When transparency pays: The moderating effect of reporting quality on changes in the cost of debt

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June 30, 2017

Abstract

Among local governments of the same credit quality that are exposed to the same relative change in local house prices, we examine the relation between ex ante disclosure choice and changes in issuer credit ratings. We find issuers that choose stronger financial reporting quality are less likely to be downgraded and more likely to be upgraded, *ceteris paribus*. Supporting the notion that reporting quality reduces uncertainty about default risk, this relation is pronounced when adverse local housing conditions persist for more than a year. These results suggest that reporting quality can lower the cost of debt by attenuating the impact of negative economic outcomes.

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1 Introduction

Theoretically, financial reporting quality reduces the cost of debt by reducing uncertainty about future cash flows (Lambert et al., 2007). However, cross-sectional studies that empirically link reporting quality to the cost of debt are subject to the concern that risky issuers tend to exhibit weak reporting quality. Similarly, studies that examine changes in reporting quality suffer the criticism that changing issuer economics drive both the disclosure change and the cost of debt change.

The municipal bond setting provides an opportunity to address these concerns and strengthen the link between reporting quality and the cost of debt for several reasons. First, even without issuer-provided disclosures, some economic information that is relevant to issuers' credit quality is publicly available. For example, changes in local house prices are observable and are correlated with the strength of the local economy (Campbell and Cocco, 2007; Standard & Poor's, 2012). Although property tax collections are the largest own-source of revenues for most local governments and are responsive to changes in house prices, house prices are largely outside the control of city and county officials. Therefore, conditioning on changes in local house prices helps to satisfy the *ceteris paribus* condition when comparing weak disclosers to strong disclosers.

Second, the municipal setting lends itself to the clean measurement of significant aspects of financial reporting quality. These aspects include: the accessibility, comprehensiveness, reliability, timeliness, and regulatory compliance of financial information. Moreover, the municipal disclosure environment is lower quality and exhibits greater cross-sectional heterogeneity than does the corporate setting. Finally, municipal bond insurance and reporting

quality are substitute mechanisms to lower the cost of debt. Therefore, we use bond insurance as an instrument for reporting quality to help attribute our results to financial reporting choices.

Our objective is to identify issuers with similar downgrade probabilities that differ in their ex ante reporting quality. Strong reporting quality issuers have a history of providing information that reduces uncertainty and allows investors and rating agencies to better assess changes in default risk. Therefore, we expect stronger reporting quality issuers to suffer less negative changes in the cost of debt than weaker reporting quality issuers with a similar probability of downgrade (Sengupta, 1998).

To identify issuers with similar downgrade probabilities, we match general obligation issuers on: their beginning credit rating and the relative magnitude of changes in local house prices. This allows us to examine whether two issuers with the same credit rating, which differ in their reporting quality, elicit different responses from the rating agencies to similar changes in the local economy.

We match issuers on their beginning credit rating because the rating provides an initial indication of the issuer's ability to withstand an economic shock. Moreover, Standard & Poor's (S&P's) transition matrices show that ratings volatility varies across ratings classes. We then match issuers on relative changes in local house prices because the economy receives the single largest weight in S&P's local government rating methodology and S&P identifies real estate values as a primary measure of economic strength (Standard & Poor's, 2012).

To validate local house price changes as a proxy for economic strength, we show that local house price changes are strongly correlated with changes in local per capita income and population. Further, we illustrate that relative changes in property values are reflected

in general obligation bond rating changes. In an average year, issuers in the most negative house price change decile are 3 times more likely to be downgraded within the next three years than are issuers in the most positive decile.

We use changes in issuer credit ratings as a proxy for changes in the cost of debt because ratings provide a relatively pure assessment of perceived default probability (Ashbaugh-Skaife et al., 2006). To validate this proxy, we provide descriptive evidence that the uninsured general obligation bonds of highly rated issuers trade at tighter spreads than bonds of lower-rated issuers. Moreover, among issuers with the same credit rating, stronger reporting quality issuers' bonds tend to trade at tighter spreads than those of weak reporting quality issuers.

Among issuers with the same beginning credit rating in the same local house price change decile, we find that stronger reporting quality issuers are less likely to be downgraded and more likely to be upgraded. After controlling for other factors that can mitigate or exacerbate the credit rating agency's response to economic changes (e.g., budget surplus, fund balance, debt burden, etc.), a one-standard deviation improvement in reporting quality lowers the probability of downgrade by 47 percent and raises the probability of upgrade by 28 percent. This relation is pronounced for issuers in the two most negative house price change deciles for two consecutive years.

Because we condition on credit rating, it is unlikely that risk differences explain this disparity. Because we condition on house price changes, it is unlikely that the propensity of weak disclosers to experience negative economic outcomes explains this disparity.

Matching issuers on their credit rating and the change in local house prices—and measuring reporting quality ex-ante—helps to address the endogeneity in the relation between reporting quality and the cost of debt. However, it is possible that an omitted issuer char-

acteristic that is positively correlated with reporting quality (rather than reporting quality itself) attenuates the impact of negative economic changes on issuer credit ratings. To strengthen our ability to attribute our results to reporting quality, per se, we estimate instrumental-variable regressions. In our setting, a valid instrument is a variable that affects issuer downgrades and upgrades only through its effect on reporting quality. Because the instrument does not independently affect upgrades or downgrades, this approach helps to isolate the effect of reporting quality on changes in issuer credit ratings.

Our instrument, the percentage of the issuer's outstanding bonds that are insured, must satisfy two conditions. First, bond insurance must be correlated with reporting quality. In addition to our evidence of this correlation, prior literature documents that insurance and reporting quality are substitute mechanisms to lower the cost of debt (Gore et al., 2004; Cuny, 2016). Second, bond insurance cannot directly affect subsequent changes in the issuer's underlying credit rating. This condition is met because issuer credit ratings primarily measure an issuer's probability of default. Insurance payouts are conditional upon issuer default and do not directly affect the underlying issuer's probability of default.

After demonstrating that the percentage of bonds insured is a strong instrument for reporting quality, particularly before the 2010 bankruptcy of many bond insurers, our instrumented results corroborate those described above. Among issuers with the same beginning credit rating in the same local house price change decile, a one-standard deviation increase in instrumented reporting quality is associated with an 81 percent reduction in the probability of downgrade and a 104 percent increase in the probability of upgrade. Together, these results corroborate the idea that strong reporting quality attenuates the impact of adverse economic changes on issuer credit ratings.

This paper is novel in several respects. First, prior literature examines the capital market consequences of changes in disclosure choices (Baber and Gore, 2008) and the disclosure consequences of economic changes (Kido et al., 2012; Cuny, 2016). We instead treat reporting quality as given and examine different rating agency responses to changing economic conditions. This approach is unique in both the corporate and municipal debt literature.

Second, this paper bridges the gap between two distinct streams of literature. Fama and French (1989) and Collin-Dufresne et al. (2001) document a negative relation between changes in the cost of debt and changes in economic conditions. Baber et al. (2013) document a negative relation between changes in the cost of debt and changes in reporting quality. However, little evidence exists supporting the idea that reporting quality moderates the negative relation between changes in the cost of debt and changes in the local economy.

The rest of the paper proceeds as follows: In Section 2, we develop hypotheses. Section 3 describes the data and defines the variables. Section 4 provides results and section 5 concludes.

2 Motivation and hypothesis development

Sengupta (1998) provides the first evidence that reporting quality is negatively related to the cost of debt. His results are consistent with investors requiring additional compensation when they believe the issuer will withhold relevant unfavorable information. Later research corroborates the negative relationship between reporting quality and the cost of debt in a variety of settings using a variety of proxies for reporting quality. For example, conservative reporting is correlated with higher credit ratings and lower bond yields (Zhang, 2008). Re-

taining a Big Six auditor and strict state reporting requirements are associated with lower borrowing costs (Pittman and Fortin, 2004; Baber and Gore, 2008). Large abnormal operating accruals are associated with higher borrowing costs and worse terms (Bharath et al., 2008).

The most frequent criticism of cross-sectional studies that link disclosure to the cost of capital is that riskier firms tend to exhibit lower reporting quality (Nikolaev and Van Lent, 2005). Some researchers combat this criticism by exploring time-series variation in reporting quality. For example, revelations of material internal control weaknesses increase the cost of debt for corporate and municipal borrowers (Dhaliwal et al., 2011; Park et al., 2017). Financial restatement disclosures also increase the cost of debt (Baber et al., 2013). However, time-series variation in reporting quality is often related to changes in firm performance (Larcker and Rusticus, 2010).

We address these criticisms by measuring reporting quality ex-ante and conditioning on the issuer's probability of downgrade. To condition on the probability of downgrade, we match issuers on the combination of their beginning credit rating and the contemporaneous change in local house prices.

We choose to match issuers on changes in local house prices because the economy receives the single largest weighting in S&P's local government general obligation rating methodology.[1] S&P uses local property values to evaluate the strength of the local economy, due to the "data availability of these statistics at the local level and their correlation with overall economic activity and local government revenues." S&P indicates, however, that extreme

[1]S&P's local government general obligation rating methodology considers seven key factors (Standard & Poor's, 2012). The most heavily weighted factor, the economy, receives a 30 percent weight. Management receives a 20 percent weight. Liquidity, budgetary performance, budget flexibility, institutional framework, and debt each account for 10 percent of the total score.

property values primarily lower—rather than raise—issuer credit ratings. Extremely high property values per capita often result from concentrated tax bases, whereas extremely low property values per capita indicate a limited tax base supporting the issuer's debt.

We expect that two issuers with the same credit rating, which differ only in their ex ante reporting quality, will elicit different responses from the rating agencies to similar changes in the local housing market. When issuers have a history of more accessible, comprehensive, reliable, timely, and compliant reporting, market participants have less uncertainty about the issuer's changing default risk (Ashbaugh-Skaife et al., 2006). Therefore, we expect the rating agencies to respond less negatively to issuers with stronger reporting quality.

