



The role of adverse outcomes in municipal debt costs

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ABSTRACT

This study investigates whether municipal bond prices reflect adverse outcomes (i.e., material noncompliance with laws and regulations and questioned costs) and the interactive effect of adverse outcomes and internal control weaknesses. Using hand-collected data from 866 official registration statements, our results suggest that adverse outcomes are an important determinant of initial bond yields and help explain the underlying relationship between weaknesses in internal control and initial bond yields. Specifically, the municipal bond market penalizes governments with adverse outcomes, with a greater penalty if an adverse outcome is accompanied by a material weakness in internal control.

1. Introduction

For fiscal year 2020, the federal government provided \$829 billion of aid to state, local, tribal, and territorial governments, accounting for about 14% of total spending by these governments and 4% of the U.S. gross domestic product that year (White House, 2021).¹ As a condition of awarding this assistance, the federal government requires that funded governments have an external audit conducted in accordance with federal audit standards, requiring auditors to report on weaknesses in internal control and adverse outcomes (i.e., material noncompliance with laws and regulations and questioned costs). Adverse outcomes capture distinct elements of local government stewardship and can lead to significant consequences for local governments including the revoking of grant funding and/or significant monetary fines (Cuny, Kim, & Mehta, 2020). However, given that the actual resolution (i.e., revoking grant funding) is not publicly available, it is an empirical question as to whether bond investors value these disclosures.²

Our study primarily builds off the work of Park, Matkin, and Marlowe (2017) and Cuny et al. (2020).³ Park et al. (2017) find that internal control weaknesses relate positively to municipal borrowing costs. However, Park et al. (2017) does not consider the impact of both

internal control weaknesses and adverse outcomes on municipal borrowing costs. Given that Cuny et al. (2020) suggest that adverse outcomes capture distinct elements of local government stewardship beyond internal control weaknesses, we examine whether municipal bond prices reflect adverse outcomes and the interactive effect of adverse outcomes and internal control weaknesses. Our main contribution is extending the findings of Park et al. (2017) by considering both internal control weaknesses and adverse outcomes, which Cuny et al. (2020) suggest are distinct elements of local government stewardship.

We find that municipal borrowing costs increase for municipalities with adverse outcomes but find no support for an association between internal control weaknesses (both significant deficiencies and material weaknesses) and initial bond yields when no adverse outcome is disclosed. However, we find that market participants more severely penalize governments when an adverse outcome is accompanied by a material weakness in internal control. Specifically, our results suggest that the combined effect of an adverse outcome and a material weakness in internal control is approximately 73.7 basis points in municipal debt costs. Overall, our results suggest that adverse outcomes help explain the relationship between weaknesses in internal control and initial municipal bond yields.

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¹ Pre-COVID funding in 2019 was \$409 billion.

² Based on discussions with Big Four partners, adverse outcomes can but do not always result in significant penalties. Often there is significant dialogue between the government and the federal agency grantor; where the government makes changes (including improving internal controls and additional staff training) to ensure that these adverse outcomes do not occur again. Once these changes are implemented, the government typically provides a report to the federal agency grantor detailing the specific changes implemented and the effectiveness of these changes. The outcome of this process is not publicly disclosed.

³ In the secondary market, Gore et al. (2016) find that municipal bond investors price material weaknesses but not significant deficiencies.

Our study contributes to the growing literature examining the overall value of municipal reporting. First, understanding the impact of adverse outcomes is important, as small changes in municipal bond prices can represent large changes in capital allocation. Currently, the municipal bond market has grown to nearly half the size of the corporate bond market (Respaut, 2016). In 2020, municipalities sold \$451.2 billion of bonds, an increase of 11% compared to 2019 (Reuters, 2021). Thus, it is important to understand the impact of adverse outcomes and their interactive effect with internal control weaknesses on municipal bond yields.

Second, state and local governments incur significant costs to comply with the independent auditor reporting standards of the Single Audit Act requirements and the federal government incurs significant costs to make these reports publicly available on the Federal Audit Clearinghouse website. The evidence presented here suggests that investors value these disclosures and incorporate them into initial bond yields.

Finally, the federal government has recently intensified efforts to increase municipal reporting oversight, due in part to the size of the municipal bond sector and the increased public sensitivity to the filing of materially misleading information in the municipal sector. As a result of these failures, the SEC formally petitioned Congress, asking for additional oversight in the municipal sector (Johnson, 2021). Our results, which suggest that auditor reporting on internal controls and adverse outcomes is valued by investors, should inform discussions on expanding auditor reporting in the municipal sector as expanded reporting may benefit investors.

Our paper proceeds as follows. Section two explains adverse outcomes and internal control reporting in the municipal sector. Section three develops our research hypotheses. Section four describes our research design and sample selection. Section five reports the results. Section six concludes.

2. Adverse outcomes and internal control reporting in the municipal sector

State and local governments that expend \$750,000 or more of federal financial assistance in a fiscal year (\$500,000 for fiscal years beginning before December 26, 2014) must have an audit under the Single Audit Act of 1984 as amended by the Office of Management and Budget (OMB) Circular A-133 (2007). A Single Audit includes (1) the auditor's opinion over the financial statements; (2) a report on significant deficiencies and material weaknesses in internal control over financial reporting; (3) a report on noncompliance material to the financial statements; (4) the auditor's opinion and report on significant deficiencies and material weaknesses in internal control over major programs; (5) the auditor's report on compliance for major programs; and (6) the auditor's determination of questioned costs. These audits are typically performed by one external auditor, either a CPA firm or state auditor. Overall, these audit requirements aim to ensure that the federal financial assistance provided to the states and local governments is used effectively to meet the purposes for which the resources were allocated (OMB Circular A-133, 2007).

While many similarities exist in the audit reporting standards between U.S. public companies under the Public Company Accounting Oversight Board (PCAOB) and municipalities under federal audit standards, a number of key differences exist. In both sectors, auditing standards define three levels of weaknesses in internal control in the following order of severity (from least to greatest): control deficiency (level one), significant deficiency (level two), and material weakness (level three).⁴ Pursuant to Section 404 of the Sarbanes-Oxley Act, auditors of large U.S. public companies only publicly report on material weaknesses in internal control (i.e., level three, the most extreme

deficiency) that exist at the balance sheet date.⁵ In contrast, auditors of municipalities that receive federal financial assistance must publicly report both significant deficiencies (level two) and material weaknesses (level three) in internal controls. Thus, the scope of internal control deficiencies reported in our sample is wider than examined in prior for-profit debt market research (Dhaliwal, Hogan, Trezevant, & Wilkins, 2011).

In addition, auditors of entities that receive federal financial assistance must determine whether the entity complied with certain laws and regulations. Specifically, the Office of Management and Budget Compliance Supplement (OMB, 2020) addresses 12 key categories: (1) activities allowed or disallowed for each Federal program; (2) allowable costs/cost principles; (3) cash management; (4) eligibility determinants and delivery of benefits; (5) equipment and real property management; (6) matching, level of effort, and earmarking; (7) period of performance; (8) procurement, suspension, and debarment; (9) program income; (10) reporting; (11) subrecipient monitoring; and (12) special tests and provisions. The compliance testing of these laws and regulations must include tests of transactions and other audit procedures necessary to provide the auditor sufficient evidence to support an opinion on compliance. Material violations discovered during these tests must be included in the audit report on compliance with laws and regulations.

Auditors of municipalities receiving federal financial assistance must also issue a report on the schedule of expenditures of federal awards, including audit findings for questioned costs for each federal award. Questioned costs are those costs that cannot be reimbursed by the federal government because they violate laws and regulations pertaining to a grant, are not supported by adequate documentation, or appear to be unreasonable or imprudent.

