, and placement type. We also restrict the sample to the debt issued in the two-year, four-year and six-year windows centered on the recalibration date, and find that our results are consistent across all three time periods. These results indicate that, compared to S&P, both Moody's and Fitch increased their debt ratings of the governmental entities in California and Texas after the recalibration date.

Having confirmed the ratings increases associated with the recalibration, our second analysis investigates whether municipalities pay more for higher ratings. Specifically, we examine whether, compared to S&P, the ratings fees charged by Moody's and Fitch were relatively higher after the recalibration. We find that over the two, four, and six-year windows, the increase in ratings fees for Fitch and Moody's is larger than the increase in ratings fees for S&P. This implies that after recalibrating their ratings, and increasing the average ratings for municipalities, Fitch and Moody's were able to charge larger fees, compared to S&P.

One concern with these tests is that there may be a selection issue. Specifically, the innate characteristics of the entities selecting Moody's or Fitch could be correlated with ratings fees and could contribute to our results. To address this issue, we focus on entities that chose to be rated by both S&P and either Moody's or Fitch in both the pre and post recalibration periods. In this sample, the entities rated by S&P are identical to the entities rated by Moody's and Fitch in both the pre and post periods, and thus there is no ratings agency selection issue. It also eliminates the concern that our results reflect differential changes in underlying fundamentals between municipalities rated by Moody's or Fitch versus by S&P around the recalibration event. Consistent with our main analysis, we find that over the 2, 4, and 6-year windows Moody's and

Fitch had relatively larger increases in ratings, and over the 4 and 6-year horizons Moody's and Fitch charged more in ratings fees.[4]

We further use this sample to investigate whether there is a direct relationship between changes in ratings fees and changes in ratings at the municipality level. We create a difference-in-difference measure that captures the relative change in fees for Moody's and Fitch compared to the change in fees for S&P. We create a similar measure for changes in ratings and examine the association between the changes in ratings and changes in fees. We find that relative to S&P, a one-notch increase in ratings for Moody's and Fitch yields an additional $839 in fees at issuance.

Having established the effect of recalibration on ratings and fees, we examine the consequences of the improved ratings and larger fees on the bond market. We first investigate whether Fitch and Moody's were able to attract more business in the post period by using a logistic regression to model the propensity for a municipality to be rated either by Fitch or Moody's. In this analysis, we restrict our sample to municipalities that choose to be rated by only one of the three ratings agencies, and investigate whether the propensity to use either Fitch or Moody's increased in the post period.[5] We find that over the two, four, and six-year horizons centered on the recalibration date, governmental entities in Texas and California were more likely to use Fitch or Moody's after the recalibration. When we combine these results with the improved ratings after the recalibration date, it suggests that the improved ratings offered by Fitch and Moody's enticed borrowers in the municipal bond market to use their services.

[4] The insignificant difference in ratings fees for Moody's and Fitch versus S&P over the two-year window is likely due to data limitations (at least in part). While the recalibration occurred over a month long period, we do not have the exact date the ratings fees are assessed by the ratings agency. Thus some of our post observations immediately after the recalibration date likely negotiated their ratings fees in the pre period. If we exclude 2010, we find that Moody's and Fitch had a significantly larger change in fees than S&P in the two-year period 2011 through 2012.

[5] There are very few observations for ratings on municipalities other than those provided by Fitch, Moody's, and S&P. Thus, by definition, municipalities rated by two ratings agencies must be rated by either Fitch or Moody's and including them in this analysis would not be appropriate.

We next focus on the consequences of the recalibration on bond yields. In the municipal bond market there is a large mix of institutional investors and retail investors, and it is unclear how investors will respond to these ratings increases. Naive investors may view the increased ratings from Moody's and Fitch as signals of improved credit quality and yields may decrease. Alternatively, investors may see through these ratings improvements as being uninformative about credit risk changes, and yields on newly issued debt may not change or even increase, as municipalities that have lower default risk are now being pooled with higher default risk issues in the same credit class.[6]

Using the same approach described above, we investigate whether the yield changes after the recalibration date are greater for the bonds rated by either Moody's or Fitch compared to S&P, and find that Moody's and Fitch rated issuances had a relatively larger decrease in yields in the post period. The results suggest that investors in the municipal markets still largely rely on credit ratings to price securities. In combination with an issuer-pay model, this phenomenon creates incentives for issuers to pay higher fees in exchange for more favorable ratings.

We conclude our tests by examining the alternative explanation that the increases in fees charged by Moody's and Fitch represent price increases due to the provision of a superior product. As part of the recalibration, both Moody's and Fitch incorporated loss given default estimates for each municipal sector. So it is possible that issuers pay more because Moody's and Fitch are incorporating their estimates of loss given default into their ratings.

Moody's and Fitch indicate that loss given default is the lowest for general obligation bonds (GO bonds), because "the legal enforceability of the GO pledge ensures a high rate of

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[6] The existing research reports mixed results. Cornaggia et al. [2017] find that, on average, yields of the debt rated by Moody's declined after the recalibration suggesting that the recalibration was considered newsworthy by some investors. Kriz and Xiao [2017] investigate a broader question, focusing on whether the structure of the yield spreads was affected by the recalibration, and find that, contrary to Cornaggia et al. [2017] the overall spreads increased for A-rated or higher bonds and did not change for Baa-rated bonds.

recovery for GO bonds" (Moody's [2007]). Thus, we partition our sample into GO bonds versus all other bonds, and examine whether the increases in fees or increases in ratings are more heavily concentrated in bonds where loss given default is likely to be more significant. We find that while both types of bonds experienced ratings increases, only GO bonds experienced fee increases. Since the loss given default for these bonds is relatively low, this is the opposite of what we would expect if information about loss given default is driving the results, making it unlikely that Moody's and Fitch are being compensated for providing superior credit ratings.

Overall, our results demonstrate some of the consequences associated with the issuer-pay ratings model. We identify an event that lead to an increase in the credit ratings for thousands of municipalities, without a corresponding change in credit quality. This event lead to municipalities increasing their use of the ratings agencies that provided higher credit ratings, and an increase in the fees these ratings agencies charged. We note that our results likely provide a lower bound of these effects, because not all states disclose ratings fees. Knowing that fees paid will become public information likely reduces the incentives for municipalities in Texas and California to buy better ratings.

Our results should be of interest to both academics and regulators. Our paper complements existing academic research considering the pros and cons of issuer-pay models in both the audit market and credit ratings settings by demonstrating that in the municipal debt market, borrowers' incentives to obtain improved credit ratings affect their choice of ratings agency and the fees they are charged. Required by the Sarbanes Oxley Act and the Dodd Frank Act, the Securities and Exchange Commission (SEC) has conducted several research reports on the independence and the conflicts of interests of nationally recognized statistical rating organizations (NSRSOs).[7] The evidence that municipal debt issuers do pay higher fees for higher ratings raises concerns about the incentives created by an issuer pay model.

The rest of this paper is organized as follows: In Section 2 we provide a background discussion and a literature review, and in Section 3 we develop our hypotheses. In Section 4 we discuss sample selection and research design. In Section 5 we present the results and in Section 6 we conduct robustness tests. Section 7 concludes.

2. *Background and Literature Review*

2.1. REGULATORY CONCERNS SURROUNDING NSRSOs

In 2002, Congress issued the Sarbanes Oxley Act in response to the Enron bankruptcy. As part of this Act, congress required the SEC to prepare a report on the role and function of credit ratings agencies in the operation of securities markets.[8] As part of this report, the SEC highlighted the fundamental conflict of interest associated with the issuer pay model. Specifically the SEC indicates that:

> *"The practice of issuers paying for their own ratings creates the potential for a conflict of interest. Arguably, the dependence of rating agencies on revenues from the companies they rate could induce them to rate issuers more liberally, and temper their diligence in probing for negative information. This potential conflict could be exacerbated by the rating agencies' practice of charging fees based on the size of the issuance, as large issuers could be given inordinate influence with the rating agencies."*

The SEC also highlighted the counter veiling market forces that potentially mitigate the inherent conflict of interest, indicating that:

> *The fees received from individual issuers are a very small percentage of their total revenues, so that no single issuer has material economic influence with a rating agency. Furthermore, the rating agencies assert that their reputation for issuing credible and*

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[7] See, for example, the Report on the Role and Function of Credit Ratings Agencies in the Operation of Securities Markets (SEC [2003]), and the Report to Congress Credit Rating Agency Independence Study (SEC [2013]).

[8] See the Report on the Role and Function of Credit Ratings Agencies in the Operation of Securities Markets (SEC [2003]).

reliable ratings is critical to their business, and that they would be loathe to jeopardize that reputation by allowing issuers to improperly influence their ratings, or by otherwise failing to be diligent and objective in their rating assessments.

Ultimately, the SEC concluded that they should explore whether NRSROs should "implement procedures to manage potential conflicts of interest that arise when issuers pay for ratings (SEC, [2003], p.2)."

In 2010, at the end of the financial crisis, Congress passed the Dodd Frank Act, which once again required the SEC to study the NSRSOs.[9] Specifically, Section 939F(b)(1) of that bill indicates that "the Commission shall carry out a study of the credit rating process for structured finance products and the conflicts of interest associated with the issuer-pay and the subscriber-pay models."[10] The increased regulatory attention on the NSRSOs is likely attributable to their role in the financial crisis. For example, the final report issued by the Financial Crisis Inquiry Commission indicates that "the failures of credit rating agencies were essential cogs in the wheel of financial destruction. The three credit rating agencies were key enablers of the financial meltdown" (FCIC [2011], p.25).

In 2012 and 2013, the SEC responded to the Dodd Frank Act by issuing a series of studies on the Credit Ratings Agencies, and as part of those reports, the SEC once again described the independence issues that arise in issuer-pay models. The SEC responded to Congressional concerns regarding these conflicts of interests by adopting a series of measures over the period 2010-2014. These measures include improving the ratings agencies internal controls, and requiring "look-back" reviews to determine whether conflicts of interest led to ratings inflation. They also required ratings agencies to publish their methodologies and credit-rating histories and required that ratings be consistent across all asset classes. Despite the

[9] See the Dodd-Frank Spotlight: Credit Rating Agencies (SEC [2014]).
[10] See the Report to Congress on Assigned Credit Ratings (SEC [2012], p.6).

changes in the regulations, skeptics remain concerned that the issuer pay model retains inherent conflicts of interest that are likely to lead to future economic crises.[11]

We seek to provide additional evidence regarding the conflicts of interest that arise under the issuer-pay models by utilizing the disclosure of ratings fees in the municipal debt markets and the recalibration of credit ratings which resulted in systematic upgrades of ratings to thousands of municipalities without any change in underlying credit risk.

2.2. ACADEMIC RESEARCH ON THE CONFLICT OF INTEREST UNDERLYING THE ISSUER PAY MODEL

The heightened regulatory interest in the conflicts of interest underlying the issuer-pay model has led to a host of academic studies investigating the extent to which the borrowers' incentives to buy better credit ratings and the ratings agencies' incentives to retain their reputational capital influence the outcomes of the ratings process. Researchers have used a variety of different approaches to address this question.

For example, Cornaggia, Cornaggia, and Hund [2017] examine default rates by initial rating, accuracy ratios, migration metrics, instantaneous upgrade and downgrade intensities, and rating changes over bond lives for bonds across different asset classes. They find that the extent to which credit ratings agencies provide ratings inflation is monotonically related to the magnitude of the revenues generated by the asset class, and that asset classes tend to receive the most generous ratings in periods when they generate the greatest amounts of revenue. Similarly, He, Qian, and Strahan [2012] examine the relationship between ratings and the size of the issuer offering mortgage backed securities (MBS). They find that larger issuers of MBS received better ratings than smaller issuers of MBS, and that investors priced this risk by offering larger issuers higher yields. The results of these papers are consistent with the independence issues associated

[11] See, for example, Dayen [2014].

with the issuer-pay model dominating the ratings agencies' incentives to maintain reputational capital.