3 Data

3.1 Reporting quality

We consider high quality financial information to be accessible, comprehensive, reliable, timely, and compliant with regulatory requirements. With this framework in mind, we identify nine readily-available measures that capture the dimensions along which issuers can influence the quality of the information available to the credit rating agencies (and other municipal bond market participants). To reduce the likelihood of simultaneity bias, all disclosure measures are either pre-determined (measured in the year before the house price change) or time-invariant. Higher values of each variable indicate higher reporting quality.

We first consider the accessibility of issuer financial information. Although the rating agencies have access to private information, we expect that issuers' private and public trans-

parency levels are correlated. We identify all cities and counties with websites evaluated by the Sunshine Review in 2010. The Sunshine Review was a nonprofit organization that advocated government transparency. It applied a ten-point transparency checklist to evaluate whether government websites proactively and voluntarily disclose information to the public, assigning each city and county an overall transparency grade. We convert these transparency grades into scores, ranging from 1 (F) to 13 (A+). Panel A of Table 1 illustrates that the average *Sunshine Review website transparency* grade in our sample is a C+.

Next, we consider the scope of information provided in issuers' financial statements. The Government Finance Officer's Association (GFOA) awards state and local governments a Certificate of Achievement in Financial Reporting if their financial statements ensure users have the information they need to assess the financial health of the issuer. We obtain a list of all cities and counties that were awarded the Certificate of Achievement in Financial Reporting from 1995 to 2014 from the GFOA (Evans and Patton, 1983). A *GFOA Certificate* characterizes 65 percent of issuer-years in our sample.

We next consider the reliability of issuer financial information. We obtain audit information from the Federal Audit Clearinghouse's Single Audit database from 1995 to 2013 (Petrovits et al., 2011). All local governments that expend more than $750,000 of federal funds are included in this database. The database indicates the following relevant information for each government-year observation: fiscal year end, date of the audit report, identity of the auditor, audit opinion, and whether a material weakness is identified. Ninety-one percent of the issuer-years in our sample receive an *Unqualified audit opinion*, 79 percent have *No material weakness*, and 90 percent are audited by an *Independent auditor* (as opposed to a state auditor).

Next, we consider how timely issuers' financial information is compiled and made public. The auditor signs its report an average of 223 days after the issuer's fiscal year-end. We multiply the reporting lag by negative one so that *Audit timeliness* increases in reporting quality. We also collect the filing date and fiscal period end date for each financial filing posted in the Electronic Municipal Market Access system (EMMA) from 2009 to 2016 (Cuny, 2016).[2] Because this disclosure data begins in 2009 (and our audit data begins in 1995), EMMA does not provide a long enough time series to include as an annual disclosure measure. We create a public disclosure timeliness measure for each issuer that is equal to the average number of days between the fiscal period-end and the financial statement filing date in EMMA for all of its filings from 2009 to 2016. Issuers take an average of 259 days after period-end to publicly file financial statements. We multiply the reporting lag by negative one so that higher values of *Public reporting timeliness* represent higher reporting quality.

Finally, we consider whether issuers are subject to and compliant with disclosure regulation. We include an indicator, denoted *GAAP state*, equal to one if the issuer's state mandates GAAP-compliant financial statements (Gore, 2004). Approximately one-third of sample issuers are domiciled in a state that mandates GAAP reporting. In addition, most issuers with outstanding bonds are required to file annual continuing disclosure documents in EMMA. We create an indicator equal to one if the issuer filed at least one financial statement in EMMA in each year from July 2009 to June 2016. Seventy-eight percent of the issuers in

[2]EMMA makes issuers' offering documents, financial statements, secondary trade data, event notices, and credit ratings available to the public free of charge. Nine-digit CUSIP numbers are required to systematically collect disclosure information from EMMA. We match each city and county by name to Thomson's SDC Platinum database, which provides 6-digit CUSIP numbers for each issuer. We match the 6-digit issuer CUSIP numbers from SDC Platinum to transaction data from the MSRB (Municipal Securities Rulemaking Board) to obtain 9-digit CUSIP numbers for each issuer. Using the 9-digit CUSIP numbers, we obtain the filing date and fiscal period end date for each financial filing posted in EMMA from 2009 to 2016.

the sample have *Non-missing EMMA filings* during this period.

Our summary measure of reporting quality, *Reporting quality*, is the first principal component of these nine individual measures. When a binary reporting quality measure is used, we identify issuer-years in the top quartile of *Reporting quality* as *Strong* reporting quality and those in the bottom quartile as *Weak* reporting quality. *Reporting quality* is relatively stable across time, as the mean and median Δ*Reporting quality* from year *t-1* to year *t+1* is zero.

Panel B of Table 1 documents the correlation between each of the nine reporting quality metrics and their first principal component, *Reporting quality*. With the exception of *GAAP state*, these measures are highly correlated with one another. The strongest determinants of *Reporting quality* are: a *GFOA Certificate*, the issuer's *Sunshine Review website transparency grade*, and an *Unqualified audit opinion*. Despite the time-invariant nature of the *Sunshine Review website transparency grade*, these three reporting quality proxies are strongly statistically and economically correlated.

3.2 Credit ratings

We collect the general obligation credit rating history from S&P for issuers with observable components of *Reporting quality*. This data is available from initiation through the end of 2015 for 462 cities and counties. We focus on issuer ratings because they capture the basic ability and willingness of an issuer to meet its financial obligations. By contrast, the ratings of specific bonds also incorporate assessments of the likely amounts of recovery in the event of default (Ashbaugh-Skaife et al., 2006; Weber, 2006). Moreover, bond yields change for

various reasons unrelated to issuer fundamentals (e.g., interest rates, liquidity, call features, insurance providers, duration, etc.).

Panel A of Table 2 illustrates that municipal issuers are generally highly rated, with an average credit rating of AA-. This table also shows that downgrades are less common than upgrades. This is consistent with S&P's relatively high upgrade-to-downgrade ratio. The unconditional average probability of downgrade (upgrade) is 3 (8) percent. To allow rating changes to lag economic changes, we create an indicator, *Downgrade*, equal to one if the issuer is downgraded in year *t, t+1,* or *t+2,* and zero otherwise. Another indicator, *Upgrade*, is equal to one if the issuer is upgraded in year *t, t+1,* or *t+2,* and zero otherwise. The unconditional average probability of downgrade (upgrade) over the three-year period is 7 (26) percent. Thirty-five percent of sample issuers do not experience a rating change during the sample period.

Table 3 and Figure 1 also summarize the downgrade (upgrade) probability of the issuers in the sample, based on the issuer's credit rating and reporting quality in year *t-1*. Among issuers with the same credit rating, *Strong* reporting quality issuers are generally less likely to be downgraded than *Weak* reporting quality issuers. This relation is most statistically and economically significant for higher-rated issuers (those rated above AA). Similarly, *Strong* reporting quality issuers are more likely to be upgraded than *Weak* reporting quality issuers with the same credit rating. This relation is most statistically and economically significant for lower-rated issuers (those rated A+ and lower).

Although prior literature documents a predictable relation between credit rating changes and bond yields (Hand et al., 1992; Cornaggia et al., 2017), Table 3 validates the use of credit ratings as a proxy for the cost of debt. We measure the average yield spread over

the maturity-matched AAA-GO yield for all trades over $100,000 in principal value of issuer i's uninsured general obligation bonds in year t. Among issuer-years for which trade data is available, the bonds of issuers whose credit rating is BBB+ or below trade at a 69 basis point wider spread than the bonds of AAA-rated issuers. This relation is consistent with the expectation that lower-rated issuers have a higher cost of debt than highly rated issuers. Moreover, among issuers with the same credit rating, *Strong* reporting quality issuers generally exhibit lower spreads than *Weak* reporting quality issuers. As is also evident in Panel C of Figure 1, this relation is most statistically and economically significant for mid-rated issuers (those rated between AA and A).

3.3 Economic changes

S&P identifies property market values as one of the primary proxies for an issuer's economic strength. Therefore, we measure changes in local house prices in each year from 1997 to 2013 to capture changes in default risk. The sample of house price changes ends in 2013 because our credit rating data ends in 2015 and we allow ratings decisions to lag house price changes by up to two years (Lutz, 2008; McFarland and Pagano, 2014).

We collect monthly median home values for each city and county in the United States using the Zillow Home Value Index (ZHVI). Zillow estimates sale prices (Zestimates) for all homes each month, even those that are not for sale. Zestimates are based on proprietary statistical and machine learning models. These models subdivide all of the homes in United States into micro-regions. Micro-regions are subsets of homes either near one another or with similar physical attributes to one another. Within each micro-region, the models observe

recent sale transactions and learn the relative contribution of various home attributes to the sale price. Based on the patterns learned, these models can estimate sale prices on homes that have not yet sold. To reduce noise in the monthly estimates, we average the monthly estimates to create an annual estimate for each city and county.

We calculate the change in property values for each city and county in each year, and partition the data into deciles. By construction, 10 percent of the cities and counties in the United States appear in decile one and 10 percent appear in decile ten each year. Decile one represents the most negative change and decile ten represents the most positive change each year. This method effectively removes the macroeconomic component from annual house price changes and creates a relative measure of the strength of the local economy. The average house price change in decile one is -11.5 percent. The average house price change in decile ten is 14.4 percent.

To validate house prices as a proxy for local economic conditions, we collect annual per capita income and population from the Bureau of Economic Analysis (BEA). We sort the percentage change in local per capita income and population in year t across all counties in the United States into deciles. Because the BEA only provides per capita income and population at the county level, changes in city per capita income and population are based on the principal county in which the city is located. Column (8) of the correlation matrix presented in Panel B of Table 2 confirms that the house price change decile is significantly positively correlated with the per capita income change decile and the population change decile.