For example, government A receives funds from the Department of Health and Human Services under the Children's Health Insurance Program (CHIP). To be eligible for CHIP, the recipient must have an annual household income under a certain amount and be either 18 years of age or under, or pregnant, or a primary caregiver with at least one child 18 years of age or under. If government A is subject to the Single Audit Act and this is a major program, the auditors of government A would first determine whether it has adequate internal controls to implement this program (i.e., controls to ensure only eligible individuals will receive funds). If no or weak internal controls are present for this program, then the auditor would most likely indicate that a material weakness exists. Next, the auditor would perform substantive tests related to this program. If adequate documentation was obtained and funds were disbursed appropriately, then no material noncompliance with laws and regulations would be indicated related to the material weakness in internal control. However, if adequate documentation was not obtained, the auditor would indicate a noncompliance with laws and regulations (i.e., a violation of the eligibility determinants and delivery of benefits of the OMB Compliance Supplement – category 4 above). In addition, if funds were disbursed to ineligible recipients, the auditor would indicate a questioned cost. Thus, the audit of a major program could result in a combination of auditor reporting for internal control, material noncompliance, questioned costs, or a combination of these.

Overall, the Single Audit Act was issued to elevate the practice of auditing by both federal agencies and recipients of federal funding. The Single Audit Act reporting standards go considerably beyond PCOAB

⁴ We insert the terms "level one", "level two", and "level three" to improve the clarity of the discussion. These terms are not used in audit standards.

⁵ Using a proprietary database of detected internal control weaknesses of U.S. public companies, research (Bedard & Graham, 2011; Lynford & Bedard, 2013) has noted that a large percentage of detected internal control weaknesses are never publicly reported. For example, 25.7% of their sample material weaknesses were remediated as of the balance sheet date and 12% of their internal control weaknesses were categorized as significant deficiencies. Thus, these internal control weaknesses (totaling over 37%) did not receive an adverse opinion on internal control.

auditing standards by requiring audit reports on the auditee's compliance with applicable laws and regulations, internal controls, and schedule of questioned costs.

3. Literature review and research hypotheses

In the municipal setting, prior research has found that investors price GAAP disclosure regulations (Baber & Gore, 2008), accounting restatements (Baber, Gore, Rich & Zhang, 2013), timeliness of financial information (Edmonds, Edmonds, Vermeer, & Vermeer, 2017), and qualified/adverse audit reports on historical financial statements (Edmonds, Leece, Vermeer, & Vermeer, 2020). In the context of internal controls, prior studies (Gore, Henderson, & Ji, 2016; Park et al., 2017) find that internal control weaknesses relate positively to municipal borrowing costs. However, these studies do not consider the impact of both internal control weaknesses and adverse outcomes on municipal borrowing costs. Given that Cuny et al. (2020) find that adverse outcomes capture distinct elements of local government stewardship beyond internal control weaknesses, this study extends the internal control literature, public sector auditing literature, and overall literature on the determinants of public financing costs by examining whether municipal bond prices reflect adverse outcomes and the interactive effect of adverse outcomes and internal control weaknesses. Our main contribution is extending the findings of Gore et al. (2016) and Park et al. (2017) by considering both internal control weaknesses and adverse outcomes, which Cuny et al. (2020) suggest are distinct elements of stewardship.

In the corporate sector, several papers (Costello & Wittenberg-Moerman, 2011; Dhaliwal et al., 2011; Kim, Simunic, Stein, & Yi, 2011) have found that investors price internal control weaknesses. In the municipal setting, financial statement audits generally have longer reporting lags (Edmonds et al., 2017), and single audits are generally available later than the financial statement audits on the Federal Audit Clearinghouse. In addition, while financial statement audits are primarily intended for investors, the primary audience for single audits is grantors. Thus, given the different procedures for internal control testing in the municipal and corporate sectors, the extended reporting lag in the municipal sector, and the different audience for single audits, it is an empirical question whether municipal investors value disclosure of internal control weaknesses.

In the municipal sector, Gore et al. (2016) and Park et al. (2017) have found that material weaknesses in internal control; but not significant deficiencies in internal control, increase borrowing costs. Consistent with the evidence in the corporate and municipal sectors, we predict that municipal investors will penalize governments with weaknesses in internal control. Our first hypothesis, presented in the alternative, reflects this expectation:

HYPOTHESIS 1. *Significant deficiencies (level two) and material weaknesses (level three) in internal controls are positively associated with the cost of debt.*

Besides reporting on internal control, independent auditors of municipalities also publicly report on material noncompliance with laws and regulations and questioned costs that occurred during the fiscal year. As noted by Cuny et al. (2020), these adverse outcomes capture distinct elements of local government stewardship beyond internal control weaknesses. Karpoff, Lee, and Vondryk (1999) note that adverse outcomes can also trigger investigations for intentional mischarging or misallocation of costs, charging of personal expenses to federal contracts, submitting invoices that include false claims, and falsifying accounting documents. In contrast, research suggests that only certain types of internal control weaknesses are priced by municipal investors, suggesting that it is an empirical question whether municipal investors will price these adverse outcomes in municipal borrowing costs. However, given the findings of Cuny et al. (2020) and the fact that municipal investors price material weaknesses in internal control, we

expect that municipal investors will penalize governments with publicly reported material violations of laws and regulations and questioned costs. Our second hypothesis reflects this expectation:

HYPOTHESIS 2. *Public disclosure of adverse outcomes (i.e., material noncompliance with laws and regulations, questioned costs, or both) are positively associated with the cost of debt.*

Our sample includes municipalities with no reported internal control weaknesses and no adverse outcomes, municipalities with internal control weaknesses and adverse outcomes, municipalities with no reported internal control weaknesses but reported adverse outcomes, and reported internal control weaknesses without adverse outcomes.⁶ Although we predict that the cost of debt increases with material noncompliance with laws and regulations, questioned costs, or both, it is likely that this increase may be more pronounced for municipalities with adverse outcomes and reported internal control weaknesses. For these municipalities, adverse outcomes are more likely in the future because the municipality's internal controls do not provide a high level of assurance that these adverse outcomes would be prevented or detected on a timely basis. Thus, we expect municipalities with weaknesses in internal control to be penalized more by municipal investors following the disclosure of adverse outcomes than municipalities with adverse outcomes without reported weaknesses in internal control. Our third hypothesis reflects this expectation:

HYPOTHESIS 3. *The increased cost of debt associated with the public disclosure of adverse outcomes (i.e., material noncompliance with laws and regulations, questioned costs, or both) is more pronounced for municipalities with a weakness in internal controls.*

4. Sample selection and research design

4.1. Sample selection

We obtained our initial sample by searching Bloomberg Professional for all fixed-rate, limited general obligation (GO) bonds issued by cities and counties between January 1, 2000 and September 30, 2012.⁷ We collected the largest issue for municipalities that issued serial bonds or had multiple bonds in a given year. From a research design perspective, Lopez and Peters (2010) note that focusing on cities and counties limits cross-sectional variation in financial performance, governance, and accounting information systems as potential alternative explanations for our research findings. This process resulted in 1749 issuances. We obtained municipal bond issuance data, financial data, and demographic data from Bloomberg Professional for these issuances. Next, to obtain internal control and adverse outcome data, Bloomberg Professional data is merged with Federal Audit Clearinghouse (FAC) data based on municipal name.⁸ Due to differences in municipal naming conventions between datasets, we employ a fuzzy match algorithm and a manual matching procedure to combine Bloomberg Professional and FAC data.

⁶ Because of cost benefit considerations and inherent limitations (such as human error), internal controls provide a reasonable, but not absolute, assurance regarding the reliability of reporting, efficiency and effectiveness of operations, and compliance with laws and regulations (Arens, Elder, Beasley, & Hogan, 2020). Thus, an organization with strong internal controls can still materially fail to comply laws and regulations or have questioned costs.

⁷ Given manual data collection and the delay in financial reporting for municipal governments (Henke & Maher, 2016), it is not uncommon for municipal bond market studies to include data that is ten or more years in the past. For example, Hickey (2022) include data from 1995 to 2014, Compton, Gore, and Kulp (2017) include data from 2000 and 2002, and Baber et al. (2013) include data from 2001 to 2004.

⁸ Organizations expending greater than \$750,000 in federal funds (\$500,000 prior to 2013) are required to have a Single Audit (OMB A-133). The data is located at <http://harvester.census.gov/facweb/>.

Table 1
Summary of sample selection procedure.