Becker and Milbourn [2011] focus on the role of reputation in ratings by examining the effect of Fitch entering the ratings market in 1999, which increased the competitiveness of the overall market. They find that increased competition from Fitch in the public bond market coincides with lower quality ratings by S&P and Moody's. Specifically, as competition increases, for both Moody's and S&P, rating levels went up, the correlation between ratings and market-implied yields fell, and the ability of ratings to predict default deteriorated. They interpret these results as consistent with an association between rating agency reputation and the quality of the ratings they provide arguing that as competition increases, the reputational rents decrease, and quality declines.

Both Bonsall [2014] and Jiang et al. [2012] examine the quality of the ratings at the time S&P and Moody's changed from investor-pay to issuer-pay. Bonsall [2014] finds that ratings quality improved, as ratings became more predictive of future economic outcomes, while Jiang et al. [2012] find that as issuers moved from investor-pay to issuer-pay, ratings increased. This suggests that ratings agencies offered higher ratings when paid by issuers.

Several papers examine the effects of the issuer-pay model by comparing ratings from issuer-paid ratings agencies to those from investor-paid ratings agencies (such as Egan-Jones and Rapid Ratings). For example, Beaver, Shakespeare, and Soliman [2006] find that certified rating agencies (i.e., issuer-paid ratings) are more conservative than investor-paid ratings because of their role in financial contracts. Similarly, Cornaggia and Cornaggia [2013] find that Moody's ratings exhibit less volatility but are slower to signal changes in default risk than investor-paid ratings. Finally, Xia [2014] finds that the presence of investor-paid rating agencies improves the quality of S&P ratings. Collectively, these papers conclude that certified rating agencies who are paid using the issuer-pay model tend to be slower and provide less informative ratings than investor-paid ratings agencies. However, the evidence is mixed on whether this is because the issuer-pay model induces an independence problem or the rating agencies act conservatively because of their contracting role.

From a theoretical perspective, Mathis, McAndrews, and Rochet [2009] develop a model showing the tradeoffs between the reputational concerns of the ratings agency and the borrowers' willingness to pay for ratings. The key insight from their model is that reputational concerns will dominate when the fraction of revenues from a particular asset class is small. In addition, Bolton, Freixas, and Shapiro [2012] model the ratings agencies incentives to provide better ratings (i.e., underrate risk) for an increase in their market share. In their model, the extent to which ratings agencies will underrate risk depends on whether the issuer will be a repeat customer and the general economic conditions. They suggest that during boom periods, both the nature of the clientele buying the bond (i.e. there are more naive investors) and the risk of bond failure are such that it is less costly to provide better ratings for riskier bonds.

Overall, in our assessment the existing academic evidence yields conflicting results on whether the issuer-pay model leads to more favorable ratings. Papers support both the reputational arguments and the conflict of interest arguments. In this paper, we attempt to add to this literature by using the disclosures of ratings fee data by municipalities to directly capture the fee revenue received by the rating agencies and the recalibration done by Moody's and Fitch in April 2010 to generate estimates that are largely free from confounding factors.

2.3. BOND RECALIBRATION AND RATINGS FEE DATA

There are two central issues that have made it difficult to assess whether better ratings are associated with larger ratings fees. First, neither the ratings agencies nor the bond issuers typically disclose fees. Second, better ratings could be associated with larger fees because they require more effort in determining the rating. We take advantage of some of the unusual elements of the municipal debt market to overcome these concerns.

First, both Texas and California have state level agencies that oversee municipal debt issuances. These agencies require municipalities to disclose various elements of the debt that they issue, including the magnitude of their ratings fees. Texas requires these disclosures at the ratings agency level for every bond issuance, while California reports the combined ratings fees paid for the bond issuance.

Second, in April 2010 both Fitch and Moody's recalibrated the ratings on municipal debt issuances to the Global Rating Scales.[12] This recalibration has two elements. The first is analogous to a change in a unit of measurement, like converting inches to centimeters. Prior to the recalibration, municipalities were subject to a stricter rating standard compared to corporate bonds. This disparity in rating standards was argued to increase state and local governments' borrowing costs, and resulted in lawsuits against the ratings agencies.[13] The 2010 recalibration of rating scales led to an increase in ratings for most state and local governments of up to three notches to reflect the ratings bands under the Global Rating Scale (Moody's [2010]). The second element is that the ratings under the Global Rating Scale reflect both default risk and loss given

[12] Studies use this event to examine whether credit ratings still matter to investors (Cornaggia et al. [2017]), how local governments' financial constraints affect employment and growth (Adelino et al. [2017]), and whether municipal bond ratings affect incumbent election prospects (Cunha et al. [2017]).

[13] For example, State of Connecticut v. the McGraw-Hill Cos., Inc., case number 08-4038927; State of Connecticut v. Moody's Corp., case number 08-4038928; and State of Connecticut v. Fitch Inc., case number 08-4038926; Bolado [2011].

default, while historically ratings for municipalities only reflect distance to default. For municipal GO debt, loss given default is typically close to zero. For other types of municipal debt, loss given default can range from 10 to 50%.[14]

These recalibrations appear to have been in response to legal pressure from municipalities on these agencies to adjust their ratings and to regulatory pressure for increased transparency. For example, the Dodd Frank Act of 2010, section 938 Universal Ratings Symbols explicitly required the SEC to require each NRSRO to apply any rating symbol in a manner that is consistent for all types of securities. S&P claimed that they adopted one rating scale across all asset classes, and thus did not recalibrate their ratings. The Moody's and Fitch recalibration provides us a rare setting where, for one set of ratings agencies, there is a change in ratings without a corresponding change in underlying issuer fundamentals, and there is a control sample of ratings where there was no corresponding recalibration. Thus, we can isolate the effect of ratings fees resulting from the recalibration on ratings changes.

3. *Hypothesis Development*

Our first hypothesis considers whether the ratings recalibration led to an increase in ratings for the bond issues rated by Moody's and Fitch in our sample. While prior studies suggest that, on average, Moody's materially increased their bond ratings on the municipal debt they rated after the recalibration period (Cornaggia et al. [2017]), there are at least three reasons these results might not hold in our sample. First, we focus on the bonds issued by municipalities in two states, and it is not clear the extent to which the bonds in these states were recalibrated. Second, we focus on Moody's and Fitch, and it is not clear whether Fitch had a material recalibration. Third, we focus on new issues while Cornaggia et al. [2017] examined the effects of

[14] See Moody's [2007].

recalibration on outstanding debt. Ultimately we expect the bond recalibration will result in better ratings, but we empirically establish this result prior to moving on to our other tests.

Our second hypothesis is that, compared to S&P, after the bond recalibration occurs both Fitch and Moody's will experience a larger increase in their ratings fees. As we discuss above, some of the existing research establishes that ratings agencies are concerned with their reputation, and thus one could expect that the recalibration will have no effect on fees. Alternatively, other papers suggest that the issuer-pay model creates independence problems, and ratings agencies may be affected by their lack of independence and charge more for better ratings.

Our third hypothesis is that after the bond recalibration, Fitch and Moody's will experience an increase in their market shares. Investors in the municipal bond market rely on credit ratings to assess the default risk of the bond, and municipalities with better ratings enjoy lower financing costs (Adelino et al. [2017], Cornaggia et al. [2017]). If the ratings recalibration resulted in improved credit ratings, then one would expect that issuers would be more likely to use the ratings agencies that offer better ratings. Further, evidence of a shift to the ratings agencies that recalibrated their ratings would be consistent with the hypothesis that issuers who pay for ratings have an incentive to use the ratings agency that will provide them with the best ratings. However, if the recalibration is associated with an increase in the ratings fee, then it is not clear that the costs of using Fitch and Moody's (increased fees) will exceed the benefits (better ratings). Thus the effect of the recalibration on rating agency market share is not known.

Our fourth hypothesis relates to the effect of recalibration on bond yields. If recalibration leads to a general upwards migration of credit ratings, to the extent that there are some naive investors in the municipal bond market, we would expect the bond yields for bonds rated by Moody's and Fitch to decline more than bond yields for bonds rated by S&P. Alternatively, if the municipal bond market is dominated by sophisticated investors that see through this artificial apparent change in credit quality, then we expect to observe no differences in yields across these ratings agencies.

Our fifth hypothesis relates to the effect of changes in ratings on changes in fees. If issuers are willing to pay for praise, then when Moody's or Fitch provides a relatively higher rating in the post period compared to S&P for the same municipality, then we expect that Moody's or Fitch will also charge a relatively larger fee. This hypothesis is similar to our second hypothesis, but it implies a direct link between changes in ratings and changes in fees at the municipality level. In other words, those municipalities that receive upgrades should also be those that pay larger fees.

Our final hypothesis relates to whether the importance of the loss given default portion of the ratings change affects issuers when they are recalibrated. If measuring loss given default improves the quality of the credit ratings, then we should see larger fees being paid in the bonds where there is more variation in loss given default.

4. *Data*

4.1. SAMPLE SELECTION

To identify our sample, we focus on municipalities that have rated debt disclosed to either the Texas Bond Review Board or to the California State Treasurer, since both Texas and California disclose ratings fees.[15] The Texas Bond Review Board provides bond issue ratings and bond issue ratings fees at issuance for governmental bonds from 2002 to 2016, while California covers bond issues from 1984 to 2017. It is important to note that these States provide initial ratings and initial fees for new bond issues. They do not provide data on the maintenance

[15] The Texas Bond Review Board website is http://www.brb.state.tx.us/publications_local.aspx#AR. The California State Treasurer Debt Watch website is http://debtwatch.treasurer.ca.gov/.

fees paid to ratings agencies or data on ratings changes over time. For most of our analyses we restrict our sample to the bonds issued in the three-year period prior to the recalibration date (April 2010) and the three-year period after the recalibration. Our overall sample size is 9,179 bond issues across the two states over this six-year period (4,225 in California and 4,954 in Texas).

For most of our tests the variables in our analysis originate from the data sources described above, including the credit rating, rating fees, par value, sale type (competitive or negotiated), entity type, insurance type, and date of sale. For our bond yield analysis, we match the data from these websites to the data on the Mergent Municipal Bond Securities Database by par value, date of sale, name of the insurance agent, and sale type. We manually verify the matches to ensure accuracy. In total we are able to match 4,969 issues, representing 2,567 issues in California and 2,402 issues in Texas.

For the bond issue samples in both states, we analyze the underlying long-term rating associated with the bond issue. To arrive at the final sample of 9,179 rated bond issues, we winsorize and truncate the sample as follows. We delete observations that are unrated, only have short-term ratings, where the ratings fee is greater than zero but the bond issue is unrated, where the ratings fee is equal to zero but the bond issue reports at least one rating, and when the number of ratings fees does not correspond to the number of credit ratings. Finally, we delete observations with missing fees and where the spread equals zero. We winsorize ratings fees at the top 1% level in both samples.