Panel A of Table 4 details the downgrade probability, upgrade probability, and yield spreads of the issuers in the sample, based on their house price change decile in year t.

Issuers in the most negative house price change decile (decile one) are 3 times more likely to be downgraded over the next three years than issuers in the most positive decile (decile ten). Yield spreads are also significantly wider for issuers in the most negative house price change decile than issuers in the most positive decile. However, issuers in the most negative decile are no less likely to be upgraded than issuers in the most positive decile. This is consistent with S&P's ratings methodology that suggests property values tend to lower, rather than raise ratings.

Unlike *Strong* reporting quality issuers, *Weak* reporting quality issuers are heavily penalized for negative changes in the local housing market. *Weak* reporting quality issuers in the most negative house price change decile are 3.7 times more likely to be downgraded than issuers in the most positive decile. By contrast, *Strong* reporting quality issuers in the most negative decile are not statistically more likely to be downgraded than issuers in the most positive decile.

Figure 2 further illustrates that *Weak* reporting quality issuers are statistically and economically more likely to be downgraded and have wider yield spreads than *Strong* reporting quality issuers in the same house price change decile. This relation is pronounced in the more negative deciles. *Weak* reporting quality issuers in the extreme tails (decile one and decile ten) are also less likely to be upgraded than *Strong* reporting quality issuers in the same house price change decile.

Panel B of Table 4 shows that issuers in the two most negative house price change deciles for two consecutive years (years t and *t+1)* are 2.75 times more likely to be downgraded than other issuers. This relation is again pronounced for *Weak* reporting quality issuers. *Weak* reporting quality issuers are 14 times more likely to be downgraded than *Strong* reporting

quality issuers following two consecutive years in decile one or two.

3.4 Bond insurance

In return for an up-front fee, bond insurers agree to make principal and interest payments to investors in the event of issuer default. The credit rating assigned to an insured bond is the higher of the issuer's credit rating or the insurer's credit rating. Therefore, the value of bond insurance to issuers is the strong credit rating of the insurer, which reduces the cost of issuing insured bonds.

To support the attribution of our results to reporting quality, we use bond insurance in year *t-1* as an instrument for reporting quality in year *t-1*. A valid instrument must be correlated with the independent variable of interest. Prior literature demonstrates that issuers treat insurance and reporting quality as substitutes (Gore et al., 2004; Cuny, 2016; Martin and Roychowdhury, 2015). However, insurance and disclosure reduce the cost of debt through different mechanisms. Reporting quality reduces investors' uncertainty about the issuer's probability of default. By contrast, insurance reduces investors' expected losses on individual (insured) bonds without affecting the underlying issuer's probability of default.

A valid instrument also cannot directly affect the outcome variable - subsequent changes in the issuer's underlying credit rating. S&P's Global Ratings definitions define the issuer credit rating as a forward-looking opinion about an obligor's overall creditworthiness. "This opinion focuses on the obligor's capacity and willingness to meet its financial commitments as they come due. It does not apply to any specific financial obligation, as it does not take into account the nature of and provisions of the obligation, its standing in bankruptcy or

liquidation, statutory preferences, or the legality and enforceability of the obligation." Unlike bond-level credit ratings, which take into account factors that affect loss given default (such as subordination, collateral, and guarantees), issuer credit ratings primarily consider the probability of default.

We assert that insurance choices made in year *t-1* do not affect the issuer's probability of downgrade (upgrade) in year *t, t+1*, or *t+2*. Insurance payouts are conditional upon issuer default, therefore insurance does not causally change the issuer's capacity and willingness to make principal and interest payments.

We do not expect insurance to be an equally strong instrument throughout the sample period. Before 2008, all of the major bond insurers (Ambac, MBIA, FGIC, and FSA) carried AAA ratings and over fifty percent of new issues were insured. By the time Ambac sought Chapter 11 bankruptcy protection in 2010, less than nine percent of new issues were insured. Therefore, we expect insurance and reporting quality are substitutable only until 2010 (Cuny, 2016).

We use the 9-digit CUSIPs of each issuer's bonds to gather bond characteristics from Bloomberg. We identify the issue date, maturity date, and insurance status of each bond. This allows us to identify the percentage of the issuer's outstanding bonds that are insured in year *t-1*. Panel A of Table 2 shows that in the average issuer-year in our sample, 58 percent of outstanding bonds are insured.

3.5 Controls for determinants of rating changes

We control for two broad categories of variables that could influence our results by mitigating or exacerbating the credit rating agency's response to economic changes. First, we control for the non-economic inputs into S&P's credit ratings. Second, we control for characteristics that prior literature shows are correlated with issuer credit rating changes.

The six determinants of S&P's credit ratings that are unrelated to the economy are: management, the institutional framework, liquidity, budgetary performance, budget flexibility, and debt. The management score assesses the policies and practices of a local government. Relying on prior literature, we gather information measuring the strength of local governance mechanisms from surveys conducted by the International City/County Management Association (ICMA). The ICMA conducts form of government surveys every five years. To maximize overlap with our sample period, we use the 2007 survey sent to counties and the 2006 survey sent to cities. Consistent with the overall response rate, 40 percent of the issuers in our sample responded to these surveys.

Prior literature shows that council-manager is the strongest form of local government (Evans and Patton, 1983; Giroux and McLelland, 2003). City managers are expected to be nonpartisan and politically neutral as they carry out the decisions of the council or mayor. Therefore, we create a variable (*Council-manager*) equal to one if the municipal government is organized as council-manager, zero if not, and 0.5 if the municipality did not respond to the survey.[3] Prior literature also shows that initiative and popular referendum provisions provide means for citizens to challenge incumbent politicians (Baber et al., 2013). Therefore,

[3]To ensure that replacing non-responses with the average does not influence our results, Table 6 includes a regression that limits the sample to issuer-years with non-missing data for all control variables.

we create an indicator (*Both provisions*) equal to one if the municipality has both initiative and popular referendum provisions in place, zero if not, and 0.5 if the municipality did not respond to the survey.

The institutional framework score assesses the legal and practical environment of the state in which the local government operates. We use the 2008 BGA-Alper Integrity Index to control for the state's management and institutional framework. The objective of the index is to assess the relative strength of laws that promote integrity in each of the fifty states. The higher the *Integrity index*, the stronger the state's laws are and the better its citizens are protected.

We use the 9-digit CUSIPs for each issuer's bonds to gather annual issuer fundamental characteristics from Bloomberg. Fundamental information is available from Bloomberg for approximately 42 percent of our issuer-year sample. Therefore, we replace missing observations with the sample average.[3] To control for liquidity, we follow S&P's rating methodology and include cash as a percentage of general fund expenditures (*Cash/Expenses*). To control for budgetary performance, we follow S&P's rating methodology and include the surplus of total general fund revenues minus total general fund expenditures (*Surplus*). To control for budgetary flexibility, we follow S&P's rating methodology and include the general fund balance as a percentage of expenditures (*Balance/Expenses*). To control for the debt burden, we follow S&P's rating methodology and include the ratio of debt service to general fund expenditures (*Debt service/Expenses*).

The regressions do not need to control for credit ratings because we condition on the issuer's rating at the beginning of the year. We control for ratings drift through a *Downgrade history* variable equal to the number of previous downgrades (Lando and Skodeberg, 2002).

We measure an issuer's house price change decile each year, giving us an annual relative change. Therefore, the regressions do not need to control for common macroeconomic changes that affect all issuers in a particular year. Moreover, the rating agencies follow a "through the cycle" approach that does not respond to short-term changes in the macroeconomy. However, downgrades are more likely during recessions because of fundamental deterioration, which can span multiple years (Amato and Furfine, 2004). Therefore, we control for the recessions in 2001-2002 and 2007-2009 with a *Recession* indicator.

Because ratings changes are more common around debt issuance, we include an indicator variable (*New issue*) equal to one if the issuer issues new debt in year *t, t+1,* or *t+2* (Marks et al., 1994). Because large cities and counties have a more diverse economic base, they can likely withstand economic changes better than small municipalities. We control for size with the natural log of population (*ln(Population)*). Because less fiscally responsible issuers are less likely to withstand economic change, we control for the natural log of general fund expenditures (*ln(Expenses)*).

Finally, we ensure the issuer's response to the economic shock does not drive our results. We control for contemporaneous changes in reporting quality through Δ*Reporting quality,* which is equal to the issuer's *Reporting quality* in year *t+1* minus *Reporting quality* in year *t-1.* For the sample for which the information is available, we control for contemporaneous changes in liquidity, budgetary performance, budgetary flexibility, and debt burden using Δ*Cash/Expenses*, Δ*Surplus*, Δ*Balance/Expenses*, and Δ*Debt service/Expenses* from year *t* to year *t+2.*

4 Results

4.1 Conditional logistic regressions

To measure the relation between reporting quality in year *t-1* and the probability of downgrade (upgrade) in year *t, t+1, or t+2,* we use logistic regressions that condition on issuer *i*'s credit rating in year *t-1* and house price change decile in year *t.* Conditional logistic regressions explore variation in the probability of downgrade (upgrade) within each *Credit rating - House price change decile* group. Formally, the regressions are specified as follows for credit rating downgrades:

$$log\left[Odds(Downgrade_{i;t,t+1,t+2}) \mid CreditRating_{t-1},\ HousePriceChangeDecile_{t}\right] =$$

$$\beta ReportingQuality_{t-1} + \sum \gamma Controls_{i,t} + \varepsilon_{i,t}$$

The same specification is used for credit rating upgrades. We present the odds ratios from these logistic regressions. Therefore, a coefficient below one indicates the presence of the variable is associated with a lower probability of downgrade (upgrade) than its absence. By contrast, a coefficient above one indicates the presence of the variable is associated with a higher probability of downgrade (upgrade) than its absence.