Sample Period 2000–2012	# Obs.
All available issuances	1749
Merge with FAC	(630) ^a
Missing audit report or registration statement	(66)
Eliminate observations with missing bond issuance data	(79) ^b
Eliminate observations with missing financial data	(108)
TOTAL	866 ^c

This algorithm provides a means to match words or phrases across databases (Foley, 1999).⁹

When combining Bloomberg Professional and the FAC, we matched each municipal bond issuance in Bloomberg with the FAC data that was filed before the bond issuance. This ensures that the internal control and adverse outcome information in the FAC was available to potential bond investors. Finally, we obtained initial bond yields, issue size, and years to maturity from the Electronic Municipal Market Access (EMMA) website.¹⁰ Our sample was reduced due to missing audit report or registration statements (66), missing bond issuance data (79) and missing financial data (108) necessary to estimate our regression models. For the 79 observations with missing bond issuance data, 73 observations had missing yields, one observation had a missing Bond Buyer yield, and five observations had missing information to determine whether the issuance was competitively bid. This process resulted in 866 successful bond issuances and year matches for 328 unique governments. All sample observations have an unmodified audit opinion on their historical financial statements. The sample selection process is summarized in Table 1.¹¹

To test our hypotheses, we evaluate the association between municipal borrowing costs and *Internal Control Weaknesses* and *Adverse Outcomes* disclosure. Municipal borrowing costs are operationalized as the true interest cost (TIC) at the date of issue and computed as the present value of the principal and interest payments on issue date (*Yield*). Our three main explanatory variables of interest are two levels of internal control weaknesses (i.e., significant deficiencies and material weaknesses) and adverse outcomes (i.e., material noncompliance with laws and regulations and questioned costs).

4.2. Main effects - internal control weaknesses (Hypothesis 1) and adverse outcomes (Hypothesis 2)

Our first model examines whether significant deficiencies and material weaknesses in internal control (Hypothesis 1) and adverse outcomes (Hypothesis 2) are associated with the cost of debt. Model 1 is specified as follows:

$$\begin{aligned}
 Yield_{it} = & \beta_0 + \beta_1 SignificantDeficiency_{it} + \beta_2 MaterialWeakness_{it} \\
 & + \beta_3 AdverseOutcome_{it} + \beta_4 IndependentAuditor_{it} + \beta_5 GAAP_{it} \\
 & + \beta_6 GFOA_{it} + \beta_7 Rating_{it} + \beta_8 Deficit_{it} + \beta_9 Leverage_{it} \\
 & + \beta_{10} Population_{it} + \beta_{11} BondBuyer_{it} + \beta_{12} Call_{it} + \beta_{13} DebtInsurance_{it} \\
 & + \beta_{14} Maturity 5_{it} + \beta_{15} Maturity 15_{it} + \beta_{16} IssueSize_{it} \\
 & + \beta_{17} Competitive_{it} + \varepsilon_{it}
 \end{aligned}$$

(Model 1)

⁹ For cities and counties that remain unmatched, we perform a manual procedure to maximize the matches between Bloomberg Professional and the FAC databases. We examined a subset of these unmatched observations, and most were not required to file a report with the FAC.

¹⁰ EMMA is operated by the Municipal Securities Rulemaking Board (MSRB). The data is located at <https://emma.msrb.org/>

¹¹ To ensure that our results are not impacted by the financial crises, we performed an additional analysis excluding the observations from September 2008 to September 2009 (61 issuances). The sign and significance of our main variables of interest are robust to excluding these observations.

AU Section 325, *Communicating Internal Control Related Matters Identified in an Audit*, notes that a material weakness is a deficiency, or combination of deficiencies, in internal controls such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, in a timely manner. A significant deficiency is a deficiency, or combination of deficiencies, in internal controls that are less severe than a material weakness, yet important enough to merit attention by those charged with governance. We include two variables (*SignificantDeficiency* and *MaterialWeakness*) in the model to examine whether municipal investors value an independent auditor's reporting on internal controls.¹² Each variable is coded as 1 if the respective internal control weakness is disclosed; 0 otherwise. The coefficient on *Material Weakness* is interpreted as the additional interest cost for disclosing a more serious weakness in internal control over a significant deficiency.

We include the variable (*Adverse Outcome*) to examine whether material noncompliance with laws and regulations and questioned costs are positively associated with the cost of debt. *Adverse Outcome* is coded as 1 if a government has either a material noncompliance with laws/regulations or a questioned cost, or both. A significant positive coefficient on our variable *Adverse Outcome* will provide support for our second hypothesis that material violations of laws and regulations, questioned costs, or both increase municipal borrowing costs.¹³

4.3. Interaction effects of internal control weaknesses and adverse outcomes (Hypothesis 3)

Hypothesis 3 predicts that the increased cost of debt associated with an adverse outcome is more pronounced for municipalities with a weakness in internal control. Model 2 evaluates Hypothesis 3 as follows:

$$\begin{aligned}
 Yield_{it} = & \beta_0 + \beta_1 SignificantDeficiency_{it} \\
 & + \beta_2 MaterialWeakness_{it} + \beta_3 AdverseOutcome_{it} \\
 & + \beta_4 SignificantDeficiency \times Adverse Outcome_{it} \\
 & + \beta_5 MaterialWeakness \times AdverseOutcome_{it} \\
 & + \beta_6 IndependentAuditor_{it} + \beta_7 GAAP_{it} \\
 & + \beta_8 GFOA_{it} + \beta_9 Rating_{it} + \beta_{10} Deficit_{it} + \beta_{11} Leverage_{it} \\
 & + \beta_{12} Population_{it} + \beta_{13} BondBuyer_{it} + \beta_{14} Call_{it} \\
 & + \beta_{15} DebtInsurance_{it} + \beta_{16} Maturity 5_{it} + \beta_{17} Maturity 15_{it} \\
 & + \beta_{18} IssueSize_{it} + \beta_{19} Competitive_{it} + \varepsilon_{it}
 \end{aligned}$$

(Model 2)

Model 2 includes all of the variables in Model 1 with the addition of two interactions (*Significant Deficiency x Adverse Outcome* and *Material Weakness x Adverse Outcome*). A significant positive coefficient on these interactions will provide support for Hypothesis 3 that municipalities with weaknesses in internal control exhibit a larger increase in their cost of debt following the disclosure of an adverse outcome.

4.4. Control variables

In both models, we follow prior literature and control for other factors that have been shown to impact municipal bond prices, including

¹² *Significant Deficiency* is coded as one and *Material Weakness* is coded as zero if the answer to the following (first) question was yes "is a significant deficiency disclosed for any major program?" and the answer to the following (second) question was no "is any significant deficiency reported for any major program (in the first question) a material weakness?" In contrast, *Significant Deficiency* is coded as zero and *Material Weakness* is coded as one if the answers to questions one and two are both yes.

¹³ We matched each municipal bond issuance with FAC data that was filed before the bond issuance. This ensures that the internal control and adverse outcome information in the FAC was relevant and available to potential bond investors.

reporting quality of the municipality, financial condition municipality, socioeconomic factors, and bond issuance characteristics. Research has shown that these factors impact municipal borrowing costs (Reck & Wilson, 2014; Baber, Gore, & Rich, 2013; Wescott, 1984; Morton, 1976).

Operational measures of overall reporting quality are included as additional covariates in the model. We include an indicator variable, *Independent Auditor*, to differentiate between municipal audits performed by independent and state auditors. Litigation risk and reputational concerns likely differ between state and independent auditors, which could impact the quality of municipal financial reporting (Baber et al. 2013). Baber and Gore (2008) find that states imposing GAAP requirements on financial reporting have lower initial yields. An indicator variable, *GAAP*, is activated if the state requires governments to prepare financial statements that comply with GAAP. Additionally, the GFOA Certificate of Achievement for Excellence in Financial Reporting represents an important indicator of financial reporting quality; therefore, it is also included in the model (Baber & Gore, 2008).

The financial condition of a government provides an important predictor of bond yields (Wescott, 1984). A bond rating captures the overall default risk associated with a government (Baber et al. 2013). We measure *Rating* based on Moody's ratings and code from 1 to 11, with higher numbers corresponding to better ratings (i.e., 11 = Aaa). *Deficit* and *Leverage* provide additional measures of municipal financial health. To adequately capture the relationship between financial health and *Yield*, we operationalize *Deficit* and *Leverage* each as an indicator if the observation falls within the top quartile of observations in our sample. *Deficit* is evaluated by measuring whether a municipality reports 5% in excess of expenses over revenue and *Leverage* captures the ratio of total liabilities to total assets.¹⁴ *Deficit* and *Leverage* are measured using general fund information.