4.2. RESEARCH DESIGN

4.2.1. Credit Ratings after Recalibration

We begin by documenting whether Moody's and Fitch improve their ratings for new bond issues after recalibration in April 2010. We use a difference-in-difference design described in Eq. (1) below:

$$Rating = \beta_0 + \beta_1(Fitch\_Moody's) + \beta_2(Post) + \boldsymbol{\beta_3(Post*Fitch\_Moody's)} + \beta_k(Controls) + e. \quad (1)$$

The dependent variable, *Rating*, is the numerical equivalent of the bond issue's credit rating, where 16 is equivalent to an S&P rating of AAA and 1 is equivalent to B- (the lowest credit rating in the sample). *Fitch_Moody's* is an indicator variable equal to 1 if the rating was assigned by either Fitch or Moody's. *Post* is an indicator variable equal to 1 if the bond issue is sold on or after May 1, 2010 (after the recalibration), and 0 otherwise. If Moody's and Fitch increase their ratings for bond issues after recalibration, then the coefficient on *Post*Fitch_Moody's*, β_3, will be greater than zero. We include controls for other determinants of credit ratings based on bond issue characteristics such as bond issue size (*Ln(Par)*), whether the bond issue is insured, sale type (private placement or competitive), and entity type (e.g., school, county, city, etc.). We perform the analysis at the ratings-bond issue level (where some bond issues have multiple ratings) and report the results using 6, 4, and 2-year windows surrounding the recalibration date.

4.2.2. Ratings Fees after Recalibration

In our second analysis, we investigate whether Fitch and Moody's are paid more after they recalibrated their ratings. We test this prediction using Eq. (2) below:

$$Ln(Rating\ Fee) = \beta_0 + \beta_1(Fitch\_Moody's) + \beta_2(Post) + \boldsymbol{\beta_3(Post*Fitch\_Moody's)} + \beta_k(Controls) + Ratings\ Fixed\ Effects + e. \quad (2)$$

The dependent variable, *Rating Fee,* is defined as the fee charged by a given rating agency. Because the rating fee data from California is summed across all rating agencies and is not separable between individual rating agencies, bond issues from California are included only if they are single-rated. If Moody's and Fitch are paid more for their ratings after recalibration, then β_3 will be greater than zero. In addition to controlling for other determinants of ratings fees, we also include ratings fixed effects to control for any rating specific effects on fees.

4.2.3. The Effect of Recalibration on the Propensity to Use Moody's or Fitch

In our third analysis, we analyze whether Moody's and Fitch were able to increase their market share after recalibrating their ratings upwards. We use a logistic regression to test whether new bond issues are more likely to use ratings from Moody's or Fitch (as opposed to S&P) after recalibration. For this analysis, we reduce the sample to bonds with only one rating. We focus our market share hypothesis on single-rated bonds because bonds with only one rating have greater potential (more choices) to switch to rating agencies with higher ratings. We test our hypothesis in Eq. (3) below. If Moody's and Fitch are able to increase their market share because municipalities are more likely to obtain Moody's and Fitch rather than S&P after recalibration, then β_1 will be greater than zero.

$$Pr\ (Fitch\_Moody's=1) = \beta_0 + \boldsymbol{\beta_1(Post)} + \beta_k(Controls) + e. \qquad (3)$$

4.2.4. Bond Yields after Recalibration

We also examine the change in yields for debt issued after the recalibration period. Using the same difference-in-difference approach discussed above, we investigate whether the change in yields over the recalibration date for the bonds rated by either Moody's or Fitch is greater than the change in yields for the bonds rated by S&P in Eq. (4) below.

$$Yield = \beta_0 + \beta_1(Fitch\_Moody's) + \beta_2(Post) + \boldsymbol{\beta_3(Post*Fitch\_Moody's)} + \beta_k(Controls) + e. \quad (4)$$

If investors view the increased number of bonds receiving good ratings from Moody's and Fitch as signals of improved credit quality, then yields will decrease and β_3 will be negative. Alternatively, if investors see through these improvements in ratings as municipalities that have lower default risk are now being pooled with those with higher default risk in the same credit class, then β_3 will be positive.

5. Results

5.1 DESCRIPTIVE STATISTICS

Figure 1 depicts the average fees (in dollars) charged by the rating agencies over time. In Panel A, the sample incorporates all municipal bond issues from Texas and single-rated bond issues from California. In general, rating fees increase for all three rating agencies over time. After recalibration in April 2010, Fitch and Moody's increase their fees more than S&P and the gap between their fees continue to widen over time. Panel B and C demonstrate similar patterns after splitting the sample into uninsured and insured bond issues, respectively. We provide additional evidence on the trends in fees charged by S&P versus Moody's and Fitch in the pre period in Panel D. In this panel, we reduce the sample to bond issues with two ratings. Before the recalibration, the trends in fees between the two groups co-moved closely, and S&P on average charged a higher fee than Moody's and Fitch. After the recalibration, although we still observe the co-movement in fees, Moody's and Fitch on average charged a higher fee than S&P.

Figure 2 depicts changes in market share between the three rating agencies over the sample period. The sample includes bond issues with only one rating, and the black dashed (blue solid) line depicts the percentage of new bond issues with an S&P (Fitch or Moody's) rating in a given quarter. Prior to the recalibration, S&P increased their market share to a maximum of 92% of new bond issues in the first quarter of 2010. However, the market share of Fitch and Moody's increased after the recalibration, to a high of 28% in the second quarter of 2011.

Table 1 provides the descriptive statistics. The average (median) rating fee at bond issuance is $13,204 ($9,900). The median credit rating is 14, corresponding to an S&P rating of AA. The mean yield to maturity is 3.46% (median = 3.54%). The bond issue size, or par amount, is $50,734,846 on average (median = $15,120,000). Municipal bond issuers on average obtain two ratings at bond issuance. The mean values of the S&P, Moody's, and Fitch dummies indicate that 53% of the ratings are from S&P, 31% from Moody's, and 16% from Fitch (92% of the bond issues are rated by S&P, 66% by Moody's, and 42% by Fitch, untabulated). There is a large amount of variation in the issuer entity type, where 25.2% are cities, 27.6% schools, and 15.4% state. Almost half (42%) of the bond issues are insured, and the vast majority of sales are negotiated (83.4%). Finally, the sample is split evenly across the two states of Texas and California (mean Texas dummy = 0.499).

Table 2 presents the correlations between the variables of interest. Most notably, rating fees are negatively correlated with credit ratings and insurance, and positively correlated with bond yields, bond issue size (par), and the number of ratings. Credit ratings are negatively correlated with bond yields, and positively correlated with bond insurance. Bond yields are positively correlated with bond issue size and the number of ratings. The correlations above are robust to using Spearman rank correlations for credit ratings and the number of ratings and to using t-tests for bond insurance (untabulated). Finally, the post period is negatively correlated with credit ratings, bond spreads, bond issue size (par), the number of ratings per issue, and bond insurance. In untabulated analyses, these correlations are similar using t-tests and chi-square tests as appropriate.

5.2. MAIN RESULTS

Table 3 presents results of Eq. (1), where we examine whether Moody's and Fitch provide higher ratings relative to S&P after recalibration. We perform this analysis using a two, four, and six-year window around the recalibration date in models (1), (2), and (3), respectively. In all three models, the coefficient on *Fitch_Moody's* is negative and significant at a 1% level, indicating that Fitch and Moody's provide lower ratings than S&P on average prior to their recalibration. This is consistent with the claim that the dual rating scale employed by Moody's and Fitch before recalibration resulted in lower ratings for municipalities. The coefficient on *Post* is also negative and significant, indicating that S&P provided lower ratings on average in the post period.

As predicted by our hypotheses, the coefficient on *Post*Fitch_Moody's* is positive and significant at a 1% level (coeff. = 0.810 in model (2)). Specifically, Fitch and Moody's provided ratings that are 0.42 notches higher (=-0.394+0.810) after their recalibration. In other words, the table shows that Fitch and Moody's provided lower ratings relative to S&P in the pre-period, and unlike S&P, their ratings improved after recalibration. In terms of economic significance (using model (2)), S&P provided ratings that were 0.7 notches higher in the prior period (average=14 (or AA) compared to 13.3), and after recalibration Fitch and Moody's provided statistically higher (but economically similar) ratings compared to S&P (average=13.7 compared to 13.6). With respect to select control variables of interest, the coefficients on *Insured* and *Ln(Par)* are positive and significant, indicating that insured bond issues and larger bond issues receive higher ratings on average.[16]

After documenting that Moody's and Fitch provide relatively higher ratings on new bond issues, we examine whether Fitch and Moody's are paid more after recalibrating their ratings upwards. Table 4 presents the regression results described in Eq. (2). In models (2) and (3), the coefficient on *Fitch_Moody's* is negative, suggesting that Fitch and Moody's charged lower fees in the prior period, on average. In all three models, the coefficient on *Post* is positive and significant, suggesting that all three rating agencies charged higher fees in the post period, consistent with inflation and rising prices. Finally, the coefficient on *Post*Fitch_Moody's* is positive and significant in all three models. Similar to Figure 1, the results show that Fitch and Moody's increased their fees by more than S&P after recalibration (and charged higher fees than S&P in total). Using model (2), the table shows that Fitch and Moody's increased their fees by \$2,086 after recalibration, equivalent to a 25% increase in fees (average fees in the prior period = \$8,465).[17]

One concern with these tests is that there may be some selection issue associated with which municipalities choose Moody's or Fitch compared to S&P. To address this issue, we perform the analysis on a sample of bond issues with two ratings both in the pre and post period, where one of the ratings is provided by S&P. In doing so, this analysis shows that the increase in ratings is robust to using the governmental entity as its own control. In Table 5, we investigate whether Moody's and Fitch provide relatively higher ratings after recalibration for bond issues that are rated by S&P and either Moody's or Fitch. The coefficient on *Post*Fitch_Moody's* is

[16] The results are robust to including government entity fixed effects and clustering standard errors by bond issue.
[17] The results in Table 4 are robust to including government entity fixed effects, clustering standard errors by bond issue, and dropping the year 2010 from the analysis.

positive and significant, suggesting that Moody's and Fitch increased their ratings for bond issues that also have an S&P rating.

In addition, we examine whether the results in Table 4, documenting an increase in ratings fees for Fitch and Moody's compared to S&P, are robust when we reduce the sample to bond issues with an S&P rating. Table 6 presents the results. We find that *Post*Fitch_Moody's* is positive and significant in models (2) and (3), indicating that ratings fees charged by Fitch and Moody's increased relative to S&P after recalibration, even for those bond issues with an S&P rating.

Given that Moody's and Fitch provide higher ratings relative to S&P after recalibration, we test whether Moody's and Fitch are able to increase their market share in Table 7. Specifically, we test whether bond issues with only one rating are more likely to be rated by either Moody's or Fitch in the post period (Eq. (3) above). We find that the coefficient on *Post* is positive and significant in all three models, but the results are stronger within smaller windows surrounding the recalibration date. In terms of economic significance (using model (2)), the likelihood of choosing Moody's or Fitch over S&P increased from 12.1% to 18.8% (an increase of 6.7% which is equivalent to a 55% increase).

Turning to the consequences of the recalibration on issuers' cost of capital, Table 8 presents the results of Eq. (4) investigating the consequences of recalibration on bond yields. Specifically, the regression tests whether the yields of bonds rated by Moody's and Fitch after recalibration are different from those rated by S&P. Columns (1) – (3) perform this analysis at the bond level. Given that there are multiple bonds per bond issue, the standard errors are clustered at the issue level. Columns (4) – (6) perform the analysis at the issue level, where the dependent variable is the average yield of all bonds per bond issue. The coefficient on *Post* is negative and significant, indicating that bond yields decreased after the recalibration date on average. However, the coefficient on *Post*Fitch_Moody's* is negative and significant (except in column (4)), indicating that the decrease in bond yields was greater for Fitch and Moody's than for S&P.

In terms of economic significance (using model (5)), the average yields for bond issues rated by Fitch and Moody's were lower by 0.836 (=-0.671-0.165), where yields are quoted in percentages. This corresponds to a 21% decrease in bond yields (the average yield in the prior period for Fitch and Moody's was 3.89%). Using the average par value of bond issues in the sample of $50,734,846, this decrease in yields translates to a lower cost of capital of $423,814 ($50,734,846*0.836%) per bond issue. Taken together, the results in Table 8 support the hypothesis that investors viewed the increases in bond ratings as signals of improved credit quality and issuers benefited from the recalibration in the form of lower bond yields.