Although *Reporting quality* is our primary measure of reporting quality, we begin by presenting results for each of the nine individual reporting quality measures. The results presented in Table 5 paint a consistent picture across the reporting quality proxies. Panel A shows that among issuers with the same credit rating in the same house price change decile, stronger reporting quality is associated with a lower probability of downgrade. The odds ratio of 0.754 in Column (1) indicates that the odds of downgrade are 24.6 percent lower (1-0.754) for each 1-unit increase in *Reporting quality.* Therefore, a one-standard deviation

(1.44) increase in *Reporting quality* decreases the probability of downgrade by 35 percent. Similarly, Column (3) shows that issuers that are awarded a *GFOA Certificate* in year *t-1* are 45 percent less likely to be downgraded than issuers with the same initial credit rating that are not awarded a certificate.

Inferences are consistent and significant for each of the reporting quality measures, except that *Unqualified audit opinion, Independent auditor, Public reporting timeliness*, and *Non-missing EMMA filings* are insignificant. Moreover, most of the model specifications are statistically significant, based on the Chi-squared goodness of fit test. The most statistically significant models use time-varying measures of reporting quality (i.e., *Audit timeliness, No material weakness, Reporting quality,* and *GFOA Certificate*). Though we focus on the summary measure, *Reporting quality*, to measure reporting quality, the results described in the remainder of the paper are robust to using these time-varying measures individually to capture reporting quality.

Panel B of Table 5 shows that for a given credit quality and house price change decile, stronger reporting quality is associated with a higher probability of upgrade. For each standard deviation increase in *Reporting quality*, the probability of upgrade increases by 28 percent. Inferences are consistent and significant for all reporting quality measures, except for *Non-missing EMMA filings* and *GAAP State*. Again, the most statistically significant models use time-varying measures of reporting quality (i.e., *Reporting quality, GFOA Certificate, Unqualified audit opinion, Audit timeliness).*

Table 6 presents results of conditional logistic regressions that control for other determinants of credit rating changes. Results are statistically and economically similar to those presented in Table 5. Column (1) indicates that for a one-standard deviation increase in *Re-*

porting quality, the probability of downgrade decreases by 47 percent. Column (5) indicates that for a one-standard deviation increase in *Reporting quality*, the probability of upgrade increases by 28 percent.

Issuers with a history of downgrades and those with high expenses are more likely to be downgraded. Issuers are more likely to be downgraded and more likely to be upgraded during a recession. This is consistent with the observation that although downgrades increased following the financial crisis, S&P maintained a high upgrade-to-downgrade ratio (Kozlik and Schankel, 2014). Issuers that issue new debt in year *t, t+1,* or *t+2* are less likely to be downgraded than issuers that do not. This can either be driven by S&P's favorable view of access to liquidity or that downgraded issuers are less likely to issue debt. Finally, issuers that improve their reporting quality between year *t-1* and year *t+1* are significantly less likely to be downgraded than issuers that do not.

To ensure that the results are not driven by the issuer's response to the change in local house prices, Columns (2) and (6) control for the change in *Cash/Expenses*, *Surplus*, *Balance/Expenses*, and *Debt service/Expenses* from year t to year *t+2.* Although this information is not available for the full sample, results remain statistically and economically consistent with those presented in Columns (1) and (5). Consistent with expectations, improved liquidity, budgetary performance, budgetary flexibility, and reduced debt burden are insignificantly negatively (positively) related to the probability of downgrade (upgrade).

To ensure the results are not driven by our choice to replace missing control observations with the sample mean, Columns (3) and (7) limit the sample to issuer-years in which all control variables are observable. Despite the dramatic loss of observations, results are statistically and economically consistent. The association between *Reporting quality* and the odds

of downgrade (upgrade) remains statistically meaningful and is economically pronounced in this sample partition. The coefficients on the control variables remain economically consistent with expectations, with the exception of *Both Provisions*, which increases (decreases) the probability of downgrade (upgrade). Despite the intent that popular referendum and initiative provisions allow citizens to discipline politicians, these provisions can also generate volatility and uncertainty that is viewed unfavorably by the rating agencies.

Columns (4) and (8) include an indicator, *Very Bad*, equal to one if the issuer is in the two most negative house price change deciles for two consecutive years. These issuers are more likely to be downgraded than other issuers. This increased propensity to be downgraded is attenuated for issuers with strong reporting quality. Thus, moderating effect of reporting quality is pronounced when the economy is stressed.

4.2 Instrumental variable regressions

To help attribute these results to reporting quality, *per se*, Table 7 presents results of instrumental variable regressions. The first and second stage regressions condition on the combination of credit rating in year *t-1* and house price change decile in year *t*. The first-stage OLS regressions, which relate reporting quality in year *t-1* to the percentage of bonds that are insured in year *t-1*, are specified as follows:

$$ReportingQuality_{t-1} \mid CreditRating_{t-1},\ HousePriceChangeDecile_t =$$

$$\beta PercentofBondsInsured_{t-1} + \sum \gamma Controls_{i,t} + \varepsilon_{i,t}$$

Panel A of Table 7 reports the results of the first stage OLS regressions. Recall that we expect a negative relation between reporting quality and insurance because they are

substitute mechanisms to lower the cost of debt. We find that insurance is an economically and statistically strong instrument for reporting quality. Conditional upon the issuer's credit rating in year *t-1* and house price change decile in year *t*, the correlation between *Reporting quality* and the *Percent of bonds insured* is -45 percent in Columns (1) and (3). The Stock and Yogo (2005) weak instrument F-statistic of 17.33 is above the critical value for statistically powerful instruments (of 16.38).

Columns (2) and (4) illustrate that when the sample is restricted to observations before most bond insurers stopped writing new policies (in 2010), the instrument is even stronger. The correlation between *Reporting quality* and the *Percent of bonds insured* before 2010 is -74 percent and the Stock and Yogo (2005) weak instrument F-statistic of 31.54 is well above the critical value for statistically powerful instruments.

Issuers organized according to a council-manager form of government, those with more cash, a higher general fund balance, and more expenses tend to have higher reporting quality. The level of *Reporting quality* is negatively related to the subsequent Δ*Reporting quality.*

In the second stage, the independent variable of interest is the predicted value of *Reporting quality* from the first stage, $\hat{RQ}$. The second-stage logistic regressions are specified as follows for credit rating downgrades:

$$log\left[Odds(Downgrade_{i;t,t+1,t+2}) \mid CreditRating_{t-1},\ HousePriceChangeDecile_t\right] =$$

$$\beta \hat{RQ}_{t-1} + \sum \gamma Controls_{i,t} + \varepsilon_{i,t}$$

The same specification is used for credit rating upgrades. Panel B reports the odds ratios from these regressions and show that the instrumented results are statistically and economically consistent with the un-instrumented results described in Table 6. Column (1) indicates that a one-standard deviation increase in $\hat{RQ}$ reduces the probability of downgrade

by 81 percent.[4] Relative to the sample mean downgrade probability of 7 percent, this is a 6-percentage point reduction. Column (3) indicates that a one-standard deviation increase in $\hat{RQ}$ increases the probability of upgrade by 104 percent.[5] Relative to the sample mean upgrade probability of 26 percent, this is a 27-percentage point increase. Columns (2) and (4) corroborate these results limiting the sample period to years before 2010.

The coefficients on the control variables are generally consistent with expectations and with those reported in Table 6. The exception is the *Council-manager* form of government, which is positively related to downgrades and negatively (though not statistically) related to upgrades. Thus, the governance effect of the council-manager form of government documented in Table 6 operates through transparency.

5 Conclusion

We address two specific sources of endogeneity in the relation between reporting quality and the cost of debt. Specifically, we address the concern that issuers with poor reporting quality tend to be higher risk and tend to experience negative economic outcomes. We further address the endogeneity in the relation by instrumenting reporting quality with the percentage of the issuer's bonds that are insured.

Among issuers with the same credit rating that experience the same relative magnitude of local house price changes, we find the ex-ante choice of reporting quality is significantly negatively (positively) related to the probability of future credit rating downgrades (upgrades). This finding is particularly pronounced when negative house price changes persist for more

[4] 0.82 standard deviation x [1-0.008 odds ratio]
[5] 0.82 standard deviation x [2.266 odds ratio - 1]

than a year. Our findings indicate that reporting quality can reduce the cost of debt by attenuating the effect of future negative economic outcomes on issuer credit ratings.

Appendix: Definitions of variables

Variable	Definition
Audit timeliness$_{t-1}$	The number of days between period-end and the audit report date of the financial statements presented in *t-1.* Multiplied by negative one so that higher numbers represent higher reporting quality.
Balance/Expenses$_t$	The issuer's general fund balance as a percentage of general fund expenditures in year *t.* Equal to the sample average for missing observations. Δ*Balance/Expenses* is *Balance/Expenses* in year *t+2* less *Balance/Expenses* in year *t.*
Both provisions	An indicator equal to one if the city/county has both initiative and popular referendum provisions in place, zero if not, and 0.5 if the municipality did not respond to the ICMA Form of Government survey.
Cash/Expenses$_t$	The ratio of cash to general fund expenditures in year *t.* Equal to the sample average for missing observations. Δ*Cash/Expenses* is *Cash/Expenses* in year *t+2* less *Cash/Expenses* in year *t.*
Council-manager	A variable equal to one if the city/county is organized according to a council-manager form of government, zero if not, and 0.5 if the municipality did not respond to the ICMA Form of Government survey.
Credit rating$_{t-1}$	Standard & Poor's *Credit rating* is measured in year *t-1* on a scale from 1 (AAA) to 22 (D). Non-rated issuer-years are not included.
Debt service/Expenses$_t$	The ratio of principal and interest payments on debt to general fund expenditures in year *t.* Equal to the sample average for missing observations. Δ*Debt service/Expenses* is *Debt service/Expenses* in year *t+2* less *Debt service/Expenses* in year *t.*
Downgrade$_{t,\ t+1,\ or\ t+2}$	An indicator equal to one if S&P lowers the issuer's credit rating in year *t, t+1,* or *t+2.*
Downgrade history$_t$	The number of issuer downgrades between the date of S&P's initial rating of the issuer and year *t.*
GAAP state	An indicator equal to one if the issuer is located in a state that mandates GAAP reporting. These states include: AZ, CT, FL, GA, KY, MI, MT, NV, NH, NM, NC, OH, RI, SD, and TN.
GFOA Certificate$_{t-1}$	An indicator equal to one if the issuer won a GFOA Certificate of Achievement for Excellence in Financial Reporting in year *t-1.*
House price change$_t$	The percentage change in local house prices in year *t.*
House price change decile$_t$	The percentage change in local house prices in year *t*, sorted into deciles, with decile one representing the most negative change and decile ten representing the most positive change in year *t.*