Socioeconomic factors capture aspects of a government (e.g., taxing ability) important in evaluating its debt (Morton, 1976; Rubinfeld, 1972). Municipalities supported by larger populations generally have a stronger tax base to support GO bonds. We include a municipality's population measured as the natural log (*Population*).

Bond issuance characteristics also impact *Yield* (Reck & Wilson, 2014; Baber et al. 2013; Baber & Gore, 2008). We include the Bond Buyer market yield (*Bond Buyer*) at the time of issuance to control for interest rate fluctuations. Callable bonds, a feature where the issuer can repay a portion or the entire principal prior to the maturity date, typically leads to higher borrowing costs. Borrowers will demand a higher yield to compensate for the risk of not receiving interest payments for the full term of the bond. We include *Call* as a dichotomous variable to control for this relationship and predict a positive relationship with *Yield*. We control for whether the bond issuance has a credit enhancement (*Debt Insurance*). Bonds with credit enhancements typically demand lower initial yields, as this option provides additional investor protection if the issuer defaults. Prior research (Baber & Gore, 2008; Gande, Puri, & Sanders, 1999) finds that default risk increases with the length of maturity, although not linearly. Thus, following these studies, we include two dummy variables (*Maturity 5* and *Maturity 15*) to distinguish both short maturities (less than five years) and long-term maturities (>15 years) from issuances with five to 15-year maturities. We also include a bond's par value, *Issue Size*, measured as the natural log of the bond issuance at maturity (Baber et al. 2013). The relationship between *Issue Size* and *Yield* is mixed. Larger issuances could be associated with lower transaction costs and thus a lower cost of capital. However, larger issuances can be negatively associated with liquidity. Therefore, we make no directional prediction regarding the sign of the coefficient on *Issue Size*.

¹⁴ We use indicators to capture *Leverage* and *Deficit* to reduce variance inflation factors and to be consistent with prior research (Baber et al. 2013). The sign and significance of our main variables of interest are robust to alternative cutoffs for both variables.

Table 2A

Internal control (IC) opinion frequency breakdown.

Opinion	Frequency	Percentage
No Internal Control Weaknesses	636	73%
Significant Deficiency	126	15%
Material Weakness	104	12%
Total	866	100%

Notes

AU Section 325, Communicating Internal Control Related Matters Identified in an Audit, notes that a deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. A *Material Weakness* is a deficiency, or combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented or detected and corrected on a timely basis. A *Significant Deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance. *No internal control weaknesses* is an entity with no *Significant Deficiencies* and/or *Material Weaknesses*.

Specific factors involved in the sale of a bond also impact bond yields (Baber & Gore, 2008; Baber et al. 2013). The bond underwriting process commonly involves either a negotiated sale or a competitive bid process and can affect initial bond yields. Competition for underwriters typically reduces bond yields, therefore, we include a dichotomous variable, *Competitive*, to capture this relationship. Finally, temporal as well as structural factors that vary by state and year of issuance may affect bond yields. Thus, we control for year and state fixed effects in all models. All variables are defined in Appendix A.

5. Results

5.1. Descriptive and univariate analysis

Table 2 provides insight into the different types of internal control weaknesses and adverse outcomes in our sample of municipal bond issuances. As noted in Table 2A, 126 (15%) of our bond issuances include a significant deficiency in internal controls, 104 (12%) include a material weakness in internal controls, and the remaining 636 (73%) received a clean opinion on internal controls with no reported significant deficiencies or material weaknesses. Table 2B reports the relationship between internal control weaknesses and adverse outcomes. As noted in Table 2B, 716 (83%) of our bond issuances include no material noncompliance with laws and regulations and/or questioned costs. Of the remaining bond issuances, 74 (9%) include only questioned costs, 67 (8%) include only material noncompliance with laws and regulations, and the remaining 9 (1%) include both questioned costs and material noncompliance with laws and regulations.

As discussed in our research design and illustrated in Table 2B, our sample includes municipalities with: (1) no reported internal control weaknesses and no adverse outcomes [563 (65%) of our bond issuances] (2) reported internal control weakness and adverse outcomes [77 (9%) of our bond issuances], (3) no reported internal control weaknesses but adverse outcomes [73 (8%) of our bond issuances], and (4) reported internal control weaknesses without adverse outcomes [153 (18%) of our bond issuances]. A comparison of items in Column 1 of Table 2B indicates that, compared to municipalities with weaknesses in internal controls, municipal bond issuances with a clean opinion on internal controls are significantly more likely to have no adverse outcomes (difference in adverse outcomes significant at $p < 0.01$). This result should be expected given that good internal controls should provide a reasonable, but not an absolute, assurance that adverse outcomes will be prevented on a timely basis.

Table 3 compares our sample of observations with no reported internal control weaknesses or adverse outcomes (Column 1), observations with reported internal control weaknesses but no adverse

Table 2B

Relationship between internal control weaknesses and adverse outcomes (i.e., questioned costs and material noncompliance with laws and regulations).

Internal Control Opinion	Frequency Breakdown				Total
	No Questioned Cost and/or Material Non-Compliance (Column 1)	Questioned Cost Only (Column 2)	Material Non-Compliance Only (Column 3)	Questioned Cost and Material Non-Compliance (Column 4)	
No Internal Control Weaknesses	563 (89%)	40 (6%)	28 (4%)	5 (1%)	636
Significant Deficiency	86 (68%)	19 (15%)	19 (15%)	2 (2%)	126
Material Weakness	67 (64%)	15 (14%)	20 (19%)	2 (2%)	104
Total	716	74	67	9	866

Notes

Clean, *Significant Deficiency* and *Material Weakness* are defined in Table 2A and in Appendix A. *Questioned costs* are those costs that cannot be reimbursed by the federal government because they are in violation of laws and regulations pertaining to a grant, are not supported by adequate documentation, or appear to be unreasonable or imprudent. *Material Noncompliance* indicates the external auditor found noncompliance with certain laws and regulations associated with federal financial assistance.

Table 3

Univariate results.

Variable	No Internal Control Issues or Adverse Outcomes Column 1		Internal Control Issues with No Adverse Outcomes Column 2			Adverse Outcomes Only Column 3			Internal Control Issues with Adverse Outcomes Column 4		
	Mn (Med)	Std	Mn (Med)	Std	Difference p-value	Mn (Med)	Std	Difference p-value ^b	Mn (Med)	Std	Difference p-value ^b
<i>Yield</i>	3.67 (4)	1.32	3.65 (3.80)	0.93	0.87	3.95 (4.00)	0.83	0.01	4.05 (4.07)	1	<0.01
<i>Independent Auditor</i>	0.75 (1)	0.44	0.92 (1)	0.27	<0.01	0.70 (1)	0.46	0.41	0.78 (1)	0.42	0.52
<i>GAAP</i>	0.96 (1)	0.19	0.96 (1)	0.19	0.84	0.96 (1)	0.20	0.80	0.97 (1)	0.16	0.65
<i>GFOA</i>	0.68 (1)	0.47	0.69 (1)	0.46	0.80	0.78 (1)	0.42	0.06	0.68 (1)	0.47	0.91
<i>Rating</i>	7.99 (8.5)	2.49	8.04 (9)	2.72	0.84	8.05 (9)	2.72	0.87	8.49 (9)	2.45	0.10
<i>Deficit</i>	0.48 (0)	0.50	0.46 (0)	0.50	0.73	0.38 (0)	0.49	0.12	0.47 (0)	0.50	0.84
<i>Leverage</i>	0.20 (0)	0.40	0.28 (0)	0.45	0.04	0.42 (0)	0.49	<0.01	0.42 (0)	0.50	<0.01
<i>Population^a</i>	222.1 (74.78)	494.72	269.64 (77.08)	560.91	0.34	520.3 (182.7)	842.3	<0.01	500.6 (106.3)	835.1	<0.01
<i>Bond Buyer</i>	4.50 (4.49)	0.39	4.44 (4.46)	0.43	0.13	4.53 (4.54)	0.42	0.43	4.51 (4.49)	0.42	0.81
<i>Call</i>	0.68 (1)	0.47	0.68 (1)	0.47	0.96	0.66 (1)	0.48	0.68	0.66 (1)	0.48	0.73
<i>Insured</i>	0.55 (1)	0.50	0.40 (0)	0.49	<0.01	0.64 (1)	0.48	0.11	0.40 (0)	0.49	0.02
<i>Years to Maturity^d</i>	14.25 (14.17)	6.00	13.78 (13.08)	5.80	0.38	14.94 (14.32)	6.10	0.37	14.31 (14.18)	5.24	0.93
<i>Issue Size^a</i>	3917 (3071)	494.72	2849 (2849)	64,601	0.32	3097 (2248)	2440	0.01	3369 (2398)	2626	0.09
<i>Competitive</i>	0.32 (0)	0.47	0.33 (0)	0.47	0.76	0.29 (0)	0.46	0.67	0.30 (0)	0.46	0.76
N	563		153			73			77		