Thus far our results indicate that municipal bond issuers received higher ratings and paid higher fees after Moody's and Fitch recalibrated their ratings scale. In our next analysis, we directly link the change in fees to the change in ratings at the issuer level to show that those municipalities who received higher ratings did, in fact, pay higher fees. In Table 9, we reduce the sample to a balanced panel of Texas issuers (i.e., municipalities with at least one bond issue in both the pre and post periods). We define the change in ratings and the change in fees by comparing the last bond issue in the pre period to the first bond issue in the post period. [18] To compare the changes from Moody's and Fitch to the changes from S&P for the same bond issues, we require that each bond issue have two ratings, where one rating is from S&P. The dependent variable, *Relative Change in Rating Fees*, is the rating fee charged by Moody's or Fitch on the

[18] Our dataset is comprised of issuance data (rather than ongoing ratings), which is advantageous because it provides the ratings fee data. The drawback is that analyzing changes in fees and changes in ratings is not straightforward.

first bond issue in the post period less the fee charged on the last bond issue in the pre period *less* the change in fees charged by S&P on the exact same bond issues. Similarly, the independent variable of interest, *Relative Change in Rating*, is the rating assigned by Moody's or Fitch to the first bond issue in the post period less the rating assigned to the last bond issue in the pre period *less* the change in ratings assigned by S&P to the exact same bond issues. In other words, we regress the change in rating fees *relative* to S&P on the change in ratings *relative* to S&P, to analyze whether getting a higher rating is associated with paying higher fees.

We perform the analysis in Table 9 at the issuer level, and we control for the number of days in between the date of the first bond issue in the post period less the last bond issue in the pre period. We find that the coefficient on *Relative Change in Rating* is positive and significant, indicating that an increase in credit ratings is positively correlated with an increase in ratings fees. This indicates that the issuers who paid higher fees received higher ratings after the recalibration, which is consistent with our interpretation of the previous tables and with the interpretation that municipal bond issuers can "pay for praise".

In our last set of analyses, we perform a cross-sectional test to distinguish between two alternative interpretations of the data. Although our results are consistent with "pay for praise," an alternative explanation is that Moody's and Fitch provided better ratings after the recalibration and issuers were willing to pay more for a better product. Specifically, one concern is that Moody's and Fitch ratings were indicative of distance to default in the pre period and after the recalibration, they were indicative of both distance to default and loss given default (i.e., recovery). As a result, issuers with higher losses given default (lower recovery rates) may be willing to pay more in the post period in order to provide more informative ratings to bond investors. Table 10 tests whether this explanation could be driving our results.

If Moody's and Fitch ratings are a better measure of loss given default (i.e., recovery) after the recalibration, then we would expect ratings fees to increase more for bond issues with lower recovery rates. We test this by analyzing our results for general obligation (GO) bond issues (i.e., state, city, and county bond issues) versus other types of municipal bond issues (e.g., water, hospital, school, etc.). GO bonds have significantly higher recovery rates than other bond types. The loss given default (LGD) for GO bond issues is approximately 5-10% compared to 45-55% for other bond issues (Moody's [2009]). Thus, if our results are driven by issuers' willingness to pay more for more informative ratings regarding LGD, then we should see stronger results for the non-GO bond issues than for GO bond issues.

In Table 10, we find that this alternative explanation is not supported by the data. In fact, we find that the increase in fees is stronger for the GO bond issues and largely insignificant in the sample of non-GO bond issues. Specifically, the coefficient on *Post*Fitch_Moody's* is positive and significant in Columns (1) to (3), yet insignificant in Columns (4) and (5). In other words, ratings fees increased significantly for GO bonds but less so for non-GO bonds, which is the opposite of what we would expect if information about LGD is driving the results. Instead, we find that ratings fees increased in the subsample of bond issues with lower expected losses given default and higher ratings increases. (In untabulated analysis, we find that the increase in ratings is larger for GO bond issues than non-GO bond issues. Specifically, the coefficients on *Post*Fitch_Moody's* are larger in magnitude in Columns (1) through (3) compared to (4) through (6), indicating that ratings increased more for GO bond issues in our sample.) Taken together, the results in Table 10 support the interpretation of "pay for praise" over payment for a better product.

6. Robustness Tests

We perform a series of robustness tests in addition to those tabulated in Tables 5 and 6. First, we find that our results are qualitatively similar including government entity fixed effects, clustering standard errors by bond issue, and dropping the year 2010 from the analysis. Second, we perform the analysis on a balanced panel of issuers, meaning that we perform the analysis only on the sample of government with at least one bond issue in both the pre and post periods. Again, we find that the results are similar. Third, to further test whether there are some selection effects driving our results, we analyze whether the characteristics of bond issues changed over the pre and post periods using univariate analyses. We find that the characteristics of bond issues in the pre and post periods are largely unchanged except for par values and the use of insurance. This holds when analyzing whether the characteristics of bond issues rated by Fitch or Moody's and those rated by S&P changed over the pre and post periods. Again, we find no significant differences over the pre and post periods aside from changes in par values and insurance. Fourth, we ran the analysis comparing the last bond issue by a government entity to the first bond issue for that same entity after the recalibration, and the results are similar. Finally, we analyze changes in ratings fees after the recalibration where we include all bond issues in the pre period and only bond issues in 2010, 2011, and 2012, respectively. In other words, we perform the analysis on each year in the post period individually. We find that the increase in fees is significant in the periods right after the recalibration, and it is not driven solely from observations in 2012.

7. Conclusion

Rating agencies are considered by many to be one of the important gatekeepers that help ensure the stability of financial markets. Over the last 30 years a variety of constituents have raised concerns surrounding the issuer-pay model they employ to generate revenues. The main concerns are that these gatekeepers can be unduly influenced by their customers to provide better ratings in exchange for increased fees.

We identify an event that lead to an increase in the credit ratings for thousands of municipalities, without a corresponding change in credit quality. We find that the rating agencies that increased their ratings enjoy both a larger increase in fees and an increase in market share compared to the rating agency that does not recalibrate their ratings. These results are consistent with the concerns that an issuer-pay model creates incentives for issuers to pay more for higher ratings.

We suggest that these results should be of interest to both academics and regulators. Several studies have used indirect approaches to investigate whether issuer-pay models compromise independence in the ratings market. Our paper complements this work, demonstrating that in the municipal debt market, the borrower's incentives to obtain improved credit ratings affect their choice of ratings agency and the fees they pay. These results should also be of interest to the SEC, who is responsible for evaluating the independence and the conflicts of interests of nationally recognized statistical rating organizations (NSRSOs).

Appendix A. *Detailed Variable Definitions*

VARIABLE	***DEFINITION***
City	Indicator variable equal to 1 if the municipal bond entity is a city, and 0 otherwise.
Competitive	Indicator variable equal to 1 if the sale type is competitive, and 0 otherwise.
County	Indicator variable equal to 1 if the municipal bond entity is a county, and 0 otherwise.
Fitch Dummy	Indicator variable equal to 1 if the bond issue is rated by Fitch, and 0 otherwise.
Fitch_Moody's	Indicator variable equal to 1 if the rating fee or rating corresponds to Fitch or Moody's, and 0 otherwise.
Hospital	Indicator variable equal to 1 if the municipal bond entity is a hospital, and 0 otherwise.
Insured	Indicator variable equal to 1 if the bond issue is insured, and 0 otherwise.
JPA	Indicator variable equal to 1 if the municipal bond entity is the Joint Powers Authority (JPA), and 0 otherwise.
Mello-Roos	Indicator variable equal to 1 if the municipal bond entity is a Mello-Roos special district, and 0 otherwise.
Moody's Dummy	Indicator variable equal to 1 if the bond issue is rated by Moody's, and 0 otherwise.
Negotiated	Indicator variable equal to 1 if the sale type is negotiated, and 0 otherwise.
No. of Ratings	The number of ratings assigned to a bond issue.
Par	The principal amount of the bond issue.
Post	Indicator variable equal to 1 if the bond issue is sold on or after May 1, 2010, and 0 otherwise.
Private Placement	Indicator variable equal to 1 if the sale type is private placement, and 0 otherwise.
Rating	The numerical equivalent of the bond issue's credit rating, where 16 is equivalent to an S&P rating of AAA and 1 is equivalent to B- (the lowest credit rating in the sample).
Rating Fee	The fee charged for a given credit rating.
Relative Change in Rating	The rating assigned by Moody's or Fitch to the first bond issue in the post-recalibration period less the rating assigned to the last bond issue in the pre-recalibration period *less* the change in ratings assigned by S&P to the exact same bond issues.
Relative Change in Rating Fees	The rating fee charged by Moody's or Fitch on the first bond issue in the post-recalibration period less the fee charged on the last bond issue in the pre-recalibration period *less* the change in fees charged by S&P on the exact same bond issues.
School	Indicator variable equal to 1 if the municipal bond entity is a school district, and 0 otherwise.
SP Dummy	Indicator variable equal to 1 if the bond issue is rated by S&P, and 0 otherwise.
Special	Indicator variable equal to 1 if the municipal bond issue is for other special purposes, and 0 otherwise.
State	Indicator variable equal to 1 if the municipal bond entity is a state, and 0 otherwise.
Texas Dummy	Indicator variable equal to 1 if the bond issue originated in Texas, and 0 if the bond issue originated in California.
Time	Number of days between the last bond issue in the pre-recalibration period and the first bond issue in the post-recalibration period.
Water	Indicator variable equal to 1 if the municipal bond entity is a water district/authority, and 0 otherwise.
Yield	The yield to maturity at the time of bond issuance.

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Figure 1. ***Rating Fees over Time***

This figure depicts the average dollar amount of rating fees (y-axis) for each quarter between May 1, 2007 and May 1, 2013 (x-axis). The dashed line represents average fees charged by S&P, and the solid line represents average fees charged by Moody's and Fitch. The line between the second and third quarter of 2010 represents the recalibration date (April 2010). In Panel A, the sample incorporates all municipal bond issues from Texas and single-rated bond issues from California. Panel B (C) splits the sample into uninsured (insured) bond issues. Panel D performs the same analysis as Panel A except on the sample of bond issues with two ratings.