Variable	Definition
Income change decile$_t$	The percentage change in local per capita income in year *t*, sorted into deciles, with decile one representing the most negative change and decile ten representing the most positive change in year *t*. Per capita income is available annually at the county level. Therefore, changes in city per capita income are based on the principal county in which the city is located.
Independent auditor$_{t-1}$	An indicator equal to one if a non-state auditor audited the issuer in *t-1.*
Integrity index	The score from the 2008 BGA-Alper Integrity Index. The objective of the index is to assess the relative strength of laws that promote integrity in each of the fifty states. The higher the index (on a scale from 1 to 100), the stronger the state laws are and the better its citizens are protected.
ln(Expenses$_t$)	The natural logarithm of the issuer's general fund expenditures in year *t*. Equal to the sample average for missing observations.
ln(Population)	The natural logarithm of the issuer's population from the 2010 census.
New issue$_{t,\ t+1,\ \text{or}\ t+2}$	An indicator equal to one if the issuer issues new bonds in year *t, t+1,* or *t+2.*
No material weakness$_{t-1}$	An indicator equal to one if the issuer's auditor did not identify a material weakness in year *t-1.*
Non-missing EMMA filings	An indicator equal to one if the issuer filed at least one financial statement in EMMA in each year from July 2009 to June 2016.
Percent of bonds insured$_{t-1}$	The percentage of the issuer's outstanding bonds at *t-1* that are insured.
Population change decile$_t$	The percentage change in local population in year *t*, sorted into deciles, with decile one representing the most negative change and decile ten representing the most positive change in year *t*. Population is available annually at the county level. Therefore, changes in city population are based on the principal county in which the city is located.
Public reporting timeliness	The average number of days between the filing date and period-end date for all filings presented in EMMA from July 2009 to June 2016. Multiplied by negative one so that higher numbers represent higher reporting quality.
Recession$_t$	An indicator equal to one in recession years (2001, 2002, 2007, 2008, and 2009).

Variable	Definition
Reporting quality$_{t-1}$	The first principal component of nine measures of reporting quality, which increase in quality. These include: *Sunshine Review website transparency, GFOA Certificate$_{t-1}$, Unqualified audit opinion$_{t-1}$, No material weakness$_{t-1}$, Independent auditor$_{t-1}$, Audit timeliness$_{t-1}$, Public reporting timeliness, GAAP state,* and *Non-missing EMMA filings.* Δ*Reporting quality* is *Reporting quality* in year *t+1* less *Reporting quality* in year *t-1.*
$\hat{RQ}$	The predicted value of *Reporting quality* from an OLS regression that relates the *Percent of bonds insured*$_{t-1}$ to *Reporting quality*$_{t-1}$.
Strong$_{t-1}$	An indicator equal to one if *Reporting quality* is in the top quartile.
Sunshine Review website transparency	The transparency score assigned to the issuer's website by the Sunshine Review in 2010 on a scale from 1 (F) to 13 (A+).
Surplus$_t$	The issuer's general fund revenues minus general fund expenditures in year *t* (in $ millions). Equal to the sample average for missing observations. Δ*Surplus* is *Surplus* in year *t+2* less *Surplus* in year *t.*
Unqualified audit opinion$_{t-1}$	An indicator equal to one if the issuer received a qualified audit opinion from their auditor in year *t-1.*
Upgrade$_{t,\ t+1,\ \text{or}\ t+2}$	An indicator equal to one if S&P raises the issuer's credit rating in year *t, t+1,* or *t+2.*
Very bad$_t$	An indicator equal to one if the issuer is in the first or second (lowest) deciles of house price changes in two consecutive years (years *t* and *t+1*).
Weak$_{t-1}$	An indicator equal to one if *Reporting quality* is in the lowest quartile.
Yield spread$_t$	The average yield spread over the maturity-matched AAA-GO yield for all trades over $100,000 in principal value of the issuer's uninsured general obligation bonds in year *t.*

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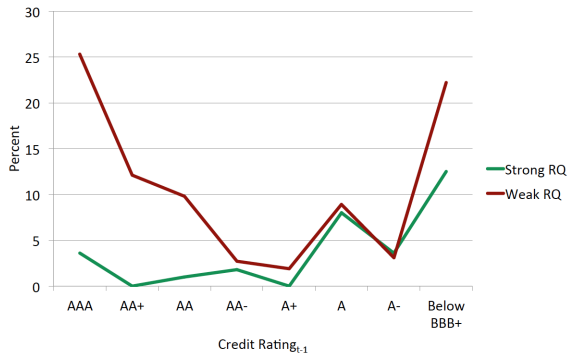
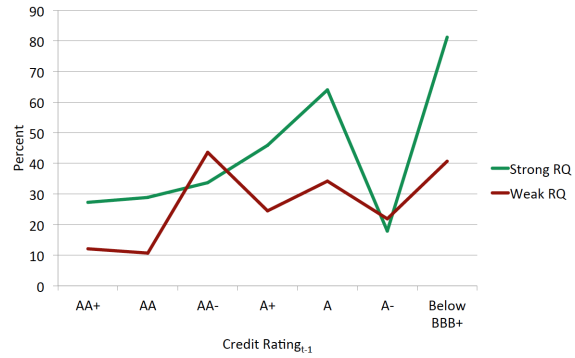
Figure 1: Rating changes and yield spreads, by credit rating

These figures summarize credit rating changes and yield spreads, based on the issuer's underlying *Credit Rating* assigned by Standard and Poor's as of the end of year *t-1.* Panel A reports the percentage of sample issuers that are downgraded, Panel B reports the percentage of sample issuers that are upgraded, and Panel C reports the average yield spread. *Downgrade* is an indicator equal to one if the issuer is downgraded in year *t, t+1,* or *t+2*. *Upgrade* is an indicator equal to one if the issuer is upgraded in year *t, t+1,* or *t+2*. The *Yield spread* is the average yield over the maturity-matched AAA-GO yield for all trades over $100,000 in principal value of the issuer's uninsured general obligation bonds in year *t.* Reporting quality is *Strong* if *Reporting quality* is in the highest quartile and *Weak* if *Reporting quality* is in the lowest quartile. *Reporting quality* is the first principal component of nine reporting quality variables, which are defined in the Appendix.

Panel A: Percentage of issuers downgraded$_{t,\ t+1,\ or\ t+2}$



Panel B: Percentage of issuers upgraded$_{t,\ t+1,\ or\ t+2}$



Panel C: Average yield spread$_t$

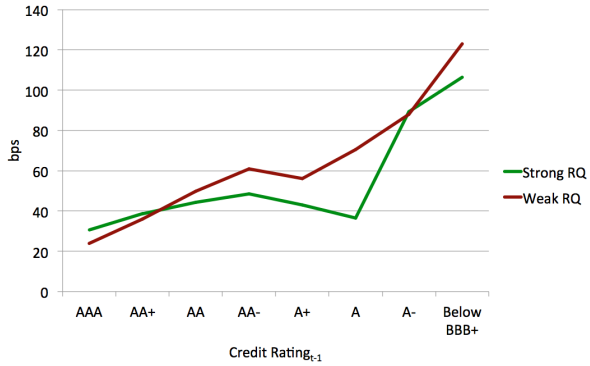
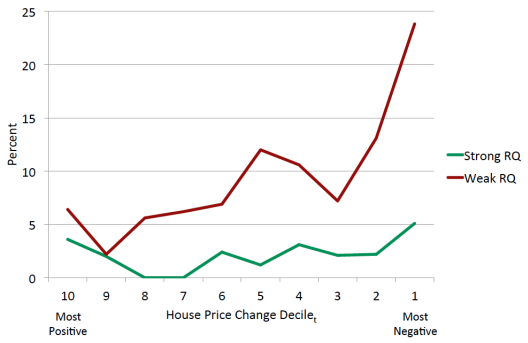


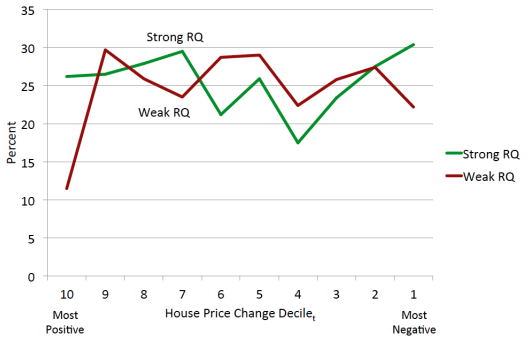
Figure 2: Rating changes and yield spreads, by house price change decile

These figures summarize credit rating changes and yield spreads, based on the relative magnitude of the change in local house prices in year t. Each issuer's percentage change in local house prices in year t is sorted into deciles, with decile one representing the most negative change and decile ten representing the most positive change in year t. Panel A reports the percentage of sample issuers that are downgraded, Panel B reports the percentage of sample issuers that are upgraded, and Panel C reports the average yield spread. *Downgrade* is an indicator equal to one if the issuer is downgraded in year *t, t+1,* or *t+2*. *Upgrade* is an indicator equal to one if the issuer is upgraded in year *t, t+1,* or *t+2*. The *Yield spread* is the average yield over the maturity-matched AAA-GO yield for all trades over $100,000 in principal value of the issuer's uninsured general obligation bonds in year *t*. Reporting quality is *Strong* if *Reporting quality* is in the highest quartile and *Weak* if *Reporting quality* is in the lowest quartile. *Reporting quality* is the first principal component of nine reporting quality variables, which are defined in the Appendix.