Notes: All variables are calculated as defined in Appendix A unless otherwise noted. **Bold** indicates the difference is statistically significant within the 0.10 level. All difference testing is in relation to column 1.

^a Unlogged values are presented in 1000s for descriptive purposes only.

^b P-values in columns 2, 3, and 4 are all in relation to column 1 (i.e., p-values in column 2 are column 2 versus column 1, p-values in column 3 are column 3 versus column 1, and p-values in column 4 are column 4 versus column 1). All p-values result from two-tailed Satterthwaite *t*-tests for unequal variances unless the comparison is between non-continuous variables. In the case of non-continuous variable comparisons, p-values result from a Chi-Square test.

outcomes (Column 2), observations with no internal control weaknesses but adverse outcomes (Column 3) and observations with both internal control weaknesses and adverse outcomes (Column 4).¹⁵ A comparison of Columns 1, 2, 3, and 4 of Table 3 indicates that, in terms of interest costs, municipal bond issuers with adverse outcomes only and municipal bond issuers with both internal control weaknesses and adverse outcomes differ significantly from their counterparts (difference in *Yield* is

significant at $p < 0.01$). Specifically, our univariate results indicate that bond issues with both internal control weaknesses and adverse outcomes (*Yield* = 4.05%) and bond issues with adverse outcomes only (*Yield* = 3.95%) pay significantly higher interest costs than bond issues with no internal control weaknesses or adverse outcomes (*Yield* = 3.67) and bond issues with internal control weaknesses only (*Yield* = 3.65). These preliminary results suggest that municipal investors are concerned with the risks associated with the presence of adverse outcomes but do not appear to penalize governments with only internal control weaknesses.

Table 3 also presents some other interesting findings. First, governments with only adverse outcomes and governments with both internal control weaknesses and adverse outcomes are nearly two times larger, in

¹⁵ P-values in columns 2, 3, and 4 are all in relation to column 1 (i.e., p-values in column 2 are column 2 versus column 1, p-values in column 3 are column 3 versus column 1, and p-values in column 4 are column 4 versus column 1).

Table 4
Pearson correlation matrix.

	Yield	No Internal Control or Adverse	Internal Control Issue but no Adverse	Both Internal Control/Adverse	Independent Auditor	GAAP	GFOA Certificate	Rating	Deficit	Leverage	Population	Bond Buyer Yield	Call Provision	Debt Insurance	Maturity < 5	Maturity > 15	Issue Size	Competitively Bid
Yield	1																	
No Internal Control or Adverse	-0.06	1																
Internal Control Issue but no Adverse	-0.03	-0.14	1															
Both Internal Control/Adverse	0.09	-0.09	-0.14	1														
Independent Auditor	0.00	-0.07	0.16	0.00	1													
GAAP	-0.03	-0.01	-0.01	0.02	0.13	1												
GFOA Certificate	-0.07	0.06	0.001	-0.01	0.02	0.24	1											
Rating	-0.18	0.01	-0.002	0.05	0.10	0.23	0.36	1										
Deficit	0.02	-0.05	-0.003	0.00	-0.06	-0.06	0.07	0.03	1									
Leverage	0.09	0.09	0.03	0.11	0.03	-0.07	-0.10	-0.21	0.05	1								
Population	0.01	0.13	-0.01	0.12	0.04	0.04	0.25	0.31	0.03	0.14	1							
Bond Buyer Yield	-0.11	0.03	-0.06	0.05	-0.12	-0.03	-0.05	0.32	0.08	0.00	0.14	1						
Call Provision	0.34	0.06	-0.06	0.01	-0.07	0.02	-0.05	-0.10	0.02	0.11	0.04	0.01	1					
Debt Insurance	0.42	-0.01	0.00	-0.01	-0.03	-0.07	-0.10	-0.13	0.02	-0.03	-0.01	-0.03	0.11	1				
Maturity < 5	0.21	0.07	-0.11	-0.07	-0.07	0.05	-0.12	-0.13	-0.04	-0.04	-0.16	-0.16	0.17	0.17	1			
Maturity > 15	-0.48	-0.05	-0.05	-0.04	0.06	-0.03	-0.01	0.09	-0.02	-0.06	-0.04	0.05	-0.12	-0.34	-0.21	1		
Issue Size	0.40	-0.02	-0.05	0.00	-0.04	-0.03	-0.06	-0.12	-0.02	-0.03	-0.04	-0.03	0.15	0.56	0.11	-0.22	1	
Competitively Bid	-0.01	-0.02	0.08	-0.02	0.02	0.01	0.02	0.04	0.03	0.05	-0.01	-0.09	0.05	-0.05	-0.02	-0.01	0.03	1

Notes: All variables are calculated as defined in Appendix A unless otherwise noted. Correlations that are statistically significant within 10% level are presented in **bold**. No internal control or adverse = bond issues with no internal control weaknesses or adverse outcomes; Internal control issue but no adverse = bonds issues with internal control weaknesses but no adverse outcomes; Both internal control/adverse = bond issues with internal control weaknesses and adverse outcomes.

Table 5

Association between initial bond yield, internal control weaknesses, and adverse outcomes including the interaction effects of internal control weaknesses and adverse outcomes.

Variable	Pred.	Column 1		Column 2		Column 3		Column 4	
		Est. Coeff.	P-Value	Est. Coeff.	P-Value	Est. Coeff.	P-Value	Est. Coeff.	P-Value
Intercept		-0.375	0.667	0.063	0.938	0.049	0.952	0.143	0.859
Significant Deficiency	+	-0.005	0.950			0.002	0.975	-0.039	0.662
Material Weakness	+	0.157	0.048			0.175	0.036	0.038	0.677
Adverse Outcome	+			0.243	0.019	0.299	0.010	0.313	0.007
Significant Deficiency x Adverse Outcome	+							0.089	0.396
Material Weakness x Adverse Outcome	+							0.424	0.002
Independent Auditor	?	0.334	0.237	0.228	0.303	0.249	0.277	0.241	0.293
Bond Buyer Index	+	0.827	<0.0001	0.791	<0.0001	0.802	<0.0001	0.793	<0.0001
Rating	-	-0.044	0.063	-0.039	0.048	-0.034	0.092	-0.035	0.083
GFOA	-	-0.085	0.172	-0.096	0.137	-0.088	0.186	-0.083	0.213
GAAP	-	0.060	0.654	-0.081	0.598	-0.112	0.497	-0.108	0.512
Deficit	+	-0.068	0.270	-0.053	0.368	-0.047	0.458	-0.046	0.467
Leverage	+	0.038	0.568	0.085	0.179	0.044	0.496	0.033	0.605
Population	?	0.018	0.075	0.020	0.038	0.017	0.091	0.016	0.103
Debt Insurance	-	-0.049	0.558	0.016	0.850	0.003	0.967	0.017	0.835
Call	+	0.398	<0.0001	0.387	<0.0001	0.406	<0.0001	0.401	<0.0001
Maturity 5	-	-1.622	<0.0001	-1.685	<0.0001	-1.692	<0.0001	-1.694	<0.0001
Maturity 15	+	0.447	<0.0001	0.441	<0.0001	0.426	<0.0001	0.425	<0.0001
Issue Size	+/-	0.039	0.299	0.025	0.446	0.024	0.464	0.023	0.486
Competitive	-	-0.087	0.253	-0.082	0.234	-0.092	0.222	-0.083	0.267
N		866		866		866		866	
Year Fixed Effects		Y		Y		Y		Y	
State Fixed Effects		Y		Y		Y		Y	
Adj. R-Squared		48.63%		48.50%		47.22%		47.88%	