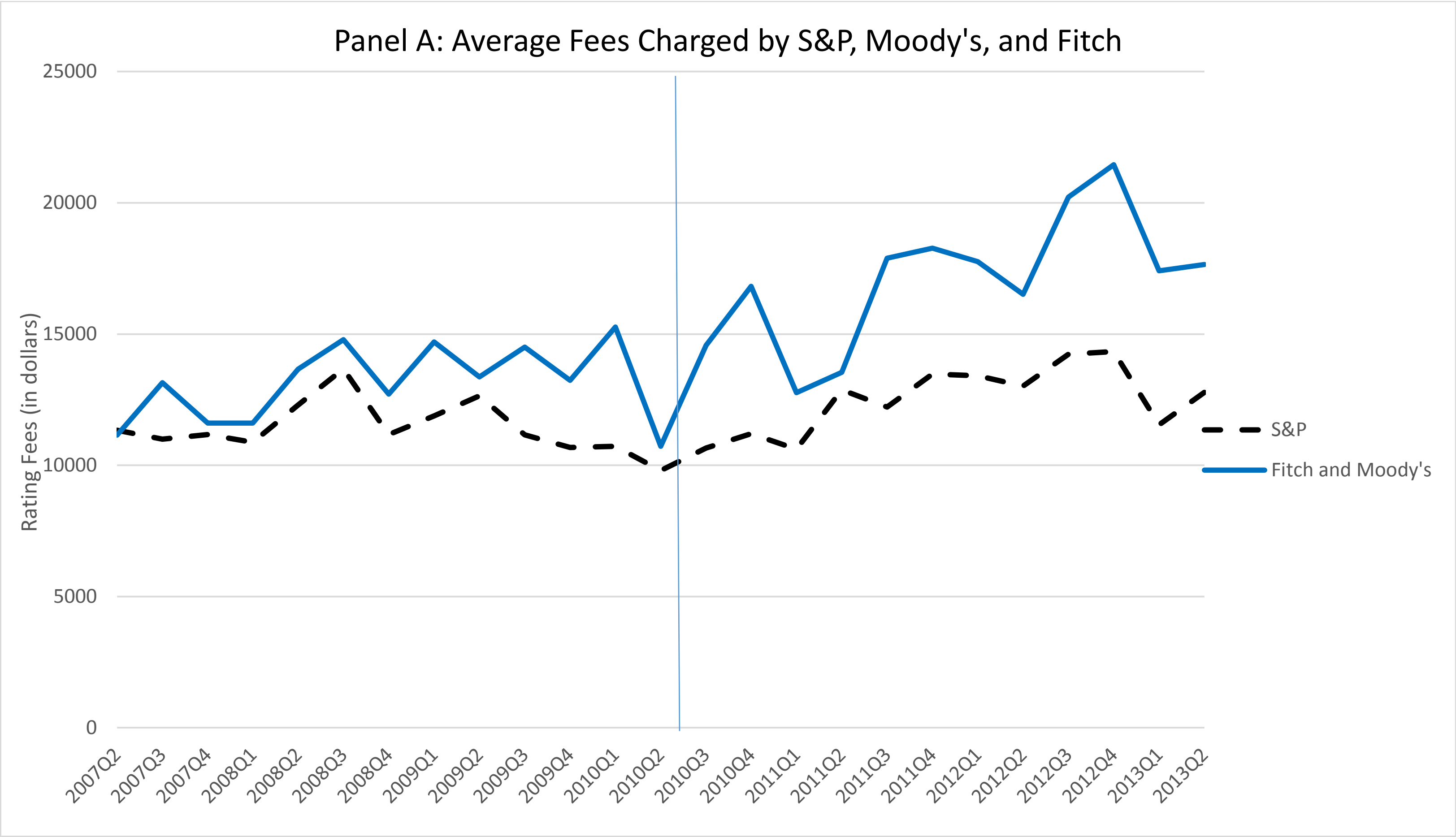
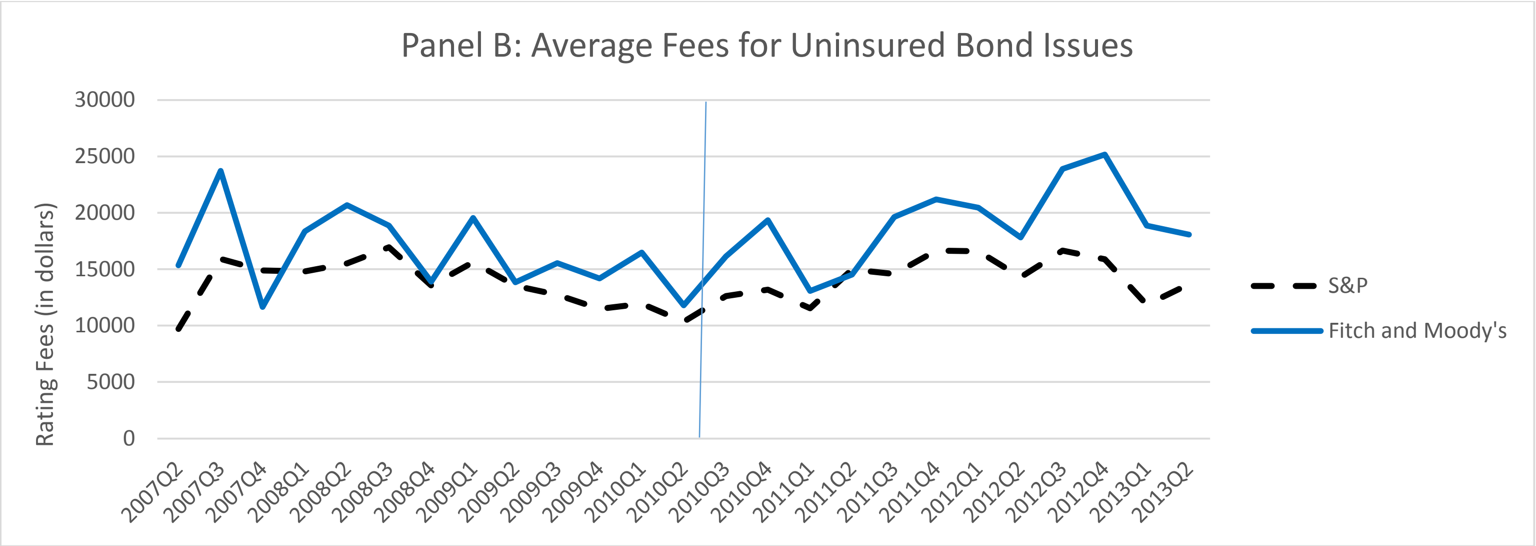


Figure 1. ***Continued***



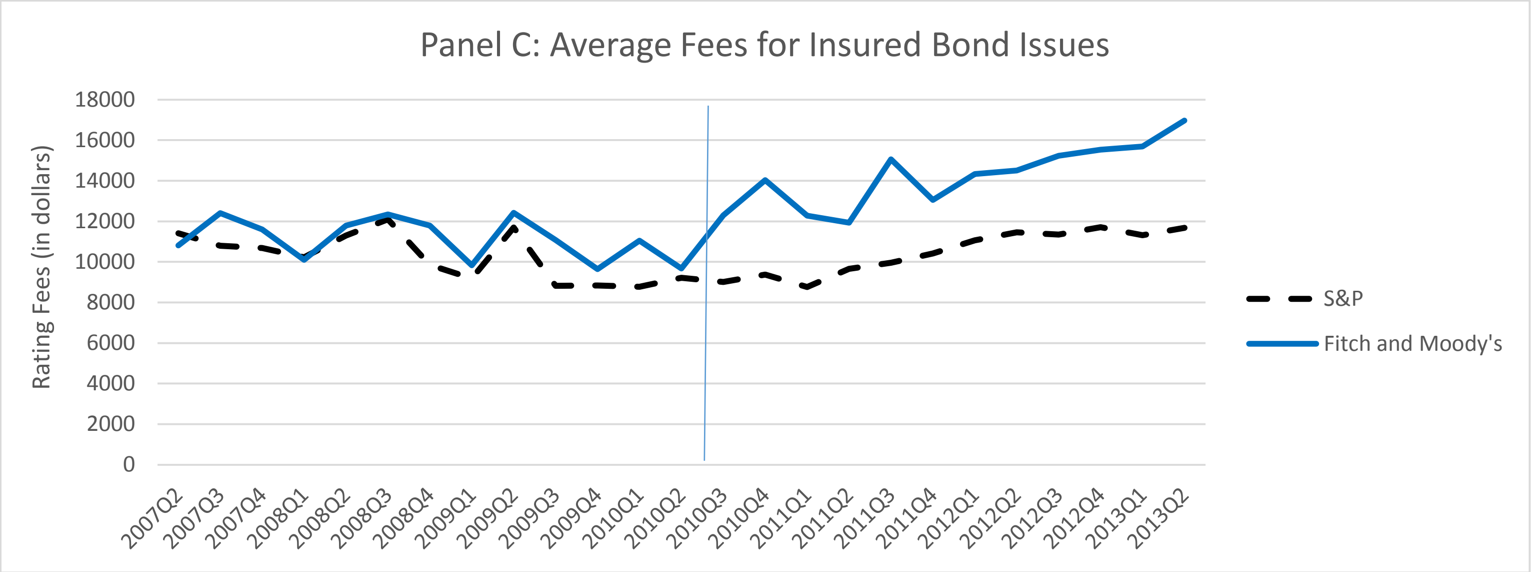


Figure 1. *Continued*

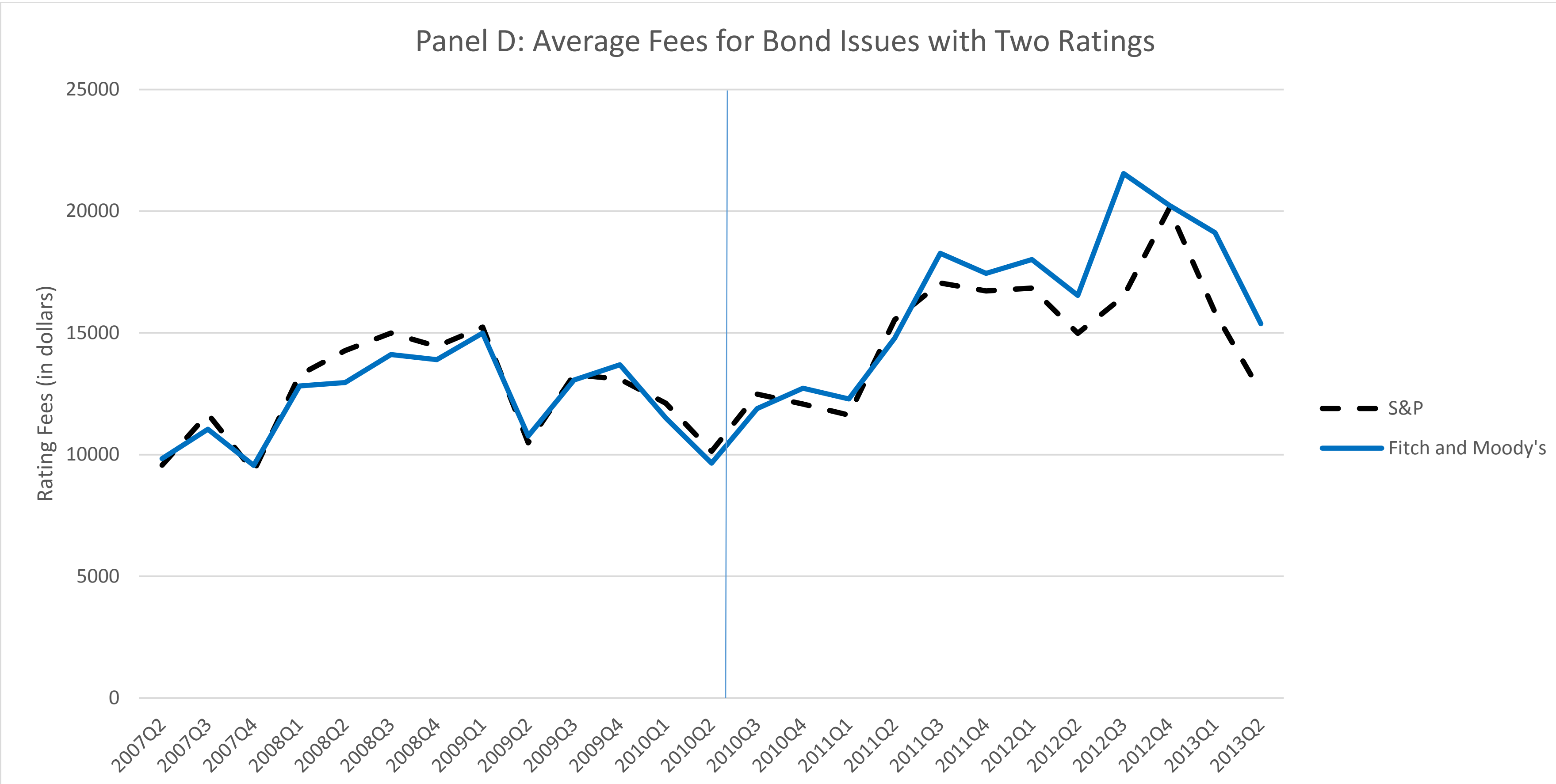


Figure 2. ***Market Share for Single-Rated Issuers***

This figure depicts the proportion of single-rated issuers that choose Fitch or Moody's instead of S&P over time. The sample is comprised of bond issues with only one rating, and the y-axis represents the percentage of bonds with an S&P rating (black dashed line) versus a Fitch or Moody's rating (blue solid line).