Panel A: Percentage of issuers downgraded$_{t,\ t+1,\ or\ t+2}$



Panel B: Percentage of issuers upgraded$_{t,\ t+1,\ or\ t+2}$



Panel C: Average yield spread$_t$

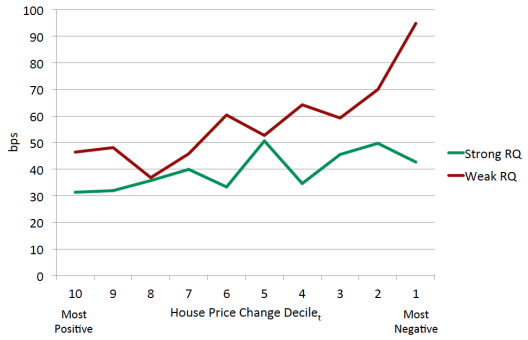


Table 1: Measuring reporting quality

This table summarizes the reporting quality measures used in the study. Panel A provides descriptive statistics for each reporting quality measure. The summary reporting quality measure, *Reporting quality,* is the first principal component of nine individual reporting quality variables. Panel B presents Pearson product moment correlations between *Reporting quality* and the nine measures of reporting quality. All variables are defined in the Appendix.

Panel A: Descriptive statistics

		Obs	Mean	Std Dev	P25	P50	P75
1	Reporting quality$_{t-1}$	3,550	0.00	1.44	-0.86	0.41	1.06
2	Sunshine Review website transparency	3,550	7.09	2.96	5.00	8.00	9.00
3	GFOA Certificate$_{t-1}$	3,550	0.65	0.48	0.00	1.00	1.00
4	Unqualified audit opinion$_{t-1}$	3,550	0.91	0.29	1.00	1.00	1.00
5	No material weakness$_{t-1}$	3,550	0.79	0.41	1.00	1.00	1.00
6	Independent auditor$_{t-1}$	3,550	0.90	0.30	1.00	1.00	1.00
7	Audit timeliness$_{t-1}$	3,550	-223	76	-267	-215	-174
8	Public reporting timeliness	3,550	-259	182	-323	-203	-156
9	GAAP state	3,550	0.33	0.47	0.00	0.00	1.00
10	Non-missing EMMA filings	3,550	0.78	0.42	1.00	1.00	1.00
11	ΔReporting quality$_{t-1 \text{ to } t+1}$	3,479	0.00	0.46	-0.09	0.00	0.07
12	$\hat{RQ}_{t-1}$	3,461	0.03	0.82	-0.46	0.10	0.58

Table 1, continued

Panel B: Correlations

		1	2	3	4	5	6	7	8	9	10
1	Reporting quality$_{t-1}$	1									
2	Sunshine Review website transparency	0.65***	1								
3	GFOA Certificate$_{t-1}$	0.79***	0.45***	1							
4	Unqualified audit opinion$_{t-1}$	0.61***	0.27***	0.40***	1						
5	No material weakness$_{t-1}$	0.34***	0.14***	0.16***	0.13***	1					
6	Independent auditor$_{t-1}$	0.25***	0.05***	0.09***	0.07***	-0.02	1				
7	Audit timeliness$_{t-1}$	0.41***	0.12***	0.23***	0.08***	0.12***	0.13***	1			
8	Public reporting timeliness	0.47***	0.14***	0.24***	0.16***	0.04***	0.09***	0.08***	1		
9	GAAP state	0.02	-0.04**	0.05***	-0.04**	-0.08***	0.02	0.19***	-0.13***	1	
10	Non-missing EMMA filings	0.27***	0.03*	0.11***	-0.02	0.04**	0.12***	0.07***	0.25***	0.10***	1

Table 2: Issuer and economic characteristics

This table describes the variables used in the study. Panel A provides descriptive statistics for issuer and economic characteristics. Panel B presents Pearson product moment correlations between *Reporting quality*, credit ratings, and economic characteristics. All variables are defined in the Appendix.

Panel A: Statistics describing issuer and economic characteristics

		Obs	Mean	Std Dev	P25	P50	P75
1	Credit rating$_{t-1}$	3,550	3.63	2.12	2.00	3.00	5.00
2	Downgrade$_{t}$	3,550	0.03	0.17	0.00	0.00	0.00
3	Downgrade$_{t,\ t+1,\ or\ t+2}$	3,550	0.07	0.26	0.00	0.00	0.00
4	Upgrade$_{t}$	3,550	0.08	0.27	0.00	0.00	0.00
5	Upgrade$_{t,\ t+1,\ or\ t+2}$	3,550	0.26	0.44	0.00	0.00	1.00
6	House price change$_{t}$	3,550	1.14	8.74	-4.02	0.75	5.32
7	House price change decile$_{t}$	3,550	5.50	2.86	3.00	5.00	8.00
8	Income change decile$_{t}$	3,361	4.97	2.49	3.00	5.00	7.00
9	Population change decile$_{t}$	3,361	6.87	2.50	5.00	7.00	9.00
10	Percent of bonds insured$_{t-1}$	3,519	0.58	0.37	0.18	0.69	0.93
11	Yield spread$_{t}$	2,305	49.9	57.1	17.9	39.0	65.5
12	Council-manager	3,550	0.60	0.30	0.50	0.50	1.00
13	Both provisions	3,550	0.43	0.30	0.00	0.50	0.50
14	Integrity Index	3,550	0.57	0.08	0.51	0.57	0.65
15	Cash/Expenses$_{t}$	3,550	0.25	0.27	0.12	0.25	0.26
16	Surplus$_{t}$	3,550	18.23	82.72	0.71	9.41	18.23
17	Balance/Expenses$_{t}$	3,550	0.32	0.38	0.17	0.32	0.35
18	Debt Service/Expenses$_{t}$	3,550	3.61	3.51	1.33	3.61	3.61
19	Downgrade history$_{t}$	3,550	0.08	0.38	0.00	0.00	0.00
20	Recession$_{t}$	3,550	0.30	0.46	0.00	0.00	1.00
21	New Issue$_{t,\ t+1,\ or\ t+2}$	3,550	0.79	0.41	1.00	1.00	1.00
22	ln(Population)	3,550	12.25	1.12	11.45	12.18	12.99
23	ln(Expenses)$_{t}$	3,550	4.68	1.26	3.99	4.53	5.38
24	ΔCash/Expenses$_{t\ to\ t+2}$	1,806	0.02	0.21	-0.04	0.01	0.06
25	ΔSurplus$_{t\ to\ t+2}$	1,901	-2.12	66.82	-5.23	-0.18	4.33
26	ΔBalance/Expenses$_{t\ to\ t+2}$	1,898	0.01	0.37	-0.04	0.00	0.05
27	ΔDebt Service/Expenses$_{t\ to\ t+2}$	977	0.17	1.89	-0.28	0.00	0.30

Table 2, continued

Panel B: Correlations among reporting quality, credit ratings, and economic characteristics

		1	2	3	4	5	6	7	8	9	10	11
1	Reporting quality$_{t-1}$	1										
2	Credit rating$_{t-1}$	-0.28***	1									
3	Downgrade$_{t}$	-0.05***	0.05***	1								
4	Downgrade$_{t,\ t+1,\ or\ t+2}$	-0.09***	0.01	0.62***	1							
5	Upgrade$_{t}$	0.04**	0.12***	-0.05***	-0.05***	1						
6	Upgrade$_{t,\ t+1,\ or\ t+2}$	0.08***	0.22***	-0.09***	-0.09***	0.56***	1					
7	House price change$_{t}$	0.05***	-0.02	-0.10***	-0.14***	-0.02	-0.01	1				
8	House price change decile$_{t}$	-0.02	-0.04**	-0.07***	-0.10***	0.01	0.03	0.74***	1			
9	Income change decile$_{t}$	0	0.03	-0.04**	-0.03*	-0.05***	0	0.30***	0.22***	1		
10	Population change decile$_{t}$	0.29***	-0.25***	-0.04**	-0.10***	0.01	0.07***	0.12***	0.19***	-0.03*	1	
11	Percent of bonds insured$_{t-1}$	-0.27***	0.49***	0.08***	0.10***	0.06***	0.10***	-0.10***	-0.03	0	-0.18***	1

Table 3: Rating changes and yield spreads, by issuer credit rating

This table summarizes credit rating changes and yield spreads, based on the issuer's underlying credit rating. *Credit Rating* is the issuer credit rating assigned by Standard and Poor's as of the end of year *t-1*. *Downgrade* is an indicator equal to one if the issuer is downgraded in year *t, t+1,* or *t+2*. *Upgrade* is an indicator equal to one if the issuer is upgraded in year *t, t+1,* or *t+2*. The *Yield spread* is the average yield over the maturity-matched AAA-GO yield for all trades over $100,000 in principal value of the issuer's uninsured general obligation bonds in year *t*. Reporting quality is *Strong* if *Reporting quality* is in the highest quartile and *Weak* if *Reporting quality* is in the lowest quartile. *Reporting quality* is the first principal component of nine reporting quality variables, which are defined in the Appendix.