Notes: All variables are calculated as defined in Appendix A B unless otherwise noted. The dependent variable in all analyses is the initial bond yield for general obligation municipal bonds. Coefficients presented in all columns are estimated using OLS. *P*-values are calculated using robust standard errors clustered by municipality. Estimates for intercept dummy variables related to year and state are not displayed to provide a succinct presentation. Statistical significance is based on two-tailed *t*-tests.

terms of population, than their counterparts ($p < 0.01$). These univariate results suggest that larger governments are more likely to have material noncompliance with laws and regulations and/or questioned costs than smaller governments. Second, our results suggest that governments in better financial condition are less likely to have internal control weaknesses and/or adverse outcomes. Specifically, the difference in *Leverage* between bond issues with no internal control weaknesses or adverse findings and bond issues with internal control weaknesses but no adverse findings is significant at $p = 0.04$ and the difference in *Leverage* between bond issues with no internal control weaknesses or adverse findings and bond issues with both internal control weaknesses and adverse findings is significant at $p < 0.01$. Finally, univariate results for the variable *Rating* imply that bond ratings are higher for governments with internal control weaknesses and adverse results. To further investigate this issue, we ran an ordered logistic regression with bond rating as the dependent variable. Untabulated results suggest that size (i.e., *Population*) is a major driver of these results (i.e., larger governments in our sample have more internal control weaknesses and adverse outcomes, and larger governments typically have higher bond ratings).

5.2. Primary multivariate analysis

Our main variables of interest are internal control weaknesses (i.e., significant deficiency and material weakness) and adverse outcomes (i.e., material noncompliance with laws and regulations and questioned costs). First, Model 1 examines whether internal control weaknesses (*Hypothesis 1*) and adverse outcomes (*Hypothesis 2*) are associated with the cost of debt. Next, Model 2 examines whether the increased cost of debt associated with an adverse outcome is more pronounced for municipalities with a weakness in internal controls (*Hypothesis 3*).

Pearson correlation coefficients for variables included in our primary analysis are reported in Table 4.¹⁶ Similar to Baber et al. (2013),

Maturity5 and *Maturity15* are strongly associated with initial yields (Pearson coefficient = -0.48 and 0.40) and *Call* (Pearson coefficient = 0.42). Results are robust to excluding these variables from our primary analyses. No other variables are correlated at levels that would pose multicollinearity concerns, and all correlations follow their predicted signs or are statistically insignificant.

To test our hypotheses, we estimate Models 1 and 2 using ordinary least squares (OLS) regression. Standard errors are clustered by municipality to mitigate biases caused by serially correlated residuals across time (Cameron, Gelbach, & Miller, 2011; Petersen, 2009; Thompson, 2011). All significance testing is based on two-tailed tests. In all panels, all control variables follow their predicted sign and/or are insignificant.

Table 5 presents four columns where each column includes a different variation of our variables of interest. To tie to prior studies (i.e., Park et al., 2017), Column 1 includes only internal control weaknesses while Column 2 includes only adverse outcomes. Column 3 includes the main effects for both internal control weaknesses and adverse outcome (i.e., to test hypotheses one and two) while Column 4 includes both the main and interaction effects for internal control weaknesses and adverse outcomes (i.e., to test hypothesis three).

Column 1 of Table 5 provides support for the assertion that internal control weaknesses are positively associated with the cost of debt (*Hypothesis 1*). Specifically, the coefficient of 0.157 on *Material Weakness* is significant at $p = 0.048$, indicating that, on average, municipal borrowing costs increase by approximately 15.7 basis points for municipalities with reported material weaknesses. This finding is consistent with studies investigating the impact of internal control weaknesses on municipal bond prices (Gore et al., 2016; Park et al., 2017) and corporate bond prices (Costello & Wittenberg-Moerman, 2011; Dhaliwal et al., 2011; Kim et al., 2011). However, consistent with prior municipal studies, we find no significant association between *significant deficiency* (a less severe weakness in internal control than a material weakness) and initial bond yields ($p = 0.975$).

Column 2 of Table 5 provides an estimate of the average impact of adverse outcomes on initial bond yields without including internal

¹⁶ Untabulated Spearman correlation coefficients are similar.

control weaknesses (**Hypothesis 2**). The coefficient of 0.253 on *Adverse Outcome* is significant at $p = 0.019$, indicating that, on average, municipal borrowing costs increase by approximately 25.3 basis points for municipalities with adverse outcomes. Column 3 of **Table 5** includes both internal control weaknesses and adverse outcomes. The coefficients on *Material Weakness* and *Adverse Outcome* remain positive and statistically significant ($p < 0.05$) supporting the assertion that both are important determinants of municipal borrowing costs.

Column 4 of **Table 5** reports our multivariate results examining the interaction effects between weaknesses in internal control and adverse outcomes and provides support for our assertion that the increased cost of debt associated with an adverse outcome is more pronounced for municipalities with an internal control weakness (**Hypothesis 3**). Specifically, the coefficient of 0.424 on *Material Weakness x Adverse Outcome* is significant at $p = 0.002$, indicating that, on average, municipal borrowing costs increase by an additional 42.4 basis points for municipalities with reported material weaknesses and adverse outcomes. Thus, our results suggest that the combined effect of a material weakness in internal control accompanied with an adverse outcome is approximately 73.7 basis points in municipal debt costs.¹⁷

In contrast to Column 3 of **Table 5**, the inclusion of the interaction variables for internal control weaknesses and adverse outcomes in Column 4 of **Table 5** produces insignificant results for the main effect variable *Material Weakness* (Coef. 0.038 $p = 0.677$). These results suggest that market participants do not penalize governments for internal control weaknesses (even a material weakness in internal control) unless they are also accompanied by an adverse outcome.¹⁸ Overall, these findings are consistent with market participants penalizing governments for reported adverse outcomes, with a more severe penalty when the adverse outcome is accompanied by a material weakness in internal controls.

5.3. Investigating the types of adverse outcomes

The results in **Table 5** include the effects of material noncompliance with laws and regulations and/or questioned costs in one variable (*AdverseOutcome*). Given that a number of observations have only one type of adverse outcome (see **Table 2B**) and there may be underlying differences between a material violation of laws and regulations and a questioned cost, it is important to examine each of these adverse outcomes separately.¹⁹ Thus, **Table 6** reports our multivariate results replacing the one variable (*AdverseOutcome*) with two variables (*Noncompliance* and *Questioned Costs*).

The results in **Table 6** suggest that, in the absence of an internal control weakness, the penalty for adverse outcomes is primarily driven by material noncompliance with laws and regulations given that only the coefficient on the *Noncompliance* variable is significant ($p = 0.020$), and the coefficient on the *Questioned Costs* variable is insignificant ($p = 0.104$). However, in cases where a material weakness in internal control is reported, market participants impose an additional penalty when *Noncompliance* or *Questioned Costs* is also reported. Specifically, the coefficient of 0.240 on *Material Weakness x Noncompliance* is significant at $p = 0.080$, and the coefficient of 0.653 on *Material Weakness x Questioned Costs* is significant at $p = 0.005$. A comparison of these coefficients indicates that the coefficient of 0.653 on *Material Weakness x Questioned*

¹⁷ This is calculated as the coefficient on *Material Weakness* of 0 (not significantly different from zero) + the coefficient on *Adverse Outcome* of 0.313 + the coefficient on *Material Weakness x Adverse Outcome* of 0.424.

¹⁸ Following Belsley, Kuhn, and Welsch (1980), we identified 27 possible influential observations using the hat matrix and DFFITS procedures. After removing the 27 observations from our sample, our results were consistent with those reported in **Table 5**.

¹⁹ See section two of the paper, adverse outcomes/internal control reporting in the municipal sector, for a description of the differences between a material noncompliance with laws and regulations and questioned costs.