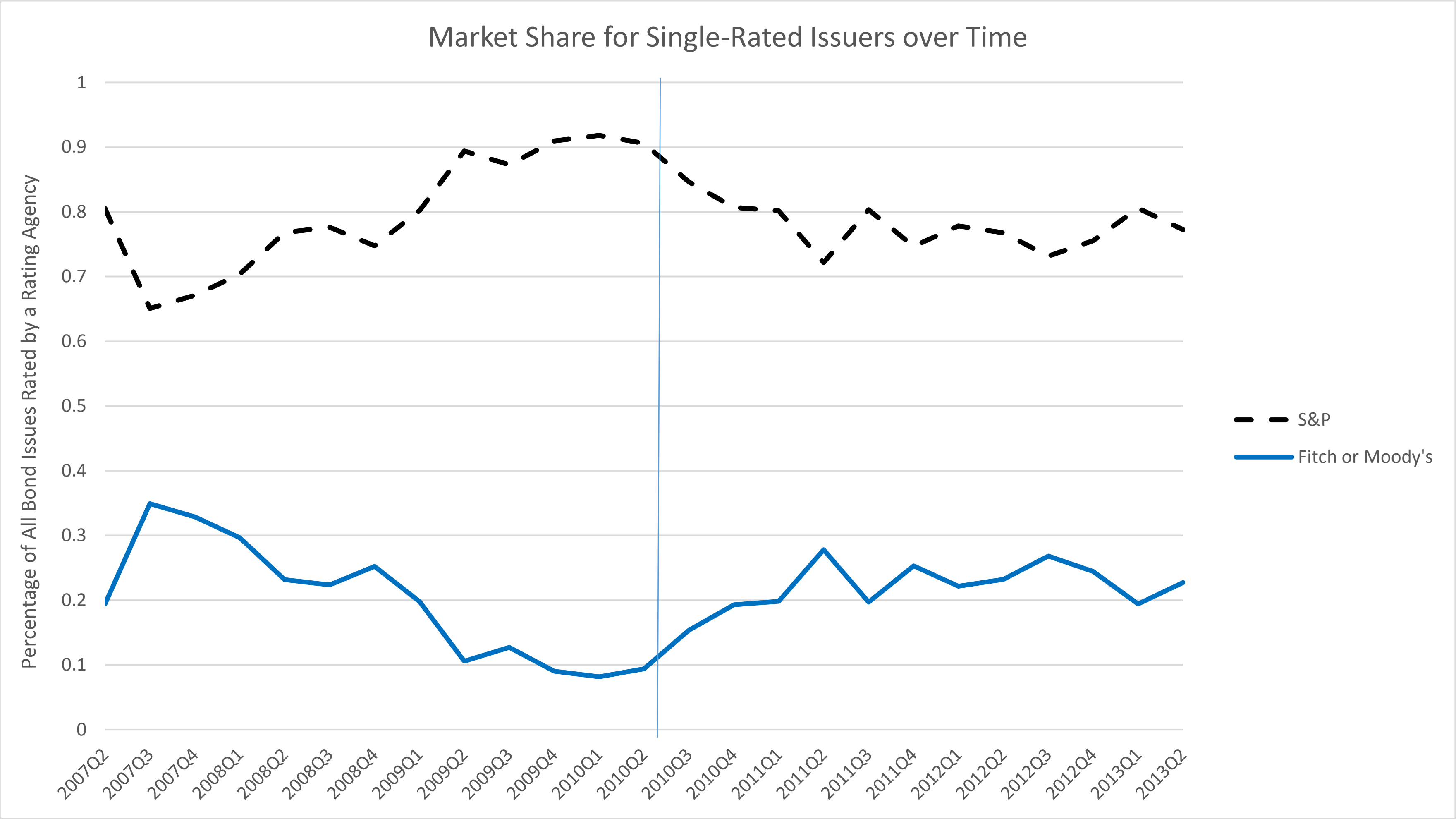


Table 1. ***Descriptive Statistics***

This table provides descriptive statistics for the ratings-issue sample of 15,269 observations consisting of 9,179 unique issues and 1,627 municipalities between May 1, 2007 and May 1, 2013. Rating fee is the fee charged by the rating agency at bond issuance. Rating is the numerical equivalent of the bond issue's credit rating, where 16 is equivalent to an S&P rating of AAA and 1 is equivalent to B- (the lowest credit rating in the sample). Yield is the interest rate on the bond issue, defined as the average yield to maturity of all bonds within a given bond issue. No. of Ratings is the number of ratings assigned to the issue. Post is an indicator variable equal to 1 if the issue is sold on or after May 1, 2010, and 0 otherwise. S&P (Moody's, Fitch) dummy is an indicator variable equal to 1 if the issue is rated by S&P (Moody's, Fitch), and 0 otherwise. City, County, Special, School, State, Mello-Roos, JPA, Water, and Hospital are indicator variables for the issuer's entity type (see Appendix A). Insured is an indicator variable equal to 1 if the bond is insured, and 0 otherwise. Private Placement, Negotiated, Competitive are indicator variables equal to 1 if the type of sale is a private placement, negotiated, or competitive, respectively. Texas dummy is an indicator variable equal to 1 if the bond originated in Texas, and 0 if it originated in California.

	N	Mean	Min	Median	Max	Std. Dev.
Rating fee	9462	13204	200	9900	315950	13321
Rating	15269	13.796	1.000	14.000	16.000	2.242
Yield	7502	3.459	0.230	3.540	12.252	1.331
Par	15269	50734846	25000	15120000	3436000000	136800000
Ln(Par)	15269	16.588	10.127	16.532	21.957	1.507
No. of Ratings	15269	1.995	1.000	2.000	3.000	0.767
Post	15269	0.530	0.000	1.000	1.000	0.499
SP dummy	15269	0.528	0.000	1.000	1.000	0.276
Moody's dummy	15269	0.309	0.000	1.000	1.000	0.474
Fitch dummy	15269	0.163	0.000	0.000	1.000	0.493
City	15269	0.252	0.000	0.000	1.000	0.434
County	15269	0.060	0.000	0.000	1.000	0.237
Special	15269	0.063	0.000	0.000	1.000	0.242
School	15269	0.276	0.000	0.000	1.000	0.447
State	15269	0.154	0.000	0.000	1.000	0.361
Mello-Roos	15269	0.005	0.000	0.000	1.000	0.074
JPA	15269	0.069	0.000	0.000	1.000	0.254
Water	15269	0.075	0.000	0.000	1.000	0.264
Hospital	15269	0.004	0.000	0.000	1.000	0.062
Insured	15269	0.420	0.000	0.000	1.000	0.494
Private Placement	15269	0.009	0.000	0.000	1.000	0.096
Negotiated	15269	0.834	0.000	1.000	1.000	0.372
Competitive	15269	0.159	0.000	0.000	1.000	0.366
Texas dummy	15269	0.499	0.000	0.000	1.000	0.500

Table 2. ***Pearson correlations***

This table provides Pearson correlations for the independent and dependent variables of interest (defined in Appendix A). ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Rating fee	1	1.00													
Rating	2	-0.05***	1.00												
Yield	3	0.06***	-0.09***	1.00											
Ln(Par)	4	0.62***	0.01	0.14***	1.00										
No. of Ratings	5	0.28***	-0.21***	0.07***	0.35***	1.00									
Post	6	-0.01	-0.19***	-0.42***	-0.12***	-0.06***	1.00								
S&P dummy	7	-0.11***	0.09***	-0.02	-0.15***	-0.35***	0.02**	1.00							
Fitch_Moody's	8	0.11***	-0.09***	0.02	0.15***	0.35***	-0.02**		1.00						
City	9	-0.09***	0.10***	0.04***	-0.11***	0.02*	-0.03***	0.02	-0.02	1.00					
County	10	0.06***	0.04***	-0.01	0.09***	0.08***	-0.01	-0.03***	0.03***	-0.15***	1.00				
Special	11	0.24***	-0.01	0.01	0.19***	0.08***	-0.03***	-0.03***	0.03***	-0.15***	-0.07***	1.00			
School	12	-0.11***	0.30***	-0.11***	-0.03***	-0.25***	0.03***	0.05***	-0.05***	-0.36***	-0.16***	-0.16***	1.00		
State	13	0.03***	-0.50***	0.05***	0.04***	0.46***	0.04***	-0.16***	0.16***	-0.25***	-0.11***	-0.11***	-0.26***	1.00	
Mello-Roos	14	-0.01	-0.05***	0.02	-0.00	-0.06***	0.01	0.03***	-0.03***	-0.04***	-0.02*	-0.02*	-0.05***	-0.03***	1.00
JPA	15	0.13***	-0.04***	0.12***	0.10***	-0.07***	-0.05***	0.04***	-0.04***	-0.16***	-0.07***	-0.07***	-0.17***	-0.12***	-0.02*
Water	16	-0.10***	-0.06***	-0.04***	-0.19***	-0.25***	0.04***	0.13***	-0.13***	-0.17***	-0.07***	-0.07***	-0.18***	-0.12***	-0.02**
Hospital	17	-0.00	-0.01	0.02	0.01	0.01	-0.02**	-0.02**	0.02**	-0.04***	-0.02	-0.02*	-0.04***	-0.03**	-0.00
Insured	18	-0.14***	0.58***	0.12***	-0.14***	-0.34***	-0.22***	0.10***	-0.10***	-0.08***	-0.11***	-0.05***	0.32***	-0.30***	0.01
Private Placement	19	-0.02*	-0.00	-0.01	-0.01	-0.05***	-0.02**	0.02*	-0.02*	0.01	-0.01	-0.00	0.01	-0.03***	-0.01
Negotiated	20	0.10***	-0.08***	0.13***	0.13***	0.13***	0.04***	-0.06***	0.06***	-0.13***	-0.04***	0.04***	0.07***	0.14***	0.02**
Competitive	21	-0.09***	0.08***	-0.13***	-0.12***	-0.12***	-0.04***	0.05***	-0.05***	0.13***	0.04***	-0.04***	-0.08***	-0.13***	-0.02*
Texas dummy	22	-0.33***	0.37***	-0.11***	-0.27***	-0.23***	0.01	0.06***	-0.06***	0.33***	0.06***	-0.20***	0.01	-0.43***	-0.07***

		15	16	17	18	19	20	21
JPA	14	1.00						
Water	15	-0.08***	1.00					
Hospital	16	-0.02*	-0.02*	1.00				
Insured	17	0.01	0.09***	-0.02**	1.00			
Private Placement	18	-0.00	0.04***	0.01	-0.03***	1.00		
Negotiated	19	0.08***	-0.24***	0.02*	-0.02*	-0.16***	1.00	
Competitive	20	-0.07***	0.23***	-0.02**	0.03**	-0.04***	-0.97***	1.00
Texas dummy	21	-0.27***	0.29***	0.06***	0.25***	0.05***	-0.16***	0.14***