		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
						(c)-(d)				(g)-(h)				(k)-(l)
			Percent Downgraded				Percent Upgraded				Yield spread (bps)			
	Credit Rating	N	All	Strong	Weak	Strong-Weak	All	Strong	Weak	Strong-Weak	All	Strong	Weak	Strong-Weak
1	AAA	705	11.5	3.6	25.3	-21.6***	N/A	N/A	N/A	N/A	38.6	30.5	23.9	6.7
2	AA+	386	4.1	0.0	12.1	-12.1***	24.6	27.3	12.1	15.2**	45.5	38.6	36.0	2.6
3	AA	730	6.7	1.0	9.8	-8.8***	21.2	28.9	10.7	18.3***	49.1	44.3	49.8	-5.6
4	AA-	614	3.4	1.8	2.7	-0.9	36.8	33.7	43.6	-9.9*	53.5	48.5	60.9	-12.4
5	A+	538	3.3	0.0	1.9	-1.9	34.6	45.9	24.5	21.4***	53.1	43.0	56.1	-13.1
6	A	312	10.6	8.0	8.9	-0.9	36.5	64.0	34.2	29.8***	57.1	36.5	70.5	-34.0**
7	A-	99	10.1	3.6	3.1	0.4	28.3	17.9	21.9	-4.0	70.0	89.3	88.0	1.2
8	BBB+ and below	166	12.7	12.5	22.2	-9.7	50.0	81.2	40.7	40.5***	107.5	106.4	123.0	-16.7

Table 4: Rating changes and yield spreads, by house price change decile

This table summarizes credit rating changes and yield spreads, based on the relative magnitude of the change in local house prices in year *t*. Each issuer's percentage change in local house prices in year *t* is sorted into deciles, with decile one representing the most negative change and decile ten representing the most positive change in year *t*. *Downgrade* is an indicator equal to one if the issuer is downgraded in year *t, t+1,* or *t+2*. *Upgrade* is an indicator equal to one if the issuer is upgraded in year *t, t+1,* or *t+2*. The *Yield spread* is the average yield over the maturity-matched AAA-GO yield for all trades over $100,000 in principal value of the issuer's uninsured general obligation bonds in year *t*. Reporting quality is *Strong* if *Reporting quality* is in the highest quartile and *Weak* if *Reporting quality* is in the lowest quartile. *Reporting quality* is the first principal component of nine reporting quality variables, which are defined in the Appendix. Panel A reports the downgrade/upgrade likelihood based on the issuer's decile in year *t*. Panel B tabulates the downgrade/upgrade likelihood for issuers in decile one (the most negative decile) for two consecutive years.

Panel A: Credit rating change likelihood, by house price change decile

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
					(c)-(d)				(g)-(h)				(k)-(l)
		Percent Downgraded				Percent Upgraded				Yield spread (bps)			
Decile	N	All	Strong	Weak	Strong-Weak	All	Strong	Weak	Strong-Weak	All	Strong	Weak	Strong-Weak
10 (Most positive)	348	5.7	3.6	6.4	-2.8	23.9	26.2	11.5	14.7**	47.8	31.3	46.4	-15.0
9	372	4.0	2.0	2.2	-0.2	25.3	26.5	29.7	-3.2	42.0	31.9	48.1	-16.1**
8	359	5.3	0.0	5.6	-5.6**	26.7	27.9	25.9	2.0	44.9	35.7	36.8	-1.1
7	322	3.7	0.0	6.2	-6.2**	28.3	29.5	23.5	6.1	43.9	39.9	45.7	-5.9
6	366	6.0	2.4	6.9	-4.6	27.3	21.2	28.7	-7.5	45.1	33.3	60.3	-27.0***
5	343	7.3	1.2	12.0	-10.8***	25.4	25.9	29.0	-3.1	48.4	50.6	52.7	-2.0
4	358	5.3	3.1	10.6	-7.5**	23.2	17.5	22.4	-4.8	56.7	34.6	64.2	-29.7***
3	389	6.4	2.1	7.2	-5.1*	22.1	23.4	25.8	-2.4	50.7	45.5	59.2	-13.6
2	375	9.9	2.2	13.1	-10.9***	27.5	27.5	27.4	0.1	58.5	49.7	70.0	-20.3*
1 (Most negative)	318	17.3	5.1	23.8	-18.7***	26.1	30.4	22.2	8.2	63.5	42.7	94.8	-52.1**
10-1		- 11.55***	-1.5	-17.4***	15.9**	- 2.25	-4.2	-10.7*	6.5	-15.7**	-11.4	-48.4*	37.1

Panel B: Credit rating change likelihood, two consecutive years in decile one

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
					(c)-(d)				(g)-(h)				(k)-(l)
		Percent Downgraded				Percent Upgraded				Yield spread (bps)			
Decile	N	All	Strong	Weak	Strong-Weak	All	Strong	Weak	Strong-Weak	All	Strong	Weak	Strong-Weak
All others	3,229	6.1	2.1	7.5	-5.4***	25.4	24.6	25.5	-0.9	49.2	38.6	55.0	-16.4***
1 or 2 for two years	321	16.5	2.4	32.7	-30.3***	26.5	34.1	16.3	17.8**	57.6	47.9	85.0	-37.1*
(All others)-(1 or 2)		-10.4***	-0.2	-25.1***	24.9***	-1.1	-9.6*	9.2	-18.7**	-8.3*	-9.3*	-30.0**	20.07

Table 5: Odds of a credit rating change, conditional upon credit rating and house price change decile

In this table, we present odds ratios from conditional logistic regressions that examine variation in the odds of downgrade and upgrade based on reporting quality in year *t-1*. The dependent variable in Panel A, *Downgrade,* is an indicator equal to one if the issuer is downgraded in year *t, t+1, or t+2*. The dependent variable in Panel B, *Upgrade,* is an indicator equal to one if the issuer is upgraded in year *t, t+1, or t+2*. Predictions are provided in the column labeled *Pred*. All regressions condition upon the issuer's Standard & Poor's Credit rating in year *t-1* and the decile rank of the local house price change in year *t*. The coefficient of interest in Columns (1) through (10) is reporting quality, measured using nine measures of reporting quality along with their first principal component, *Reporting quality*. These measures are defined in the Appendix. Standard errors clustered at the rating-decile level are reported in parentheses underneath the coefficient estimates. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Downgrade											
Reporting Quality metric	Pred.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Reporting quality	<1	0.754***									
		(0.048)									
Sunshine Review website transparency	<1		0.910***								
			(0.031)								
GFOA Certificate$_{t-1}$	<1			0.553***							
				(0.110)							
Unqualified audit opinion$_{t-1}$	<1				0.724						
					(0.160)						
No material weakness$_{t-1}$	<1					0.471***					
						(0.075)					
Independent auditor$_{t-1}$	<1						0.780				
							(0.189)				
Audit timeliness$_{t-1}$	<1							0.994***			
								(0.001)			
Public reporting timeliness	<1								1.000		
									(0.000)		
GAAP state	<1									0.698**	
										(0.114)	
Non-missing EMMA filings	<1										1.292
											(0.326)
Obs		3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013	3,013
Chi-squared		19.48	7.49	8.90	2.14	22.12	1.04	31.46	0.02	4.84	1.03
p>Chi-squared		0.00	0.01	0.00	0.14	0.00	0.31	0.00	0.88	0.03	0.31

Table 5, continued

Panel B: Upgrade											
Reporting Quality metric	Pred.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Reporting quality	>1	1.191***									
		(0.043)									
Sunshine Review website transparency	>1		1.046***								
			(0.016)								
GFOA Certificate$_{t-1}$	>1			1.538***							
				(0.181)							
Unqualified audit opinion$_{t-1}$	>1				1.766***						
					(0.304)						
No material weakness$_{t-1}$	>1					1.251**					
						(0.136)					
Independent auditor$_{t-1}$	>1						1.323**				
							(0.175)				
Audit timeliness$_{t-1}$	>1							1.002***			
								(0.001)			
Public reporting timeliness	>1								1.001***		
									(0.000)		
GAAP state	>1									0.763**	
										(0.084)	
Non-missing EMMA filings	>1										0.877
											(0.087)
Obs		3,315	3,315	3,315	3,315	3,315	3,315	3,315	3,315	3,315	3,315
Chi-squared		23.94	8.25	13.35	10.90	4.21	4.52	9.50	6.64	6.01	1.75
p>Chi-squared		0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.01	0.01	0.19

Table 6: Odds of a credit rating change, conditional upon credit rating and house price change decile, including other controls

In this table, we present odds ratios from conditional logistic regressions that examine variation in the odds of downgrade and upgrade based on reporting quality in year *t-1*. The dependent variable in Columns (1) through (4), *Downgrade,* is an indicator equal to one if the issuer is downgraded in year *t, t+1, or t+2*. The dependent variable in Columns (5) through (8), *Upgrade,* is an indicator equal to one if the issuer is upgraded in year *t, t+1, or t+2*. Predictions are provided in columns labeled *Pred*. Columns (1), (4), (5), and (8) include all observations. Columns (2) and (6) are limited to observations for which Δ*Cash/Expenses*, Δ*Surplus*, Δ*Balance/Expenses*, and Δ*Debt service/Expenses* from year *t* to year *t+2* are observable. Columns (3) and (7) are limited to observations with non-missing data for all control variables. All regressions condition upon the issuer's Standard & Poor's Credit rating in year *t-1* and the decile rank of the local house price change in year *t*. The coefficients of interest are: *Reporting quality*, measured as the first principal component of nine issuer reporting quality metrics; an indicator equal to one if the issuer is in the two lowest house price change deciles in years *t* and *t+1* (*Very bad*); and the interaction between the two (*Reporting quality*Very bad*). The nine reporting quality measures and control variables are defined in the Appendix. Standard errors clustered at the rating-decile level are reported in parentheses underneath the coefficient estimates. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 6, continued