Table 6

Association between initial bond yield, internal control weaknesses, and adverse outcomes breaking out adverse outcomes into material noncompliance with laws and regulations and questioned costs.

Variable	Pred.	Est. Coeff.	P-Value
Intercept		0.155	0.848
Significant Deficiency	+	-0.040	0.653
Material Weakness	+	0.033	0.713
Noncompliance	+	0.552	0.020
Questioned Costs	+	0.150	0.104
Significant Deficiency x Noncompliance	+	0.170	0.298
Significant Deficiency x Questioned Cost	+	0.012	0.932
Material Weakness x Noncompliance	+	0.240	0.080
Material Weakness x Questioned Cost	+	0.653	0.005
Independent Auditor	?	0.292	0.240
GAAP	-	-0.102	0.518
GFOA	-	-0.087	0.186
Rating	-	-0.034	0.081
Deficit	+	-0.053	0.404
Leverage	+	0.039	0.551
Population	?	0.017	0.094
Bond Buyer	+	0.774	<0.0001
Call	+	0.394	<0.0001
Debt Insurance	-	0.014	0.863
Maturity 5	-	-1.696	<0.0001
Maturity 15	+	0.432	<0.0001
Issue Size	+/-	0.028	0.399
Competitive	-	-0.074	0.338
N		866	
Year Fixed Effects		Y	
State Fixed Effects		Y	
Adj. R-Squared		48.02%	

Notes: All variables are calculated as defined in Appendix A unless otherwise noted. The dependent variable in all analyses is the initial bond yield for general obligation municipal bonds. Coefficients presented are estimated using OLS. P-values are calculated using robust standard errors clustered by municipality. Estimates for intercept dummy variables related to year and state are not displayed to provide a succinct presentation. Statistical significance is based on two-tailed *t*-tests.

Costs is significantly different than 0.240 on *Material Weakness x Noncompliance* (F-stat = 5.12; $p = 0.006$). This provides some evidence suggesting that material weaknesses in internal control matter most when they are accompanied by a questioned cost. Future research should further examine these relationships to determine the potential underlying reasons for these relationships.

Overall, our results suggest that adverse outcomes play an important role in explaining the underlying relationship between weaknesses in internal control and initial bond yields. Specifically, the municipal bond market penalizes governments with only adverse outcomes and penalizes them even more if an adverse outcome is accompanied by a material weakness in internal controls.

5.4. Within-sample robustness tests

To provide additional validity to our research design and help alleviate potential concerns of omitted correlated variables, we conduct a within-sample analysis. Specifically, for governments in our sample that issued bonds with a significant deficiency and/or a material weakness (i.e., at least one reported internal control weakness), we re-estimate Model 1 to compare initial yields for years in which these governments issued bonds with an internal control weakness to initial yields for years in which these same governments issued bonds with no reported internal control exceptions. Year and state fixed effects are not included in this model given the smaller sample size.

We were able to identify 135 unique governments in our full sample with at least one municipal bond issuance during our sample period (2000 to 2012) with a reported internal control weakness and at least one municipal bond issuance during our sample period with no reported internal control exceptions. As noted in Column 1 of **Table 7**, our within-sample analysis includes 414 municipal bond issuances from these 135

Table 7
Within Analysis.

Variable	Pred.	Column 1		Column 2		Column 3	
		Est. Coeff.	P-Value	Est. Coeff.	P-Value	Est. Coeff.	P-Value
<i>Intercept</i>		1.177	0.209	1.924	0.134	-0.085	0.956
<i>Significant Deficiency</i>	+	0.005	0.960	0.145	0.193	0.043	0.805
<i>Material Weakness</i>	+	0.065	0.522	0.021	0.852	0.136	0.432
<i>Adverse Outcome</i>	+	0.211	0.098	0.348	0.082	0.129	0.620
<i>Significant Deficiency x Adverse Outcome</i>	+	0.086	0.440	0.234	0.103	-0.135	0.604
<i>Material Weakness x Adverse Outcome</i>	+	0.384	0.006	0.809	0.000	0.831	0.010
<i>Independent Auditor</i>	?	0.235	0.295	0.303	0.397	0.442	0.260
<i>Bond Buyer Index</i>	+	0.674	<0.0001	0.492	0.004	0.453	0.058
<i>Rating</i>	-	-0.031	0.071	-0.012	0.585	-0.049	0.416
<i>GFOA</i>	-	0.000	0.997	-0.126	0.318	-0.245	0.403
<i>GAAP</i>	-	-0.415	0.346	-0.834	0.184	0.000	0.000
<i>Deficit</i>	+	0.031	0.717	0.219	0.049	0.390	0.041
<i>Leverage</i>	+	0.119	0.200	0.172	0.151	0.428	0.106
<i>Population</i>	?	0.014	0.373	0.008	0.677	-0.030	0.767
<i>Debt Insurance</i>	-	0.091	0.372	0.184	0.116	0.113	0.652
<i>Call</i>	+	0.472	<0.0001	0.476	<0.0001	0.606	0.000
<i>Maturity 5</i>	-	-1.386	<0.0001	-1.100	<0.0001	-1.179	<0.0001
<i>Maturity 15</i>	+	0.422	<0.0001	0.569	<0.0001	0.656	<0.0001
<i>Issue Size</i>	+/-	0.004	0.901	-0.003	0.952	0.091	0.292
<i>Competitive</i>	-	-0.112	0.193	-0.067	0.518	-0.092	0.567
N		414		238		116	
Adj. R-Squared		55.55%		61.40%		67.86%	

Notes: All variables are calculated as defined in Appendix A unless otherwise noted. The dependent variable in all analyses is the initial bond yield for general obligation municipal bonds. Coefficients presented are estimated using OLS. P-values are calculated using robust standard errors clustered by municipality. Statistical significance is based on two-tailed t-tests. Year and state fixed effects are not included in this model given the smaller sample size.

unique governments, with 228 bond issuances where the official registration statement includes an internal control exception and 188 bond issuances where the official registration statement reports no internal control exceptions. Column 1 of Table 7 reports our multivariate results for this within-sample analysis and are consistent with our primary findings in Table 5. Specifically, the significant coefficients on the *Adverse Outcome* variable and the *Material Weakness x Adverse Outcome* interaction are consistent with our primary findings that market participants penalize governments for reported adverse outcomes, with a more severe penalty when these outcomes are accompanied by a material weakness in internal controls. In fact, our within-sample analysis suggests that, compared to a municipal bond issuance with no internal control weaknesses and/or adverse outcomes, municipal debt costs are 59.5 basis points higher when an adverse outcome is accompanied by an internal control material weakness.

Although our within-sample analysis in Column 1 of Table 7 maximizes the number of observations (i.e., increases the power of our test), this analysis is an unmatched comparison with some governments having an unbalanced number of municipal issuances with and without an internal control exception, allowing governments with more observations to have a potentially greater influence on our coefficient estimates. Further, the approach used in Column 1 of Table 7 also raises concerns that other omitted temporal events may be driving these results given that there may be long periods of time between a municipality's bond issuance with an internal control deficiency and the same municipality's bond issuance with no internal control exceptions.

To alleviate these concerns, we conduct two additional analyses. First, we rerun the within-sample analysis by matching each municipal bond issuance including an internal control weakness to the same municipality's closest bond issuance with no reported internal control exceptions (i.e., a one-to-one match). Consistent with our prior findings, these results are reported in Column 2 of Table 7 and reflect that the coefficients on the *Adverse Outcome* variable and the *Material Weakness x Adverse Outcome* interaction are positive and significant and consistent with our prior findings that support Hypothesis 1 and Hypothesis 2.

Next, to help further alleviate concerns of omitted temporal events, we require that each one-to-one match be consecutive years so the period of time between the bond issuance with an exception reported and the bond issuance with no exception reported is less than a year. Consistent with our prior findings, these results are reported in Column 3 of Table 7 and reflect that the coefficient on the *Material Weakness x Adverse Outcome* interaction is positive and significant and suggests that, when comparing within governments, the penalty for reporting an internal control deficiency with an adverse outcome is 83.1 basis points.