Table 3: *Ratings after Recalibration*

This table reports the estimated coefficients and t-statistics (in parentheses) for the regression describing credit ratings assigned by Fitch and Moody's after recalibration in 2010. This sample incorporates all municipal bond issues from Texas and California. The dependent variable is Rating defined as the numerical equivalent of the bond issue's credit rating, where 16 is equivalent to an S&P rating of AAA and 1 is equivalent to B- (the lowest credit rating in the sample). Fitch_Moody's is an indicator variable equal to 1 if the rating was assigned by Fitch or Moody's, and 0 otherwise. Post is an indicator variable equal to 1 if the issue is sold on or after May 1, 2010, and 0 otherwise. See Appendix A for definitions of the control variables. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Rating		
		(1) May 1, 2009– May 1, 2011	(2) May 1, 2008- May 1, 2012	(3) May 1, 2007- May 1, 2013
	Exp. signs			
Fitch_Moody's		-0.976***	-0.688***	-0.441***
		(-14.94)	(-14.62)	(-12.00)
Post		-0.219***	-0.394***	-0.600***
		(-3.62)	(-8.99)	(-17.07)
Post*Fitch_Moody's	+	**0.955*** **	**0.810*** **	**0.659*** **
		(10.51)	**(12.66)**	**(13.21)**
Insured		2.081***	2.002***	2.006***
		(37.22)	(52.47)	(67.79)
City		-0.312***	-0.314***	-0.291***
		(-2.59)	(-3.70)	(-4.40)
County		0.034	0.034	-0.006
		(0.24)	(0.33)	(-0.08)
Special		-0.038	-0.131	-0.310***
		(-0.26)	(-1.25)	(-3.75)
School		0.005	0.102	0.024
		(0.04)	(1.20)	(0.35)
State		-2.539***	-2.116***	-2.050***
		(-18.24)	(-21.89)	(-27.13)
Mello-Roos		-2.452***	-2.528***	-1.854***
		(-5.66)	(-9.31)	(-10.21)
JPA		-0.543***	-0.481***	-0.627***
		(-3.72)	(-4.59)	(-7.61)
Water		-1.433***	-1.602***	-1.716***
		(-10.02)	(-16.10)	(-22.08)
Hospital		-0.785**	-1.003***	-1.099***
		(-2.53)	(-3.85)	(-5.21)
Ln(Par)		0.185***	0.184***	0.164***
		(11.01)	(15.45)	(18.18)
Private Placement		-0.388*	-0.331**	-0.072
		(-1.71)	(-2.04)	(-0.55)
Competitive		0.177**	0.290***	0.341***
		(2.45)	(5.85)	(9.48)
Texas dummy		1.083***	1.039***	0.871***
		(17.76)	(23.50)	(25.04)
Constant		10.086***	10.180***	10.698***
		(31.80)	(45.03)	(61.50)
N		5113	9921	15269
R^2		0.519	0.504	0.532
adj. R^2		0.517	0.503	0.531

Table 4: ***Rating Fees after Recalibration***

This table reports the estimated coefficients and t-statistics (in parentheses) for the regression describing credit rating fees charged by Fitch and Moody's after recalibration in 2010. This sample incorporates all municipal bond issues from Texas and single-rated bond issues from California. The dependent variable is Ln(Rating Fee) defined as the natural log of the fee charged by a rating agency. Fitch_Moody's is an indicator variable equal to 1 if the rating fee corresponds to the rating given by Fitch or Moody's, and 0 otherwise. Post is an indicator variable equal to 1 if the issue is sold on or after May 1, 2010, and 0 otherwise. See Appendix A for definitions of the control variables. Columns (1) to (3) include credit rating fixed effects. ***, **, * indicates significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Ln(Rating Fee)		
		(1)	(2)	(3)
		May 1, 2009– May 1, 2011	May 1, 2008- May 1, 2012	May 1, 2007- May 1, 2013
	Exp. signs			
Fitch_Moody's		-0.047	-0.072^{***}	-0.080^{***}
		(-1.52)	(-3.23)	(-4.67)
Post		0.057^{**}	0.106^{***}	0.154^{***}
		(2.41)	(5.87)	(10.20)
Post*Fitch_Moody's	+	$\mathbf{0.085}^{**}$	$\mathbf{0.114}^{***}$	$\mathbf{0.138}^{***}$
		(2.12)	**(3.93)**	**(6.01)**
Insured		0.114^{***}	0.059^{***}	0.066^{***}
		(3.98)	(2.96)	(4.06)
City		-0.156^{***}	-0.168^{***}	-0.105^{***}
		(-3.55)	(-5.35)	(-4.20)
County		-0.135^{**}	-0.198^{***}	-0.146^{***}
		(-2.49)	(-4.99)	(-4.55)
Special		0.118^{*}	0.192^{***}	0.196^{***}
		(1.73)	(3.69)	(4.61)
School		-0.204^{***}	-0.171^{***}	-0.121^{***}
		(-4.59)	(-5.39)	(-4.80)
State		-0.071	0.004	0.046
		(-0.82)	(0.06)	(0.85)
Mello-Roos		0.022	-0.026	-0.074
		(0.13)	(-0.22)	(-0.90)
JPA		-0.121^{*}	-0.022	0.019
		(-1.85)	(-0.45)	(0.49)
Water		0.083	0.086^{**}	0.124^{***}
		(1.63)	(2.36)	(4.21)
Hospital		0.128	0.117	0.323^{***}
		(1.20)	(1.29)	(4.32)
Ln(Par)		0.461^{***}	0.463^{***}	0.476^{***}
		(50.59)	(69.11)	(87.41)
Private Placement		0.076	-0.061	-0.070
		(1.00)	(-1.03)	(-1.42)
Competitive		-0.040	-0.077^{***}	-0.071^{***}
		(-1.43)	(-3.87)	(-4.70)
Texas dummy		-0.200^{***}	-0.110^{***}	-0.111^{***}
		(-6.19)	(-4.65)	(-5.82)
Rating FE		Yes	Yes	Yes
N		3285	6195	9462
R^2		0.486	0.484	0.493
adj. R^2		0.482	0.481	0.491

Table 5: *Ratings after Recalibration for Bonds with an S&P Rating*

This table reports the estimated coefficients and t-statistics (in parentheses) for the regression describing credit ratings assigned by Fitch and Moody's after recalibration in 2010. This sample incorporates municipal bond issues from Texas and California with two ratings: one from S&P and the other from either Fitch or Moody's. The dependent variable is Rating defined as the numerical equivalent of the bond issue's credit rating, where 16 is equivalent to an S&P rating of AAA and 1 is equivalent to B- (the lowest credit rating in the sample). Fitch_Moody's is an indicator variable equal to 1 if the rating was assigned by Fitch or Moody's, and 0 otherwise. Post is an indicator variable equal to 1 if the issue is sold on or after May 1, 2010, and 0 otherwise. See Appendix A for definitions of the control variables. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Rating		
		(1) May 1, 2009– May 1, 2011	(2) May 1, 2008- May 1, 2012	(3) May 1, 2007- May 1, 2013
	Exp. signs			
Fitch_Moody's		-0.925***	-0.709***	-0.463***
		(-10.32)	(-10.79)	(-9.25)
Post		-0.151*	-0.392***	-0.493***
		(-1.70)	(-6.03)	(-9.50)
Post*Fitch_Moody's	+	**0.552*** **	**0.542*** **	**0.385*** **
		(4.43)	**(5.95)**	**(5.44)**
Insured		1.303***	1.508***	1.671***
		(17.17)	(29.20)	(41.79)
City		-0.297*	-0.236**	-0.132
		(-1.93)	(-2.14)	(-1.51)
County		0.228	0.339***	0.416***
		(1.28)	(2.59)	(3.98)
Special		0.154	-0.032	-0.259**
		(0.84)	(-0.23)	(-2.38)
School		0.246	0.249**	0.148*
		(1.61)	(2.28)	(1.71)
State		-0.005	0.152	-0.342**
		(-0.02)	(0.74)	(-2.21)
Mello-Roos		-2.392***	-2.747***	-1.189***
		(-3.30)	(-6.90)	(-4.61)
JPA		-0.377*	-0.315**	-0.469***
		(-1.95)	(-2.18)	(-4.12)
Water		-1.201***	-1.014***	-1.024***
		(-5.69)	(-6.61)	(-8.23)
Hospital		-0.631	-1.051***	-1.299***
		(-1.46)	(-2.99)	(-4.47)
Ln(Par)		0.098***	0.118***	0.137***
		(3.42)	(5.57)	(8.22)
Private Placement		-0.343	-0.314	-0.269
		(-0.90)	(-1.07)	(-1.04)
Competitive		0.125	0.269***	0.337***
		(1.27)	(3.85)	(6.78)
Texas dummy		1.177***	0.996***	0.803***
		(15.16)	(17.19)	(17.89)
Constant		11.700***	11.498***	11.318***
		(22.10)	(29.37)	(36.71)
N		2067	3942	5956
R^2		0.323	0.336	0.381
adj. R^2		0.318	0.333	0.379

Table 6: ***Rating Fees after Recalibration for Bonds with an S&P Rating***

This table reports the estimated coefficients and t-statistics (in parentheses) for the regression describing credit rating fees charged by Fitch and Moody's after recalibration in 2010. This sample incorporates municipal bond issues from Texas with an S&P rating (i.e., two or three ratings). The dependent variable is Ln(Rating Fee) defined as the natural log of the rating fee charged by the rating agency. Post is an indicator variable equal to 1 if the issue is sold on or after May 1, 2010, and 0 otherwise. See Appendix A for definitions of the control variables. Columns (1) to (3) include credit rating fixed effects. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Ln(Rating Fee)		
	Exp. signs	(1) May 1, 2009– May 1, 2011	(2) May 1, 2008- May 1, 2012	(3) May 1, 2007- May 1, 2013
Fitch_Moody's		-0.037	-0.080**	-0.093***
		(-0.79)	(-2.42)	(-3.53)
Post		0.058	0.074**	0.108***
		(1.24)	(2.17)	(3.76)
Post*Fitch_Moody's	+	**0.060**	**0.131*** **	**0.172*** **
		(0.94)	**(2.83)**	**(4.54)**
Insured		0.133***	0.050	0.092***
		(2.93)	(1.51)	(3.29)
City		-0.213***	-0.222***	-0.171***
		(-3.21)	(-4.69)	(-4.39)
County		-0.164**	-0.240***	-0.212***
		(-2.12)	(-4.24)	(-4.48)
Special		0.369***	0.535***	0.418***
		(2.92)	(5.58)	(5.20)
School		-0.313***	-0.227***	-0.196***
		(-4.47)	(-4.58)	(-4.81)
Water		0.060	0.062	0.118**
		(0.68)	(0.97)	(2.16)
Hospital		0.120	0.124	0.413***
		(0.79)	(0.98)	(3.88)
Ln(Par)		0.521***	0.513***	0.525***
		(31.58)	(42.07)	(51.88)
Private Placement		-0.216	-0.428***	-0.359***
		(-1.27)	(-3.12)	(-3.50)
Competitive		-0.081*	-0.110***	-0.106***
		(-1.73)	(-3.29)	(-4.12)
Rating FE		Yes	Yes	Yes
N		1606	3100	4698
R^2		0.439	0.430	0.430
adj. R^2		0.432	0.425	0.428

Table 7: ***Logistic Regression on the Likelihood of Using Moody's or Fitch after Recalibration***