	Pred.	(1)	(2)	(3)	(4)	Pred.	(5)	(6)	(7)	(8)
		Downgrade					Upgrade			
Reporting quality	<1	0.677***	0.707**	0.467***	0.716***	>1	1.195***	1.384***	1.404***	1.172***
		(0.043)	(0.109)	(0.105)	(0.049)		(0.044)	(0.135)	(0.152)	(0.041)
Very bad	>1				1.711*	<1				0.995
					(0.511)					(0.217)
Reporting quality*Very bad	<1				0.645***	>1				1.292
					(0.096)					(0.243)
Council-manager	<1	0.606	0.444	1.194	0.593	>1	1.108	0.800	0.506**	1.110
		(0.222)	(0.236)	(0.545)	(0.218)		(0.200)	(0.313)	(0.144)	(0.200)
Both provisions	<1	1.265	3.156**	4.665***	1.219	>1	0.950	0.663	0.700	0.940
		(0.465)	(1.771)	(2.496)	(0.451)		(0.155)	(0.213)	(0.173)	(0.154)
Integrity index	<1	0.285	0.001***	0.000***	0.416	>1	0.922	1.665	4.253	0.901
		(0.401)	(0.001)	(0.001)	(0.597)		(0.545)	(2.554)	(8.689)	(0.535)
Cash/Expenses	<1	0.404	0.501	0.096	0.409	>1	1.099	2.957	1.514	1.097
		(0.332)	(1.003)	(0.206)	(0.326)		(0.158)	(2.528)	(0.509)	(0.157)
Surplus	<1	0.999	0.994**	0.998	0.999	>1	0.999	1.002	0.999	0.999
		(0.001)	(0.002)	(0.004)	(0.001)		(0.001)	(0.002)	(0.004)	(0.001)
Balance/Expenses	<1	0.399	0.596	0.105	0.430	>1	1.225	1.995	1.619	1.214
		(0.355)	(0.879)	(0.150)	(0.371)		(0.191)	(1.548)	(1.634)	(0.180)
Debt service/Expenses	>1	1.000	1.022	1.017	1.000	<1	1.004	0.997	1.017	1.004
		(0.027)	(0.035)	(0.039)	(0.028)		(0.019)	(0.029)	(0.032)	(0.019)
Downgrade history	>1	3.175***	5.831***	0.378*	3.380***	<1	1.150	1.074	2.985***	1.153
		(0.740)	(2.560)	(0.214)	(0.820)		(0.160)	(0.312)	(1.102)	(0.161)
Recession	>1	2.033***	2.873***	1.479	2.014***	<1	1.332***	1.894***	1.004	1.320***
		(0.374)	(0.926)	(0.561)	(0.349)		(0.134)	(0.417)	(0.270)	(0.136)
New issue	>1	0.430***	0.775	0.670	0.423***	>1	1.053	1.177	1.120	1.061
		(0.080)	(0.266)	(0.384)	(0.075)		(0.091)	(0.297)	(0.302)	(0.095)
ln(Population)	<1	0.984	1.131	1.293	0.990	>1	0.889*	1.035	0.899	0.885*
		(0.091)	(0.216)	(0.522)	(0.096)		(0.061)	(0.152)	(0.198)	(0.062)
ln(Expenses)	>1	1.359***	1.387	1.564	1.329***	<1	1.056	1.188	1.024	1.062
		(0.098)	(0.299)	(0.665)	(0.099)		(0.062)	(0.174)	(0.227)	(0.062)
ΔReporting quality	<1	0.679**	0.618	0.429*	0.674**	>1	1.038	1.405	1.877***	1.041
		(0.112)	(0.204)	(0.196)	(0.107)		(0.084)	(0.310)	(0.407)	(0.085)
ΔCash/Expenses	<1		0.286			>1		1.733		
			(0.541)					(2.023)		
ΔSurplus	<1		0.997			>1		1.003*		
			(0.003)					(0.002)		
ΔBalance/Expenses	<1		0.530			>1		1.457		
			(0.777)					(1.061)		
ΔDebt service/Expenses	>1		1.028			<1		0.928		
			(0.077)					(0.053)		
Observations		2,917	653	267	2,917		3,247	701	387	3,247
Chi-squared		177.4	165.0	62.06	181.9		56.62	51.44	41.36	58.42
p>Chi-squared		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00

Table 7: Instrumental Variables

This table uses the percentage of outstanding bonds that are insured in year *t-1* as an instrument for reporting quality in year *t-1*. Panel A reports the results of the first stage OLS regression. The dependent variable, *Reporting quality*, is the first principal component of nine issuer reporting quality metrics, defined in the Appendix. The *Percent of bonds insured* is the variable of interest. The results of the first stage weak instrument tests (Stock and Yogo, 2005) are reported. Panel B reports odds ratios from the second stage logistic regressions, in which $\hat{RQ}$ is the variable of interest. The dependent variable in Columns (1) and (2) of Panel B is an indicator equal to one if the issuer experiences a *Downgrade* in year *t, t+1,* or *t+2.* The dependent variable in Columns (3) and (4) of Panel B is an indicator equal to one if the issuer experiences an *Upgrade* in year *t, t+1,* or *t+2.* Columns (1) and (3) include all issuer-years (ranging from 1997 to 2013). Columns (2) and (4) are limited to years before 2010, inclusive. All regressions include fixed effects for the combination of credit rating in year *t-1* and house price change decile in year *t.* Standard errors clustered at the rating-decile level are reported in parentheses underneath the coefficient estimates. Control variables are defined in the Appendix. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7, continued

Panel A: First stage, dependent variable = Reporting quality					
	Pred.	(1)	(2)	(3)	(4)
		OLS			
Percent of bonds insured	-	-0.448***	-0.737***	-0.448***	-0.737***
		(0.108)	(0.131)	(0.108)	(0.131)
Council-manager	+	0.902***	0.864***	0.902***	0.864***
		(0.084)	(0.113)	(0.084)	(0.113)
Both provisions	+	-0.057	0.033	-0.057	0.033
		(0.090)	(0.104)	(0.090)	(0.104)
Integrity index	+	-0.385	-0.451	-0.385	-0.451
		(0.399)	(0.486)	(0.399)	(0.486)
Cash/Expenses	N/A	0.129	0.204**	0.129	0.204**
		(0.088)	(0.096)	(0.088)	(0.096)
Surplus	N/A	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Balance/Expenses	N/A	0.336*	0.222	0.336*	0.222
		(0.173)	(0.189)	(0.173)	(0.189)
Debt service/Expenses	+	-0.009	0.004	-0.009	0.004
		(0.008)	(0.010)	(0.008)	(0.010)
Downgrade history	-	-0.047	0.013	-0.047	0.013
		(0.073)	(0.100)	(0.073)	(0.100)
Recession	N/A	0.050	-0.085	0.050	-0.085
		(0.053)	(0.062)	(0.053)	(0.062)
New issue	+	0.018	0.004	0.018	0.004
		(0.069)	(0.076)	(0.069)	(0.076)
ln(Population)	+	0.049	0.058	0.049	0.058
		(0.035)	(0.036)	(0.035)	(0.036)
ln(Expenses)	+	0.343***	0.268***	0.343***	0.268***
		(0.028)	(0.036)	(0.028)	(0.036)
ΔReporting quality	-	-0.694***	-0.693***	-0.694***	-0.693***
		(0.053)	(0.063)	(0.053)	(0.063)
Rating - Decile fixed effects		YES	YES	YES	YES
Time period		All years	<=2010	All years	<=2010
Observations		3,461	2,276	3,461	2,276
R-squared		0.330	0.324	0.330	0.324
Stock-Yogo (2005) Weak instrument F-statistic		17.33	31.84	17.33	31.84

Table 7, continued

Panel B: Second stage, dependent variable = Downgrade/Upgrade						
	Pred.	(1)	(2)	Pred.	(3)	(4)
		Logistic				
		Downgrade			Upgrade	
$\hat{RQ}$	<1	0.008***	0.015***	>1	2.266**	1.719*
		(0.006)	(0.007)		(0.885)	-0.564
Council-manager	<1	39.892***	8.362***	>1	0.619	0.952
		(29.250)	(4.182)		(0.264)	(0.342)
Both provisions	<1	0.908	1.247	>1	0.988	0.925
		(0.321)	(0.657)		(0.170)	(0.205)
Integrity index	<1	0.021***	0.028*	>1	1.642	2.376
		(0.031)	(0.056)		(1.147)	(2.397)
Cash/Expenses	<1	1.125	0.601	>1	0.995	0.501**
		(0.789)	(0.705)		(0.165)	(0.155)
Surplus	<1	0.998**	0.998*	>1	1.000	0.999**
		(0.001)	(0.001)		(0.001)	(0.001)
Balance/Expenses	<1	0.954	1.844	>1	1.015	9.296***
		(0.898)	(2.080)		(0.253)	(5.865)
Debt service/Expenses	>1	0.969	1.027	<1	1.007	0.990
		(0.029)	(0.042)		(0.020)	(0.026)
Downgrade history	>1	2.495***	17.161***	<1	1.199	0.127***
		(0.588)	(9.559)		(0.174)	(0.061)
Recession	>1	2.208***	1.608**	<1	1.335***	2.272***
		(0.433)	(0.360)		(0.138)	(0.292)
New issue	>1	0.533***	0.479**	>1	1.054	1.122
		(0.104)	(0.140)		(0.096)	(0.179)
ln(Population)	<1	1.289***	1.141	>1	0.863*	0.994
		(0.123)	(0.146)		(0.067)	(0.084)
ln(Expenses)	>1	6.837***	4.677***	<1	0.839	1.109
		(2.005)	(0.978)		(0.117)	(0.129)
ΔReporting quality	<1	0.028***	0.046***	>1	1.618*	1.263
		(0.016)	(0.019)		(0.432)	(0.317)
Rating - Decile fixed effects		YES	YES		YES	YES
Time period		All years	<= 2010		All years	<= 2010
Observations		2,902	1,567		3,230	2,098
Pseudo R-squared		0.212	0.306		0.121	0.153