Overall, our primary and within-sample analyses both provide compelling evidence that adverse outcomes play an important role in explaining the underlying relationship between weaknesses in internal control and initial bond yields.

5.5. Propensity score robustness tests

Following Rosenbaum and Rubin (1983), we also employ a propensity score matching procedure to test the robustness of our primary debt market results. The propensity score represents the predicted probability of receiving a treatment based on observable covariates. In the first stage model, an ordered logistic regression model is used to estimate the conditional probability of a municipality receiving an adverse outcome using covariates from Model 1. A propensity score is estimated for each observation in the full sample. Observations with adverse outcomes are then matched to observations without an adverse outcome or an internal control deficiency creating a pseudo-random assignment of adverse outcomes across the control and treatment

Table 8
Propensity Score Analysis.

Variable	Column 1		Column 2	
	Est. Coeff.	P-Value	Est. Coeff.	P-Value
<i>Intercept</i>	0.072	0.949	0.426	0.682
<i>Significant Deficiency</i>	-0.181	0.194	-0.086	0.547
<i>Material Weakness</i>	0.096	0.584	0.169	0.357
<i>Adverse Outcome</i>	0.171	0.060	0.253	0.009
<i>Significant Deficiency x Adverse Outcome</i>			0.074	0.499
<i>Material Weakness x Adverse Outcome</i>			0.369	0.004
<i>Independent Auditor</i>	-0.144	0.286	-0.148	0.272
<i>Bond Buyer Index</i>	0.934	<0.0001	0.898	<0.0001
<i>Rating</i>	0.018	0.373	0.015	0.434
<i>GFOA</i>	-0.097	0.266	-0.076	0.390
<i>GAAP</i>	-0.496	0.076	-0.517	0.070
<i>Deficit</i>	0.026	0.759	0.012	0.889
<i>Leverage</i>	-0.063	0.454	-0.059	0.480
<i>Population</i>	0.014	0.444	0.014	0.476
<i>Debt Insurance</i>	-0.035	0.689	-0.018	0.841
<i>Call</i>	0.598	<0.0001	0.579	<0.0001
<i>Maturity 5</i>	-1.612	<0.0001	-1.547	<0.0001
<i>Maturity 15</i>	0.429	<0.0001	0.442	<0.0001
<i>Issue Size</i>	-0.038	0.356	-0.042	0.254
<i>Competitive</i>	-0.146	0.137	-0.130	0.173
N	298		298	
Year Fixed Effects	Y		Y	
State Fixed Effects	Y		Y	
Robust R-Squared	71.18%		72.03%	

Notes: All variables are calculated as defined in Appendix A or B unless otherwise noted. The dependent variable in all analyses is the initial bond yield for general obligation municipal bonds. Coefficients presented in all columns are estimated using OLS. P-values are calculated using robust standard errors clustered by municipality. Estimates for intercept dummy variables related to year and state are not displayed to provide a succinct presentation. Statistical significance is based on two-tailed t-tests.

groups (Heckman & Navarro-Lozano, 2004).²⁰ Matches are based on the closest propensity score distance (i.e., nearest neighbor).²¹

Using the propensity score matched sample of 292 observations, we re-estimate Model 1. As reported in Column 1 of Table 8, the coefficient of 0.171 on the primary variable of interest (*Adverse Outcome*) is significant at $p = 0.06$, indicating that, on average, municipal borrowing costs are higher by approximately 17.1 basis points for municipalities receiving adverse outcomes. Consistent with our prior findings, Column 2 of Table 8 indicates that the coefficient on the *Material Weakness x Adverse Outcome* interaction is positive and significant at $p = 0.004$ and suggests that governments that report an internal control deficiency with an adverse outcome are penalized by an additional 36.9 basis points.

6. Conclusion

In 2020, municipalities sold \$451.2 billion of bonds, the highest amount on record and an increase of 11% compared to 2019 (Reuters, 2021). In this study, we examine whether adverse outcomes and the interactive effect of adverse outcomes and internal control weaknesses are associated with the cost of debt. Cuny et al. (2020) note that adverse outcomes capture distinct elements of local government stewardship beyond internal control weaknesses. To our knowledge, we are the first study to investigate the impact of both types of disclosures on municipal

bond prices.

Using hand collected data from 2000 to 2012, we find that municipal investors penalize governments with adverse outcomes regardless of whether they are or are not accompanied by an internal control weakness, and the increased cost of debt is more pronounced for governments with adverse outcomes accompanied by a material weakness in internal control. Overall, our results suggest that adverse outcomes play an important role in explaining the underlying relationship between weaknesses in internal control and initial bond yields.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

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²⁰ Coca-Perraillon (2007) provides a detailed discussion of the matching algorithm.

²¹ Inferences using propensity score matching procedures can be sensitive to design choices (DeFond, Erkens, & Zhang, 2016; Shipman, Swanquist, & Whited, 2017). To test the robustness of this design choice, we modify our matching methodology by requiring propensity score matches to be within a specified threshold (i.e., caliper distance). Untabulated results indicate that our propensity score multivariate analysis is robust to matching with and without replacement across caliper differences of 10, and 20%. Under all situations, the coefficient on our primary variable of interest (*Adverse Outcome*) is significant at $p < 0.063$ or less.

Appendix A

Panel A: Dependent variable and main variables of interest	
Yield	The issuance rate of return until the maturity date.
Significant Deficiency	An indicator equal to 1 if the external auditor reports at least one significant deficiency in internal control and no material weaknesses over major programs.
Material Weakness	An indicator equal to 1 if the external auditor reports at least one material weakness in internal control over major programs.
Adverse Outcome	An indicator equal to 1 if the external auditor reports a material noncompliance with laws or regulations for major programs and/or a questioned cost.
Significant Deficiency x Adverse Outcome	An interaction equal to 1 if the external auditor reports a significant deficiency in internal control over major programs and a material noncompliance with laws or regulations for major programs and/or a questioned cost.
Material Weakness x Adverse Outcome	An interaction equal to 1 if the external auditor reports a material weakness in internal control over major programs and a material noncompliance with laws or regulations for major programs and/or a questioned cost.
Noncompliance	An indicator equal to 1 if the external auditor reports a material noncompliance with laws or regulations for major programs.
Questioned Costs	An indicator equal to 1 if the external auditor reports a questioned cost.
Significant Deficiency x Noncompliance	An interaction equal to 1 if the external auditor reports a significant deficiency in internal control over major programs and a material noncompliance with laws or regulations for major programs.
Significant Deficiency x Questioned Costs	An interaction equal to 1 if the external auditor reports a significant deficiency in internal control over major programs and a questioned cost.
Material Weakness x Noncompliance	An interaction equal to 1 if the external auditor reports a material weakness in internal control over major programs and a material noncompliance with laws or regulations for major programs.
Material Weakness x Questioned Costs	An interaction equal to 1 if the external auditor reports a material weakness in internal control over major programs and a questioned cost.
Panel B: Control Variables	
Independent Auditor	An indicator equal to 1 if the external auditor is not associated with the state government (e.g., state auditor).
GAAP	An indicator if the state requires GAAP accounting.
GFOA	An indicator equal to 1 if the municipality is awarded the Government Finance Officers Association's Certificate of Achievement for Excellence in Financial Reporting.
Rating	A numerical rating calculated based on Moody's ratings (e.g., Aaa + =11 and decreases as the rating decreases).
Deficit	An indicator equal to 1 if the municipality reports 5% in excess of expenses over revenues of the general fund.
Leverage	An indicator if the municipality is in the top quartile of leverage across the sample, calculated as Total Liabilities / Total Assets of the general fund.
Population	The natural logarithm of the population of the issuing municipality.
Bond Buyer	The Bond Buyer Index yield for general obligation bonds.
Call	An indicator equal to 1 any part of the debt issuance is redeemable prior to the bond's maturity date.
Debt Insurance	An indicator equal to 1 if the bond issuance is insured.
Maturity 5	An indicator equal to 1 if bond matures in less than five years.
Maturity 15	An indicator equal to 1 if bond matures in greater than fifteen years.
Issue Size	The natural logarithm of the dollar value of the bond issuance at maturity.
Competitive	An indicator equal to 1 if the underwriting process was competitively bid.

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