This table reports the estimated coefficients and t-statistics (in parentheses) for a logistic regression describing the propensity to obtain a rating from Moody's or Fitch after recalibration in 2010. Post is an indicator variable equal to 1 if the bond issue is sold on or after May 1, 2010, and 0 otherwise. See Appendix A for definitions of the control variables. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Pr(Fitch_Moody's=1)		
	Exp. signs	(1) May 1, 2009– May 1, 2011	(2) May 1, 2008- May 1, 2012	(3) May 1, 2007- May 1, 2013
Post	+	**0.716***** **(4.25)**	**0.520***** **(4.74)**	**0.137*** **(1.69)**
Insured		-0.350* (-1.91)	-0.263** (-2.19)	-0.078 (-0.86)
City		-0.960** (-2.32)	-1.011*** (-3.97)	-0.604*** (-3.16)
County		-0.278 (-0.49)	-0.630 (-1.60)	-0.452 (-1.55)
Special		0.938** (2.00)	0.412 (1.28)	0.501** (1.96)
School		0.220 (0.58)	0.085 (0.37)	0.317* (1.83)
State		2.801*** (5.70)	2.548*** (7.77)	2.571*** (9.78)
Mello-Roos		0.000 (.)	-1.635 (-1.55)	-0.808 (-1.45)
JPA		-0.311 (-0.64)	-0.207 (-0.68)	0.112 (0.50)
Water		-0.528 (-1.23)	-0.781*** (-3.06)	-0.689*** (-3.55)
Hospital		3.192*** (2.74)	2.770** (2.50)	2.630*** (3.31)
Ln(Par)		0.152* (1.95)	0.140*** (2.68)	0.201*** (4.97)
Private Placement		-0.042 (-0.09)	0.168 (0.51)	-0.072 (-0.25)
Competitive		-0.063 (-0.26)	0.026 (0.18)	0.143 (1.39)
Texas dummy		0.445** (1.98)	0.587*** (4.02)	0.694*** (6.38)
Constant		-4.782*** (-3.54)	-4.107*** (-4.59)	-5.012*** (-7.19)
N		1592	2955	4536
Pseudo R2		0.137	0.0978	0.0762

Table 8: *Bond Yields after Recalibration*

This table reports the estimated coefficients and t-statistics (in parentheses) for the regression describing bond yields for those bond issues rated by Moody's or Fitch after recalibration in 2010. This sample incorporates municipal bond issues from Texas and California, and the dependent variable is the yield to maturity at bond issuance. Post is an indicator variable equal to 1 if the bond issue is sold on or after May 1, 2010, and 0 otherwise. Columns (1) to (3) perform the analysis at the bond level (where several bonds are included in one bond issue), and standard errors are clustered at the bond issue level. Columns (4) to (6) perform the analysis at the bond issue level, where the yield is the average yield across all bonds within a given issue. See Appendix A for definitions of the control variables. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Bond Yields					
		Bond Level			*Issue Level*		
	Exp. signs	(1) May 1, 2009– May 1, 2011	(2) May 1, 2008- May 1, 2012	(3) May 1, 2007- May 1, 2013	(4) May 1, 2009– May 1, 2011	(5) May 1, 2008- May 1, 2012	(6) May 1, 2007- May 1, 2013
Fitch_Moody's		0.007	0.029	0.027**	-0.018	0.005	0.028
		(0.22)	(1.43)	(2.04)	(-0.23)	(0.10)	(0.78)
Post		-0.159***	-0.779***	-1.168***	0.011	-0.671***	-1.103***
		(-2.86)	(-20.88)	(-40.53)	(0.14)	(-13.15)	(-29.44)
Post*Fitch_Moody's	**-**	**-0.206***	**-0.184***	**-0.135***	**-0.175**	**-0.165**	**-0.142***
		(-3.40)	**(-4.90)**	**(-4.85)**	**(-1.48)**	**(-2.17)**	**(-2.61)**
Insured		0.073	0.239***	0.277***	-0.010	0.145***	0.203***
		(1.36)	(6.41)	(10.14)	(-0.13)	(3.23)	(6.61)
City		0.290*	0.382***	0.278***	0.646***	0.691***	0.416***
		(1.75)	(3.53)	(3.38)	(3.13)	(4.95)	(4.24)
County		0.219	0.236*	0.190**	0.548**	0.429***	0.236**
		(1.14)	(1.85)	(1.99)	(2.50)	(2.89)	(2.23)
Special		-0.016	0.033	0.060	0.170	0.095	-0.025
		(-0.09)	(0.27)	(0.63)	(0.78)	(0.64)	(-0.23)
School		0.065	0.088	0.034	0.208	0.190	-0.027
		(0.39)	(0.82)	(0.42)	(1.00)	(1.36)	(-0.28)
State		0.408*	0.363***	0.340***	0.590**	0.349**	0.210*
		(1.78)	(2.67)	(3.36)	(2.47)	(2.22)	(1.88)
Mello-Roos		0.490**	0.879***	0.484***	0.154	1.170***	0.399**
		(2.02)	(4.30)	(3.74)	(0.29)	(3.75)	(2.16)
JPA		0.527***	0.502***	0.340***	0.691***	0.710***	0.424***
		(2.82)	(3.98)	(3.60)	(3.17)	(4.75)	(4.00)
Water		0.662***	0.638***	0.493***	1.144***	1.039***	0.665***
		(3.78)	(5.54)	(5.67)	(5.05)	(6.92)	(6.27)
Hospital		1.110	0.881	0.732*	1.197***	1.205***	0.900***
		(1.56)	(1.64)	(1.71)	(2.74)	(3.56)	(3.21)
Ln(Par)		0.043*	0.086***	0.070***	0.163***	0.133***	0.090***
		(1.67)	(5.21)	(5.95)	(6.96)	(8.49)	(7.93)
Private Placement		-0.671***	-0.221	-0.062	-1.472**	-0.324	-0.141
		(-5.63)	(-1.31)	(-0.34)	(-2.09)	(-1.04)	(-0.53)
Competitive		-0.127**	-0.076*	-0.070***	-0.361***	-0.221***	-0.197***
		(-2.19)	(-1.95)	(-2.71)	(-4.90)	(-4.78)	(-6.18)
Texas dummy		-0.550***	-0.386***	-0.282***	-1.007***	-0.814***	-0.636***
		(-7.09)	(-7.82)	(-8.39)	(-12.51)	(-15.50)	(-17.08)
Constant		2.773***	2.160***	2.502***	0.971**	1.565***	2.469***
		(5.63)	(6.86)	(11.00)	(2.05)	(4.93)	(10.76)
N		30841	67552	111821	2383	4727	7502
R^2		0.053	0.114	0.232	0.174	0.166	0.256
adj. R^2		0.052	0.114	0.232	0.168	0.163	0.254

Table 9: *Changes in Rating Fees Based on Changes in Ratings*

This table reports the estimated coefficients and t-statistics (in parentheses) for the regression describing changes in rating fees as a function of changes in ratings after recalibration. This regression is performed at the issuer level, and the sample consists of municipal bond issues from a balanced panel of issuers in Texas, where each municipality issued at least one bond issue in both the pre and post-recalibration periods. In addition, the sample is reduced to the last bond issue in the pre period and the first bond issue in the post period, and each bond issue has two ratings such that one rating is from S&P and the other is from either Moody's or Fitch. The dependent variable, Relative Change in Rating Fees, is the rating fee charged by Moody's or Fitch on the first bond issue in the post period less the fee charged on the last bond issue in the pre period *less* the change in fees charged by S&P on the exact same bond issues. Similarly, the independent variable of interest, Relative Change in Rating, is the rating assigned by Moody's or Fitch to the first bond issue in the post period less the rating assigned to the last bond issue in the pre period *less* the change in ratings assigned by S&P to the exact same bond issues. Time is equal to the number of days in between the issue date of the first bond issue in the post period less the last bond issue in the pre period. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: Relative Change in Rating Fees			
	Exp. Signs		
Relative Change in Rating	**+**	**839.05**	**
		(2.20)	
Time		3.56	***
		(3.04)	
Constant		-2637.69	***
		(-2.79)	
N		201	
R^2		0.066	
adj. R^2		0.056	

Table 10: *Rating Fees after Recalibration: GO Bonds v. Non-GO Bonds*

This table reports the estimated coefficients and t-statistics (in parentheses) for the regression describing credit rating fees charged by Fitch and Moody's after recalibration in 2010 and partitions the sample on GO (general obligation) versus non-GO bond issues. This sample incorporates all municipal bond issues from Texas and single-rated bond issues from California. The dependent variable is Ln(Rating Fee) defined as the natural log of the fee charged by a rating agency. Fitch_Moody's is an indicator variable equal to 1 if the rating fee corresponds to the rating given by Fitch or Moody's, and 0 otherwise. Post is an indicator variable equal to 1 if the issue is sold on or after May 1, 2010, and 0 otherwise. Columns (1) to (3) perform the analysis for GO bond issues, including state, county, and city bond issues, and Columns (4) to (6) represent all other bond issues. All of the columns include credit rating fixed effects. See Appendix A for definitions of the control variables. ***, **, * indicates significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Ln(Rating Fee)					
		GO Bonds			*Non-GO Bonds*		
	Exp. signs	(1) May 1, 2009– May 1, 2011	(2) May 1, 2008- May 1, 2012	(3) May 1, 2007- May 1, 2013	(4) May 1, 2009– May 1, 2011	(5) May 1, 2008- May 1, 2012	(6) May 1, 2007- May 1, 2013
Fitch_Moody's		-0.179***	-0.221***	-0.204***	0.070	0.060**	0.039*
		(-3.81)	(-6.39)	(-7.54)	(1.57)	(2.02)	(1.72)
Post		0.047	0.112***	0.146***	0.045	0.102***	0.164***
		(1.16)	(3.60)	(5.48)	(1.51)	(4.61)	(8.97)
Post*Fitch_Moody's	+	**0.131****	**0.213*****	**0.223*****	**0.053**	**0.038**	**0.059****
		(2.07)	**(4.58)**	**(6.00)**	**(0.97)**	**(0.99)**	**(1.97)**
Insured		0.262***	0.229***	0.213***	0.012	-0.042	-0.015
		(5.95)	(7.27)	(8.33)	(0.27)	(-1.49)	(-0.69)
City		-0.130	-0.136*	-0.100*			
		(-1.35)	(-1.87)	(-1.65)			
County		-0.113	-0.160**	-0.144**			
		(-1.07)	(-2.02)	(-2.18)			
Ln(Par)		0.545***	0.557***	0.561***	0.398***	0.402***	0.419***
		(36.69)	(49.19)	(60.83)	(33.46)	(47.78)	(61.51)
Private Placement		0.200	-0.265**	-0.245***	0.069	-0.015	0.020
		(0.76)	(-2.01)	(-2.74)	(0.92)	(-0.23)	(0.36)
Competitive		-0.027	-0.068**	-0.049**	-0.051	-0.086***	-0.081***
		(-0.64)	(-2.24)	(-2.11)	(-1.35)	(-3.36)	(-4.14)
Texas dummy		-0.078	-0.033	-0.046	-0.248***	-0.139***	-0.137***
		(-1.19)	(-0.68)	(-1.22)	(-6.55)	(-5.12)	(-6.21)
Special					0.037	0.142	-0.093
					(0.36)	(1.64)	(-1.30)
School					-0.309***	-0.281***	-0.476***
					(-3.31)	(-3.56)	(-7.28)
Mello-Roos					-0.098	-0.081	-0.373***
					(-0.55)	(-0.63)	(-3.87)
JPA					-0.221**	-0.095	-0.288***
					(-2.11)	(-1.10)	(-4.05)
Water					-0.031	-0.006	-0.199***
					(-0.32)	(-0.08)	(-2.98)
Rating FE		Yes	Yes	Yes	Yes	Yes	Yes
N		1459	2664	4071	1642	3159	4815
R^2		0.508	0.502	0.504	0.479	0.493	0.509
adj. R^2		0.501	0.498	0.501	0.471	0.489	0.506